THE SPONTANEOUS EMERGENCE OF LINGUISTIC DIVERSITY IN AN ARTIFICIAL LANGUAGE

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Human languages are socially learnt, and this social learning permits the persistence of linguistic diversity at many levels (language families, languages, dialects, accents, familylects). Language therefore provides an excellent marker of social identity, and this social function for language has been implicated in the generation of linguistic diversity: the linguistic systems of competing social groups will be driven apart due to social selection, resulting in linguistic divergence and the emergence of reliable markers of group identity (Nettle, 1999). Moreover, the evolution of the capacity for vocal learning itself may be driven by the need to acquire ever more subtle social group markers (a possibility known as the *password hypothesis,* see e.g. Fitch, 2000).

Roberts (2011) explored the role of between-group competition in linguistic diversification. He developed an experimental paradigm where sets of participants played a trading game involving requesting objects from each other using an artificial language. He found that password-like social group markers developed in conditions where there was competition between groups and high frequency of interaction within groups; this was driven by the intentional generation of linguistic diversity by his participants. Here we present an experimental paradigm, combining artificial language learning with the Minimal Group method borrowed from social psychology (e.g. Tajfel, 1970), and demonstrate the spontaneous emergence of linguistic diversity despite the absence of functional pressures for social differentiation.

We ran an experiment in which groups of four participants (72 participants total) were trained on a miniature language and then communicated dyadically using that language. After arriving in the lab, participants completed a short-form personality questionnaire. They were then trained on the miniature language: all four participants were seated in a room with a large shared monitor and speakers, saw objects appear on the screen and heard names of those objects (novel words). The target language featured two labels for every object, both used equally frequently during training, and therefore exhibited unpredictable

variation (of a form similar to that used in e.g. Reali & Griffiths, 2009). After training, all four participants sat together around a table and took turns naming objects for the person sitting opposite them (their partner) and selecting objects from an array based on their partner's label. All four participants could therefore hear the labels used by all other participants (and the feedback signal indicating whether the label was correctly interpreted by the partner), but only ever had to make object selections based on the descriptions of one individual, their partner.

We manipulated whether the four participants functioned as a single social group or two separate groups (the two pairs of partners) by constructing artificial social groups. In the Group condition the experiment proceeded as outlined above. In the Pairs condition, after completing the personality questionnaire, participants were told they had been allocated to two separate groups (Apples and Oranges) based on their personality scores; the two groups wore distinctively coloured bibs and sat together during training, separated from the other group by a screen but still receiving identical training on the shared display and speakers. All four participants sat around a table together during interaction, as in the Group condition; individuals were partnered with their group-mate, i.e. the Apples sat opposite each other, as did the Oranges.

We observed linguistic divergence in both conditions: participants were more likely to use the same object names as their partner than their non-partners. However, divergence was significantly higher in the Pairs condition than the Group condition: the mere allocation to social groups resulted in the partnered pairs diverging in their label choices, each pair using different labels for the same objects, despite their full exposure to the labels used by the entire group. Post-experiment debrief suggested this was not a conscious strategy, and would be afunctional in the object-selection communication task anyway.

This data shows that linguistic divergence can occur purely as a consequence of the existence of social groups. This suggests that socially learnt linguistic systems will rapidly acquire the social functions central to the password hypothesis even without pre-existing functional pressure for social differentiation.

References

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