

Why do languages tolerate heterography? An experimental investigation of the cultural evolution of informative orthographies

Jon W. Carr; Kathleen Rastle

Royal Holloway, University of London, UK

It is widely acknowledged that opaque orthographies place additional demands on learning, often requiring many years to acquire fully. It is less widely recognized, however, that such orthographies may offer certain benefits in the context of reading. For example, the heterographic homophones (e.g., <knight> vs. <night>) impose additional costs in learning but may be beneficial in reading because they reduce ambiguity. Could it be the case, then, that heterography – and therefore orthographic opacity – may sometimes be selected for in the evolution of writing systems, despite the cost in learning? Berg and Aronoff (2021) have posited two models of heterography: *differentiation*, in which new spellings are created to differentiate words that are homophonous in speech (e.g., <lite> from <light> to signal low-fat), and *conservation*, in which heterography arises as an epiphenomenon of sound change (e.g., <meat> vs. <meet> resulting from the /ɛ:/-/e:/ merger in the Great Vowel Shift). In large-scale experiments with 540 participants, we test these models by simulating the cultural evolution of orthography using the iterated learning paradigm (Kirby et al., 2015). Specifically, an artificial “alien language” is allowed to evolve as it is inherited along a chain of participants, allowing us to explore the processes of differentiation and conservation, as well as two distinct pressures: a learning pressure (participants are incentivized to faithfully reproduce what they learned) and a communicative pressure (participants are incentivized to be communicatively successful). Under the learning pressure, we expect to observe the emergence of spelling transparency, while under the communicative pressure, we expect to observe the emergence of informative heterographic spellings that diverge from the spoken language to express meaning directly. We will further discuss how these scaled-down simulacra can inform our understanding of the real-world processes underlying spelling change, including the roles of variation, redundancy, and top-down reform.

Berg, K., & Aronoff, M. (2021). Is the English writing system phonographic or lexical/morphological? A new look at the spelling of stems. *Morphology*, 31(3), 315–328. <https://doi.org/10.1007/s11525-021-09379-5>

Kirby, S., Tamariz, M., Cornish, H., & Smith, K. (2015). Compression and communication in the cultural evolution of linguistic structure. *Cognition*, 141, 87–102. <https://doi.org/10.1016/j.cognition.2015.03.016>