

COGS300

Iterated learning

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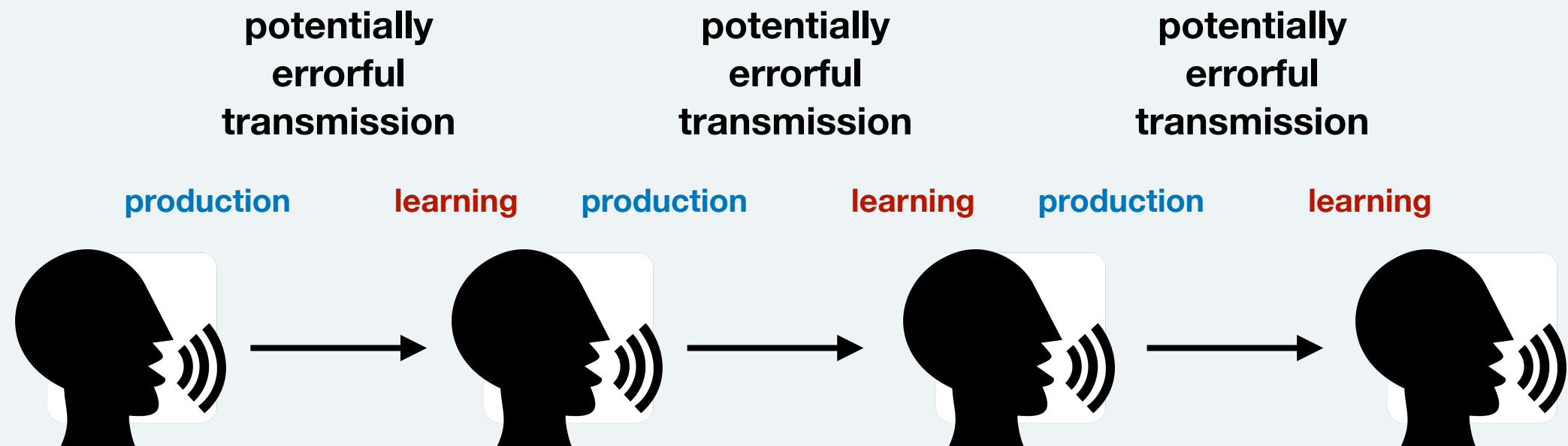
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Iterated learning

- iterated learning:

“a process in which an individual acquires a behaviour by observing a similar behaviour in another individual who acquired it in the same way”



Sally likes rubber duckies and sinking ships
in wet rain puddles.

Sally likes sinking ships in raining puddles
rubber duckies in

Sally likes Rubber ducks in sinking ship in puddles.

Sally likes Robert in sinking ship and bottles

Sally likes Robert in sinking shoes and bottles.

Sally likes Robert in sinking shoes and bottles

Sally likes Robert in sinking shoes and bottles.

this side up

Sally likes rubber duckies and sinking ships
in wet rain puddles.

Sally likes rubber duckies and sinking ships and wet rain puddles

Sally likes sinking ships and rain puddles

The sally lights reigning ships and reigning rebuttal
 ^{or} ^{or}
 raining raining

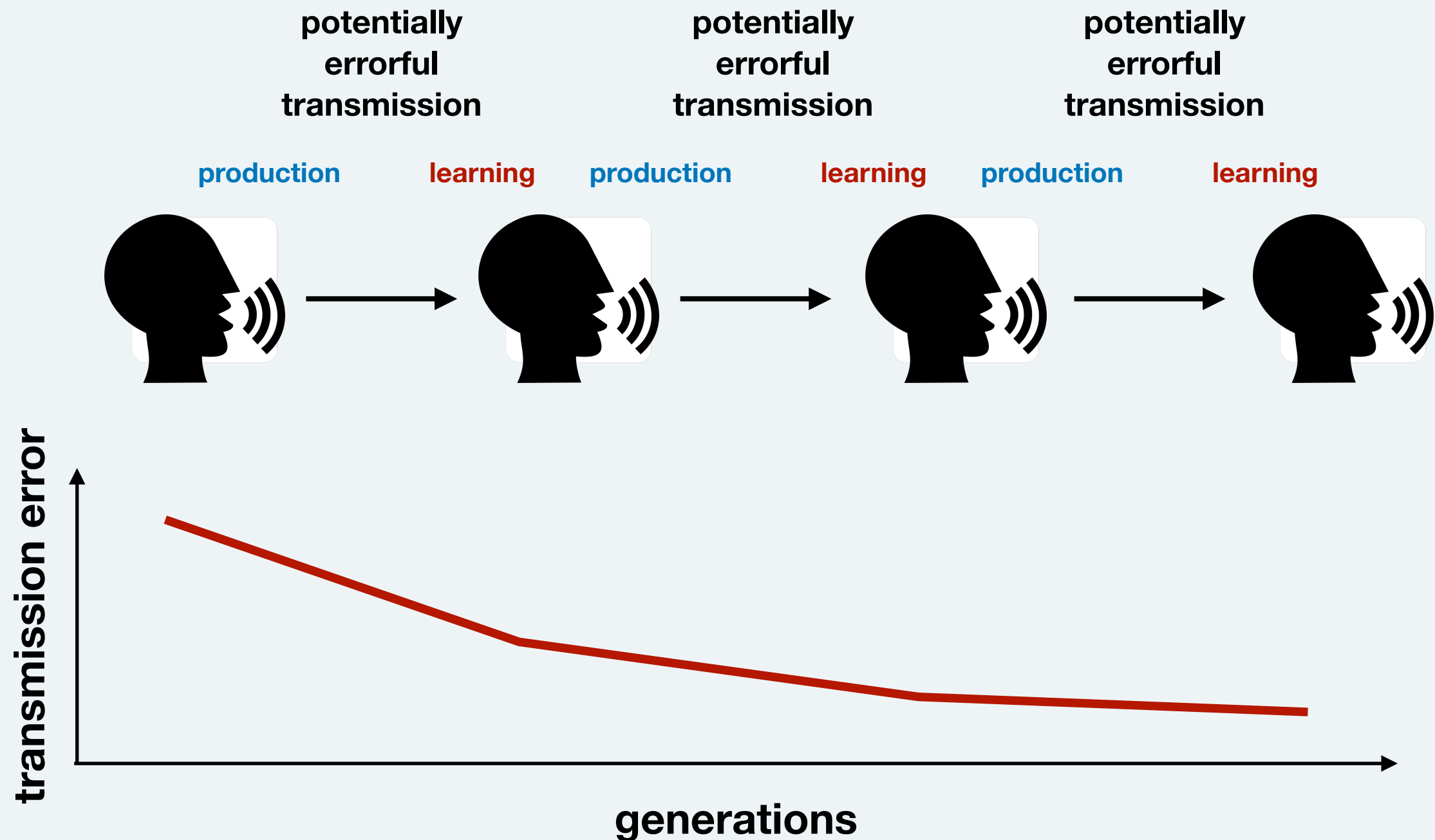
the something lights something rebuttal

"THE SOMETHING SOMETHING REBUTTAL"
(THAT'S ALL I GOT)

this side up

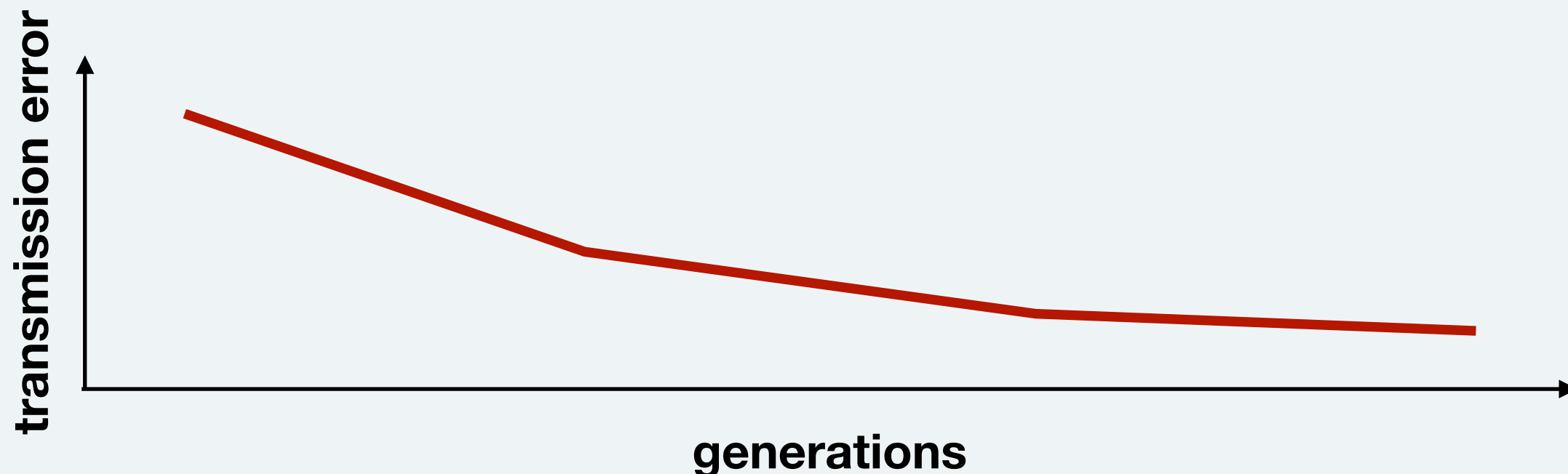
Iterated learning

- typical trajectory of iterated learning



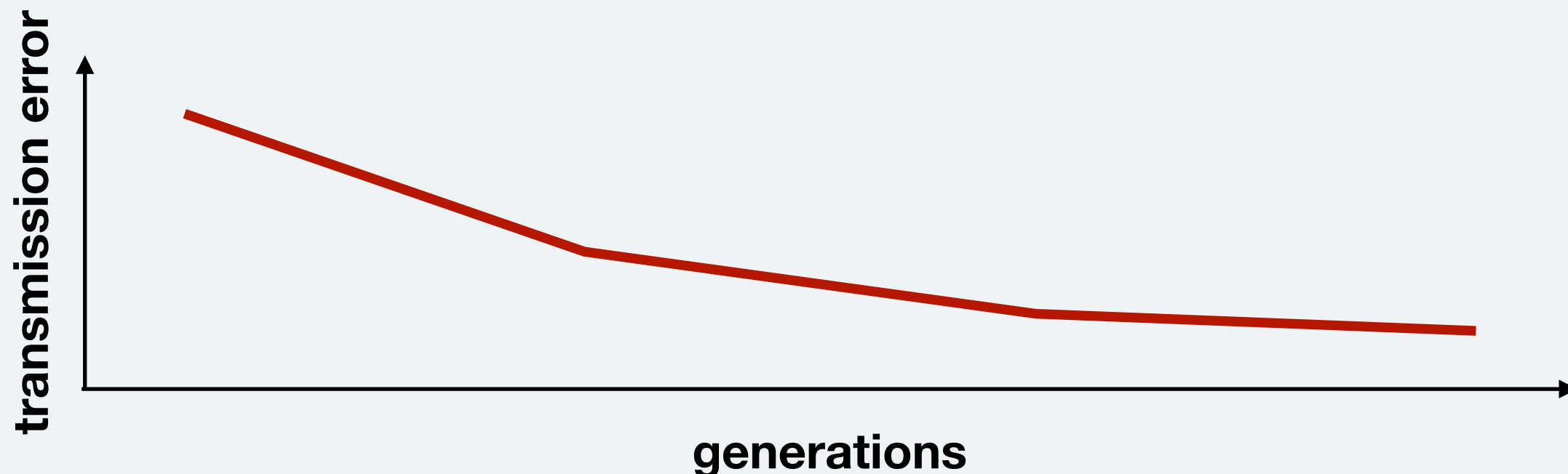
Iterated learning

- typical trajectory of iterated learning: *transmission error decreases over time*
 - features that are hard to transmit often don't get transmitted
 - features that are easy to transmit typically do get transmitted
 - features that are easy to transmit: **higher fitness!**



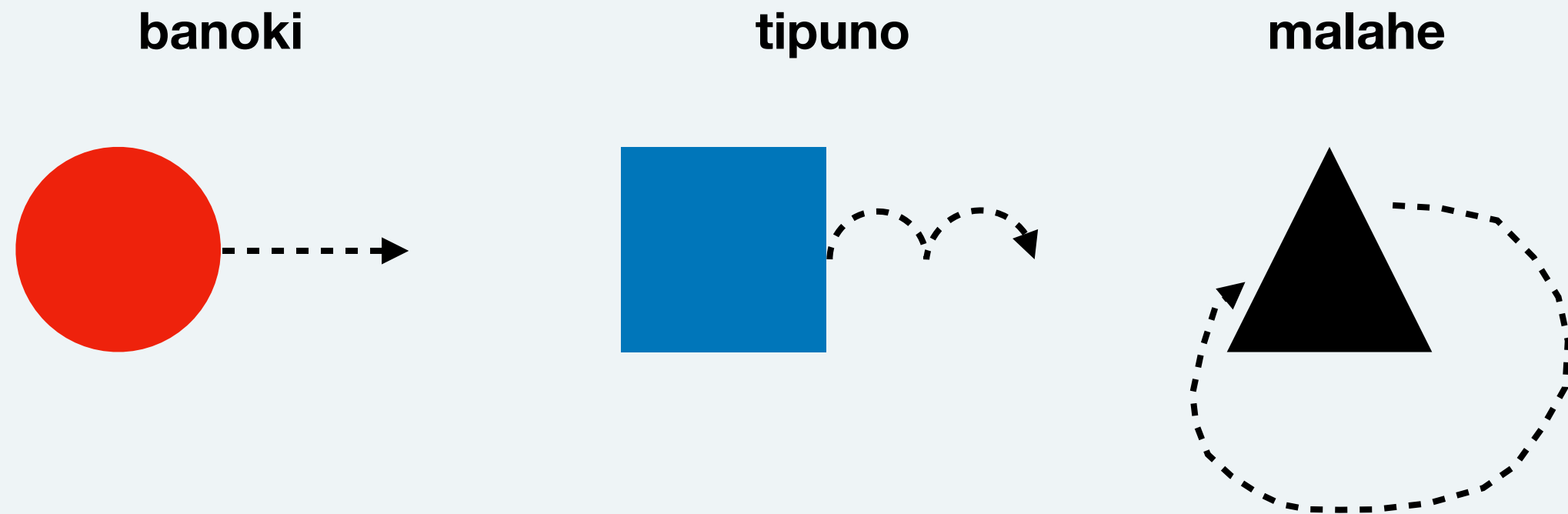
Iterated learning

- transmission error: *the difference between two adjacent generations at a given point in the transmission chain*
- transmission error \neq the overall amount of distortion between the first vs. last generation



Iterated learning

- Kirby et al. 2008: the task



Iterated learning

- Kirby et al. 2008: the task



Iterated learning

- Kirby et al. 2008: SEEN vs. UNSEEN

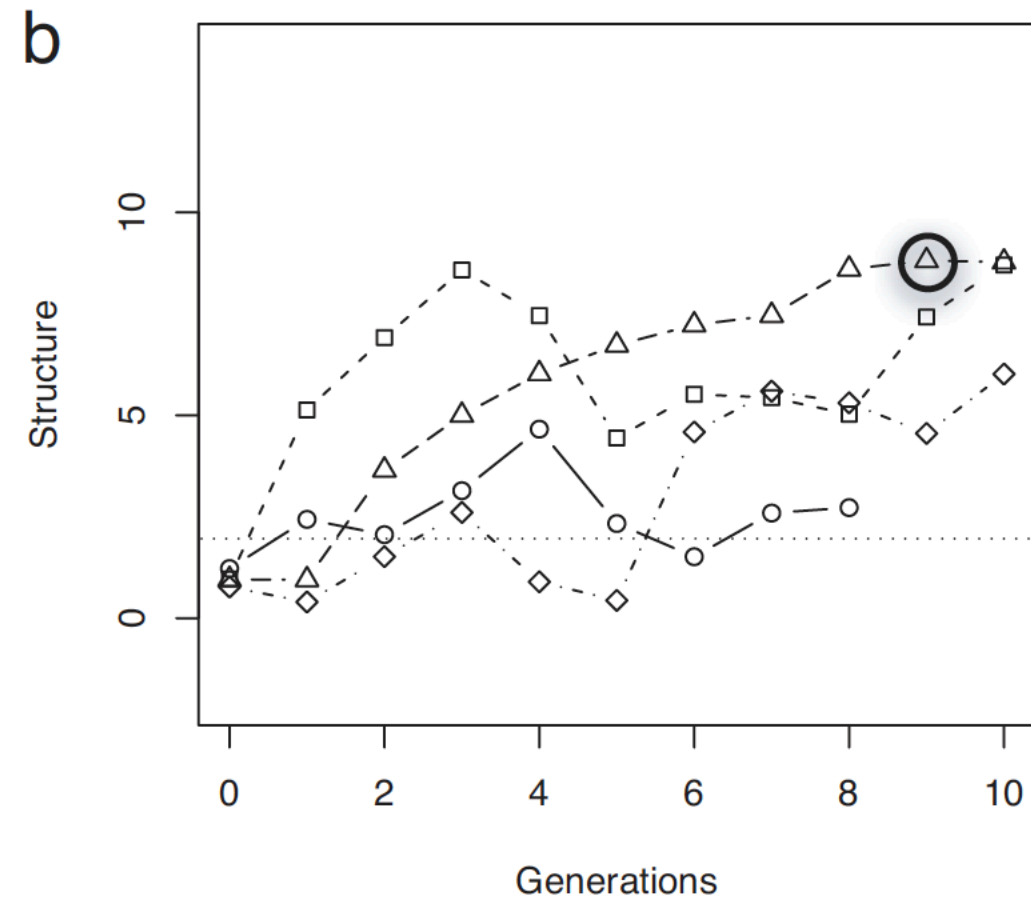
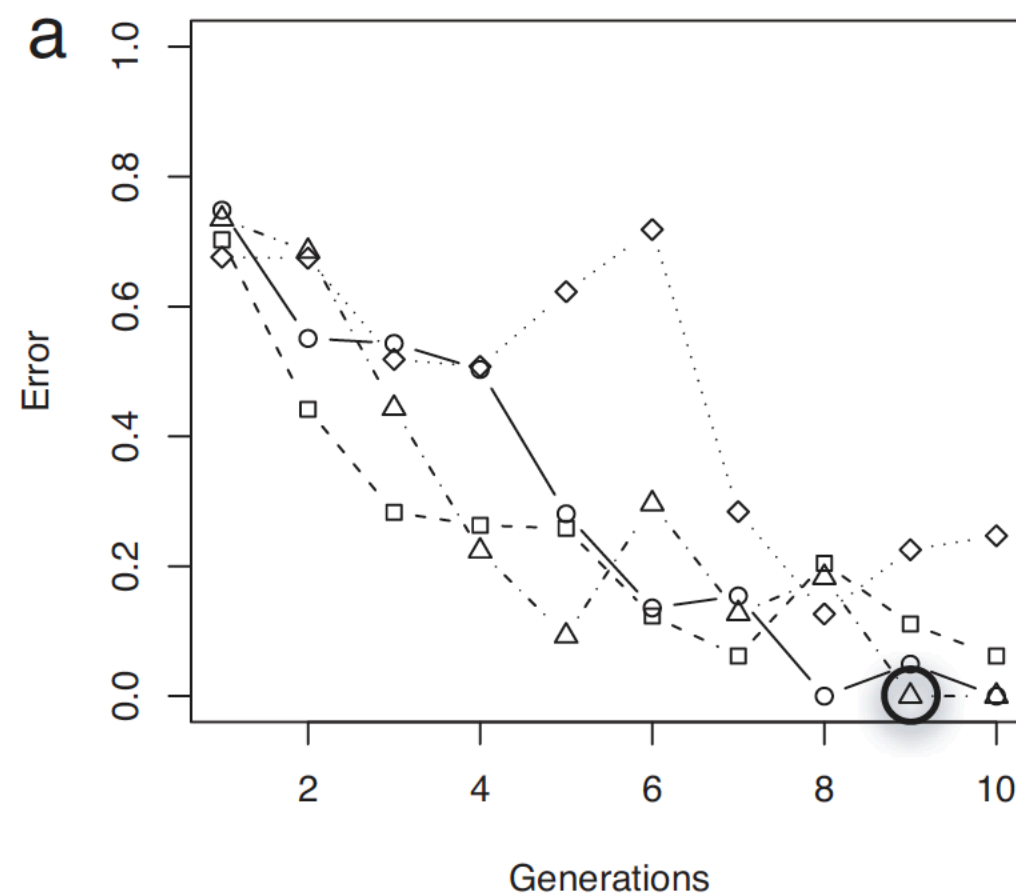


Iterated learning

transmission error

structure

(correlation between
meaning & form)



Iterated learning

- **systematic underspecification:** collapsing word distinctions in a systematic way (e.g. “all spiralling objects are *poi*”)



Iterated learning

- second experiment: ambiguous words removed (+ SEEN / UNSEEN)



Iterated learning

- second experiment: ambiguous words removed (+ SEEN / UNSEEN)

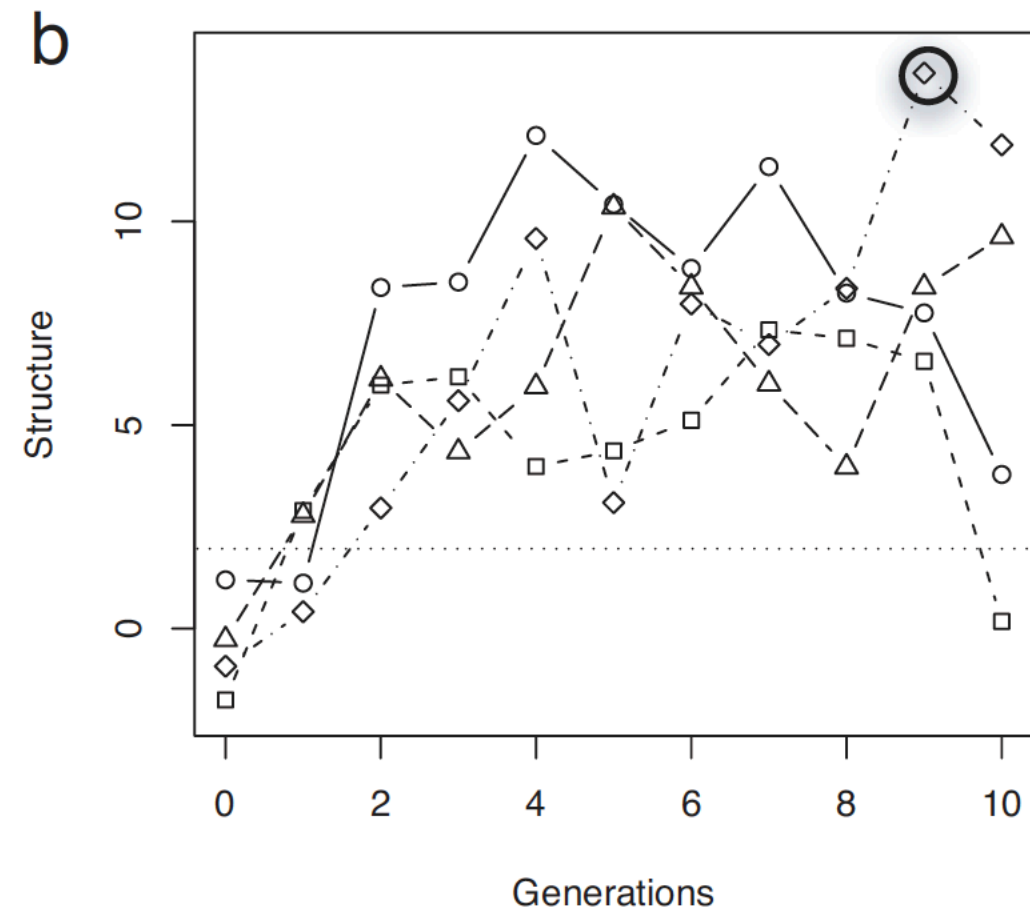
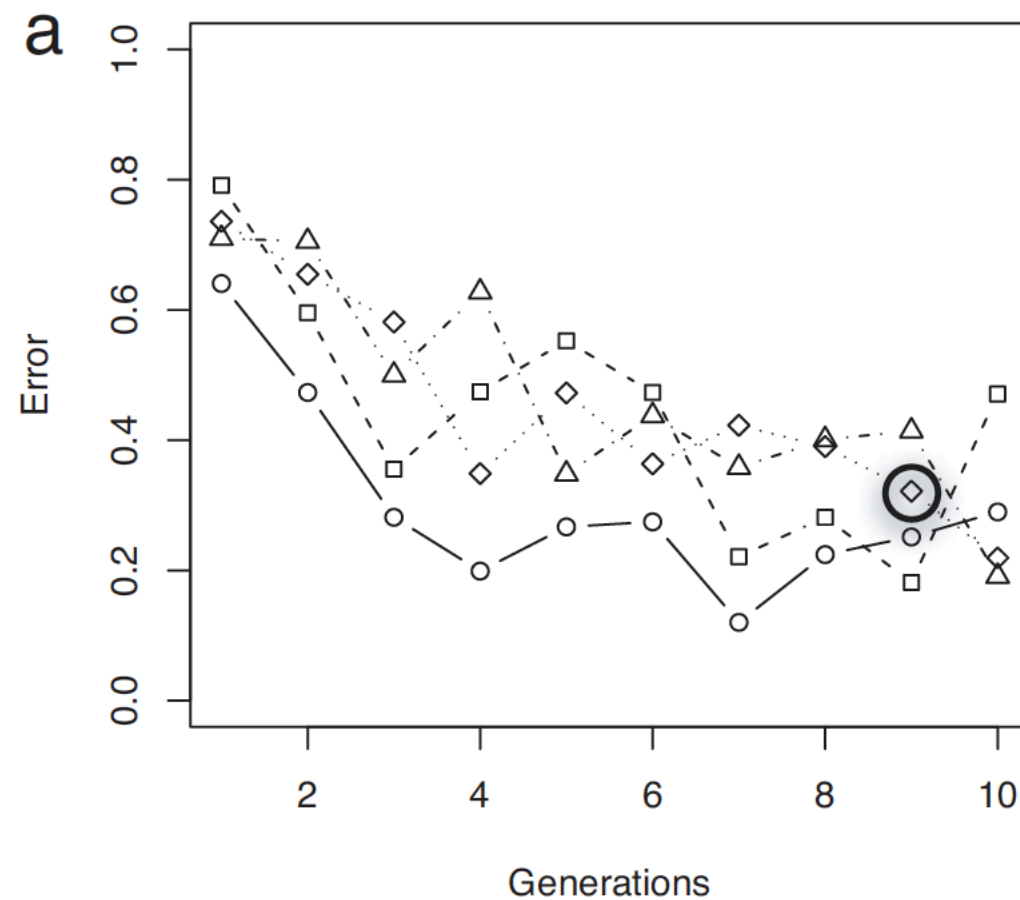


Iterated learning

transmission error

structure

(correlation between
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Iterated learning

- **compositionality**: The meaning of an expression is a function of the meanings of subparts of that expression and of the way the subparts are put together.

