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Probing for experience-driven critical period effects in a large language model

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Abstract

Critical period effects (CPEs), wherein learning during childhood is easier, are often considered to be maturationally-driven. However, recent findings of CPEs in artificial, non-maturing models suggest they can be driven by experience alone. We investigate to what extent experience can drive CPEs in second language (L2) grammar acquisition by probing for CPEs in a large language model (LLM). Constantinescu et al. (2024) report no evidence for experience-driven L2 CPEs in LLMs, but do not discuss the fine-grained grammatical rules used in prior behavioral studies of CPEs. We document that LLM learning patterns vary across these rules, but mostly find no evidence for human-like CPEs. Our results therefore support previous conclusions that CPEs in L2 grammar acquisition are not driven by experience alone.