Jonas **Nölle**, jonas.noelle[at]live.de
Aarhus University, Denmark
Stefan **Hartmann**, hartmast[at]uni-mainz.de
University of Mainz, Germany
Peeter **Tinits**, peeter.tinits[at]gmail.com
Tallinn University, Estonia
Michael **Pleyer**, michael.pleyer[at]hggs.uni-heidelberg.de
Universität Heidelberg, Germany

Investigating the emergence of overspecification in an Iterated Learning setup

Natural languages differ in their degree of overspecification, the extent to which overt semantic markers are required even when irrelevant in the given context. But how and why does systematic and obligatory overspecification emerge in the first place? Recent research has emphasized the importance of context in the emergence of different types of language systems (Winters et al., 2015). The present paper investigates the hypothesis that overspecification can be cognitively beneficial in particular communicative situations.

For the present study, 205 volunteers were recruited online and took part in an Iterated Learning experiment (Kirby et al., 2008). In two blocks of 32 randomized trials, they were first trained on an artificial language and then asked to use that language to point out objects to an alien. The output of participant *n* was used as input for participant *n*+1 for 5 generations. The initial language consisted of four different words denoting four objects (e.g. *meeb* 'ball') as well as two markers denoting colors (*pu* 'blue', *li* 'yellow'). In the initial language, these markers were only used when an object had to be distinguished from the same type of object in a different color (e.g. yellow ball and blue ball). Across conditions, this distinction was relevant in 16 of the 32 trials. In the **distractor condition**, the other half of trials consisted of pictures showing two items, but different types (e.g. ball and pen). In a **control condition**, by contrast**,** pictures showing only one single item were displayed in the remaining 16 trials. We predicted that the semantic markers would tend to become obligatory even when not required by the immediate communicative context in the distractor condition, but not in the control condition.

Overspecification increased in both types of trials but, as predicted, proved more pervasive in the distractor condition. Here, the color marker became fully obligatory in the 5th generation in 17 out of 18 chains, while it was used significantly less in the 5th generation of the control trials (two-sample $t(34)=-4.06$, $p_{\text{two-tailed}}<.001$, $r=.57$).

Importantly, the development to be observed is conditioned by contextual factors. In the distractor condition, overspecification reduces the speaker's cognitive effort of disambiguating between same-type and different-type contexts. While this communicative pressure is highly artificial, other situations where semantic distinctions (e.g. number) are relevant in limited contexts are easily conceivable. Therefore, the present study lends further support to the hypothesis that contextual factors can significantly influence grammatical structures.

References

Kirby, Simon, Hannah Cornish & Kenny Smith. 2008. Cumulative Cultural Evolution in the Laboratory: An Experimental Approach to the Origins of Structure in Human Language. *Proceedings of the National Academy of Sciences of the United States of America* 105(31). 10681–10686.

Winters, James, Simon Kirby & Kenny Smith. 2015. Languages adapt to their contextual niche. *Language and Cognition* 7(3). 415–449.