The role of social biases in linguistic innovation: An artificial language learning study

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Languages are socially constructed entities, and as such, the ways in which they evolve over time are subject to various social pressures. The role of one such factor – extravagance, defined as language users' desire to talk in such a way that they are noticed (Haspelmath, 1999) – has seen a surge of recent research interest (e.g. Baumann & Mühlenbernd, 2022; Koliopoulou & Walker, 2024; Ungerer & Hartmann, 2020). According to the extravagance view, speakers aim to stand out from their peers by creating novel linguistic forms and meanings, which may then be adopted by others due to the competing social pressure towards conformity.

However, as a concept that refers to language users' intentions, extravagance has proven difficult to operationalize, especially since most studies to date have been corpus-based (e.g., De Wit, Petré, & Brisard, 2020; Petré, 2017). Here, we present the first experimental study of the role of extravagance as a driver of linguistic innovation, using an artificial language-learning approach (Fedzechkina, Hall Hartley, & Roberts, 2022; Kirby, Cornish, & Smith, 2008).

In our experiment ($N = 830$), participants were taught eight words of an "alien" miniature language (e.g., *eso, nupna*). During training, participants saw the written forms paired with symbolic pictures expressing adjectival meanings (e.g., 'good', 'small', 'fast'), followed by a comprehension (picture-selection) task with feedback. Depending on the group, 0%, 25%, 50%, 75%, or 100% of the input words contained special diacritic symbols (triangles on top of vowels).

In the test phase, participants were instructed to pursue either of three social (non-linguistic) goals: (i) to stand out from the aliens ("extravagance bias"); (ii) to blend in with the aliens ("conformity bias"); (iii) none ("baseline"). Participants were then presented with pictures and asked to type the alien word, using a virtual keyboard that included the above-mentioned diacritics. Participants were

prompted both with the familiar (trained) pictures and eight novel (untrained) pictures for which they were asked to freely invent words. We predicted that participants in the "extravagance bias" condition, compared with "conformity bias", would produce more forms with diacritics, using these unusual symbols as markers of extravagant innovation. We also expected that social bias would interact with input type, such that the difference between extravagance and conformity would be largest when diacritics had been present but infrequent in the input (i.e., 25% of words), thus standing out the most within the language. Finally, we predicted that participants would use more diacritics for novel items, for which they freely created new words, than for familiar (trained) items, where a "correct" answer existed.

The results were analyzed with mixed-effects logistic regression models. As Figure 1 shows, the proportion of words produced that contained diacritics varied by input type and training condition. The more diacritics participants had seen in the input language, the more diacritics they tended to produce themselves (linear trend $p < .001$). Moreover, participants produced more diacritics for novel than for familiar items in all input types except when the input language contained 100% diacritics (all ps $< .001$). However, none of the models showed a statistically significant effect of social bias on diacritic production (all ps $> .05$). We also explored other measures, for example the length of the words participants produced or their similarity to the input words, but again, these measures were not significantly affected by social bias.

To the best of our knowledge, our study is the first to experimentally explore how social biases towards extravagance and conformity shape linguistic innova-

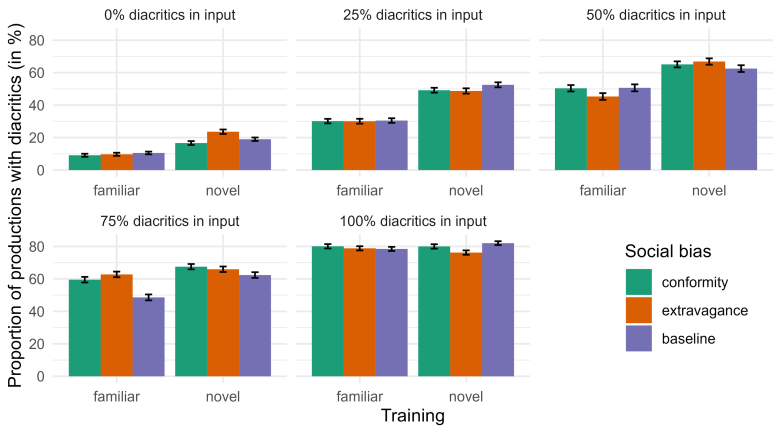

Figure 1. Proportion of participants' productions that contain diacritics, grouped by input type, social bias, and training condition; error bars represent standard errors around the mean.

tions at the lexical level. Contrary to our hypotheses, the results do not support the assumption that participants biased towards extravagance would use more forms with diacritics. This might indicate that we overestimated the role of extravagance, or it might point to limitations of the experimental design. For instance, it is an open question to what extent the diacritics we used were perceived as salient, potentially innovative features. In addition, there may be different ways in which "standing out" or "blending in" manifest themselves in the foreign-language learning scenario evoked by our experiment: For instance, mirroring the input language could potentially be a viable strategy towards either social goal. Further manipulations of the experimental scenario and instructions may help distinguish more clearly between the respective social mechanisms. While the results remain inconclusive, our experimental paradigm provides a resource-efficient way of testing the influence of diverse socio-contextual factors on linguistic innovation.

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