

Jenann Ismael's 'Probability and physics'

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Jenann's central metaphysical thesis is that there is an objective conditional probability function $\text{Pr}_G(A/B)$, the domain of which includes a great many, perhaps all, pairs of contingent propositions. This pair can be synchronic or diachronic: both can concern how things are at the same time, or not.

Jenann's central epistemological thesis is antiskepticism about Pr_G , in the following sense: *prima facie*, the subjective credence functions of epistemically reasonable agents converge on Pr_G : roughly, if you've done a lot of science, for all A, B , your $C(A/B)$ is similar to $\text{Pr}_G(A/B)$. (Compare antiskepticism about perceptual knowledge: *prima facie*, if circumstances are good and one's visual experience represents that p , p .)

These theses have two cool consequences: first, the possibility of a novel approach to objective Bayesianism; second, a way of doing away with dynamical laws.

1

We don't know exactly where we are in state space. At the very least, we are uncertain about the exact positions and momenta of various particles. We know at best that we are in a certain region of state space.

Stat mech tells us that when we evolve the vast bulk of the points in this region in accord with deterministic laws, the outcomes we end up with look pretty "normal". Still, in some of them things go pretty crazy.

In light of this, how are we to decide how things will be—normal or crazy? In practice we anticipate that things will be normal, but how do we do this? Two questions here: a psychological question—what's the mechanism by which we do this?—and an epistemological question—what justifies this?

On the psychological question, Bayesians tell us that we can be modeled as having a "subjective credence distribution" which assigns a high probability value to the proposition that we are at one of the points which evolve into a normal state, and a low probability value to the points which evolve into a crazy state. To anticipate that p is to have a subjective credence distribution which assigns a high value to p . That is how we come to anticipate that things will be normal rather than crazy.

On the epistemological question, opinions vary among Bayesians. All Bayesians think that insofar as there is any justification for this practice, it stems from conditionalizing on the evidence against a reasonable system of background conditional credences. As far as the extent to which these systems of background conditional credence are themselves open to epistemological assessment, Bayesians disagree: more “subjective” Bayesians think that a great many such systems are all equally rational, whereas more “objective” Bayesians think that relatively fewer such systems are equally rational.

Subjectivists motivate their approach in a pair of ways. First, technical worries about how to formulate the objective view: it’s not easy to say which small number of conditional credence functions are the good ones; in particular, the “principles of indifference” on which objectivists have often hung their hopes are shown to be extremely problematic by examples from de Finetti, van Fraassen and others. Second, they play “refute the skeptic”: confronted with someone with an allegedly irrational conditional credence function, objectivists have a hard time pushing that person off his perch—from Phil 101, “counterinduction has never worked before”; “exactly!”

Jenann’s Pr_G promises to deflect both styles of argument, since the rationally optimal conditional credence function is the one that tracks Pr_G . (So that C is rationally optimal just if for all A, B , $C(A/B) = \text{Pr}_G(A/B)$.) Concerning formulation, that’s no longer a problem for epistemologists but is rather “naturalized” by seeing which probability measure is implicit in science. Concerning refute the skeptic, there are now objective facts to which credences may or may not conform. If the counterinductivist’s subjective conditional credence function is at variance to these, we can point to these facts as an external ground of the legitimacy of our practice and the illegitimacy of his. Of course that won’t convince him but here as elsewhere in epistemology, playing “refute the skeptic” is a waste of time. “Why believe in this external ground?”—it’s implicit in the practice of science, surely you don’t want to go against science!

2

At time t the world is at point p of state space; at time t' it is at point p' . Why?

The standard answer appeals to dynamic laws of nature. First, assuming determinism: the dynamical laws collectively entail that if at some time, the world is at p , then $|t' - t|$ units later, the world is at p' .

Second, assuming indeterminism: the dynamical laws collectively entail that if at some time, the world is at p , then $|t' - t|$ units later, the world is at p' with chance c .

In Jenann’s view, things are a bit different. Assuming determinism: $\text{Pr}_G(\text{the world is at } p' / \text{the world is at } p |t' - t| \text{ units earlier}) = 1$; assuming indeterminism: $\text{Pr}_G(\text{the world is at } p' / \text{the world is at } p |t' - t| \text{ units earlier}) = c$.

Jenann’s answer is more economical than the standard answer. The standard answer appeals to dynamical laws of nature (deterministic or chancy) to explain diachronic change. Assuming that we are convinced by the earlier arguments

that we need Pr_G to rationalize the weights we give to synchronic alternatives, we can regard the dynamical laws of nature as a needless excrescence.