ELECTRONIC SUPPLEMENTARY MATERIAL

The lag-time constraint for behavioural plasticity

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Figure S1. Exact values (averages along generations in the simulation) for the results in Figure 1.

Figure S2. Exact values (averages across replicated simulations) and standard deviations (SD) for the results in Figure 2.

Figure S3. Result of simulations using discrete behavioural strategies. Simulation model similar to Figure 1, except for using a stronger fitness penalizations for mismatches between behaviour and environment (0 rather than 0.5).

Figure S4. Exact values (averages along generations in the simulation) for the results in Figure S3.

Figure S5. (*a*) Result of simulations using discrete behavioural strategies, as in Figure 1, and a probability of environmental change (*P*) of 0.2. (*b*) Result of identical simulations, but with asymmetrical probabilities of environmental change ($P_{A\ to\ B}$ = 0.2, and $P_{B\ to\ A}$ = 0.1). (*c*) and (*d*) Proportion of individuals with fixed behaviour *a*, as opposed to fixed behaviour *b*, among all individuals with fixed behaviour. Exact values (averages along generations in the simulation) presented.

Code. (separate file) Code to run simulations, as described in the main text.

Rate of increase in performace (*I*)

Rate of reduction in performance (*R*)

Probability of environmental change (P) = 0.8

R \ I	0.05	0.1	0.2	0.4	0.8
0.8	0.01	0.01	0.01	0.01	0.01
0.4	0.01	0.01	0.01	0.01	0.02
0.2	0.01	0.01	0.01	0.03	0.74
0.1	0.01	0.01	0.03	0.85	0.96
0.05	0.01	0.03	0.84	0.96	0.98

P = 0.4

R \ I	0.05	0.1	0.2	0.4	0.8
0.8	0.01	0.01	0.01	0.01	0.02
0.4	0.01	0.01	0.01	0.02	0.08
0.2	0.01	0.01	0.02	0.06	0.94
0.1	0.01	0.02	0.05	0.91	0.97
0.05	0.02	0.04	0.87	0.97	0.98

P = 0.2

R \ I	0.05	0.1	0.2	0.4	0.8
0.8	0.01	0.01	0.01	0.03	0.88
0.4	0.01	0.01	0.02	0.05	0.94
0.2	0.01	0.01	0.03	0.76	0.96
0.1	0.01	0.02	0.12	0.95	0.97
0.05	0.02	0.05	0.93	0.97	0.98

P = 0.1

R \ I	0.05	0.1	0.2	0.4	0.8
0.8	0.01	0.02	0.04	0.92	0.97
0.4	0.01	0.02	0.06	0.93	0.97
0.2	0.01	0.02	0.13	0.95	0.97
0.1	0.02	0.04	0.89	0.96	0.98
0.05	0.02	0.13	0.95	0.97	0.98

P = 0.05

R \ I	0.05	0.1	0.2	0.4	0.8
0.8	0.02	0.06	0.91	0.97	0.98
0.4	0.02	0.07	0.93	0.97	0.98
0.2	0.02	0.08	0.95	0.97	0.98
0.1	0.03	0.56	0.96	0.97	0.98
0.05	0.05	0.92	0.96	0.98	0.98

P = 0.025

R \ I	0.05	0.1	0.2	0.4	0.8
0.8	0.08	0.93	0.97	0.98	0.98
0.4	0.10	0.94	0.97	0.98	0.98
0.2	0.16	0.95	0.97	0.98	0.98
0.1	0.55	0.95	0.97	0.98	0.98
0.05	0.86	0.96	0.98	0.97	0.98

Scale:

Proportion of individuals with responsive behaviour

- **> 0.95**
- **]0.80 ; 0.95]**
- **]0.50 ; 0.80]**
- **]0.20 ; 0.50]**
- **[0.05 ; 0.20]**
- **< 0.05**

Figure S1. Exact values (averages along generations in the simulation) for the results in Figure 1.

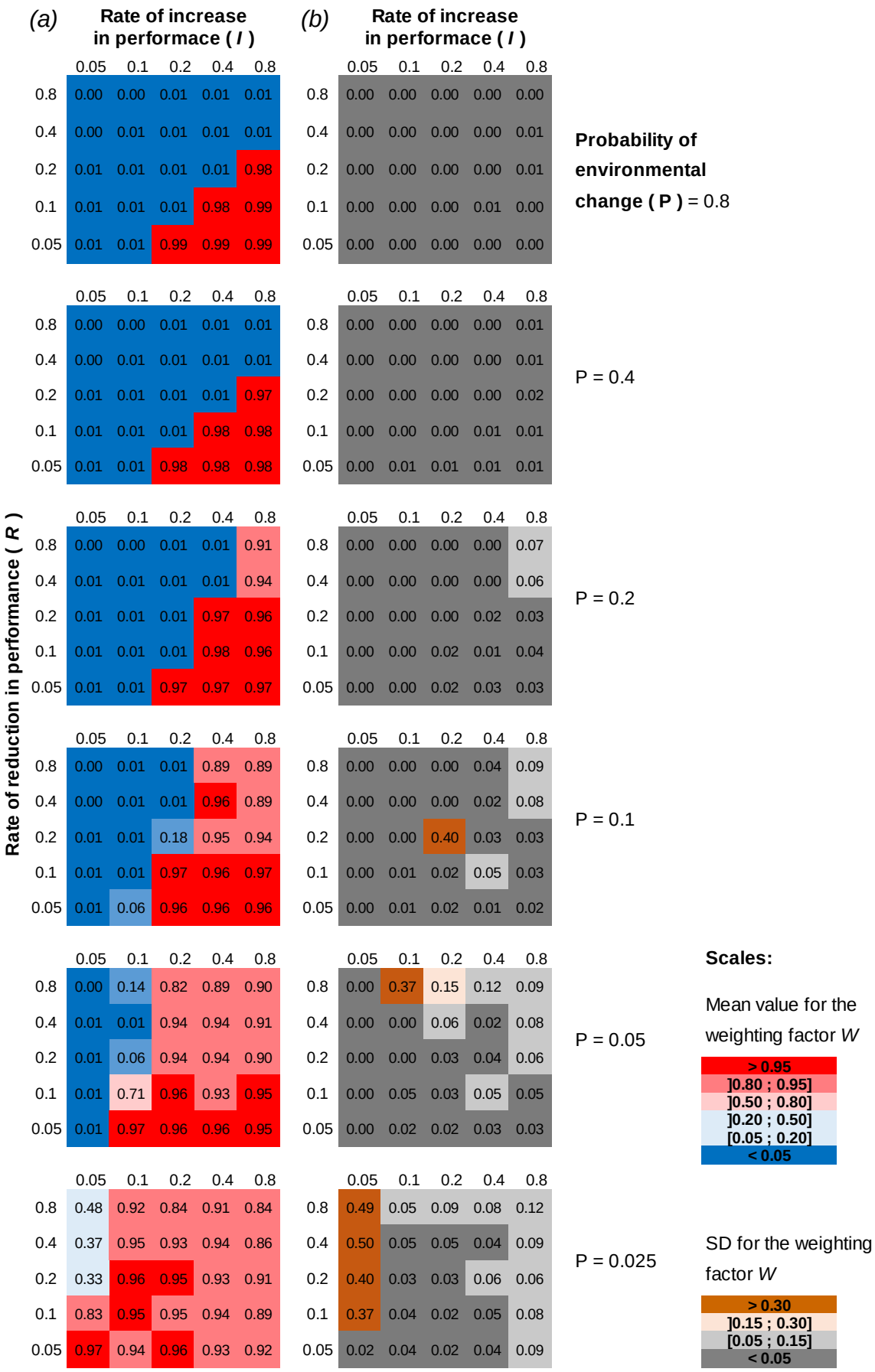


Figure S2. Exact values (averages across replicated simulations) and standard deviations (SD) for the results in Figure 2.

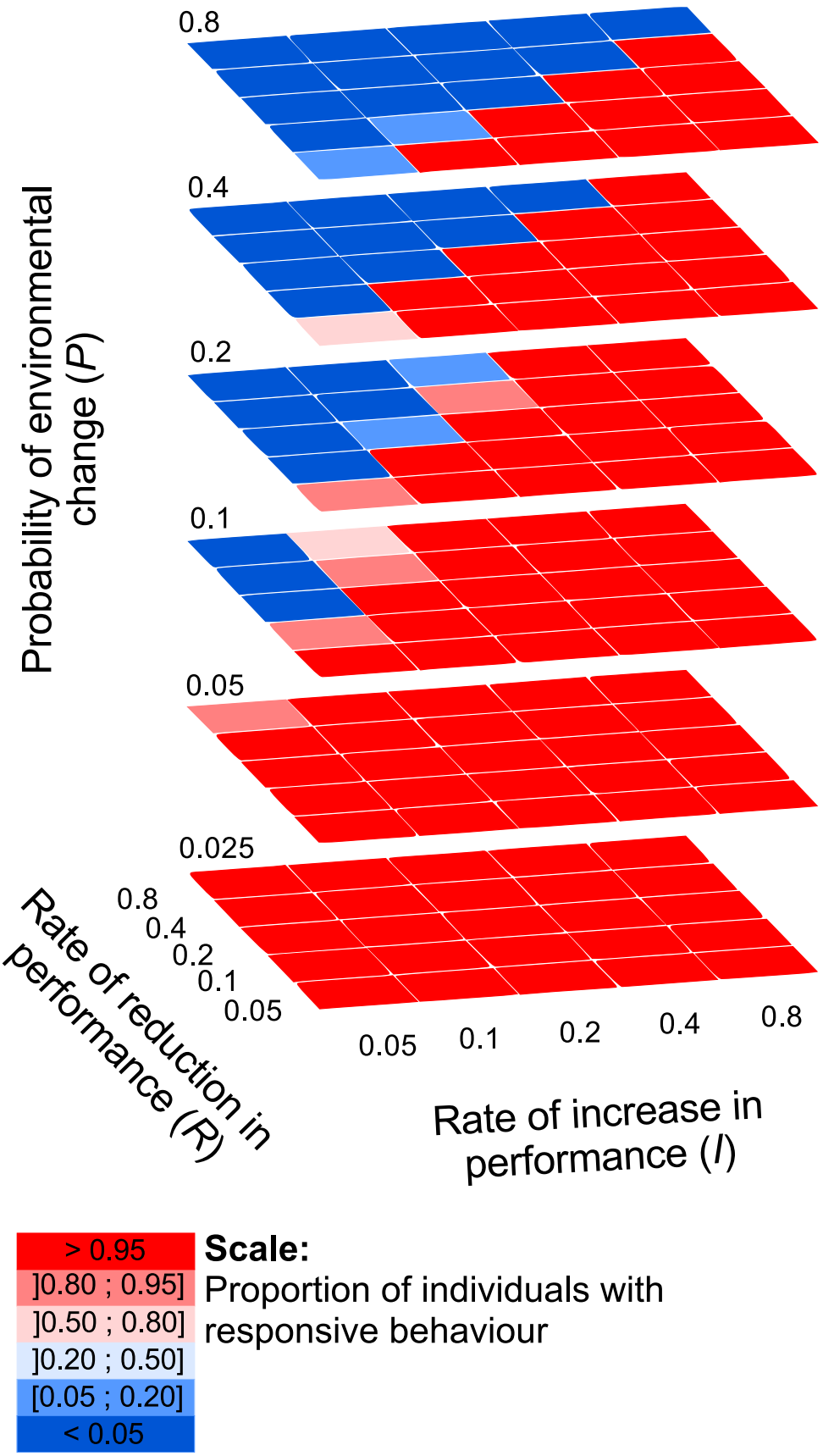


Figure S3. Result of simulations using discrete behavioural strategies. Simulation model similar to Figure 1, except for using a stronger fitness penalizations for mismatches between behaviour and environment (0 rather than 0.5).

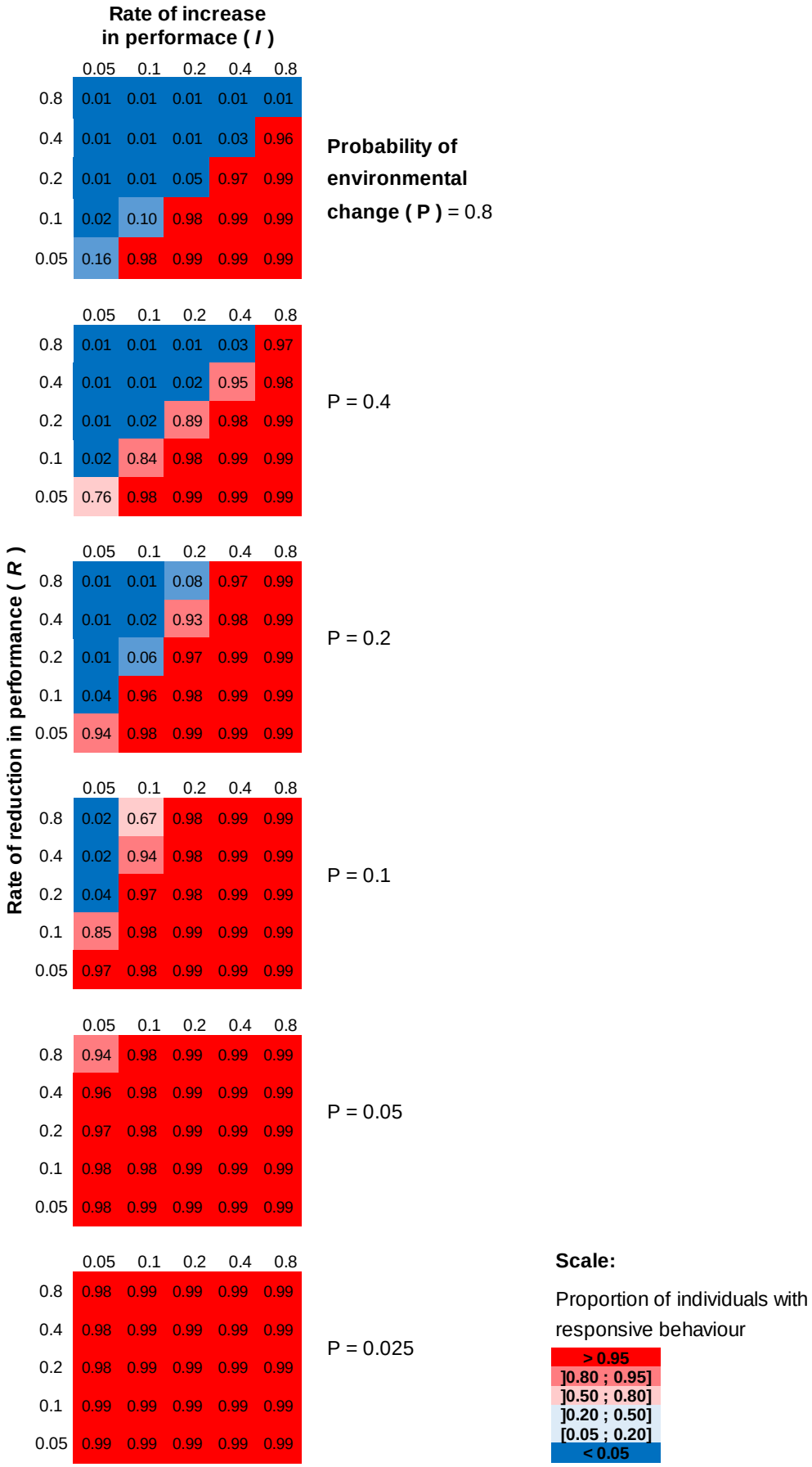
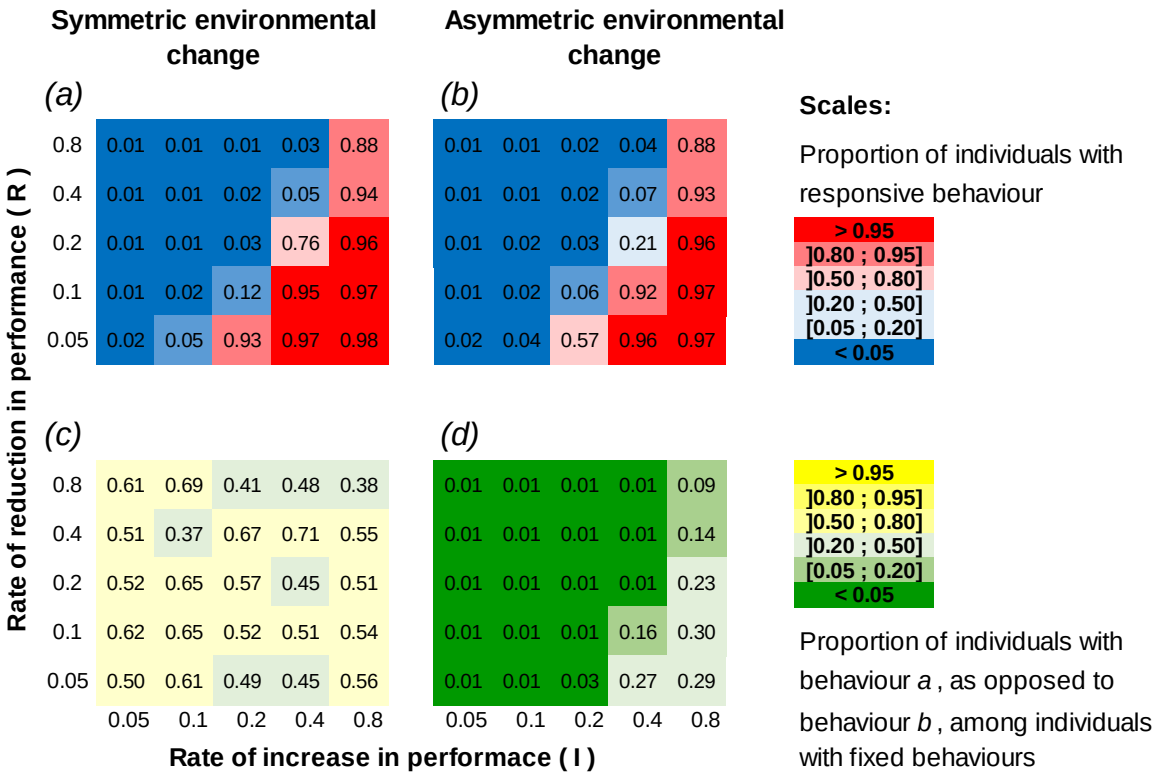


Figure S4. Exact values (averages along generations in the simulation) for the results in Figure S3.



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