

# ADULT LANGUAGE LEARNING AND THE EVOLUTION OF LINGUISTIC COMPLEXITY

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The pressures shaping languages may differ in different physical, demographic, and sociocultural environments. In other words, non-linguistic factors may systematically determine linguistic features (Lupyan & Dale, 2010; Trudgill, 2011; Nettle, 2012). Identification of such factors, and the mechanisms by which they operate, will provide valuable insights into how languages evolve to exhibit differing degrees of grammatical complexity, and also shed light on the structural properties of the earliest languages (Wray & Grace, 2007). We present three experiments which investigate the mechanisms linking sociocultural factors and linguistic structure: specifically, we attempt to explain why languages of small social groups tend to be morphologically complex and opaque, while the languages of larger groups tend to be morphologically simpler, more regular and transparent (Wray & Grace, 2007; Lupyan & Dale, 2010).

An explanation of how group size could have such an effect is yet to be convincingly demonstrated (Nettle, 2012). One possible mechanism is the different learning biases and abilities of adults and children (Wray & Grace, 2007; Lupyan & Dale, 2010; Nettle, 2012; Atkinson, Kirby, & Smith, 2015): languages with more speakers tend to have a greater proportion of non-native speakers, and these adult learners may acquire and subsequently transmit simplified morphological systems. We assess this claim experimentally, exploring not only the generation of simplified morphology by individuals, but also the potential for such simplifications to influence group-level language characteristics.

In Experiment 1, we trained adult participants on a morphologically-complex

miniature language with semantically-redundant suffixes, and then tested them on their ability to reproduce those languages. We found that ‘non-native’ speakers (participants given less input data, which we use as a proxy for the reduced exposure characterising adult learning) produced simpler morphological systems.

In Experiment 2 we focus on how such simplifications could spread through a population. We used the languages produced by our participants in Experiment 1 as the input for a fresh set of learners, manipulating (i) whether this second generation received input drawn from few or many speakers, and (ii) whether those model speakers had received a lot or a little exposure to the original complex target language (representing input from native or non-native speakers). We found that mixing input from multiple speakers nullified the simplifications introduced by non-native learners in Experiment 1. While the output of individuals may be simplified, such simplifications tend to be idiosyncratic, and therefore mixing the output of one or more non-native speakers with the output of native speakers yields a system which is itself complex and variable, and which did not lead to the acquisition of a simpler language by our second generation.

In Experiment 3, we focus on language *use*, and the consequences of the interaction between native and non-native speakers: after training on a miniature language (which includes irregular forms for native learners but only regular forms for non-native learners), participants interact in pairs, taking turns to describe scenes for each other. Our results show that a speaker who acquires a more complex language than their partner may simplify their output in interaction, in particular by using (inferred) regular forms instead of irregulars.

We suggest that adult learning is a plausible explanation for why languages spoken by more people have simpler morphology, but that native speaker accommodation to non-natives is a key linking mechanism: idiosyncratic simplifications by non-natives alone does not offer a complete explanation.

## References

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