

ited degree of toleration (p. 190), since people in the real world often see their opponents' views as unjustified. Rawls offers us an account of liberalism that explains why we should tolerate people even when we are certain their views are false or unjustified—this seems to me to be a great virtue, one that Long's relativist approach lacks.

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***Probability: A Philosophical Introduction***, by D. H. Mellor. London and New York: Routledge, 2005. Pp. xi + 152. H/b £55.00, P/b £16.99.

The philosophy of probability is a hot field, at least if the number of new introductory textbooks is any indication—including the present volume, at least five have emerged in recent years (I am thinking of books by Richard Jeffrey, Ian Hacking, Donald Gillies and Maria Carla Galavotti). With such competition, any new volume must not only serve the purposes of an introduction, giving the canonical positions in the field, but must do so in an original and distinctive fashion. D. H. Mellor's *Probability: A Philosophical Introduction* rises to this difficult challenge admirably. It is philosophically the best of this recent crop of textbooks, by quite a way. But as it also serves to further Mellor's own position in the debate, it has much interest in its own right beyond its role as a textbook.

As an introduction the book is thorough, though in places quite compressed. Mellor spends the first five chapters covering the main philosophical accounts of probability: classical, frequency, chance, and credence. He then covers a selection of further topics: confirmation theory, conditionalisation, the relation of credences to traditional epistemology, Bayesianism, and statistical inference. Mellor's slender book makes no claims to exhaustiveness in its coverage of these topics, and though seasoned probabilists may wish to see more on their favoured issues, as a philosophical introduction it is hard to fault. Indeed, in its emphasis on more strictly philosophical concerns, Mellor's book provides a welcome change from other introductions which seemingly regard probability as an issue in philosophy of science and foundations of statistics alone. But since the book is largely about how to give a philosophical account of probabilities, chances, and credences, and *not* about probability theory, readers hoping to learn the mechanics of statistical inference or confirmation theory should look elsewhere (as should those readers looking for detailed information about the history and development of the various theo-

ries of probability, as Mellor's book is almost exclusively focused on conceptual issues).

Readers who think that an introduction must be an unbiased survey are advised to look elsewhere too: Mellor expresses firm opinions about the untenability of a purely epistemic probability, and about various problems for a pure (Bayesian) subjectivism about probability, and he defends a propensity theory that remains broadly along the lines of his earlier work (especially his *The Matter of Chance*, Cambridge: Cambridge University Press, 1971). But he is admirably evenhanded in his treatment of each position he addresses, and he is explicit about the motivations and arguments for and against his preferred position.

The merits of Mellor's approach are clearly displayed in his discussion of the frequency theory (chapter three). Rather than simply laying out the various rival theories of probability as if they arose as independent responses to the mathematical calculus, Mellor situates all the theories as proposing answers to the fundamental question: in what sense do probabilities measure possibilities? If we adopt a 'Humean' view of possibility, that  $p$  is possible iff  $p$  sometimes happens, then the frequency theory answers the fundamental question by connecting how possible  $p$  is with how frequently  $p$  occurs (p. 38). This simple move by Mellor casts the frequency theory in a quite new light. Rather than appearing to be a confusion of our evidence for chances with chances themselves, frequencies emerge as the best surrogate for genuine chances that this Humean account of the modalities can entertain. When the modal locutions appearing in the probability axioms are read in the Humean way (for instance, reading  $\text{Pr}(\mathbf{T}) = 1$  as 'necessary truths always occur'), the (actual) frequency theory turns out to validate the axioms of probability. This constitutes, Mellor argues, a Humean theory of chance, which fits well with Humean approaches to other natural necessities in causation and in laws of nature (pp. 35–7).

As I read him, Mellor develops three problems for this frequency view. The first problem is that there are probabilistic laws of nature, but no single case chances (since every probability is a probability of an outcome type in a sequence of outcomes, not a token). Mellor points out that this leads to quite curious probabilistic laws, which unlike their universally quantified non-probabilistic counterparts have to take the form  $f(Gx|Fx) = p$  (p. 38). (Strangely, Mellor does not force the point home by questioning the modal status of probabilistic laws themselves: for it will *not* be always true that the frequency of  $G$ s in the class of  $F$ s will be  $p$ , and hence the laws can have no Humean or any other kind of necessity.) Regardless, Mellor pushes on to the second worry, which is that actual finite frequencies cannot be sufficient to deal with infinite reference classes (which exist, given the infinite divisibility of temporal durations). The normal response, to appeal to limiting frequencies, must be recognised as appealing to an *additional* fact over and above the available empirical facts: that such a limit exists (p. 41). The third problem is the most severe: as I construe him, Mellor points out that probabilities have modal properties that

cannot be given a Humean reading (pp. 42–3). If we consider a fair coin that is tossed just once, the frequency is either 1 or 0. But because the coin is fair, the probability is not identical to the frequency. It is, perhaps, identical to what the frequency *would have been*: but this ‘would have been’ cannot be a Humean modality, because at no actual time does the coin get tossed again. Other authors have observed this tension between frequencies and modality (notably Alan Hájek, “Mises Redux”-Redux: Fifteen Arguments Against Finite Frequentism’, *Erkenntnis* 45, 1997, pp. 209–227), but amongst textbook authors only Mellor recognises the force of this objection.

I hope this has been sufficient to show the merits of Mellor’s discussion: starting with a simple and philosophically well motivated assumption about probabilities, we get an elegant rationale for the frequency theory—and we also see the problems for that theory emerge from its own internal structure in a straightforward way. As with frequencies, so with most of the other familiar topics that Mellor deals with: recast in a striking framework and discussed with a minimum of fuss and a maximum of philosophical punch. In some ways, however, the book shows its qualities best when dealing with unfamiliar topics. This is in part because after reading Mellor one wonders why those topics haven’t been seen as central to the philosophy of probability before. In particular, the chapters on the relationship of probability and modality (chapter four), and on the justification of prior credences (chapter eight) are extremely suggestive philosophically, and provide ample justification, if any were needed, for philosophical attention to these topics.

Leading on from the discussion of frequencies, Mellor asks: what could explain hypothetical limiting relative frequencies, if a Humean theory cannot? Mellor’s answer is that it is real dispositional properties of chance trials to produce certain frequencies that ground this modal claim—*propensities* (pp. 49–50). These dispositions cannot be reduced to (counterfactual) conditionals about the trials, for that would make the explanation of the frequencies circular; Mellor therefore is a realist (anti-reductionist) about dispositions (pp. 51–2). Nevertheless, Mellor does think that dispositions supervene on non-modal intrinsic categorical natural properties (p. 53). This move allows probability to be compatible with determinism (p. 55), in much the same way as frequencies are compatible with determinism: many sets of categorical properties *F* ground propensities, and as long as *F* doesn’t exhaust the properties than an object has, *F* can give rise to non-trivial probabilities even in deterministic situations.

Several worries arise at this point; I will mention two (for others, see my ‘Twenty-One Arguments Against Propensity Analyses of Probability’, *Erkenntnis* 60, 2004, pp. 371–416). Firstly, if a given object can have more than one propensity, as Mellor seems to allow in his discussion of determinism, then which of these propensities governs the hypothetical frequencies? If there are to be single case chances, there must be a privileged propensity; but I strongly suspect that this privileged propensity’s having a non-trivial value *will* turn out to be incompatible with determinism, contrary to Mellor’s claims. Secondly, if

propensities are themselves non-modal, how can they support the hypothetical frequencies? For it is possible that a chance device might have the same intrinsic categorical properties, hence the same propensities, and yet the outcome frequencies it gives rise to are quite different because of *extrinsic* factors. Although these factors are held fixed, and thus neutralized, at the nearest possible worlds, the worlds that support hypothetical limit frequencies are worlds with infinitely long sequences of outcomes. These worlds are quite unlike our own finite world, and so are not among the nearest worlds—we have therefore no guarantee that the limit frequencies will come out correctly.

Mellor proposes propensities to explain the connection between modality and chance, an important yet strangely neglected topic, and obviously of great philosophical import. Even though I do not think propensities are an adequate solution, Mellor is one of very few philosophers of probability to actually come to grips with the issue. Much of what he says is of considerable interest even separated from the discussion of propensities, particularly the illuminating yet brief discussion of chance and necessity (pp. 58–62). It would be wonderful if, thanks to Mellor, this explicitly philosophical topic were to be given a more central role in discussion of probability.

Mellor also discusses more mainstream philosophical concerns in chapter eight, discussing the relations between credences and traditional epistemology. He develops a reliabilist theory of the *justification* of credences: as reliable perception justifies full belief, ‘perceived frequencies ... justify credences by giving them a high enough chance of being close enough to the corresponding chances’ (pp. 107–8). This is not a Bayesian position, not only because of the role that chances play, but also because it demands that credences be justified before they can play a useful epistemic role. Again, though we should be grateful to Mellor for raising this topic to greater prominence, I think his position is problematic, from the perspectives of both probabilistic and traditional epistemologies. From a probabilistic perspective (quite apart from problems with pure externalism elsewhere in epistemology) Mellor’s theory seems to slide from reliable perception of frequencies (a straightforward reliabilism) to frequencies reliably indicating the values of chances, which seems to address the quite different issue of inverse inference from frequencies to chances. From a traditional perspective, Mellor’s view that full belief is ‘credence at or very close to 1’ (p. 101) is quite problematic. It is quite improbable that we demand unrevisability for beliefs, yet maximal credences are unable to be lowered by conditioning. If we drop to a lower threshold, we get problems with conjunction:  $p$  and  $q$  may have high enough credence, and thus be believed, while  $p$  &  $q$  may fall below the threshold—yet we think full belief is closed under conjunction (see Mark Kaplan, *Decision Theory as Philosophy*, Cambridge: Cambridge University Press, 1996, chapters three to four).

As we have come to expect, Mellor’s writing is very clear, and a model of concision. He gives the main positions with a maximum of content and a minimum of distracting digression. Mellor’s book requires little of the reader in

terms of mathematical sophistication, but is quite demanding philosophically. The argument is dense in places—perhaps too dense for the book to be used, unsupplemented, as a textbook in most undergraduate classes. The book might have been better subtitled ‘a *philosopher’s* introduction’, because it is ideal for professional philosophers and graduate students who wish to find out what might be philosophically interesting about probability. I obviously have doubts about some of the claims Mellor defends; but I have no doubt about the importance and value of this book to the philosophy of probability.

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***Understanding People: Normativity and Rationalizing Explanation***, by Alan Millar. Oxford: Oxford University Press, 2004. Pp Xvi + 262, H/b £40.00.

Millar’s aim is to defend the truth and compatibility of two propositions. First, that psychological explanations that rationalize the actions or states of mind they explain can be, and often are, causal. And second, that such explanations are often normative. To do this he has to provide a clear version of the much-thrown-around concept of normativity. He does this admirably: his reconstruction of what philosophers mean when they say that attributions of states of mind have a normative component is wonderfully unmythical. And given this reconstruction the compatibility with causal explanation is convincing. I am less convinced that Millar is discussing a single phenomenon that we can usefully call normativity.

The central idea is that of a commitment. A person in believing something commits herself to believing things that follow from it. In intending something she commits herself to intending means to it, and in wanting something to considering means to it. The normative aspect to commitment depends on the person’s attitude to her own state: in believing something she must take herself to be committed to going along with its consequences, or withdrawing her belief. It does not follow that she ought to believe the consequences, since the belief may have been a foolish one in the first place, but as long as the person holds onto it she has put herself under the conditional obligation to give it up or accept what follows from it. To ascribe a belief to oneself or to someone else is to link up with practices of reasoning and attribution that require us to regulate our states of mind in accordance with its norms. If you deny the obvious consequences of your beliefs people will take you to be insincere; if you fail to take obvious means to ends that you want people will take you to be deceiving