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Language production is harder than comprehension for children and language models

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Abstract

Infants can understand some language even when they have no productive ability, but later in development, children can produce much more of what they understand. Explanations of this production–comprehension asymmetry (PCA) typically appeal to specific mechanisms, such as motor demands or communicative intent. Here, we investigate the hypothesis that the development of PCA emerges from the inherent structure of the two tasks. Production involves selecting a particular word to produce (and no other); in contrast, comprehension typically involves selecting the correct response to a word within a relatively constrained context. We tested this hypothesis by exploring whether developmental changes in PCA emerge in language models, which are sensitive to these structural asymmetries but not other factors previously proposed to cause PCA. We find that two types of language models—unimodal language models and vision–language models—both show PCA. Moreover, similar to children, PCA decreases in more highly-trained models and was more pronounced for predicates than nouns. These results suggest that production–comprehension asymmetries, a fundamental feature of child language acquisition, may be explained by the basic task demands involved in language use.

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