Bilingualism: Language and Cognition

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How fuzzy are L2 phonological representations?

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Peer Commentaries

Cite this article: Nicol J (2022). How fuzzy are L2 phonological representations? *Bilingualism: Language and Cognition* **25**, 230–231. https://doi.org/10.1017/S1366728921000614

Received: 15 July 2021
Revised: 23 July 2021
Accepted: 28 July 2021
First published online: 27 January 2022

Keywords:
Second language; lexicon; L2 representations

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The idea that language learners create imperfect mental representations of new words is difficult to dispute, as Bordag, Gor, and Opitz (2021) say. For anyone who has interacted with language learners, it is clear that they have sometimes miscoded the phonological or orthographic form of a word, or use it in a way that shows that the meaning they associate with it is not exactly native-like.

Further, it seems plausible that lexical semantics might remain non-native-like for an extended period of time; in some cases, prolonged and extensive exposure to L2 input would be required in order to fine-tune the representation of a word with complex and nuanced meaning.

It also seems plausible that some types of form representations would remain "fuzzy" even in proficient L2 speakers. The authors describe research showing that phonological representations for L2 words that contain a sound contrast that does not exist in L1 are likely to be incorrect or imprecise. For example, /l/ and /r/ are phonemically contrastive in English but not Japanese, and this contrast is notoriously difficult for native speakers of Japanese to acquire. They may assimilate both sounds to the same /ɾ/ phoneme in Japanese. As a consequence, the phonological representation for the word "rock" would be identical to the word "lock", with both containing /ɾ/ as the initial segment. There is ample research documenting the persistent difficulty that such learners have discriminating this contrast, both in perception and production.

However, the authors claim that "fuzziness" is a GENERAL property of L2 phonolexical representations, and even those that contain ONLY segments that also occur in L1 could be fuzzy.

This claim is less well supported. One of the major pieces of evidence brought to bear is research by Cook, Pandža, Lancaster and Gor, K. (2016). The participants in their Experiment 1 were "Advanced" and "Superior" native English learners of Russian and a group of native Russian speakers. Their task was to judge whether pairs of words (a spoken Russian word followed by a visually-presented English word) were translation equivalents. There were three conditions, two of which used Russian words whose initial segments were similar; degree of similarity was manipulated. For example, in the Matching condition, the spoken Russian word /malatok/ (*hammer*) would be followed by the visual word "HAMMER"; in the Mismatching Competitor condition, /malako/ (*milk*) would be followed by "HAMMER". There was also a Mismatching Non-Competitor condition: /zvezda/ (*star*) would be followed by "BASEMENT". The results showed that participants were slower to reject "HAMMER" as a translation of /malako/ than they were to reject "BASEMENT" as a translation of /zvezda/. Consistent with this, RTs for the Mismatching Competitors varied as a function of phonological similarity, with less similar competitors eliciting faster RTs. In addition, the lower proficiency Advanced group showed a heightened effect of similarity.

Does this mean that phonological forms in the mental lexicon of Advanced language learners are "fuzzy"? Not necessarily. In this study, even the Native Russian group was marginally slower to indicate that "HAMMER" is not the translation of /malako/, and this cannot be attributed to fuzzy phonolexical representations. An alternative explanation is that participants double-check the translations and, in order to do so, mentally "replay" the Russian word they had heard. Hence, they hear /malako/, see "HAMMER", and then consult their phonological working memory (WM) to verify that they indeed heard /malako/. What if it is the WM representations that are sometimes "fuzzy"? It would be expected that native speakers and Superior learners would have more robust WM representations than Advanced learners, but even those could be fuzzy from time to time, due, for instance, to lapses in attention.

Cook et al. also conducted a priming experiment in which participants heard pairs of spoken items and judged whether the second item was a real word or not. For the critical pairs, the prime was either semantically-related to the target (e.g., /karova/ (*cow*) + /malako/ (*milk*), the Semantic condition), or semantically-unrelated to the target but phonologically related to a similar-sounding word (e.g., /karova/ (*cow*) + /malatok/ (*hammer*), the Pseudo-Semantic condition). There was also a control condition with unrelated prime-target pairs. Results showed a facilitation effect for items in the Semantic condition, as expected. Critically, the Advanced group was slower to respond to targets in the Pseudo-Semantic condition (/karova/+/malatok/) than to targets in the control condition (for high-frequency items). Native speakers, on the other hand, showed no such slowdown. This result is taken to mean that Advanced

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learners have fuzzy phonological representations which can result in impaired access to lexical semantics. But note that it is not that the phonolexical representation of /malatok/ is the SAME as that of /malako/: if it were, there would be a semantic priming effect in the form of facilitation. So, what causes the slowdown? At one point in their paper, Cook et al. suggest that "both a native and nonnative listener will expect to hear "milk" after they hear "cow"; when they realize that they hear "hammer" instead of the onset-matched "milk," a native speaker will quickly recover from the unmet expectation, while a nonnative speaker will be slower in recovering from the semantic "garden path" created by the prime and the target with a highly expected onset" (p. 4). But this describes a PROCESSING problem, not a representational problem: on this scenario, the nonnative speaker hears /malatok/ and correctly accesses *hammer*. (Note also that the same potential WM problem raised above could apply here: the fuzziness may have to do with the phonological representation that is in WM.)

In order to convincingly argue in favor of fuzzy form representations in the L2 mental lexicon, it is essential to present converging evidence not just from comprehension tasks – where WM limitations may play a role – but also from production tasks. Would Advanced Russian learners translate *hammer* as /malako/? It would be worth finding out.

Competing interests. The author declares none

References

Bordag D, Gor K and Opitz A (2021) Ontogenesis model of the L2 lexical representation. *Bilingualism: Language and Cognition*. https://doi.org/10.1017/S1366728921000250

Cook S, Pandža NB, Lancaster AK and Gor K (2016) Fuzzy nonnative phonolexical representations lead to fuzzy form-to-meaning mappings. *Frontiers in Psychology* **7**, 1345.

https://doi.org/10.1017/S1366728921000614 Published online by Cambridge University Press