***eLife’s* transparent reporting form**

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**Sample-size estimation**

* You should state whether an appropriate sample size was computed when the study was being designed
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This information does not apply to our submission. Many of our results contribute new theoretical concepts, which do not depend on sample size. One of our results (Figure 7) involves statistical analysis between two groups; we chose the number of replicate simulations (5 per set of parameters) as a balance between adequately sampling each parameter set and not producing too many data points compared to experiments.

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We report the number of replicate simulations in figure captions, and we report exclusion/inclusion criteria in the Methods and Appendix 1.

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* Statistical analysis methods should be described and justified
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* For each experiment, you should identify the statistical tests used, exact values of N, definitions of center, methods of multiple test correction, and dispersion and precision measures (e.g., mean, median, SD, SEM, confidence intervals; and, for the major substantive results, a measure of effect size (e.g., Pearson's r, Cohen's d)
* Report exact p-values wherever possible alongside the summary statistics and 95% confidence intervals. These should be reported for all key questions and not only when the p-value is less than 0.05.

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We describe statistical methods in the Methods and Appendix 1. In Figures 5 and 7, we report exact p-values and in their captions, we identify the statistical tests used. Throughout the paper, we report definitions of center as well as dispersion measures.

(For large datasets, or papers with a very large number of statistical tests, you may upload a single table file with tests, Ns, etc., with reference to sections in the manuscript.)

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* Indicate how samples were allocated into experimental groups (in the case of clinical studies, please specify allocation to treatment method); if randomization was used, please also state if restricted randomization was applied
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Group allocation does not apply to our theoretical paper.

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* Where provided, these should be in the most useful format, and they can be uploaded as “Source data” files linked to a main figure or table
* Include model definition files including the full list of parameters used
* Include code used for data analysis (e.g., R, MatLab)
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We include source code for our main simulation, whose results appear throughout the paper, including Figures 1-7.