

## Reaction to the paper

Cade (2015). Model averaging and muddled multimodel inference. *Ecology* 96, 2370-2382.

We started working on data-based model selection in about 1990. Our motivation was, and is, real data applications. We have read or examined hundreds of statistical publications on model selection. We use the same structural approach to model averaging as is repeatedly given in this literature. We did not invent model averaging; it precedes us in the statistical literature. However, we have published three books and 18 peer reviewed papers on the subject, 4 of these are invited papers. We have taken part in significant data analyses wherein model selection was unavoidably a key aspect. The theory of maximum likelihood estimates, AIC, and derived model weights validly applies without regard to covariates being correlated or not (a good model set is a prerequisite). Moreover, for a given model these quantities, starting with ML parameter estimates, are unique under likelihood theory and the fitted model properly takes into account covariate correlations. Drawing on this extensive foundation of knowledge and experience we assert that Cade's ideas are wrong about model-averaging model parameters, in general, and what we presented as a type of relative variable importance weights, in particular, for the all subsets case.

We have put some technical material on our web sites (same material, either site), and a sampling of citations to the theoretical and applied multimodel inference literature. More technical and philosophical material, in response, will be prepared and then made available. Key "conclusions" of Cade are just his opinions, and do not follow rationally from the material in his paper.

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Files to see:  
*Multimodel inference: Understanding AIC relative variable importance values.*  
*Journals that have papers using MMI.*