Bilingualism: Language and Cognition

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Helping busy Suzy fight fuzzy in foreign language learning

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Peer Commentaries

Cite this article: Baxter P, Leoné F, Dijkstra T (2022). Helping busy Suzy fight fuzzy in foreign language learning. *Bilingualism: Language and Cognition* **25**, 202–203. https://doi.org/10.1017/S1366728921000651

Received: 16 July 2021
Revised: 22 July 2021
Accepted: 28 July 2021
First published online: 28 September 2021

Keywords:
foreign language learning; instruction methods; contrasting; lexical specification

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The Ontogenesis Model of the L2 Lexical Representation (OM) introduced by Bordag, Gor, and Opitz (2021) represents a significant contribution to the field of second language (L2) acquisition. Their efforts in characterizing the nature of developing L2 representations, a hitherto underexplored domain, are commendable.

We especially applaud the usefulness of the OM as a valuable theoretical underpinning for educational research. Bordag and colleagues briefly touch upon the relation between specific dimensions of the OM and teaching methods. Here, we would like to offer some additional insights into how specific teaching methods can influence the trajectory of lexical development. This is of importance, because while the keynote article describes what fuzziness might look like on different dimensions and offers useful vocabulary in how to think about L2 acquisition, it fails to address the question of exactly HOW fuzziness reduction evolves into an optimum (more research may indeed be needed to determine this).

In a recent article, we reviewed in depth how commonly used instruction methods interact with each of the dimensions described in the model, leading to better or worse learning (Baxter et al., 2021a). In particular, we argued that few teaching methods contribute to developing specificity in all three dimensions, thereby often leading to suboptimal learning outcomes. Our own work provides some clues as to how the specification process can be enhanced by new teaching methods. In essence, an instruction method that requires learners to carefully compare, or contrast, similar words facilitates learning when the contrasted dimension is underspecified. Specifically, in adults, we found that contrasting orthographically similar L2 words led to more specific orthographic representations on the dimension of linguistic domains (Baxter et al., under review). In children, we additionally found that contrasting semantically similar words led to more precise form-meaning mappings (Baxter et al., 2021b). Consequently, we propose that contrasting contributes to triggering the specification process, presumably by engaging specific mechanisms of attention.

This indicates that the learning task at hand unquestionably has an impact on how the dimensions of the OM evolve to reach an optimum. It should therefore be useful to add a model component reflecting a task/decision system, as suggested in bilingual word processing models such as the BIA+ (Dijkstra & van Heuven, 2002) or Multilink (Dijkstra et al., 2019). This inclusion would allow the model to account for effects of different teaching methods on lexical development. Such a model component could, for instance, indicate which dimension (s) is/are being developed depending on the learning method at hand, as hinted by the authors on page 36. As such, this component should be part and parcel of a more differentiated and quantified account of L2 learning.

To enable implementation in a computational model, we believe that some aspects of the present verbal model will need to be clarified, concretized, and quantified in the future. Most importantly, there is a certain level of confusion as to the definition of "fuzzy". In their conclusion (p. 37), the authors state: "Inaccurate or low-resolution encoding in one or more domains produces fuzzy lexical representations. This fuzziness at the level of linguistic domains has a cascading effect on the robustness level of the mappings between different domains and the strength of connections between different lexical representations in the IntraNetwork …". This seems to imply that only representations themselves can be fuzzy, and that there is a causal relationship between the dimensions. However, on page 11 fuzziness is described independently for each dimension of the OM, and further defined as an "imprecise lexical encoding". We wonder, therefore, if these dimensions are always interrelated. Does a fuzzy representation in the dimension of linguistic domains automatically translate to "fuzziness" on the remaining dimensions of the model? Conversely, does "fuzziness" in the remaining two dimensions imply that the representation itself is fuzzy? We can think of some examples where this is not the case. Take, for instance, a word such as "afraid", which has no orthographic neighbors: even though this hermit word is inherently not strongly integrated in the lexical orthographic network (i.e., it has few links to other items), it is still a high-frequency word that learners would not typically experience as problematic. Alternatively, learners may consistently misspell or mispronounce a word, which indicates a fuzzy lexical representation, but they may know what the word means, also in relation to other, similar words. We suggest that a graphical representation like Figure 1 is useful to clarify

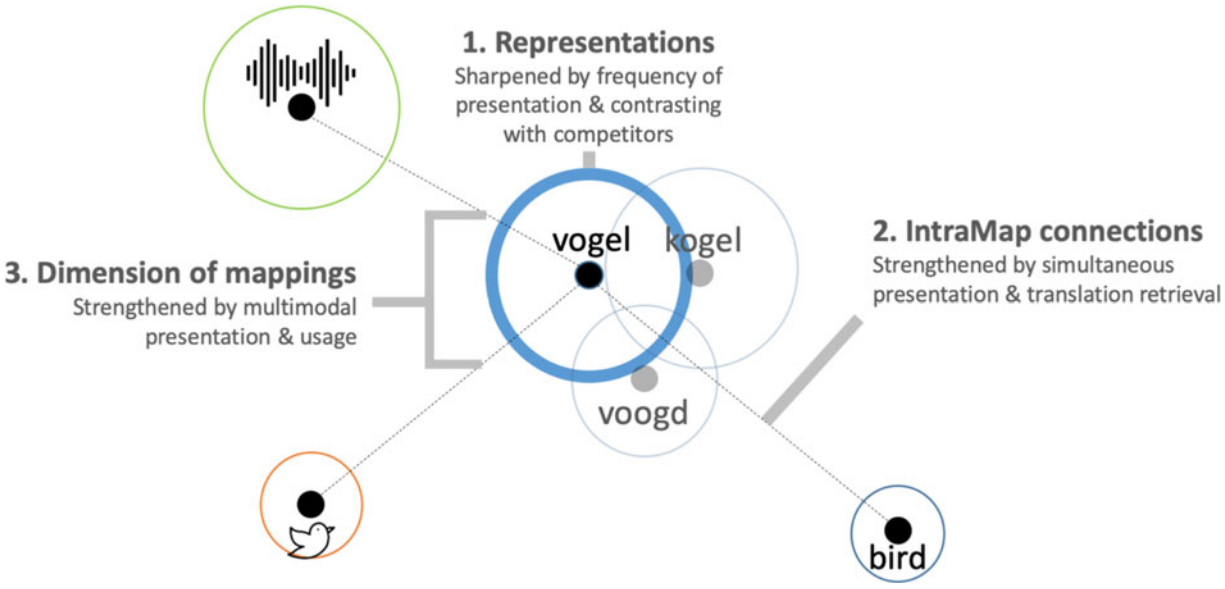

Figure 1. A graphical representation of the three types of fuzziness specified in the OM, including how they can be sharpened (see Baxter et al., 2021a), using the Dutch (L2) word 'vogel' as an example ("vogel" means "bird").

these different relationships in the OM. As this figure shows, first, representations themselves can be fuzzy. Circles indicate individual representations and overlap between representations indicates potential confusion; the "fuzzier" the representation, the larger the circle and the more overlap (see also Baxter et al., 2021a). Second, the IntraMap connections (between a word and its translation) can also be fuzzy, leading to difficulties and confusion in translation. Third, the "dimension of mappings" (i.e., the multimodal integration of a word) can be fuzzy, meaning that a word is not well-connected to the associated other dimensions. In the example, the word "vogel" is not well-connected to phonology (sound icon) and meaning (bird icon).

All in all, while more work will be needed to further specify, characterize and ideally implement the OM, the model is a promising anchoring and thought-provoking framework for studies in the field of L2 acquisition. The authors took the first steps in providing researchers in the field with a model that is uniquely aimed at understanding the development of individual L2 representations. This hopefully allows future L2 research to less heavily rely on theoretical models that are only indirectly or partially related to L2 acquisition, and move our field forward.

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https://doi.org/10.1017/S1366728921000651 Published online by Cambridge University Press