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| ??th September 2018  Presubmission Inquiry | **Telephone:** +44 (0) 114 222 6595  **Email:** s.p.wilson@sheffield.ac.uk |

To the Editors,

Please consider this presubmission inquiry relating to our proposed manuscript *Modelling the Evolution of Cortical Development: A Baldwin Effect.*

Self-organisation and natural selection are two fundamental forces that shape all biological systems. Self-organisation typically describes developmental dynamics that unfold within the lifetime of an individual organism, whereby ordered biological patterns emerge spontaneously from unordered initial conditions. The laws that govern self-organisation are thought by some to constrain the nature of the adaptations to the environment that may in principle be discovered by natural selection. Progress towards exposing such theories to empirical testing may be made by identifying a specific biological network in which the interactions can be manipulated directly. To this end, we model self-organising interactions between the genes whose expression patterns are known to affect the division of the cortex into distinct visual, auditory, somatosensory, and motor areas. We then simulate the evolution of this gene network using a simple evolutionary algorithm, and show that this algorithm can exploit structure in the relationship between the genotype and the self-organising phenotype to more rapidly discover successful gene networks. The model therefore shows how the nature of self-organising dynamics may influence the course of natural selection, to discover specific gene networks whose interactions in developing mammal brains ultimately influence cortical information processing.

**Here we explain how the predictions of the model can be tested directly, and thus show for the first time how the Baldwin Effect can be falsified as a scientific theory**. As such, we anticipate that the manuscript will appeal to a broad audience of both modelers and experimentalists, and therefore feel that it is particularly well suited to the unrestricted access model of *PLoS Computational Biology*.

If guidance of a specific editorial board member is helpful at this stage we suggest Prof. Carl T. Bergstrom, whose expertise in the evolutionary implications of social dynamics is especially relevant to our manuscript proposal.

We thank you in advance for your consideration of this inquiry and look forward to the suggestions of the editorial staff about the suitability of *Modelling the Evolution of Cortical Development: A Baldwin Effect* for submission to *PLoS Computational Biology*.

Yours sincerely,

Stuart Wilson

Daniel Whiteley

Leah Krubitzer