Introduction

We sometimes think of belief as an on-off attitude that we either bear to a proposition or do not. Other times, it seems natural to think of belief as something *graded*. I believe that I have two hands more strongly than I believe that the average US CEO earns over 200 times as much as the average US worker and, in turn, I believe that the average US CEO earns over 200 times as much as the average US worker more strongly than I believe that Mallory reached the summit of Chomulungma (Mount Everest) in 1924. What considerations like this suggest is that propositions can at least be partially ordered according to the strength of belief that I invest in them. Bayesian epistemologists tend to go further than this, claiming that the strength of belief that I invest in these, and other, propositions can be associated with real numerical *degrees* between 0 and 1, with 1 representing certainty of truth, 0 representing certainty of falsehood and 0.5 representing perfect agnosticism. Degrees of belief, so understood, become the basic target of epistemic evaluation for Bayesians, who go on to provide a detailed story as to how they ought to be rationally policed.

For the Bayesian, one's overall doxastic state can be captured by a degree of belief function that takes propositions as arguments and yields real numbers as values. There is something undeniably captivating about this picture, and yet it sits rather uneasily alongside the old-fashioned, on-off notion of outright belief. How exactly does outright belief fit into this picture? A natural first thought to have is that outright belief should simply correspond to some suitably high degree of belief. That is, belief in a proposition will be 'switched on' when one's degree of belief exceeds some threshold and 'switched off' when one's degree of belief dips below that threshold. This is sometimes termed the *threshold view* or *Lockean thesis* (see, for instance, Foley, 1992, 2009).

Despite its initial attractiveness, though, the threshold view faces a range of difficulties, as a number of the papers in this volume discuss, including those by Ralph Wedgwood and Peter Milne. In 'Outright belief' Wedgwood emphasises how the threshold view leads to the violation of consistency and closure norms that outright belief is intuitively subject to. In 'Belief, degrees of belief, and assertion' Peter Milne demonstrates how difficult

it is to square the threshold view with a plausible account of assertion and the norms that govern it.

As Milne argues, there is little plausibility to the idea that a high degree of belief in a proposition guarantees a willingness to assert it. Furthermore, reflection upon the norms that govern assertion suggests that a rational high degree of belief in a proposition does not guarantee a warrant or license for asserting it. But these conclusions sit very uneasily alongside the idea that high degree of belief suffices for outright belief, and rational high degree of belief suffices for rational outright belief.

In 'The lottery paradox and the pragmatics of belief' Igor Douven also draws a kind of parallel between belief and assertion arguing, in particular, that the kinds of Gricean pragmatic considerations widely agreed to influence the propriety of assertions may also affect the propriety of beliefs. This has the potential to be another complicating factor when it comes to any simple equation between outright belief and high degree of belief.

While rejecting the threshold view, Wedgwood maintains the plausible idea that outright belief is ultimately reducible to degrees of belief, suggesting a more nuanced way as to how this reduction might proceed. The crucial move is to separate out two different roles that degrees of belief have traditionally been thought to play – namely, tracking the perceived strength of justification that we have for various propositions, and guiding us in our practical deliberations. Wedgwood draws a distinction between *theoretical* degrees of belief, which play the former role, and *practical* degrees of belief that play the latter. In Wedgwood's view, it is practical degrees of belief that serve as a reduction base for outright belief.

Elia Zardini, in his paper 'Luminosity and Vagueness', also draws a distinction between two different kinds of degrees of belief – albeit one that is motivated in a very different way. Building upon remarks made by Williamson (2000, section 4.4), Zardini distinguishes between what he calls *credences* and *doxai* or *degrees of outright belief*. While the former are closer to degrees of belief as orthodox Bayesians conceive them, it is the latter that connect with outright beliefs (perhaps in a threshold-like way). According to Zardini,

careful attention to the properties of these two sorts of doxastic attitude can serve to undermine Williamson's influential 'anti-luminosity' argument.

As mentioned above, the Bayesian assumption that degrees of belief correspond to real numbers paves the way for the central tenets of orthodox Bayesianism: A static constraint to the effect that one's degrees of belief ought to conform to the probability axioms – one's degree of belief function ought to be a probability function – and a dynamic constraint to the effect that degrees of belief ought to be updated by conditionalising on new evidence. The papers by Alan Hajek, Carl Hoefer and Kenny Easwaran and Branden Fitelson all concern, though in rather different ways, static rationality constraints upon degrees of belief.

There is some disagreement amongst orthodox Bayesians as to whether the former, probabilistic constraint is the only static constraint to which one's degrees of belief must conform, if one is to be rational. Some have been attracted to the idea that one's initial, pre-conditionalisation, degree of belief function ought to be *regular* – assigning a 0 degree of belief only to propositions that are inconsistent or impossible (see Lewis, 1980, 1987). In 'Is strict coherence coherent?' Alan Hajek presents a battery of arguments to the effect that, despite appearances, regularity should *not* be regarded as a norm of rationality – there are epistemically possible propositions in which we should, and perhaps must, invest a 0 degree of belief. Interestingly, a different argument to similar effect can be found in Wedgwood's paper.

In 'An "evidentialist" worry about Joyce's argument for probabilism' Kenny Easwaran and Branden Fitelson are concerned with the Bayesian probabilistic constraint itself – and, in particular, with a certain style of argument that has been offered in favour of this constraint. The most familiar way of motivating the probabilist constraint is via Dutch Book arguments that purport to show that violation of the constraint carries with it a susceptibility to sure monetary loss (see, for instance, de Finetti, 1980). Easwaran and Fitelson, however, are concerned with a more recent argument in favour of the constraint, showing that any non-probabilistic degree of belief function is *accuracy dominated* by a probabilistic one (Joyce, 1998). That is, for any nonprobabilistic degree of belief function, there is a probabilistic function that outperforms it, in terms of accuracy, at all possible worlds (and for a suitable

accuracy measure). As Easwaran and Fitelson demonstrate, the argument breaks down once further rationality constraints upon degrees of belief are brought into play.

In addition to rationality constraints upon degrees of belief, some have been attracted to the idea that degrees of belief are subject to a norm of *calibration* (van Fraassen, 1983, Lange, 1999). Suppose one assigns a certain degree of belief to each of a range of propositions. Put very roughly, this degree of belief assignment might be described as 'well-calibrated' just in case, amongst this range of propositions, the proportion of truths is equal to the degree of belief assigned. It's natural to think that degrees of belief need something to *aim at* or *aspire after*, in the same way that outright beliefs seem to aim at being true. It's sometimes argued that calibration is cut out to play this role – that degrees of belief aim at being well calibrated. In 'Calibration: Being in tune with frequencies' Carl Hoefer defends a version of this idea and answers a number of objections that have been levelled at the calibrationist approach.

This special issue originates from a pair of workshops dedicated to topics in the area of overlap between formal and traditional epistemology. The first of these was held at the XXX and the second at the XXX. All the papers collected here were presented at one of the two workshops. We would like to take this opportunity to thank the Analysis Trust, the British Society for the Philosophy of Science, the Mind Association, the XXX for financially supporting these two events.

References

de Finetti, B (1980) 'Probability: Beware of falsifications' in Kyburg, H. and Smokler, H. eds. *Studies in Subjective Probability*, eds. (Robert E. Krieger Publishing Company)

Foley (1992) 'The epistemology of beliefs and degrees of belief' *American Philosophical Quarterly* v29, pp111-121

Foley, R. (2009) 'Beliefs, degrees of belief and the Lockean thesis' in Huber, F. & Christoph Schmidt-Petri, C. eds. *Degrees of Belief* (Springer)

Joyce, J. (1998) 'A non-pragmatic vindication of probabilism' *Philosophy of Science* v65(4), pp575-603

Lange, M. (1999) ‘Calibration and the epistemological role of Bayesian conditionalization’, *Journal of Philosophy* 96, pp. 294–324

Lewis, D. (1980) ‘A subjectivist’s guide to objective chance’ in Jeffrey, R. ed. *Studies in Inductive Logic and Probability* (University of California Press)

Lewis, D. (1987) ‘Postscripts to “Causation”’ in *Philosophical Papers Volume II* (Oxford University Press)

van Fraassen, B. (1983) ‘Calibration: A frequency justification for personal probability’ in Cohen, R. and Laudan, L. eds., *Physics, Philosophy, and Psychoanalysis* (Reidel)

Williamson, T. (2000) *Knowledge and Its Limits* (Oxford University Press)