Accepted Manuscript

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PII: S0022-5193(17)30469-1 DOI: 10.1016/j.jtbi.2017.10.006

Reference: YJTBI 9230

To appear in: Journal of Theoretical Biology

Received date: 13 June 2017
Revised date: 2 October 2017
Accepted date: 5 October 2017



Please cite this article as: Matthijs van Veelen, Fisher's fundamental theorem of natural selection, dynamic sufficiency, and the necessity of higher moments, *Journal of Theoretical Biology* (2017), doi: 10.1016/j.jtbi.2017.10.006

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Fisher's fundamental theorem of natural selection, dynamic sufficiency, and the necessity of higher moments

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October 10, 2017

Abstract

The "average effects" of alleles in Fisher's Fundamental Theorem of Natural Selection are meant to capture what having an allele does to fitness. These average effects however are generally not constant, because the way they are determined implies that they may depend on the composition of the current population. This can easily be mistaken for dynamic insufficiency. In a recent paper by Smerlak and Youssef (2017), both of these issues are moreover treated as related to the question whether or not there is a way around needing all higher moments for determining the long run behavior of a dynamical system. In this note I will argue that these are three unrelated issues.

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