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Simulating Cross-Linguistic Influence in Bilingual Reading – a Knowledge Distillation Approach

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Abstract

Cross-linguistic influence — the effect of between-language (dis)similarities on bilingual processing — affects both native (L1) and second-language (L2) processing, as well as L2 predictive processing, suggesting that expectations in one language can be shaped by the other. We compare bilingual language models where L1 (Dutch) affects L2 (English) only implicitly through mixed training data or pre-training, to models that explicitly import L1-specific next-word predictions during bilingual learning through knowledge distillation to test whether importing explicit L1 expectations into L2 learning improves a model’s predictions of L2 reading times. On Dutch–English bilingual reading data, L2 reading is better accounted for by monolingual surprisal overall, but bilingual models with explicit L1 expectations outperform bilingual models without. Additionally, L1 reading is better predicted by bilingual than monolingual models. Our findings indicate that explicit L1 expectations improve bilingual models’ account of L2 reading behaviour and that bilingual models capture aspects of bilingual L1 reading which monolingual models do not.