

Strategies in the Dirichlet-categorical NG

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August 8, 2017

In this appendix some further illustrations of the Bayesian Naming Game with other parameter settings are given. The figures are explained in more detail in section ??.

The figures illustrate how the languages used by agents, $\phi^{(t)}$ change over time: subfigure A shows $\phi_A^{(t)}$ for every agent (thin lines), the average $\bar{\phi}^{(t)}$ (thick lines) and the prior (orange) at $t = 10, 100, 1000, 10\,000$. Next, in subfigure B, the produced utterances are shown as small dots. Behind the utterances, the distribution over words is plotted in blue, estimated using a moving window spanning (at most) the last 2000 utterances. Even if use a completely different language at every timestep (as in Iterated Learning), the utterances might exhibit a regularity, when averaged over time. This is illustrated in subfigure C, where you see the time-average over all $10\,000$ utterances (blue), compared with the prior (orange) and the average language $\bar{\phi}^{(t)}$ used by agents at $t = 10\,000$. For all parameter settings, two simulation runs are shown. In all simulations we approximate $\infty \approx 10^{20}$ and use a deterministic hazard function.

FIGURE 5 Iterated Learning ($\gamma = 1$) with a sample-sample strategy ($\eta = 1, \zeta = 1$). Agents develop no shared language, but over time converge to the prior.

FIG05 $\eta = 1, \zeta = 1, \gamma = 1, b = 1, N = 15, K = \beta = 12$

FIGURE 6 Iterated Learning ($\gamma = 1$) with a sample-MAP strategy ($\eta = 1, \zeta = \infty$). Agents do not develop a shared language, but the utterances over time converge to an exaggerated version of the prior.

FIG05 $\eta = 1, \zeta = \infty, \gamma = 1, b = 1, N = 15, K = \beta = 12$

FIGURE 7 Iterated Learning ($\gamma = 1$) with a MAP-sample strategy ($\eta = \infty, \zeta = 1$). Again, no stable language, but now the time-average strongly exaggerates the prior.

FIG05 $\eta = \infty, \zeta = 1, \gamma = 1, b = 1, N = 15, K = \beta = 12$

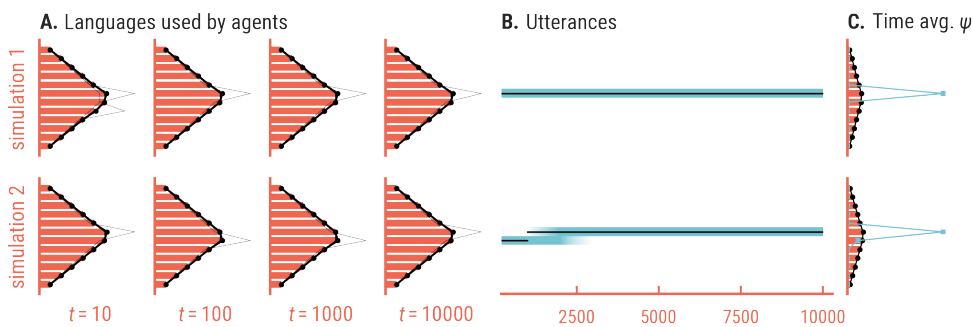


FIGURE 8 Iterated Learning ($\gamma = 1$) with a MAP-MAP strategy ($\eta = \infty, \zeta = \infty$). This strategy corresponds to the frequency strategy

FIG05 $\eta = \infty, \zeta = \infty, \gamma = 1, b = 1, N = 15, K = \beta = 12$