

DECODING THE “BOUBA-KIKI” EFFECT IN EARLY VISUAL CORTEX

Stefano Ioannucci¹, Carole Jordan¹, Anne-Sophie Carnet^{1,2}, Carolyn McGettigan³
& Petra Vetter¹

¹Visual and Cognitive Neuroscience Lab, Department of Psychology, University of Fribourg, Switzerland; ²Institut et Haute École de la Santé La Source, Switzerland;
³UCL Speech Hearing and Phonetic Sciences, University College London, UK

Grant 238/20

Background/Rationale: The “bouba-kiki” effect, or sound symbolism, is the non-arbitrary mapping between speech sounds and visual shapes, in which words like “bouba” are consistently associated with round shapes, and “kiki” with spiky shapes.

Research Questions: Despite robust behavioral evidence for sound symbolic associations, it is still unclear whether they are a linguistic epiphenomenon or manifest themselves as distinct sensory representations in the human brain.

Methods: We conducted 2 fMRI studies (total $n = 46$) in which blindfolded adult participants either judged the shape of sound-symbolic words or their meaningfulness.

Analysis: We used fMRI together with multivariate pattern analyses (MVPA) and representational similarity analysis (RSA) to examine neural activity patterns in visual, auditory, and control brain regions and across the whole brain.

Results: Our results show that, in the absence of visual input, round and spiky sound symbolic words elicit distinct neural representations, not only in auditory and speech processing regions, but also in parietal and even early visual cortex including V1. These neural representations correlate with behavioural shape judgements of sound-symbolic words, as revealed by representational similarity analyses.

Discussion: Our findings suggest a potential functional mechanism for sound symbolism: phonological features of sound symbolic words are represented in auditory and speech processing regions and linked to cross-modal shape representations in parietal and early visual regions, which in turn lead to sound symbolic perceptual judgements. Thus, our results provide evidence for a neural mechanism underlying the “bouba-kiki” effect in the human brain.

Keywords: Sound symbolism, Bouba-kiki effect, Cross-modal correspondences, fMRI

Publication:

Ioannucci, S., Jordan, C., Carnet, A.-S., McGettigan, C., & Vetter, P. (2026). *Decoding the “bouba-kiki” effect in early visual cortex* [Preprint]. bioRxiv. <https://doi.org/10.64898/2026.01.17.700088>

E-mail contact: petra.vetter@unifr.ch