

Rejoinder

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Abstract. In the main article I presented a series of objections to Bayesian inference, written in the voice of a hypothetical anti-Bayesian statistician. Here I respond to these objections along with some other comments made by four discussants.

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1 Introduction

I wrote my anti-Bayesian rant in a fit of April Fool’s Day inspiration, but now is the time to be serious. To start with, I appreciate the four thoughtful discussions, two of which are Bayesian and two of which are non-Bayesian, but none of which are anti-Bayesian. I would like to attribute this, possibly optimistically, to an advance in statistical culture. It is still possible to be non-Bayesian, but, given the advances in practical Bayesian methods in the past two decades, *anti-Bayesianism* is no longer a serious option. Of the four discussions, Kadane’s is closest to my own views (with Bernardo’s a close second), but I learned from and would like to comment on points raised by all four.

Before going on, I wish to make some comments about the term “frequentist,” a word which I was careful to avoid in my original article but which was used by Bernardo, Senn, and Wasserman in their discussions. Wasserman writes, “a particular analysis can be Bayesian or frequentist.” Larry is also in the machine learning department so I assume that when he uses the word “or,” it includes “and” as well. I worry, however, that readers may erroneously interpret it as “exclusive or,” so let me clarify. Bayesian inference (or, more generally, Bayesian data analysis) is a method for summarizing uncertainty and making estimates and predictions using probability statements conditional on observed data and an assumed model. Frequentist statistics, as I understand the term, is an approach for evaluating statistical procedures conditional on some family of posited probability models.

In a nutshell: Bayesian statistics is about making probability statements, frequentist statistics is about evaluating probability statements. As Wasserman points out (following Box and Rubin before him), Bayesians can feel free, or even obliged, to evaluate the frequency properties of their procedures. Conversely, as Efron, Morris, Little, and others have pointed out, frequentists can feel free to use Bayesian methods to derive statistical procedures with good frequency properties. So, not only can a statistician

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