

# Semantic effects in word recognition in speakers of English as a second language

Agata Dymarska

(Adam Mickiewicz University)

Keywords: word recognition; megastudy; perceptual experience; semantic richness; situated simulation

Word recognition performance is facilitated by the semantic content of the word. For example, people read the word “chair”, which is strongly linked with visual or haptic experience, faster than the word “truth”, which is not directly represented with sensory information. However, this phenomenon has been underexplored in second language speakers for whom semantic processing is thought to be more “shallow”, relying less on sensory information about concepts. Here, I take advantage of the *English Crowdsourcing Project* – a large-scale dataset of response times to 20,000 words, collected using the same procedure from speakers of English as L1 and L2 (Brysbaert et al. 2021, Mandera et al. 2020), in order to investigate whether semantic variables elicit facilitation effects on L2 word recognition performance, and whether these effects vary from effects observed in L1.

Large-scale Bayesian hierarchical item-level regressions were carried out using accuracy and time to respond per word, as well as word rank (higher rank indicating a word known by a larger number of people) as dependent variables, and perceptual and motor strength of experience associated with each word as predictors (perceptual modalities: visual, auditory, olfactory, haptic, interoceptive and gustatory strength; motor effectors: mouth/throat; hand/arm; foot/leg; head; torso; sourced from Lynott et al., 2020). Data was analysed separately for L1 and L2 speakers, while controlling for lexical variables such as word length and frequency.

Results showed that, in both groups, perceptual strength of the word facilitated performance, that is, participants responded faster to words referring to concepts with high sensorimotor strength. In particular, a composite measure of sensory strength, aggregating all modalities into one rating, was the best predictor of performance. In line with previous findings in L1 speakers of English (Dymarska et al., 2023), sensorimotor dimensions associated with bodily experience (interoceptive or haptic) and with communication experience (head or mouth movement) produced strong effects in both groups. Some differences emerged between L1 and L2 speakers, in particular in the role that baseline lexical information played in word recognition.

Overall, the study suggests that L2 speakers can also rely on automatic activation of semantic information when reading words and retrieving conceptual information, albeit with some differences from the L1 population. This provides implications for our understanding of the mechanisms of second language processing and the nature of conceptual representations in bilinguals. The study also demonstrates the usefulness of megastudy datasets for investigating questions of bilingual representations.

References:

Brysbaert, M., Keuleers, E., & Mandera, P. (2021). Which words do English non-native speakers know? New supernational levels based on yes/no decision. *Second Language Research*, 37(2), 207-231.

Dymarska, A., Connell, L., & Banks, B. (2023). Weaker than you might imagine: Determining imageability effects on word recognition. *Journal of Memory and Language*, 129, 104398.

Lynott, D., Connell, L., Brysbaert, M., Brand, J., & Carney, J. (2020). The Lancaster Sensorimotor Norms: multidimensional measures of perceptual and action strength for 40,000 English words. *Behavior Research Methods*, 52, 1271-1291.

Mandera, P., Keuleers, E., & Brysbaert, M. (2020). Recognition times for 62 thousand English words: Data from the English Crowdsourcing Project. *Behavior Research Methods*, 52, 741-760.