

## **Does bilingual experience facilitate novel vocabulary learning? The role of orthographic similarity.**

Jose Armando Aguasvivas (BCBL, Basque Center on Cognition, Brain and Language; Universidad del País Vasco, UPV/EHU)

Jon Andoni Duñabeitia (Centro de Ciencia Cognitiva C3, Universidad Nebrija; The Arctic University of Norway)

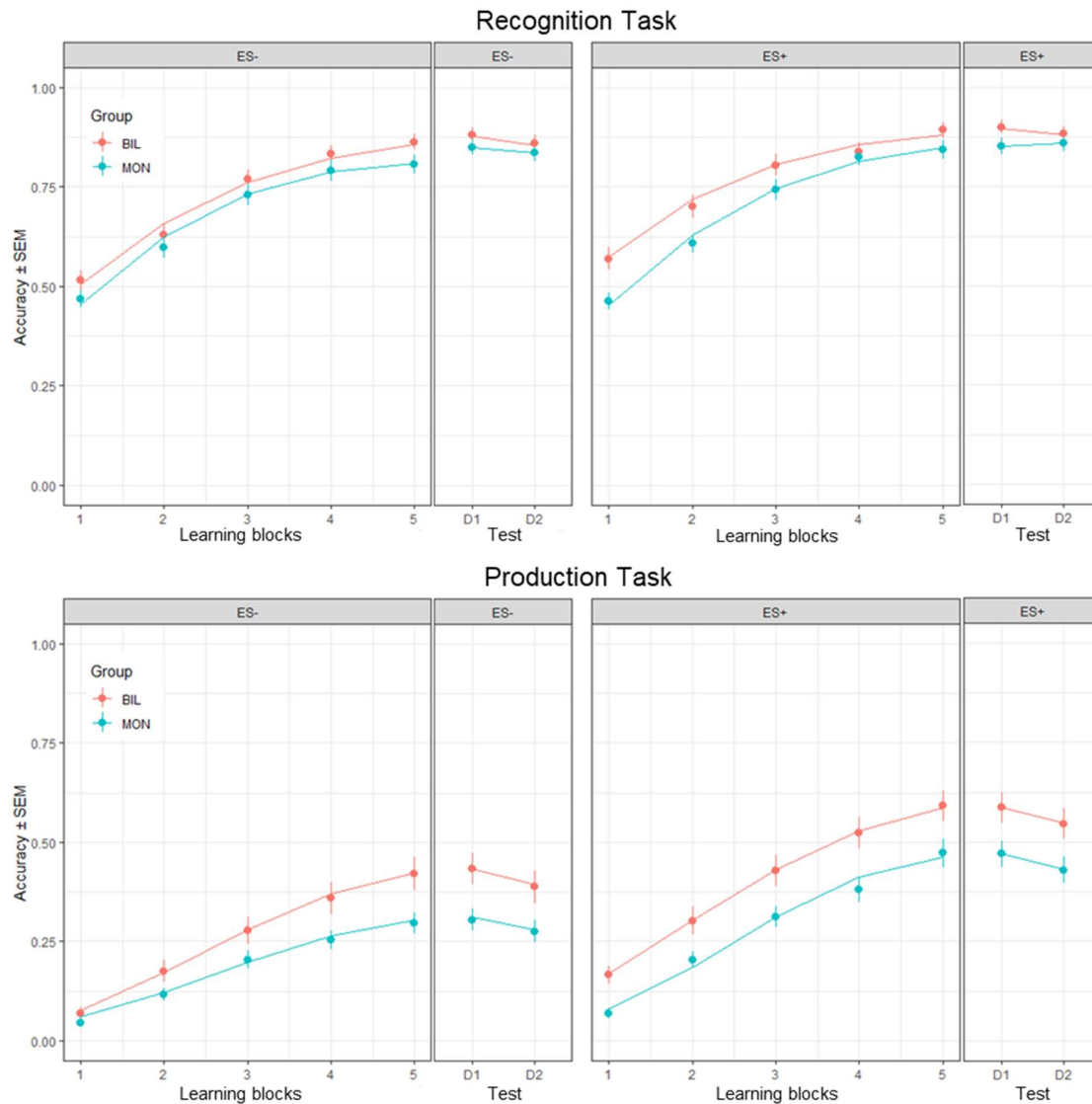
Manuel Carreiras (BCBL, Basque Center on Cognition, Brain and Language; Ikerbasque, Basque Foundation for Science; Universidad del País Vasco, UPV/EHU)  
j.aguasvivas@bcbl.eu

Many adults struggle when learning a foreign language. An important aspect of foreign language acquisition is the mapping between new word forms and their corresponding meanings to build vocabulary. Previous studies suggest that bilinguals seem to outperform monolinguals when learning words with novel phonemes that are dissimilar to their native language (Kaushanskaya & Marian, 2009a, b). Given that a common strategy to accelerate vocabulary acquisition involves using words that overlap with the native language as anchors (i.e., cognates), it is essential to ask whether this advantage holds for orthography. That is, do bilinguals and monolinguals differ when learning written vocabulary? Is there an effect of orthographic similarity with the native language?

Spanish-Basque bilinguals (n=40) and Spanish monolinguals (n=40) participated in an artificial vocabulary learning task. The groups were matched on age, education level, and non-verbal intelligence. The vocabulary contained 48 disyllabic written non-words paired with black-and-white depictions of real objects. Half of the non-words were orthographically similar to Spanish (ES+ condition; e.g., donta), while the other half were dissimilar to both Spanish and Basque (ES- condition; e.g., rutbo). The orthographic similarity was composed of bigram/gram frequency, orthographic neighborhood size, and ratings from 10 native Spanish-speakers. Following a familiarization phase, participants completed five blocks of recognition (4AFC task) and production tasks (type the novel name of each object) with feedback. Finally, they completed production and recognition tests of the words after a short (20 minutes) and a long (12 hours) delay. Recognition and production data, as well as learning and test phases, were analyzed separately.

We evaluated the learning phase using growth curve analyses with second-order orthogonal polynomials (Mirman, 2016). The models were fitted to the empirical logits obtained from the absolute accuracy scores in each task, aggregated by participant, condition, and group. In the recognition task, results indicated significant effects of the linear and quadratic terms and a main effect of condition, suggesting that scores improved throughout the blocks and were overall higher in the ES+ condition. In the production task, the model showed contributions of the linear, quadratic, and condition terms, as well as group x linear term and group x condition interactions. The linear slope was higher for bilinguals than monolinguals, and the magnitude of the difference across blocks was more prominent for the ES+ condition (see Figure 1). Linear mixed-effects models on the test data revealed no significant effects for the recognition tests. However, results for the production tests indicated significant main effects of test delay, group, and condition.

The present study highlights three aspects of novel vocabulary learning. First, orthographic similarity plays a role during word learning, for both receptive and productive vocabulary. Second, bilinguals seem to outperform monolinguals when producing (not recognizing) novel written words. Finally, bilinguals retain more productive vocabulary after a delay than monolinguals, regardless of orthographic similarity. These results add to the growing literature suggesting a bilingual advantage for novel-language learning (Hirosh & Degani, 2018). Future studies could investigate whether this advantage emerges as a consequence of being exposed to different (and often contrasting) orthographic patterns.



**Figure 1.** Observed accuracy (symbols, vertical lines indicate  $\pm$  SEM) and GCA model fits (lines) as a function of task, condition, and block. Model fits were inverse-transformed from logits to accuracy. The color indicates the group. BIL = bilinguals; MON = monolinguals; D1 = delay 1; D2 = delay 2.

## References

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