CO-EVOLUTIONARY LINKS BETWEEN LINGUISTIC ALIGNMENT AND COOPERATION – AN EXPERIMENTAL STUDY

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Linguistic communication requires a high degree of cooperation between interaction partners (Tomasello, 2008; Fitch, 2010; Grice, 1975; Hurford, 2007; Knight, 2016). At the same time, language unlocks mechanisms for maintaining and strengthening cooperation: it facilitates cooperation through verbal coordination (Gärdenfors, 2004), or raises the costs of non-cooperation by spreading the track record of individuals via gossip (Dunbar, 1996). These close links between language and cooperation make it highly plausible that these two traits co-evolved during their evolutionary emergence. Our study explores these co-evolutionary links between cooperation and language and helps to shed light on possible causalities and directionalities of these links.

In particular, we hypothesize that people are more likely to cooperate with individuals that align with them linguistically, i.e. share lexical or syntactic choices (Pickering & Garrod, 2004). Such correlations have already been observed with respect to task success (Reitter & Moore, 2014), and we expect that the same positive relationship exists between language and cooperation.

To test this, we conducted an online experiment with 40 native English-speaking participants. Each participant communicated with two interaction partners in a picture-naming task (Bock, 1986), in which the participants and their partners took turns describing pictures that represented ditransitive events. After an initial communication stage, where both partners (which were in fact standardized chat bots) did not align their syntactic constructions with the participants, one of the partners switched to an aligned syntactic construction, whereas the other partner

continued to use a non-aligned syntactic construction (Fig. 1). After this communicative interaction, participants had to decide in a two-alternative forced choice task with which of the two partners they would like to play a cooperation game that determined the financial bonus that they would receive for participation. The participants' choices in this task were our main variable of interest. We predicted that linguistically aligning communication partners would be preferred as cooperation partners over non-aligning ones.

Our results did not confirm this prediction. Instead, aligning (47.5%) and non-aligning (52.5%) partners were chosen equally often as cooperation partners (confidence intervals include 50%). Further exploratory analyses showed that there was no correlation between the attention that participants paid to the language used by their partners and their partner choices ($\chi^2 = 0.17$, $p = 0.68$, $\varphi = 0.07$): also when participants reported that they actively paid attention to and based their decisions on the "correctness" of their partners' responses, they did not choose the aligned partners significantly more often than the unaligned ones (note that "correctness" is the participants' subjective impression, since both aligned and non-aligned partners answered grammatically correctly).

Our study did not find evidence that syntactic alignment is a decisive factor for people when choosing their cooperation partners. Other yet unexplored factors may override the influence of linguistic alignment in such decisions. For example, people may avoid partners who mimic them exactly, and rather regard those using different syntactic structures as more competent, honest or trustworthy partners in cooperative interactions. However, since our design relied on only a single instance and a single type of alignment (syntactic alignment), it might not have been sensitive enough to capture subtle effects. Follow-up research is necessary, in particular with alignment unfolding over a longer course of interaction, to reach a firmer conclusion regarding the interdependence, and possible co-evolution, of linguistic alignment and cooperation.

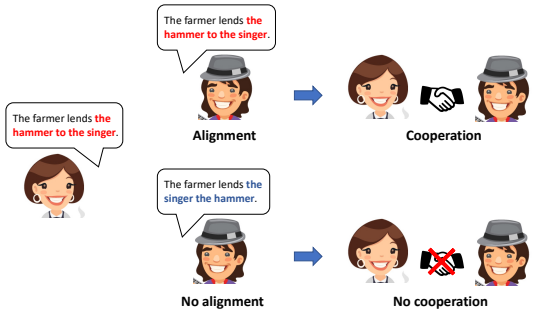

Figure 1. Experimental design and hypotheses.

References

Bock, J. K. (1986). Syntactic persistence in language production. *Cognitive Psychology*, 18, 355–387.

Dunbar, R. I. M. (1996). *Grooming, gossip and the evolution of language*. London: Faber and Faber.

Fitch, W. T. (2010). *The Evolution of Language*. Cambridge: Cambridge University Press.

Gärdenfors, P. (2004). Cooperation and the evolution of symbolic communication. In K. Oller & U. Griebel (Eds.), *The Evolution of Communication Systems* (pp. 237–256). Cambridge, MA: MIT press.

Grice, H. P. (1975). Logic and conversation. In P. Cole & J. Morgan (Eds.), *Syntax and semantics* (pp. 41–58). New York: Academic Press.

Hurford, J. R. (2007). *The origins of meaning: Language in the light of evolution I* (Vol. 8). Oxford and New York: Oxford University Press.

Knight, C. (2016). Puzzles and mysteries in the origins of language. *Language & Communication*, 50, 12–21.

Pickering, M. J., & Garrod, S. (2004). Toward a mechanistic psychology of dialogue. *The Behavioral and Brain Sciences*, 27(2), 169–226.

Reitter, D., & Moore, J. D. (2014). Alignment and task success in spoken dialogue. *Journal of Memory and Language*, 76, 29–46.

Tomasello, M. (2008). *Origins of human communication*. Cambridge, MA: MIT Press.