Form-meaning associations drive common patterns in language change

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When comparing words for the same concepts across unrelated languages, we sometimes find commonalities in the sounds employed. For example, words for 'mother' often contain /m/ or another nasal sound. Large-scale cross-linguistic comparisons have identified many such form-meaning association biases, which are thought to arise from universal aspects of human experience (e.g. Blasi et al., 2016; Johansson et al., 2020; Joo, 2020; Wichmann et al., 2010). For example, the association between nasals and words for 'mother' is attributed to nasals being among the first sounds infants produce (Jakobson, 1962; Murdock, 1959).

In this study, we examine the transmission of sounds involved in these biases in seven families: Bantu, Pama-Nyungan, Austronesian, Indo-European, Dravidian, Uralic, and Tupi-Guarani. The comparison across languages spoken in geographically diverse regions by culturally diverse groups allows us to filter out lineage-specific effects to uncover common patterns of transmission. For each family, we use ancestral state reconstruction to estimate rates of sound gains and losses in concepts relevant and irrelevant to attested biases. We examined 184 concepts for which we had words in at least 4 of the 7 families, to identify concepts which had unusually high rates of gaining, and/or unusually low rates of losing sounds involved in a bias. For example, Figure 1 plots the rates of gaining and losing nasal sounds for each of the 184 concepts. Concepts which have unusually high rates of gaining nasals and unusually low rates of losing them are labelled, while the colour of the points indicates the number of families for which words for the concept were attested.

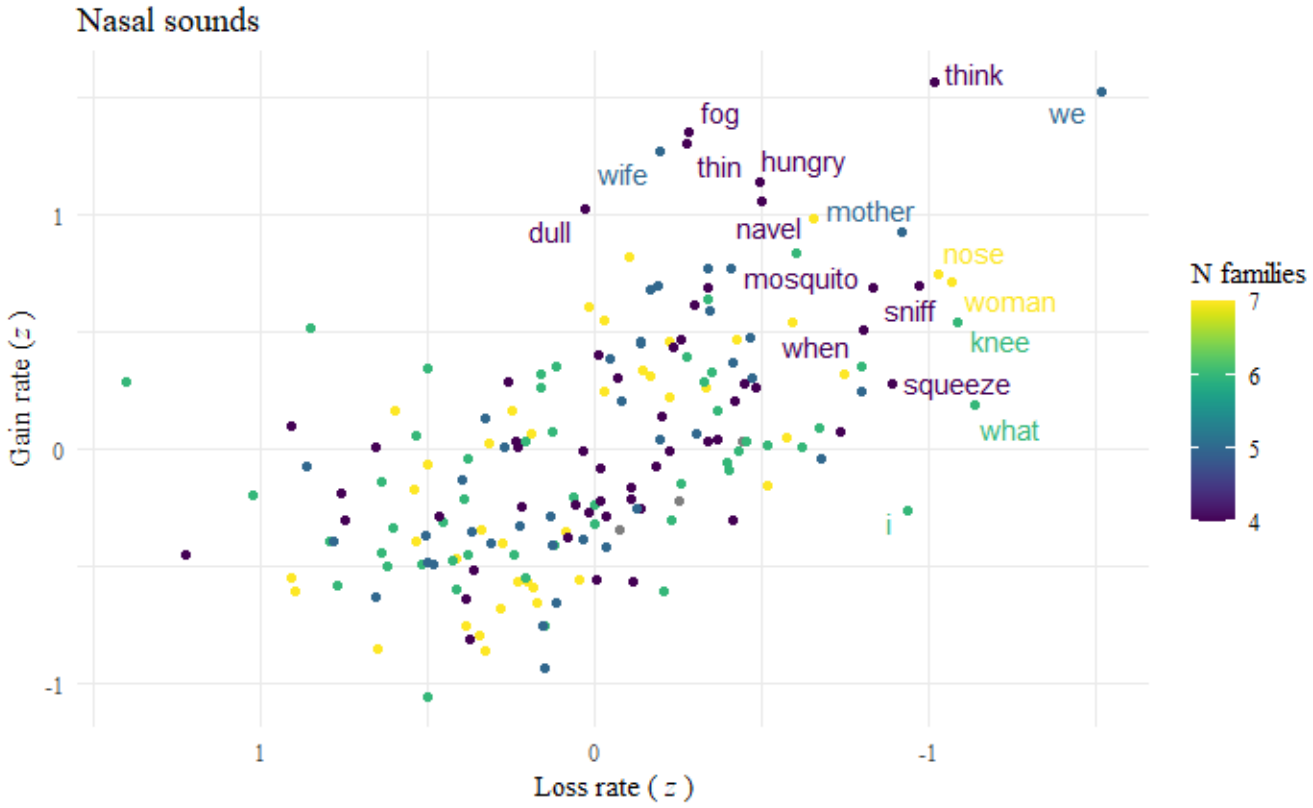

Figure 1. Rates of gaining and losing nasals across the 7 families. The coordinates of the points were derived by adding together the vectors representing the rates (z-scored) for each family.

While unstable concepts with high rates of lexical replacement will have higher rates of gaining new sounds in general, and conversely more stable concepts will have lower rates of losing them, we found that even after accounting for the stability of the concept—operationalised by its TIGER rate (Syrjänen et al., 2021)—some concepts had particularly high rates of gaining and particularly low rates of losing *specific* sounds. As well as nasals, we examined the transmission of labial sounds, rounded sounds, high front vowels, and low back vowels. We found that different concepts favoured different sounds in language transmission, and we discuss some potential mechanisms behind these patterns—including the role of iconic and indexical form-meaning associations.

Experiments with non-words have shown that people consistently favour certain sounds for certain meanings (e.g. Köhler, 1929; Sapir, 1929), and that in some cases these biases can transcend both linguistic and cultural boundaries (Ćwiek et al., 2022). Moreover, words that conform to these biases are often easier to learn (see Nielsen & Dingemanse, 2021 for a review). Here, we reveal the influence of these biases on language evolution, as we find that where there are opportunities for the alignment of form and meaning, words will gravitate towards forms that suit their meanings—both over time and across languages.

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