

The Strategic Role of the Weight of Evidence in Abduction

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1 Abduction and Inference to the Best Explanation

The positions I argue against

1.1 Probabilism and Bayesianism

In the philosophical context, the term “Bayesianism” is to be understood as an overarching epistemological position about the rationality of our beliefs. It certainly won’t do to call anyone who uses Bayes’ theorem a Bayesian, since the theorem itself is a logical consequence of conditional probability, so anyone who accepts the axioms of probability is a “Bayesian” in that sense. We also ought to distinguish Bayesianism in epistemology with Bayesianism in statistics. Even the strictest Bayesian statistician, who might reject all uses of Frequentist methods, could consistently maintain that

Bayes' theorem is not the *only* rational way to revise one's belief in light of new evidence.¹

I will begin by spelling out a foundational thesis that encompasses the types of views relevant to our discussion: *probabilism* is the acceptance of the two statements below:

1. There are *partial* beliefs, which are measurable in terms of degrees.
2. The axioms of probability govern the rationality of partial beliefs.

Minimal Bayesianism, as an epistemological thesis, is the position that accepts the tenets of probabilism, plus the thesis that *conditionalization* is only rational way to revise one's belief:

Conditionalization: it is rational to update one's prior degree for belief H in light of evidence E via the application of Bayes' theorem, which determines the posterior opinion degree of belief $P(H|E)$.

Thus, Minimal Bayesianism claims that that a rational agent is one whose belief can be captured by some prior distributions, which would be mechanically revised whenever data is introduced. The term "Bayesian" refers to someone who thinks that not only is this revision justifiable only by conditionalization, but also that rationality mandates it. A person does not have to a Bayesian buy into conditionalization. One, for instance, may think that while conditionalization is a perfectly fine principle, it cannot be the only rule, since there are occasions in which it is not applicable, e.g., a required prior might not be available.

¹This does not mean that philosophical Bayesianism and statistical Bayesianism are entirely separate—in fact, I think that Bayesian statistics is should be the model of a general Bayesian rationality. The position I advocate reflects this idea.

Minimal Bayesian, however, is incomplete: since conditionalization presupposes the existence of a prior distribution for the belief H supported by evidence E , Bayesians need an account for the status of these priors. In particular, it must address whether or not prior degrees of belief ought to be justified for it to be admissible to conditionalization.

A prominent view is

Subjective Bayesianism: priors need not be justified, as long as they are consistent with the axioms of probability.

For example, for any proposition H , $P(H)$ must be between 0 and 1, and $P(\neg H) = 1 - P(H)$. An early proponent of this view is F. P. Ramsey, who says:

...to ask what initial degrees of belief are justified... seems to me a meaningless question; and even if it had a meaning I do not see how it could be answered.[@ramsey 88]

There is no objective justification for our prior opinions.

Objective Bayesianism: P+MB+

There are rational degrees of beliefs.

1.2 Explanationism

In its most naive form, inference to the best explanation(IBE) says that we should infer the hypothesis that best *explains* the evidence we have. In our context, explanationism refers to the position that IBE is viable *inductive* rule of inference. In

fact, in the original articulation by Harman, IBM is conceived to replace enumerative induction.

In this chapter, I will not concern myself with naive explanationism. Instead, my focus is on the explanationists who accept and argue for what I call the *compatibilist* thesis:

IBE is compatible with Minimal Bayesianism. (MB)

The compatibilists are almost universally motivated by van Fraassen's argument against a non-compatibilist version of Explanationism. Van Fraassen is well-known in arguing against IBE in its original, non-probabilistic, form. In its most naively powerful form—a view that van Fraassen does ascribe to some philosophers—IBE can be construed as a solution to Hume's problem of induction, that there is no independent justification for extrapolating beyond the evidence we have. IBE gets us out of this problems by giving justificatory force to explanatory virtues, so that the best explanation is the one we *should* accept. Van Fraassen attacks this position relentlessly. One often cited argument is that we never pick the best explanation simpliciter, but the best *out of the explanations available to us*. Van Fraassen argues this is a horrible justification for a belief, since for some reason we might only have horrible explanations for us. So, 'our selection may well be the best of a bad lot.' (143)

Van Fraassen suggests that the strongest recourse available the supporters of IBE is *entrenchment*, which essentially amounts to the repackaging IBE into a rule that plays well with probabilistic account of beliefs. The more plausible way to do this, according to van Fraassen, is to give explanatory virtues a place in the revision of belief in light of new evidence: 'behind the naive rule of IBE there might lie a recipe

for adjusting our personal probabilities, in response to new experience, under the aegis of explanatory success’.

Van Fraassen, however, argues that this cannot do. To begin, if IBE is to be harmonized with Bayesianism, since it must not clash the Bayesian procedure of belief revision, i.e., conditionalization.

2 Against Explanationist Bayesianism

3 Volunterism and Long/Short Term Commitment

4 Van Fraassen’s Volunteerism in the Context of Pragmatism