

The Naming Game

How do we agree on new words for new concepts?

William Schueller, Vittorio Loreto, Pierre-Yves Oudeyer

Inria Flowers Team, University of Bordeaux, Sapienza University of Rome

What is a social convention?

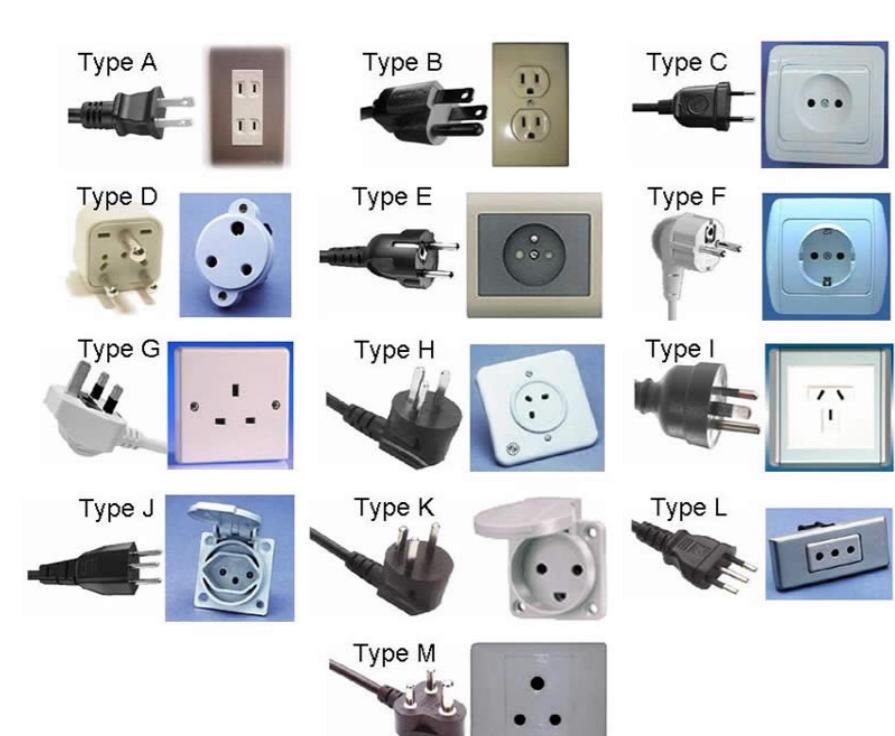
- Arbitrary choices between equivalent options
- Benefits everyone when the group agrees on the same choice



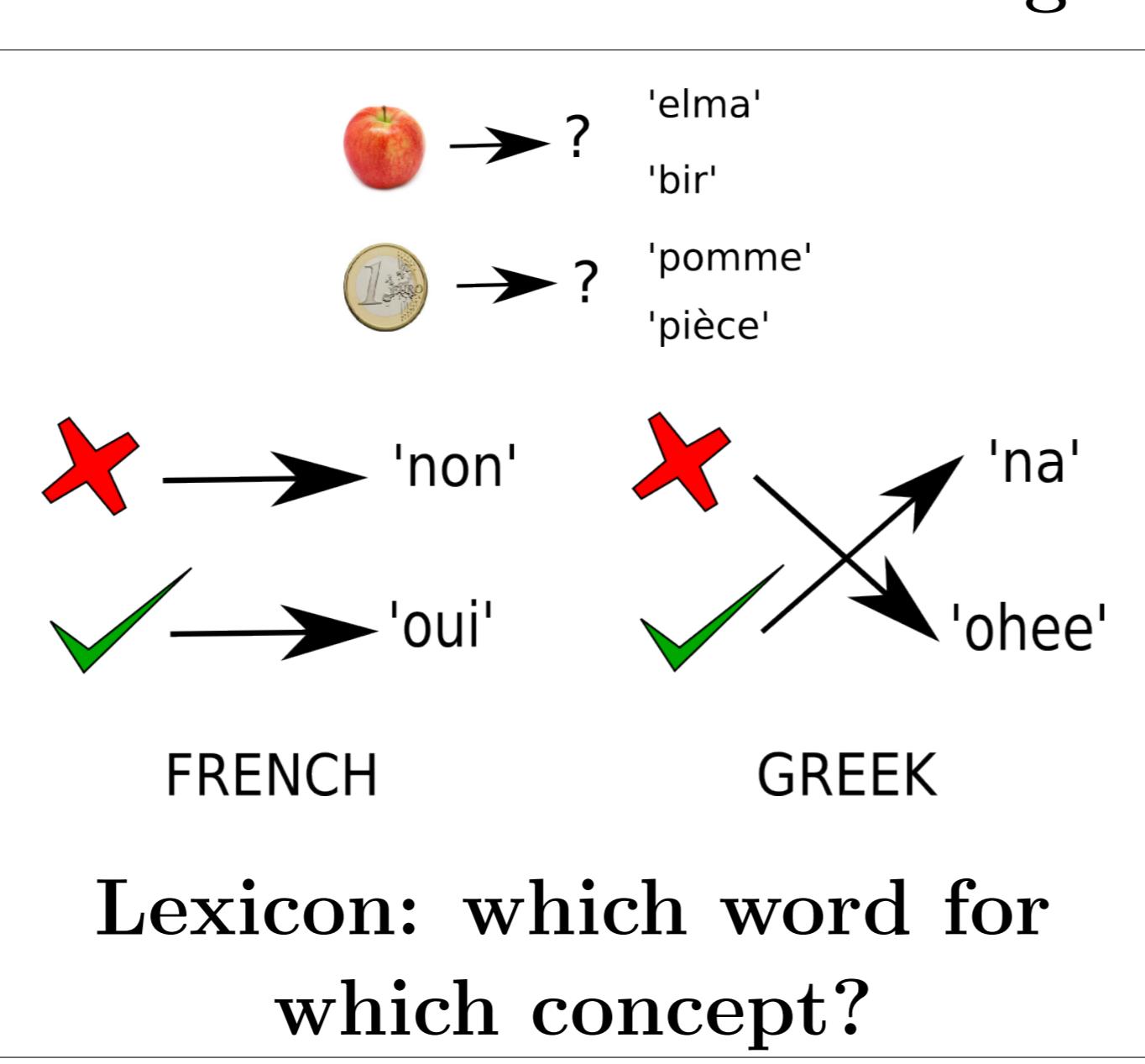
Driving on the left or the right side?



Greeting protocol: kissing on the cheek or handshaking?



Which electric plug?



How do we agree on new words?

- First hypothesis: through a central authority
Like the *Academie française*?
Do we use words as *pourriel*? (rotten-mail-electronic)
NO, they just fail at imposing new lexical conventions
- Second hypothesis: through decentralized social interactions
Do you know where *spam* comes from?
It used to refer to canned pork meat, and its present meaning was inspired by a sketch of the *Monty Python*. This usage spread quickly, even to people who do not know about its origin!

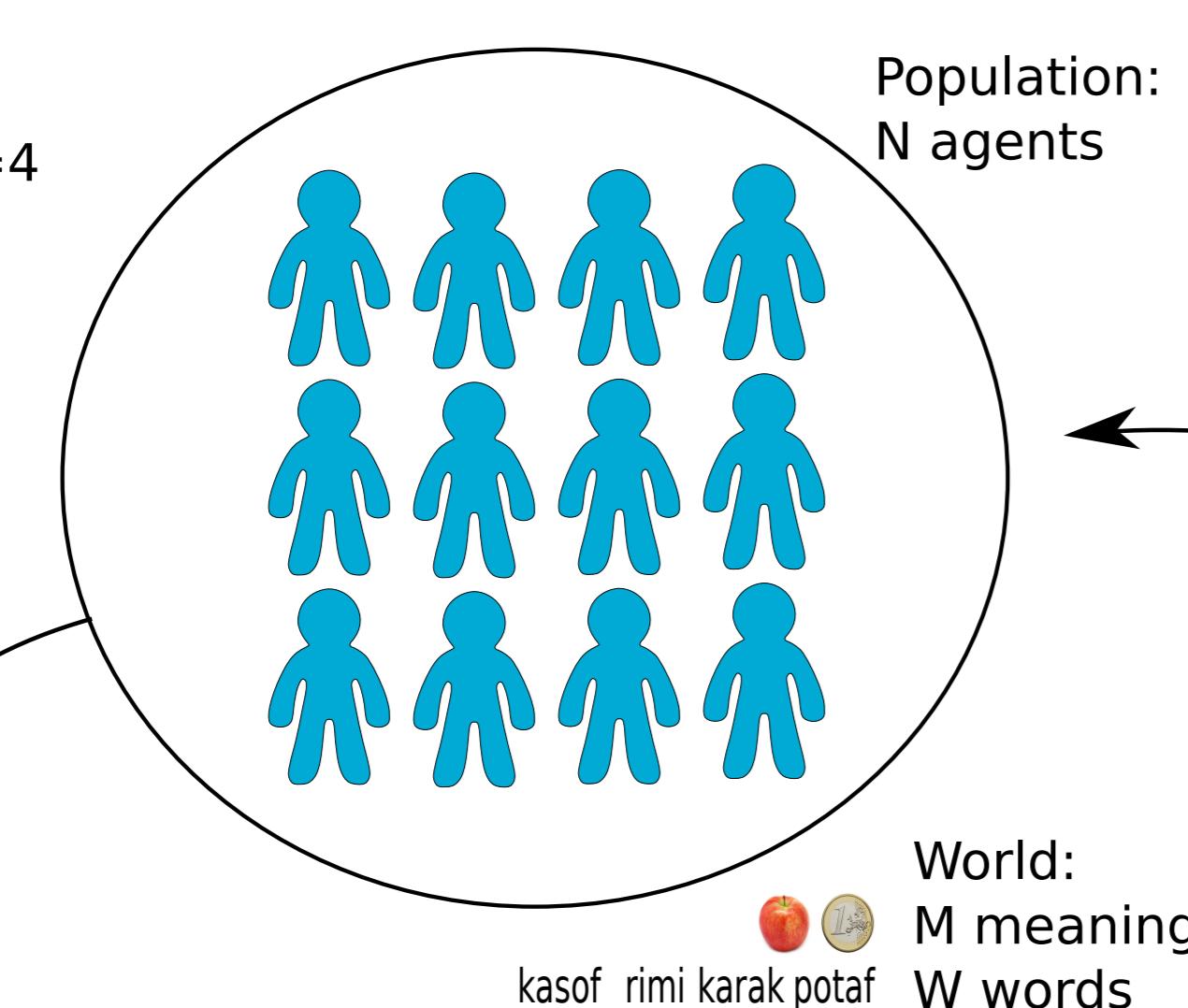


The Naming Game model

Example:
N=12, M=2, W=4

Simulations:
N=M=W=20

Random pick



Population: N agents

World: M meanings W words

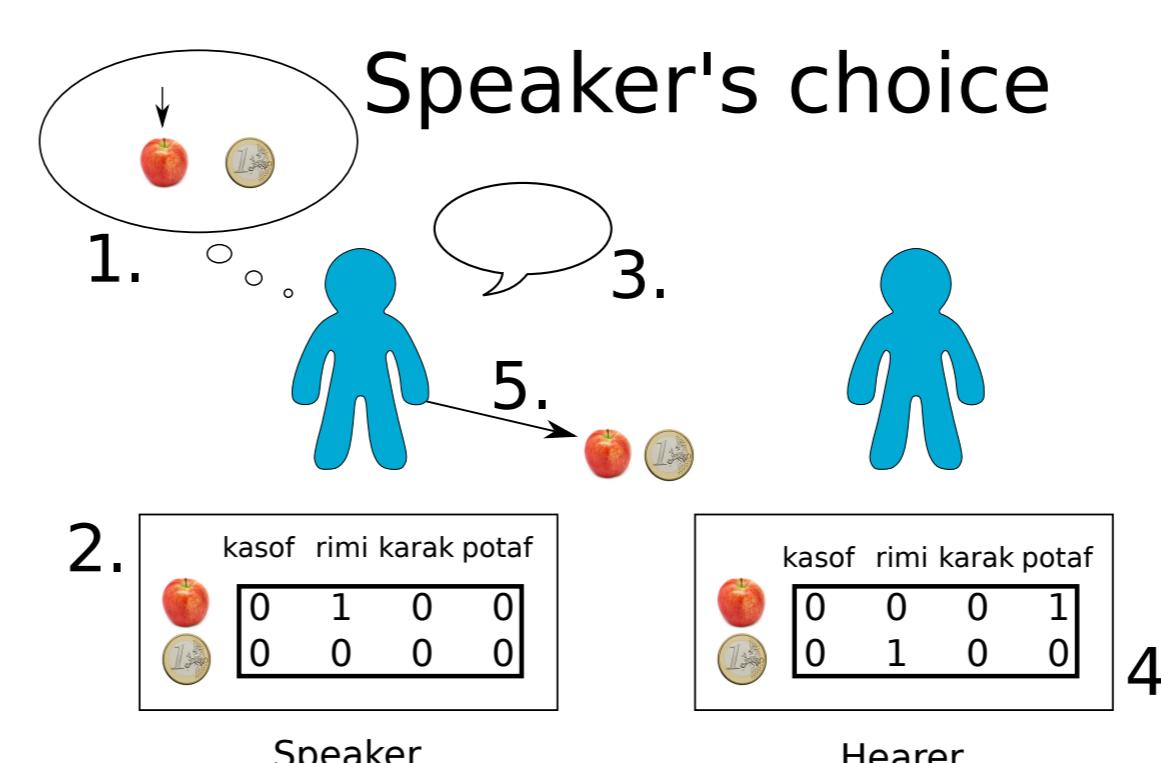
Start Again

Vocabulary update

Success or Failure
of Communication

Evolution towards a **global pattern** (shared lexicon) through repeated **local interactions**

Interaction scenario



- S chooses a topic
- S checks its vocabulary to find/invent an associated word
- S utters the word
- H guesses the intended meaning
- S indicates the intended meaning
- If H guessed the correct meaning, the communication is considered successful

My work: Active Topic Choice

Balancing 2 behaviors:

- Inventing new conventions: necessary exploration but leading to conflictual synonymy and homonymy within the population
- Reinforcing/disambiguating known word-meaning associations

Exploration vs. Exploitation paradigm, using memory of past interactions

What is YOUR strategy?



Italiano

Interaction #26 / 50

Past Interactions

what do you want to talk about?

Using which word?

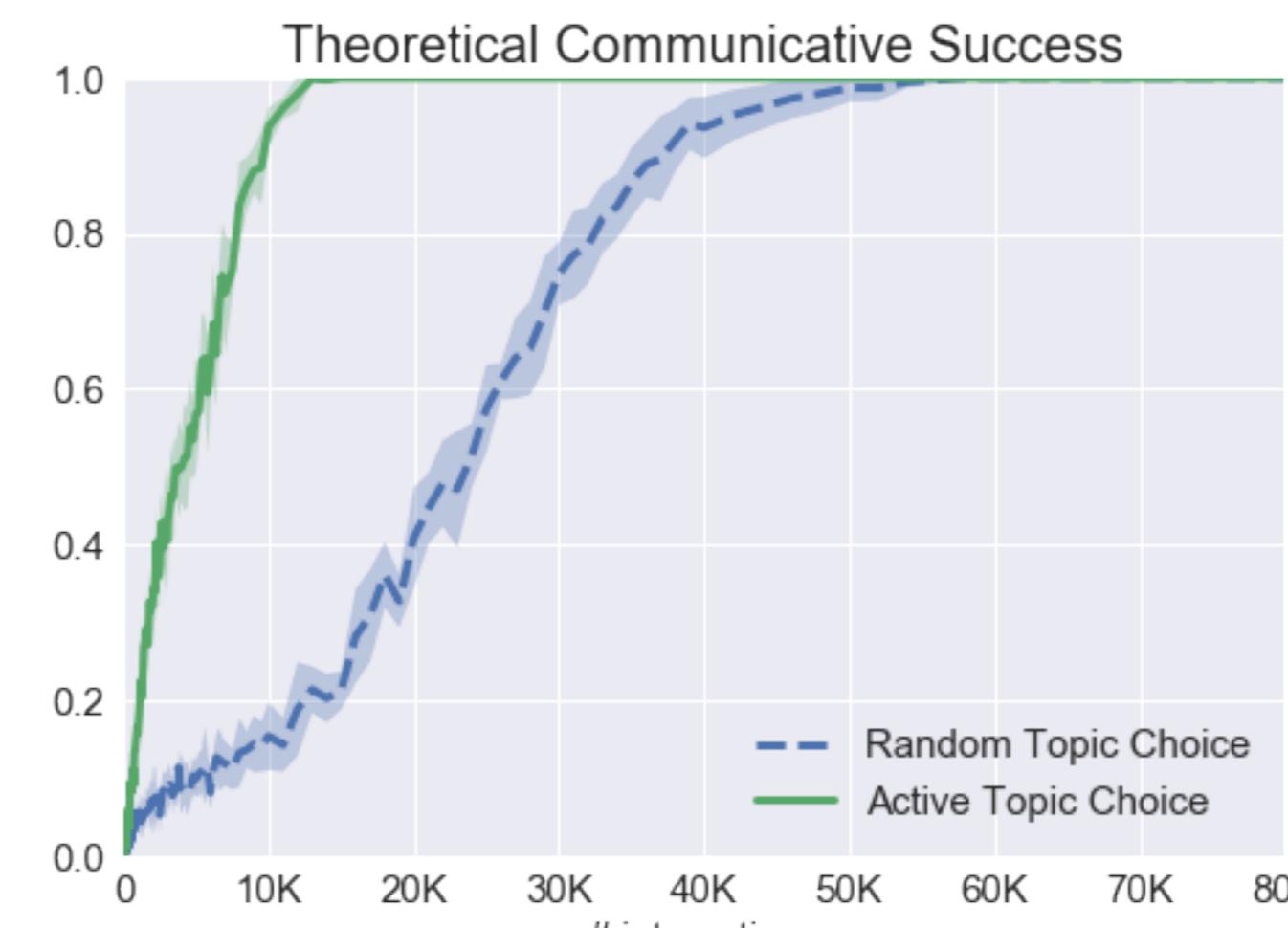
You are the SPEAKER!



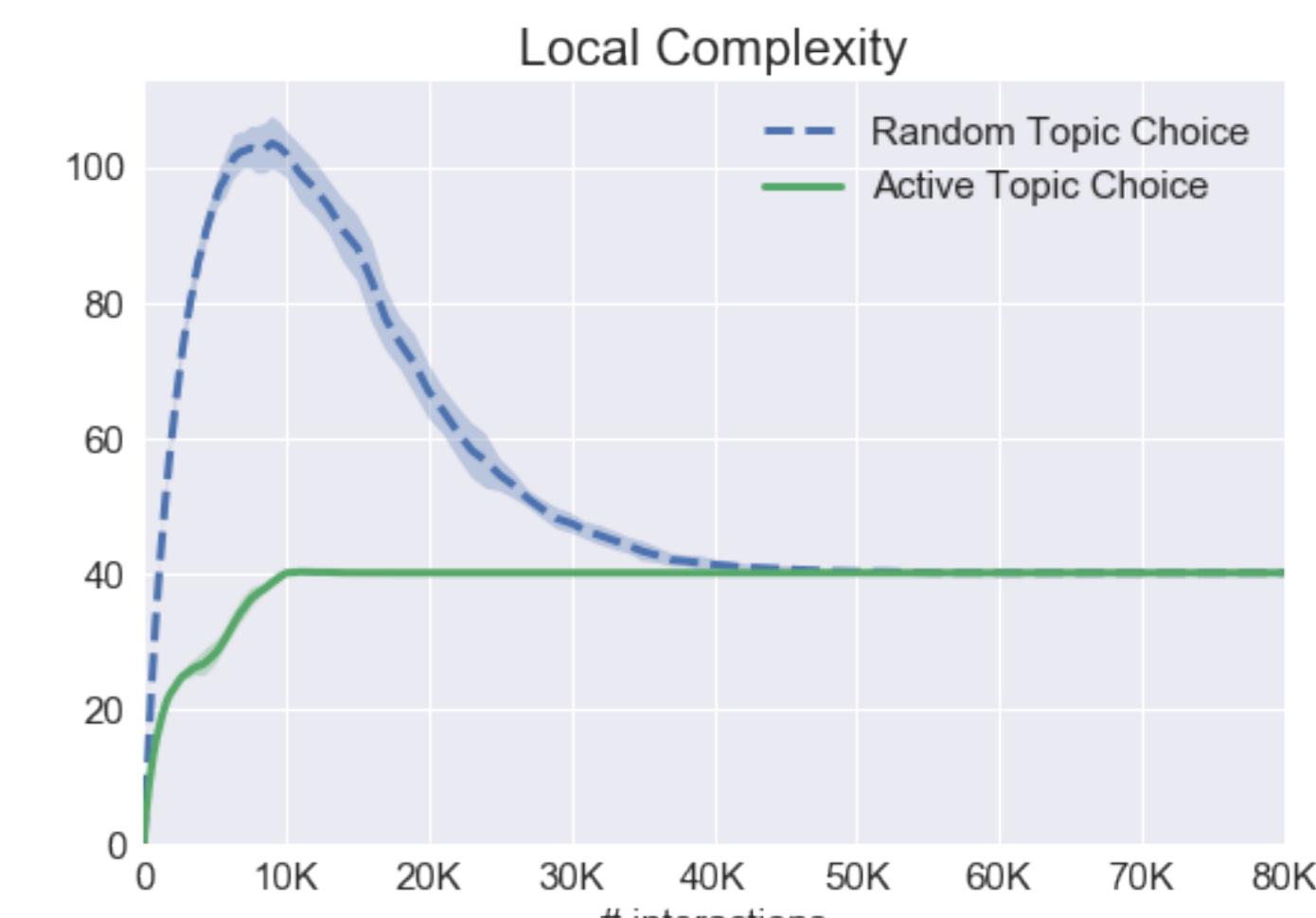
PLAY IT ONLINE!

<http://naming-game.bordeaux.inria.fr>

Results: Active vs. Random



Faster convergence towards shared vocabulary



Less memory needed per individual: no explosion of complexity

Open source software

Python lib: <https://github.com/flowersteam/naminggamesal>

Play with the model and replot figures: https://github.com/wschuell/notebooks_edmi18