Jeffrey Conditioning and External Bayesianity

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Abstract

Abstract. Suppose that several individuals who have separately assessed prior probability distributions over a set of possible states of the world wish to pool their individual distributions into a single group distribution, while taking into account jointly perceived new evidence. They have the option of (i) first updating their individual priors and then pooling the resulting posteriors or (ii) first pooling their priors and then updating the resulting group prior. If the pooling method that they employ is such that they arrive at the same final distribution in both cases, the method is said to be externally Bayesian, a property first studied by Madansky (1964). We show that a pooling method for discrete distributions is externally Bayesian if and only if it commutes with Jeffrey conditioning, parameterized in terms of certain ratios of new to old odds, as in Wagner (2002), rather than in terms of the posterior probabilities of members of the disjoint family of events on which such conditioning originates.

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