Applied Bayesian Inference in R using **MCMCpack**

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MCMCpack is an R package designed to allow users to perform Bayesian inference via Markov chain Monte Carlo (MCMC) for models commonly used in the social sciences. Currently **MCMCpack** allows the user to perform Bayesian inference via simulation from the posterior distributions of the following models: linear regression (with Gaussian errors), a general linear panel model, Quinn's dynamic ecological inference model, Wakefield's hierarchical ecological inference model, a probit model, a logistic regression model, a one-dimensional item response theory model, a K-dimensional item response theory model, a robust k-dimensional item response theory model, a Normal theory factor analysis model, a mixed response factor analysis model, an ordinal item response theory model, a Poisson regression, a tobit regression, a multinomial logit model, an SVD regression model, and an ordered probit model.

The posterior samples returned by each function are returned as mcmc objects, which can easily be summarized and manipulated by the **coda** package. **MCMCpack** also contains densities and random number generators for commonly used distributions that are not part of the standard R distribution, a general purpose Metropolis sampling algorithm, functions to compute Bayes factors for some models, a handful of teaching models, and some data visualization tools for ecological inference.

MCMCpack is very much a work in progress. We are interested in demonstrating the user interface, taking a look "under the hood" at some of the code base, and demonstrating three recently added features that increase the power of **MCMCpack** as an estimation engine: the addition of a generic Metropolis sampler for quickly fitting arbitrary models (with the log-posterior density programmed in R), the ability to simultaneously fit models with dispersed starting values and suitable random number generators on clusters of machines, and for some models computation of log-marginal likelihoods to facilitate computation of Bayes factors.