

## **Modelling the dynamic interaction between syntactic and phonological accuracy among second language learners over time**

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### **Summary**

While most research on first language (L1) acquisition suggests that phonological development is a pre-condition for the development of syntax, this is not the case for most late second and foreign language learners, whose development of the L2/FL grammar and phonology usually needs take place at the same time from the very beginning of the learning process. Nonetheless, how these subsystems develop and interact over time for the case of L2/FL learners is still unclear. Psycholinguistic literature has repeatedly pointed at attention and memory as determining factors in the development of L2 accuracy. Similarly, Usage-Based (UB) accounts of language acquisition posit that engagement in repeated language usage events allows the regularisation of linguistic forms and is a key factor in the automatization of L2 processes, which eventually leads to increasingly accurate linguistic output. In turn, the Dynamic Systems Theory (DST) offers a framework for understanding how linguistic subsystems (such as syntax and phonology) interact and why such relationship can change over time.

In our study, we flesh out the dynamics in the development of L2 syntactic and phonological accuracy over time. Informed by the aforementioned theories of linguistic development and language acquisition, we hypothesised that at earlier moments in the process of linguistic development both subsystems should display a competitive interaction which should gradually become supportive at more advanced stages of linguistic development.

Three native speakers of English learning Spanish in a condition of immersion participated in this study. Participants differed from one another in their extent of prior exposure to and use of the L2. An oral production task was designed to collect samples of oral production for a period of 18 weeks. General and detailed accuracy ratios were devised and implemented to measure the participants' syntactic and phonological accuracy over time, and values were plotted in line graphs. Results suggested that phonological and syntactic accuracy indeed seemed compete at early stages of linguistic development and gradually supported each other at more advanced stages.

To further validate whether efficiency in the allocation of attention and memory as a product of increased exposure and use of the L2 could account for such observed patterns of interaction, mathematical models were configured where initial parameters were informed by each participant's linguistic situation, literature on cognitive resource

allocation during language production, and the role of increased exposure and use of the L2 in the development of accuracy. The relevant expectation was that such models would replicate the overall patterns of interaction between syntactic and phonological accuracy over time. The models indeed succeeded to replicate the observed data, which further confirmed that assumptions made on the role of attention and memory and frequency of use and exposure to the L2 could be plausible account for the nature of the dynamic interaction between the syntax and phonology amongst L2 learners over time.

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