Stable Models and Causal Explanation in Evolutionary Biology

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Abstract

Abstract: Models that fail to satisfy the Markov condition are unstable in the sense that changes in state variable values may cause changes in the values of background variables, and these changes in background lead to predictive error. This sort of error arises exactly from the failure of non-Markovian models to track the set of causal relations upon which the values of response variables depend. The result has implications for discussions of the level of selection: under certain plausible conditions the models of selection presented in such debates will not satisfy the Markov condition when fit to data from real populations. Since this is true both for group and individual level models, models of neither sort correctly represent the causal structure generating, nor correctly explain, the phenomena of interest.

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