Simulation Models of Cultural Evolution in R

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Table of parameters

Parameter	Definition	Model first introduced
N	Number of agents in the population.	1
t_{max}	Maximum number of timesteps or generations.	1
r_{max}	Maximum number of independent simulation runs.	1
p	Frequency of trait A.	1
p_0	Starting value of p.	1
μ	Probability of unbiased cultural mutation. Specifically, the probability of trait A mutating into trait B, or trait B mutating into trait A.	2
μ_b	Probability of biased cultural mutation. Specifically, the probability of trait B mutating into trait A.	2
s	Strength of biased transmission / cultural selection. Specifically, in Model 3 (direct bias) the probability of switching to a more favourable trait upon encountering another agent with that trait, or in Model 4 (indirect bias) the payoff advantage to trait A relative to trait B.	3
q	Frequency of a second trait in a two-trait model (trait X in Model 4), or the frequency of trait A in a second sub-population or group (Model 7).	4
q_0	Starting value of q.	4
L	Probability in two-trait models that the two traits are linked. Specifically, the probability that, if trait 1 is A, then trait 2 is X.	4
D	Strength of conformity. Specifically, the increased probability of adopting a majority trait, relative to unbiased transmission.	5
s_v	Strength of biased transmission / cultural selection under vertical cultural transmission. Specifically, the increased probability of adopting a favoured trait, relative to unbiased transmission, when only one parent holds that favoured trait.	6

Parameter	Definition	Model first introduced
s_h	Strength of biased transmission / cultural selection under horizontal cultural transmission. Specifically, the probability of switching to a more favourable trait upon encountering at least one of n demonstrators with that trait.	6
a	Probability of assortative mating under vertical cultural transmission, such that both parents have identical cultural traits.	6
n	Number of demonstrators from whom an agent learns under horizontal transmission (Model 6) or blending inheritance (Model 8).	6
m	Strength of migration. Specifically, the probability that each agent migrates to a randomly chosen sub-population.	7
e	Error in copying the traits of n demonstrators under blending inheritance. Specifically, the variance of the normal distribution with mean of the demonstrator trait value, from which the copied trait value is drawn.	8
α	Copying error in the 'Tasmanian' model of cultural gain/loss. Specifically, the amount by which the mode of a gumbel distribution is reduced relative to the highest skill level in the previous generation.	9
β	Inferential guesses or experimentation in the 'Tasmanian' model of cultural gain/loss. Specifically, the dispersion of the gumbel distribution from which the new skill level is drawn.	9
z_i	Culturally transmitted skill level of the ith agent in the 'Tasmanian' model of cultural gain/loss.	9
$\bar{z}$	Mean culturally transmitted skill level across all agents of one generation in the 'Tasmanian' model of cultural gain/loss.	9
g	The number of cultural features in Axelrod's model of polarization, with each feature taking one of ten possible trait values.	10
N_{side}	The number of agents along one side of a square grid in Axelrod's model of polarization, giving ${N_{side}}^2$ agents in total.	10