

Beyond proficiency: Sources of variability in L2 grammatical processing

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Variability in L2 acquisition may reflect the interplay of learners' language experience, proficiency, and cognitive abilities (Dąbrowska, 2019). In particular, individual differences in working memory and long-term memory systems have been proposed to contribute to variability in L2 learning and grammatical development (Morgan-Short et al., 2014). However, these sources of variability may not contribute equally to the processing of different aspects of L2 grammar. The present study therefore examined how language experience, proficiency, and memory abilities relate to one another and to individual differences in L2 grammatical processing.

Ninety-six French learners of English completed measures of language experience, L2 proficiency, working memory (WM), declarative memory (DM, verbal and non-verbal), and procedural memory, followed by a grammaticality judgement task (GJT) involving two grammatical structures: (i) inversion in main and embedded *wh*-questions and (ii) auxiliary constructions with DO and HAVE. We addressed two questions: (1) How are L2 learners' language experience, proficiency, and cognitive abilities related to one another? and (2) Are these individual differences associated with initial grammatical processing, and does their contribution vary across grammatical structures?

To address RQ1, we examined correlations among measures of language experience, proficiency, and cognitive abilities. WM was associated with both non-verbal DM ($r = 0.27, p = .009$) and verbal DM ($r = 0.35, p = .001$), whereas procedural memory was not significantly associated with the other cognitive measures. Proficiency was positively associated with non-verbal DM ($r = 0.27, p = .031$) and WM ($r = 0.28, p = .007$), as well as with English exposure ($r = 0.28, p = .007$) and identification with English-speaking culture ($r = 0.24, p = .020$). Measures of language experience showed consistent associations with one another, whereas cognitive measures were largely independent of language-experience measures.

To address RQ2, we tested whether individual differences predicted GJT performance and whether their effects varied across grammatical structures with generalized linear mixed-effect models. Proficiency was the strongest predictor of GJT performance ($\beta = 0.22, z = 3.93, p < .001$). However, the contribution of cognitive abilities varied across structures. Higher WM was associated with greater accuracy on *wh*-questions ($\beta = 0.10, z = 1.98, p = .047$), whereas this relationship was absent for auxiliary constructions. Response-time analyses showed a similar pattern: more proficient learners responded faster ($\beta = -.10, t(82) = -3.15, p = .002$).

Overall, the findings suggest that variability in L2 grammatical processing cannot be reduced to proficiency alone. While proficiency was the strongest and most consistent predictor of performance, the contribution of memory abilities varied across grammatical structures. These results highlight the value of examining learner variability in relation to both individual cognitive characteristics and the specific linguistic demands of the structures being processed.

References

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