Abstract:
The classical or frequentist approach to statistics (in which inference is centered on significance testing), is associated with a philosophy in which science is deductive and follows Popper's doctrine of falsification. In contrast, Bayesian inference is commonly associated with inductive reasoning and the idea that a model can be dethroned by a competing model but can never be directly falsified by a significance test. The purpose of this article is to break these associations, which I think are incorrect and have been detrimental to statistical practice, in that they have steered falsificationists away from the very useful tools of Bayesian inference and have discouraged Bayesians from checking the fit of their models. From my experience using and developing Bayesian methods in social and environmental science, I have found model checking and falsification to be central in the modeling process.