



Ecology Letters
Editorial Office

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Dear Dr. Coulson,

Functional responses have undergone intense scrutiny in Ecology, being foundational to consumer-resource interactions by dictating the rate at which consumers acquire resources and the trophic control they exert upon them. Although most functional-response research has focused on predator-prey and parasitoid-host interactions, they are increasingly studied in basic and applied contexts ranging from pollinator-plant mutualisms to plant-plant interactions and even bacterial microbiomes. In each of these fields, there is growing recognition of the perpetual need of merging mathematical theory with empirical work using statistical approaches.

From this vantage point, our manuscript uses a debate that has dominated the literature—whether functional responses are best described by models with prey-dependent, ratio-dependent, or more general interference-driven functional forms—to evidence unrecognized bias in the statistical analysis of functional-response models and data. In the past, many have argued over the mathematical and philosophical underpinnings of alternative functional response models, and a large number of empirical studies have sought a data-driven resolution. Importantly, we show these studies to be statistically biased towards the selection of certain model forms and stronger-than-true inferences of consumer interference. We demonstrate why these two forms of bias (i.e. model-comparison bias and parameter-estimation bias) are in fact universal to nonlinear (functional response) models and their parameters in general. Consequently, the implications of our study are relevant to myriad other biologically-motivated questions to which the functional-response concept has been applied.

We believe that the broad generality of our insights, as well as the guidance these insights provide for future work, will receive strong interest from the wide variety of ecologists battling with the characterization and consequences of species interactions throughout the subfields of Ecology. Further, since the issues the manuscript addresses are directly relevant to both empiricists and theoreticians alike, we consider *Ecology Letters* to be the most appropriate venue for its dissemination.

The manuscript has already been positively reviewed by Peter Abrams, Roger Arditi, Lev Ginzburg, Tom Hossie, and has been approved by all individuals who contributed their functional-response datasets to our synthetic analysis. The manuscript is not under consideration by any other journal and both authors have read and approved it for submission. Finally, we note that we will soon be submitting a second manuscript to *Ecology Letters* on the topic of functional responses which makes use of the same published datasets but is otherwise unrelated.

On behalf of my co-author, Daniel Stouffer, I thank you for your consideration.

Sincerely,

A handwritten signature in blue ink that reads "Mark Novak".

Mark Novak