3

The Bayesian Argument from Animal Pain

3.1 Formalizing the problem: a Bayesian approach

We have been considering the nature of the datum that is the foundation of the problem of animal pain. The first chapter identified the problem as one of a potential failing in comparative confirmation relative to animal suffering. The second chapter defended the possibility and sensibleness of making the kinds of judgments necessary for that kind of problem to exist and clarified important features of the datum. Now that we have clarified our starting point adequately, we can discuss the path from there to the problem for theism. I will give the problem a probabilistic analysis. This chapter will cover three things. First, I will briefly describe the formal structure of the argument in Bayesian terms. Then I will consider, for each of the two components of the equation, what a plausible assessment of their values might be. The first step is of obvious importance. The second (two-part) step is important for situating the importance of the outcome of considering the problem of animal pain and situating it within a broader context in the philosophy of religion.

3.1.1 The formal structure of the argument from animal suffering

Consider the odds form of Bayes’s Theorem.

\[
\frac{\Pr (H_p|\text{Evidence})}{\Pr (H_d|\text{Evidence})} = \frac{\Pr (\text{Evidence}|H_p)}{\Pr (\text{Evidence}|H_d)} \times \frac{\Pr (H_p)}{\Pr (H_d)}
\]

Posterior Odds                   Likelihood Ratio                  Prior Odds

\[
\Pr (H_p|\text{Evidence}) = \frac{\Pr (\text{Evidence}|H_p) \times \Pr (H_p)}{\Pr (\text{Evidence}|H_d) \times \Pr (H_d)}
\]

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In this equation, there are three kinds of expressions, each exemplified twice: once for each of two competing hypotheses – $H_p$ and $H_d$. We will consider them from right to left. The three kinds of expressions are, first, the prior probabilities of the hypotheses under consideration. This is the measure of the intrinsic plausibility of the hypotheses before we consider how a body of evidence bears upon them. Next in the right-to-left direction are the likelihoods. They measure the predictive power of the hypotheses with respect to the evidence in question. They express how expected the evidence is given the hypothesis in question. Since we can ask how expected something that has already happened ought to have been given what evidence was had at some previous point, predictive power needn’t be – in fact usually isn’t – a matter of literally predicting the future. Finally come the posterior probabilities, which are our final target. They express the probability of the hypotheses after the influence of the evidence has been assessed (via the likelihoods) and weighted by the prior probabilities. The equation is a theorem of the standard probability calculus, but hopefully the relations are all intuitive. The equation says essentially that there are two ways things can go well (or poorly) for a hypothesis: It can start out with a measure of intrinsic plausibility and it can get a boost from its ability to render intelligible the evidence we have.

Since this equation compares one hypothesis to another in terms of the components enumerated above, it is composed of three ratios. The posterior odds – our final target – express the ratio of the posterior probability of one hypothesis – posterior to considering the evidence in question – to the posterior probability of its competitor. If the odds are, say, 3:1 in favor of $H_p$ – that is, if the quotient equals three – then

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1 Perhaps you will remember weighting from grammar school. Suppose the teacher informs you that you will be given two exams – a midterm exam, which counts for 40% of your grade, and a final exam, which counts for 60% of the final grade. And suppose you get 93 points on the first and 88 points on the second and you wonder if you’ve made the cut at an average of 90. You can’t just average the grades, for that would ignore the weighting. So you use the following equation .4(93) + .6(88) = your grade. The weightings are multiplied with the exam scores to give you your grade, which is the “weighted average.” Similarly, you can’t just assess how well hypotheses do on the evidence; you also have to consider how they ought to be weighted by their prior probability. Thus, the prior probabilities are multiplied with the likelihoods to give the final probability of the hypothesis.

2 I do not assume (or think) that the Kolmogorov axioms are the only (or best) way to represent epistemic probability, but we needn’t get into that here.