

The manuscript discusses the limitations of multi-model approaches in dealing with multifactorial systems. The author presents several interesting observations that merit publication. Particularly noteworthy is the discussion regarding the potential pitfalls of model averaging.

However, I believe the paper could benefit from improved precision in certain statements and increased accessibility for non-ecologists.

- The paragraph starting at line 43: Some of the philosophical statements in this paragraph may be subject to scrutiny. Specifically, it appears as though the author is asserting that only the "full model" is reasonable to consider. The notion of a full model is also referenced later in line 135, where the author seems to assume that analysts typically have a full model that closely approximates truth. I am uncertain of the author's intended meaning, but it seems these statements require clarification. It may be beneficial to express these ideas with greater precision, or if not possible, to soften them. It is my understanding that constructing a complete model for complex multifactorial phenomena is often unattainable. We operate under the assumption that some factors may explain observations, yet inevitably overlook others. Thus, all models can be regarded as subsets of others that may better explain the data, unrecognized to the analyst. Consequently, it may be prudent to explore models that encompass only a subset of factors present in the largest model conceivable by the analyst. Firstly, parsimony is crucial to mitigate overfitting – this is somehow mentioned by the author. Secondly, selecting appropriate models is largely empirical, and I am reluctant to dissuade scientists from considering simpler models if they adequately explain observations compared to more complex alternatives.
- Does the paper address the possibility of correlations between different factors in certain applications? This consideration seems significant and warrants discussion.
- Line 78: Stepwise regression is described as deprecated, although I guess it may still be widely utilized in certain contexts—perhaps not so much within ecology? While I acknowledge that data constraints can severely impact the efficacy of stepwise regression, many criticisms of this method presuppose knowledge of the correct model. However, this is rarely the case when proposing models to explain a dataset. Consequently, what purpose is served by employing a more complex model if the available data can be explained by a simpler one? The simpler model may exhibit bias compared to a superior model fitted to a larger dataset. Nonetheless, such a comparison is only feasible when a larger dataset and a more appropriate model are available.
- In relation to the previous point, does the author consider stepwise regression based on combinations of multiple factor subsets or only one factor at a time? For instance, Hastie et al.'s "The Elements of Statistical Learning" advocate for exploring multiple subsets.
- Incidentally, adding a citation to Hastie et al.'s book may be appropriate regarding penalized approaches.
- I am concerned that the paper's key messages may not be fully appreciated by many readers. While there is a discernible emphasis on ecology, readers outside this domain may struggle to extract relevant information. Accordingly, I propose several modifications and additions:
 - o Introducing the example from the paragraph starting at line 103 earlier in the paper and utilizing it throughout to elucidate various concepts.
 - o Providing a straightforward illustration of multi-model averaging would help.
 - o A diagram or table summarizing the discussed methods and their respective strengths and weaknesses could prove beneficial.