

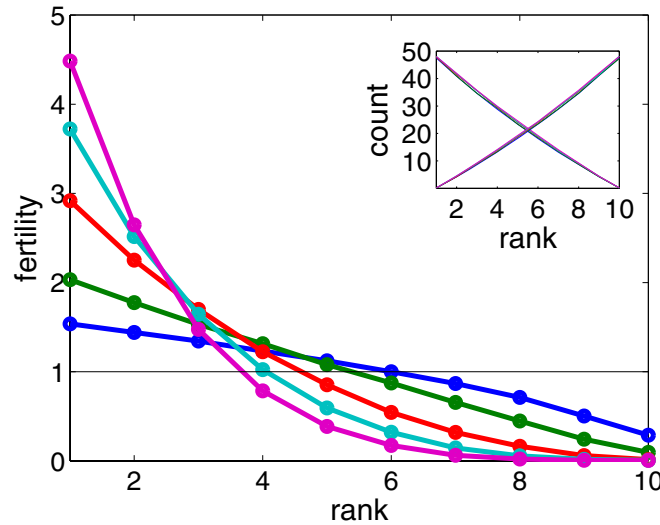
# Supporting Information

Gavrilets 10.1073/pnas.1201718109

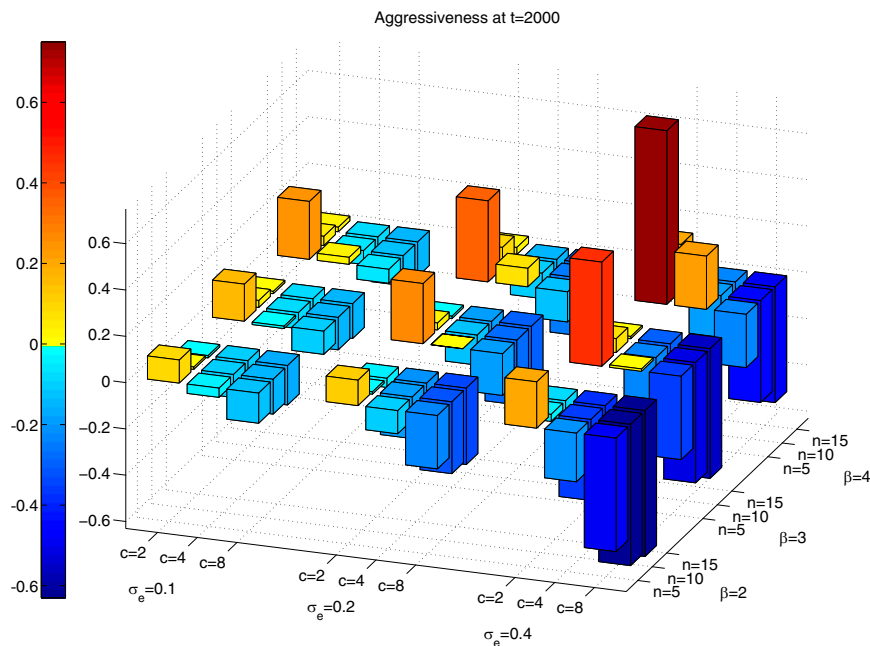
## SI Text

Fig. S1 illustrates the effects of contest intensity parameter  $\beta$  on the steepness of dominance hierarchies. Table S1 and Figs. S2–S7 illustrate the effects of various parameters on different es-

calation thresholds and on the Gini index of inequality. Figs. S2–S4 are for generation  $t = 2,000$  (i.e., just before the evolution of helping was allowed) and Figs. S5–S7 are for generation  $t = 20,000$  (when helping has already evolved).



**Fig. S1.** The effect of  $\beta$  on the average fertility at each rank after 2,000 generations of selection. The curves correspond to five different values of  $\beta = 0.5, 1, 2, 3,$  and  $4$  (from shallower to steeper). Other parameters:  $n = 10, c = 8, \alpha = 3, \gamma = \sigma_e = \sigma_v = 0.2$ . The Gini index of inequality (defined as half the relative mean difference) was  $0.22, 0.36, 0.52, 0.62,$  and  $0.69$ , respectively. (Inset) The average number of times each individual of a particular rank lost the resource to a bully (increasing curves) and took the resource from an owner (decreasing curves). No apparent effect of  $\beta$  is shown.



**Fig. S2.** Effects of  $n, \beta, c,$  and  $\sigma_e$  on the average aggressiveness  $x$  at generation 2,000 (i.e., before helping behavior could evolve). Note that both negative and positive values of  $x$  are observed. Other parameters:  $\gamma = 0.2, \sigma_v = 0.4$ .





