

A little production practice provides a big boost in language learning.

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Language production practice provides a stronger grammar and vocabulary learning experience than language comprehension practice (Hopman & MacDonald, 2018). Unlike in typical classroom environments, learners in that study received either only comprehension exercises or only production exercises. Here we investigate the learning benefits of language production in a more realistic setting in which learners get mostly comprehension practice and only a little production practice.

As in Hopman & MacDonald's study, English speaking participants learned a 20-word artificial language that described a cartoon world in 7-word sentences. Four word types ended in suffixes agreeing in number and gender. Participants learned this language through interleaved passive exposure and active learning blocks. In active comprehension trials, learners made a match-mismatch judgment on an auditory phrase and an accompanying picture. In active production trials, learners were asked to describe pictures aloud in the novel language. We trained 104 participants in a new Mixed-Experience condition and compared their rates of learning and comprehension to that of participants from Comprehension-Only and Production-Only training conditions (208 participants total). The Mixed-Experience condition was identical to the original Comprehension-Only condition, except that 1 trial in each active comprehension block was replaced with a production trial, affecting approximately 17% of learning trials.

After learning, participants completed speech-picture matching tests to assess understanding of grammatical agreement markers and a grammatical judgment test to assess understanding of agreement rules. Although the Mixed-Experience condition differed from the Comprehension-Only condition in only about 1/6th of the learning trials, the Mixed-Experience participants significantly outperformed Comprehension-Only participants on tests of comprehension. These results show that even a small amount of production practice provides strong learning and comprehension benefits compared to a comprehension-only curriculum. We will discuss potential mechanisms for this effect and implications for language learning.

Question: How do production- and comprehension practice differentially affect language learning?

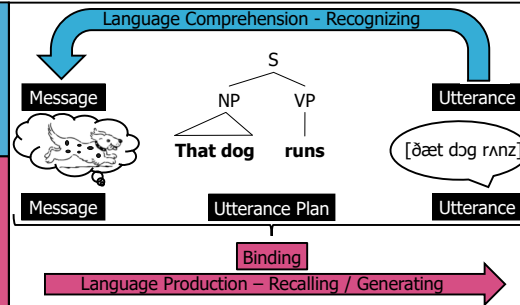
Due to the different memory processes involved in producing and comprehending language, **Production-Only** practice provides a stronger grammar learning experience than **Comprehension-Only** practice (Hopman & MacDonald, 2018). In order to test whether production practice improves learning incrementally or can provide a strong learning boost, we trained participants in a new **Mixed-Experience** condition. Learners got mostly comprehension practice and a little production practice, a mixture typical of classroom learning settings.

Hypothesis: Adding even a little production practice will provide strong learning and comprehension benefits compared to a Comprehension-Only curriculum.

Production: stronger learning experience than comprehension

Comprehenders, especially at the early stages of second language learning, may settle for a good-enough interpretation without a detailed analysis of syntactic dependencies (Ferreira & Patson, 2007).

While elements of the to-be-produced utterance are held in working memory during utterance planning, binding can happen between them, strengthening learning of dependencies between words.



Well-controlled training tasks

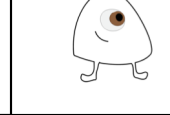
Active Comprehension Trial

1. Phrase is played, participant makes match/mismatch judgment. Participant is told whether their judgment was correct.
2. Same phrase paired with correct picture is played auditorily.

1. "Vus Pexus"



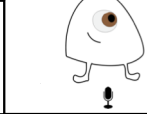
2. "Vus Pexus"



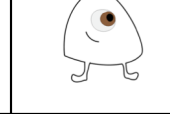
Active Production Trial

1. Participant is prompted to describe the picture out loud in the novel language.
2. The correct phrase to describe the picture is played auditorily.

1. "Vus Pexus"



2. "Vus Pexus"






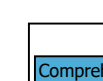

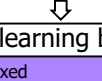


We control for:





- Listening experience
- Task demands and attention
- Vocabulary learning

Tool: Artificial Language

Full Sentence Example

							
"Vus	Fumus	Pexus	Stam	Ot	Zevus	Chaftem"	
Det.	Adjective	Noun	Markings	Prep.	Verb	Location	
The-k-s	Yellow-k-s	Pex-k-s	Spots	With	Grow-k-s	Mountain	

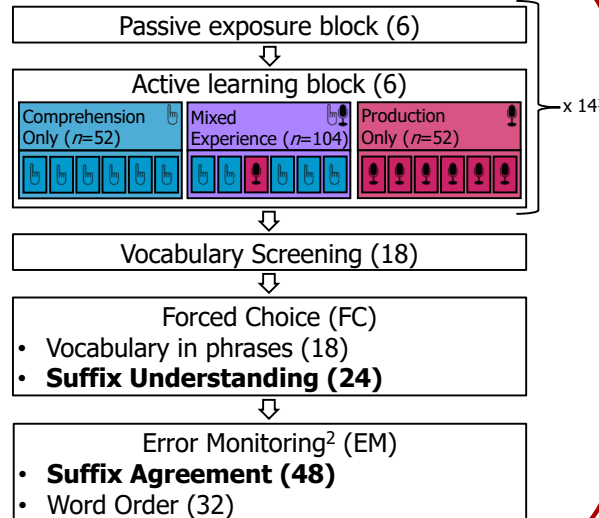
Grammatical Dependencies

	Singular (-s)	Plural
Kind-looking (-k)	-us 	-usu 
Scary-looking	-ok 	-oko 

Random assignment of:

- suffixes to categories
- root-words to visual referents

Training & Testing Procedure



Testing Grammatical Comprehension

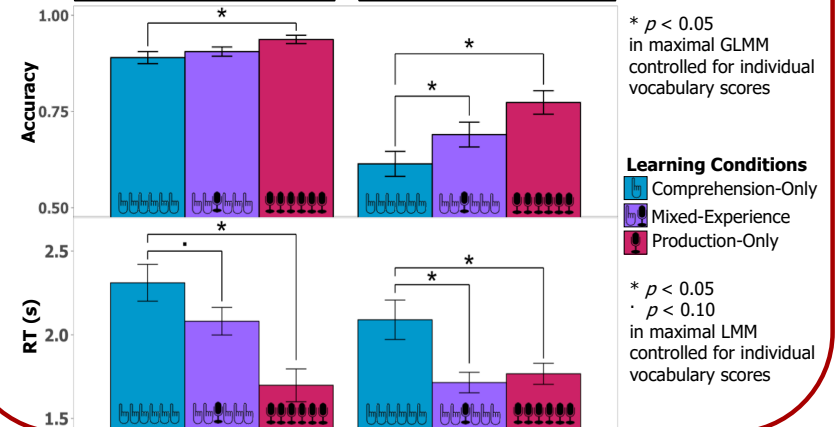
FC Suffix Understanding






EM Suffix Agreement



↑ Element that
disambiguates phrase



* $p < 0.05$
in maximal GLMM
controlled for individual
vocabulary scores

Learning Conditions
 Comprehension-Only
 Mixed-Experience
 Production-Only

* $p < 0.05$
• $p < 0.10$
in maximal LMM
controlled for individual
vocabulary scores

References

- Hopman, E.W.M. & MacDonald, M.C., (2018). Production practice during language learning improves comprehension. *Psychological Science*, 29 (6).
- Ferreira, F., & Patson, N. D. (2007). The 'good enough' approach to language comprehension. *Language and Linguistics Compass*, 1.

Notes

- ¹Training built up gradually from single words to sentences over the course of 14 rounds.
- ²The EM test also contained 44 correct sentences. Sentences in this test had not been used during training and were novel to participants. EM data was lost for the first set of 52 Mixed-Experience participants so another set of 52 participants were run. Thus, the FC data are for 104 and the EM data for 52 participants.

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Theoretical implications & future directions to investigate mechanisms

- Production-training to comprehension-test transfer is in line with shared production-comprehension representations.
- Boost from only 1/6th production practice suggests that becoming a producer changes the way one comprehends.
- Do participants improve only on words they produced, or is there a general benefit of producing to all words?
- To what degree do the inherent production-comprehension differences contribute to the learning boost we see?