Bilingualism: Language and Cognition 22 (4), 2019, 689–690 © Cambridge University Press 2018 doi:10.1017/S1366728918000706

COMMENTARY

Words only go so far: Linguistic context affects bilingual word processing*

JANET G. VAN HELL
Department of Psychology, *Pennsylvania State University*

(Received: April 23, 2018; accepted: May 21, 2018)

In their keynote paper, Dijkstra, Wahl, Buytenhuijs, van Halem, Al-jibouri, de Korte, and Rekké (2018) present a computational model of bilingual word recognition and translation, Multilink, that integrates and further refines the architecture and processing principles of two influential models of bilingual word processing: the Bilingual Activation Model (BIA/BIA+) and the Revised Hierarchical model (RHM). Unlike the earlier models, Multilink has been implemented as a computational model so its design principles and assumptions can be compared with human processing data in simulation studies – which is an important step forward in model development and refinement. But Multilink also leaves behind an important theoretical advancement that was touched upon in extending BIA to BIA+ (Dijkstra & Van Heuven, 2002): how linguistic context influences word processing. In their presentation of BIA+, Dijkstra and Van Heuven (2002) hypothesized that syntactic and semantic aspects of sentence context may affect the word identification system. Theoretically, this was an important step forward, as none of the bilingual word processing models (and few monolingual word processing models, for that matter) had incorporated linguistic context, and at that time only a handful of empirical studies had examined how linguistic context affects bilingual word processing. However, in the past 15 years a significant body of empirical work has been published that examines how semantic and syntactic information in sentences impacts word processing in bilinguals. These important insights are not incorporated in the Multilink model.

Studies that examined how linguistic context impacts lexical access in bilinguals have found that the language of the sentence context in and of itself does not affect cross-language activation of target words embedded in the sentence, and is not sufficient to restrict activation of lexical alternatives to the language of the sentence context, not even in cross-script bilinguals reading sentences that unambiguously point at one language (Jouravlev & Jared, 2014). However, semantic information has been found to modulate cross-language activation, suggesting that readers and listeners use semantic cues to guide lexical access (for a review, see Lauro & Schwartz, 2017). Specifically, semantic cues in a sentence can bias towards a particular meaning, and thereby constrain the activation of upcoming words, and the degree of language-nonselective access in bilingual processing. For example, Van Hell and De Groot (2008), testing Dutch–English bilinguals, found that semantically high constraint sentence contexts (e.g., "The best cabin of the ship belongs to the ... [captain]"), but not low constraint sentence contexts (e.g., "The handsome man in the white suit is the ... [captain]"), eliminated the cognate facilitation effect in L2 lexical decision and reduced the cognate facilitation effect in forward (from L1 to L2) and in backward (from L2 to L1) translation production. These findings suggest that semantic constraints in a sentence context affect language selection via top-down activation of appropriate lexical entries and thus influence bottom-up processes of lexical access in bilingual word recognition and translation, as implemented in Multilink.

A related line of research studying prediction during L1 and L2 language comprehension suggests that bilingual readers and listeners may also use sentence structure and syntactic information to guide the selection of target words embedded in the sentence and constrain the degree of language-nonselective access (cf. Zirnstein, Van Hell & Kroll, 2018). For example, Foucart, Martin, Moreno, and Costa (2014) had Spanish–Catalan bilinguals and French–Spanish bilinguals read semantically constraining sentences in Spanish in which the gender marking of the article preceding the sentence-final noun either matched or did not match the expected word (e.g., "The pirate had a secret map, but he never found the [masculine] treasure [expected target] / the [feminine] cave [unexpected target] he was looking for."). Foucart et al. observed an effect of congruency of the article and the predicted noun (i.e., larger N400 effects were elicited on the preceding article when the gender did not match the expected

* The preparation of this commentary was supported by National Science Foundation grants BCS-1349110, SMA-1514276, and OISE 1545900.

Address for correspondence:
Janet G. van Hell, Department of Psychology, 414 Moore Building, Pennsylvania State University, University Park, PA 16802 USA
jgv3@psu.edu

https://doi.org/10.1017/S1366728918000706 Published online by Cambridge University Press

word, and N400 and frontal positive effects were elicited for unexpected targets), suggesting that bilinguals can use semantic and gender agreement cues to predict upcoming target words. Interestingly, the means and visual inspection of the grant averages for the French–Spanish bilinguals suggested more pronounced effects for cognate than for noncognate target words, but the interaction between expectation and cognate status did not reach significance, which the authors attribute to lack of statistical power due to the low number of cognates and noncognates.

Bilinguals rarely read or listen to isolated words, and a substantial body of evidence indicates that semantic and grammatical cues potentially guide lexical access in bilingual word recognition and translation. A next step forward is to incorporate this knowledge in Multilink, and examine how contextual information affects its basic principles and assumptions regarding nonselective lexical access, resting level activation, and interactions among orthographic, semantic, and phonological codes.

References

Dijkstra, T., & Van Heuven, W. J. B. (2002). The architecture of the bilingual word recognition system: From identification to decision. *Bilingualism: Language and Cognition, 5,* 175–197.

Dijkstra, A., Wahl, A., Buytenhuijs, F., van Halem, N., Al-jibouri, Z., de Korte, M., & Rekké, S. (2018). Multilink: a computational model for bilingual word recognition and word translation. *Bilingualism: Language and Cognition,* doi:10.1017/S1366728918000287.

Foucart, A., Martin, C. D., Moreno, E. M., & Costa, A. (2014). Can bilinguals see it coming? Word anticipation in L2 sentence reading. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 40,* 1461–1469.

Jouravlev, O., & Jared, D. (2014). Reading Russian-English homographs in sentence context: Evidence from ERPs. *Bilingualism: Language and Cognition, 17,* 153–168.

Lauro, J. G., & Schwartz, A. I. (2017). Bilingual non-selective lexical access in sentence contexts: A meta-analytic review. *The Journal of Memory and Language, 92,* 217–233.

Van Hell, J.G., & De Groot, A. M. B. (2008). Sentence context affects lexical decision and word translation. *Acta Psychologica, 128,* 431–451.

Zirnstein, M., Van Hell, J. G., & Kroll, J. F. (2018). Cognitive control abilities mediate prediction costs in monolinguals and bilinguals. *Cognition, 176,* 87–106.

https://doi.org/10.1017/S1366728918000706 Published online by Cambridge University Press