

Experience and conceptual overlap modulate cross-language priming effects

Adel Chaouch-Orozco (University of Reading), Jorge González Alonso (The Arctic University of Norway) & Jason Rothman (The Arctic University of Norway, Universidad Nebrija)

Studies examining translation priming between non-cognate words with lexical decision tasks (LDT) report a priming asymmetry (larger L1 prime-L2 target priming compared to L2-L1). This potentially reflects (qualitative and/or quantitative) differences in representation and processing between L1 and L2 words. Several models of bilingual lexical processing have sought to explain this finding, with the Revised Hierarchical Model (Kroll et al., 2010) and Multilink/BIA+ (Dijkstra et al., 2019) being the most prominent. The former explains the asymmetry through differential access to conceptual information by L1 vs. L2 words. Under Multilink, it is explained by slower L2 word processing, reflecting lower (subjective) word frequencies in the L2. Both models assume holistic, largely overlapping conceptual representations between translation equivalents.

The present study explores the role of L2 use and word frequency on cross-language priming. We implement a nuanced two-way operationalization of L2 use by (a) manipulating immersion in a novel design with three groups differing in both quality and quantity of L2 exposure, and (b) employing the Language and Social Background Questionnaire' (Anderson et al., 2018) score as continuous variables. Secondly, we employ stimuli with a large frequency range to thoroughly investigate this factor. Potential effects of conceptual overlap between cross-language related words would have consequences for both the RHM and Multilink (e.g., van Hell & de Groot, 1998). For this reason, our stimuli set contains concrete and abstract translation equivalents, as well as cross-language semantic associates (obtained from a norming study).

Three hundred late sequential (L1) Spanish-(L2) English bilinguals are being tested in three groups: an L2 immersed group (UK), a non-immersed group (Spain), and a group (Norway) where the participants' relative L2 use is higher than in the Spain Group but lower than in the UK Group. All participants are similarly (highly) proficient in the L2, allowing factoring out a potential confounding effect. 300 translation equivalent pairs and 110 semantic associative pairs were used. This large sample size and stimuli N reflects our effort to draw robust conclusions supported by large statistical power (Brysbaert, 2020). We employ an unmasked translation priming LDT (see Figure 1 and Table 1 for procedure and stimuli). Effects of L2 use, word frequency, and concreteness are investigated through linear mixed effects models (Baayen, 2008).

Preliminary results with a subset of 72 participants from the immersed group (UK) show significantly faster responses with related primes in all conditions (see Table 2). The priming asymmetry is replicated: priming effects are larger in the L1-L2 direction. Also, L1-L2 priming is significantly larger for concrete pairs than for abstract ones, suggesting that a higher degree of conceptual overlap (which is typically true of concrete vs. abstract words) might produce a larger stimulation of the L2 targets. Moreover, more L2 use leads to significantly slower responses in all conditions (a potential effect of competition), except from L1-L2 responses with unrelated primes (Figure 2). This suggests that participants with increased L2 use can cope more efficiently with the misleading information from the L1 unrelated primes. Finally, more frequent related primes yield larger priming effects in all conditions, indicating these primes are more efficient in facilitating target processing.

These partial and preliminary results highlight the importance of L2 exposure/use and prime frequency in the study of translation priming. Also, they suggest that future experimental research should further explore the degree of conceptual overlap between cross-language related words, which could imply a step forward in our current understanding of lexico-semantic effects in bilingual visual word recognition. We are cautious in interpreting these results, however, as they represent a fraction of the expected data. Collection (Norway group) and analysis (of non-immersed groups and semantic associative priming) are still ongoing, but we expect being able to report definitive results at CUNY 2021. Whatever the outcome, these will surely have broad implications for the role of speaker- and stimulus-level variables in bilingual lexical processing.

Table 1. Sample stimuli used in each translation direction.

L1-L2			
Related prime	Unrelated prime	Word target	Nonce target
<i>lápiz</i> ('pencil')	<i>bosque</i> ('forest')	PENCIL	SMOUNT
L2-L1			
Related prime	Unrelated prime	Word target	Nonce target
onion	clown	CEBOLLA ('ONION')	TUNGO

Table 2. Response times, standard deviations (in parentheses), and priming effects, in milliseconds, for all conditions.

	Concrete pairs			Abstract pairs		
	Related	Unrelated	Priming	Related	Unrelated	Priming
	RT	RT		RT	RT	
L1 to L2	641 (220)	731 (275)	90*	687 (267)	763 (324)	76*
L2 to L1	647 (257)	704 (259)	57*	657 (235)	712 (258)	55*

Figure 1. Presentation procedure.

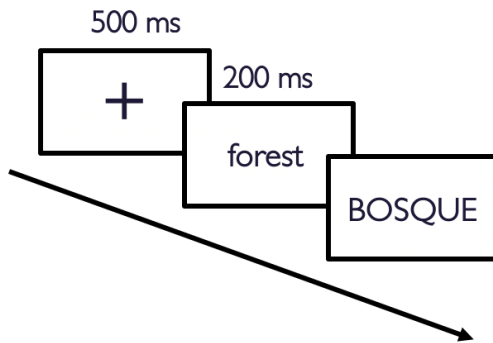
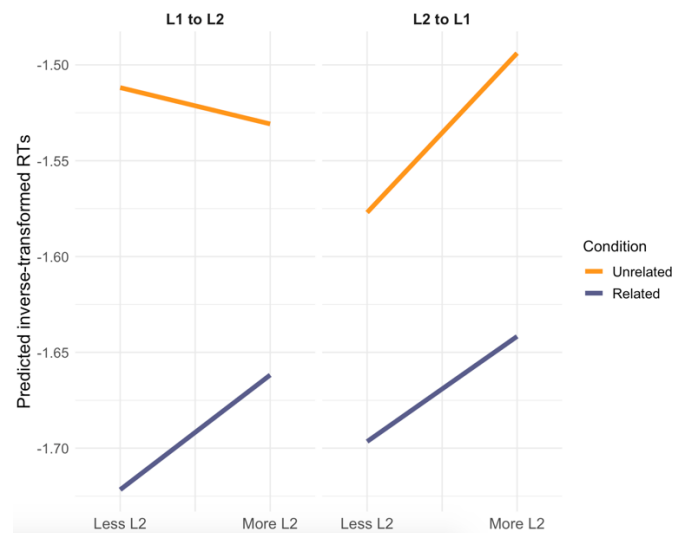


Figure 2. Effect of L2 use on the predicted inverse-transformed RTs in all conditions.

Note: smaller inverse RTs indicate slower responses



References

- Anderson, J., Mak, L., Keyvani Chahi, A., & Bialystok, E. (2018). The language and social background questionnaire: Assessing degree of bilingualism in a diverse population. *Behavior research methods*, 50(1), 250–263. <https://doi.org/10.3758/s13428-017-0867-9>
- Baayen, R. H. (2008). *Analyzing linguistics data: a practical introduction to statistics using R*. Cambridge: CUP.
- Brysbaert, M. (2020). Power considerations in bilingualism research: Time to step up our game. *Biling: Lang & Cog*, 1-6. Ahead of print. DOI:10.1017/S1366728920000437.
- Dijkstra, T., Wahl, A., Buytenhuijs, F., Van Halem, N., Al-Jibouri, Z., De Korte, M., & Rekké, S. (2019). Multilink: a computational model for bilingual word recognition and word translation. *Biling: Lang & Cog*, 22(4), 657-679.
- Kroll, J. F., Van Hell, J. G., Tokowicz, N., & Green, D. W. (2010). The Revised Hierarchical Model: A critical review and assessment. *Biling: Lang & Cog*, 13, 373–38.
- Van Hell, J. G., & De Groot, A. M. (1998). Conceptual representation in bilingual memory: Effects of concreteness and cognate status in word association. *Biling: Lang & Cog*, 1(3), 193-211.