

## **COMMUNICATIVE INTERACTION LEADS TO THE ELIMINATION OF UNPREDICTABLE VARIATION**

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Certain properties are shared among the world's languages and are assumed to reflect learners' cognitive and linguistic biases. One such feature is that linguistic variation tends not to be unpredictable; instead, the variation present in languages is usually conditioned on grammatical or social context. For example, English exhibits variation in how the plural is marked: it can take different forms besides the regular 's' such as the morpheme '-en' in 'oxen' or nothing as in 'sheep', but these forms are fully predicted by the lexical item they mark, the variation is not free or unpredictable. Studying how learners acquire and use artificial languages exhibiting unpredictable variation can inform us about the biases that shape languages over long time-scales, because certain linguistic "preferences" may show up very quickly during learning and recall. Previous research has shown that children, and adults under certain conditions such as increased task demands, often eliminate variation by regularizing on one of the synonymous forms (Hudson Kam and Newport, 2009). Variation can also be eliminated by processes of transmission as shown by Smith & Wonnacott (2010) using an iterated learning paradigm. Another mechanism by which individual-level processes may shape the properties of languages is *communicative interaction*. We present findings from two experiments showing that

communication leads to the rapid elimination of variation, as interlocutors converge on a shared grammatical system.

We trained pairs of participants on miniature artificial languages that exhibited variation in either the presence or absence of a grammatical marker (Exp. 1) or in word order (Exp. 2), and then allowed them to communicate using the language they learnt. We used semi-artificial languages (pseudo-English words for lexical items and nonce words as grammatical markers) and varied the probability with which the grammatical marker appeared on each training trial in Exp. 1 and the probability of either word order to describe simple visual events in Exp. 2. Participants were randomly placed in one of several conditions (differing only in the statistics of their input language). Regardless of how large the difference was in their initial input language, communicating pairs in both experiments quickly converged on a shared linguistic system, jointly regularizing on a common form (not necessarily reflecting the pattern of their native language, English). Experiment 1 showed that when variable users interact with categorical users (who had been trained on an consistent system), they accommodate their use to match their partners', whereas categorical users do not change their behaviour during interaction. In addition to convergence, Experiment 2 provided evidence for structural priming: participants were more likely to use their preferred word order when their partners used that same order in the trial immediately preceding. This largely automatic priming is a likely mechanism leading to behavioral convergence (Pickering & Garrod, 2004). Moreover, we found a lasting effect of interaction on recall in both experiments as revealed by a post-interaction individual test.

This study shows that moment-to-moment alignment between communicating partners plays an important role in driving convergence to a shared, predictable grammatical system. More generally, we show that communicative interaction leads to the elimination of unpredictable variation, which may be a third important mechanism (besides individual learning and cultural transmission) that may lead to language change and ultimately language design by amplifying learners' weak individual biases.

## References

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