

# Production training benefits both comprehension and production of grammatical gender in L2 German

## 1. Background

- Memory research suggests that language production (i.e., *retrieval*) provides a stronger learning experience than language comprehension (i.e., *recognition*) (Karpicke & Roediger, 2008)
- Hopman and MacDonald (2018) showed that artificial language learners with production training were faster and more accurate on post-training comprehension tests targeting semantic and number agreement features than learners with comprehension training
- In natural L2 learning, the generalization of production skills to the domain of comprehension remains contested (DeKeyser, 2007; VanPatten, 2013)

The current study investigated whether benefits of production training over comprehension training would extend to comprehension as well as production of grammatical gender in a natural language, German.

## 2. Method

**Participants:** First semester L2 learners of German in week 4: Comprehension ( $N=26$ ) and Production ( $N=22$ )

**Materials:** Words, phrases and sentences paired with pictures (as well as audio recordings during training)

- Ten blocks with 3-15 words, phrases, or sentences per block: masculine, feminine, and neuter definite and indefinite determiners, 4 cognate and 4 non-cognate adjectives, and 15 non-cognate nouns (see 1))

1) Ein blauer gepunkteter (Becher) steht neben dem Radio.  
 $A_{MASC}$   $blue_{MASC}$   $dotted_{MASC}$  ( $cup_{MASC}$ ) stands next to the radio.

**Procedure:** All participants completed training immediately followed by 4 testing measures

**Training:**

a) Passive Exposure	b) Active Comprehension		c) Active Production	
1. Correct phrase is played and visually displayed.	1. Phrase is played and displayed (mismatch trial presented here); they judge whether sentence matches picture. 2. Correct phrase is played and displayed.		1. Participants orally describe the picture. 2. Correct phrase is played and displayed.	
Exposure  der blaue gepunktete ... ▶ "der blaue gepunktete ..."	Trial X  die blaue gepunktete ... ▶ "die blaue gepunktete ..."	Feedback  der blaue gepunktete ... ▶ "der blaue gepunktete ..."	Trial  d_ ...	Feedback  der blaue gepunktete ... ▶ "der blaue gepunktete ..."

Figure 1. Training sample items: Participants were passively exposed to blocks of words, phrases, and sentences (a)). After each block of passive exposure, participants completed active learning tasks that differed by group (b) and c)).

**Testing:**

a) Forced Choice Test	b) Error Monitoring Test	c) Production Test
1. Participants choose which of two pictures corresponds to the phrase they see.	1. Participants see a picture and decide whether the sentence they read below the picture contains an error.	1. Participants describe a picture by typing a full sentence, using a definite or an indefinite article.
  der blaue gepunktete ... Left Right	  Der blauer gepunkteter Becher steht neben dem Radio. Good Bad	  d_ ...

Figure 2. Testing sample items: Participants completed two forced choice tests (with and without nouns, a)), an error monitoring test (b)), and a written production test (c)). We measured accuracy and RTs.

## 3. Results

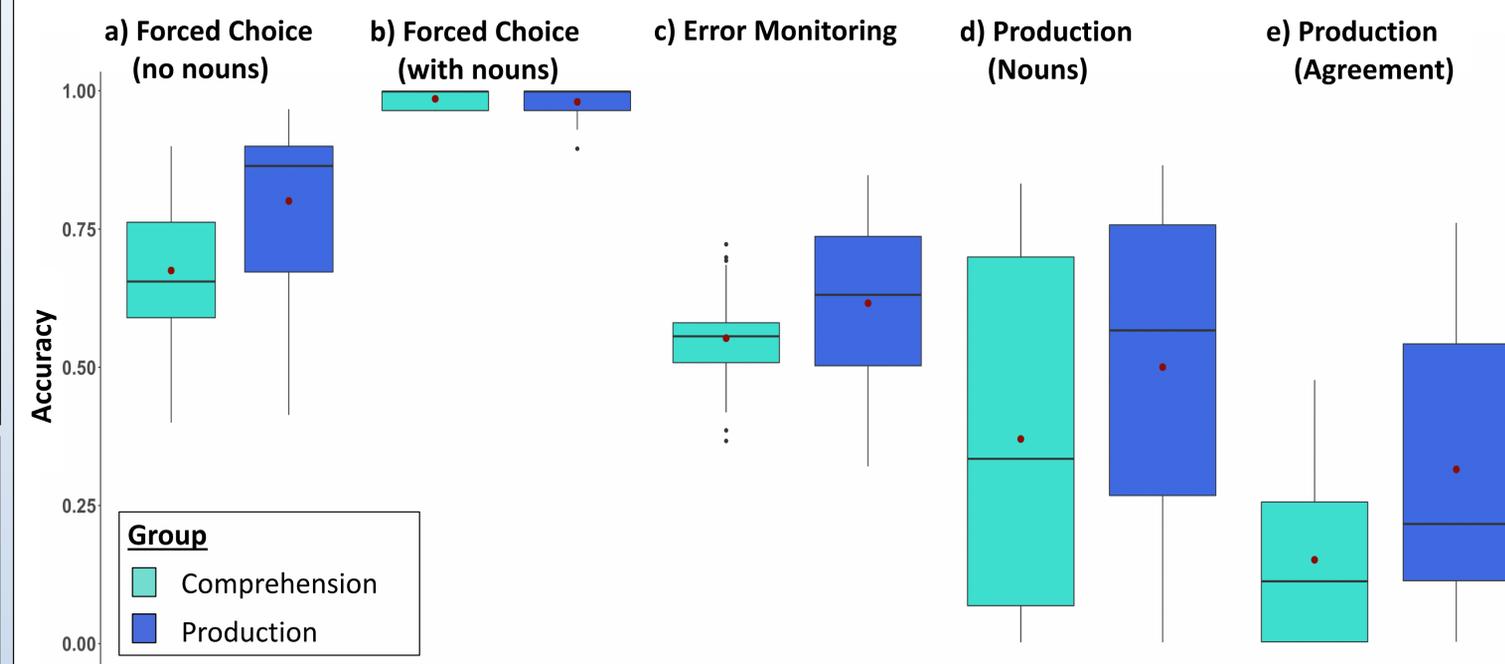


Figure 3. Median and mean accuracy across groups for comprehension and production tests.

- Mean accuracy in Production group for a), c), d), e) is significantly higher than in Comprehension group
- No significant differences in RTs between the Comprehension and Production group for any test

### Error Monitoring $d'$ score

- Comprehension=0.61; Production=1.04,  $p=.02$

### Production Test

- The distribution of errors in articles and adjectives is comparable across groups

Overall, production training benefits comprehension and production accuracy as well as sensitivity to correct gender markings more than comprehension training.

## 4. Discussion

- The results largely replicate findings from Hopman & MacDonald (2018)
- With equal amount of input and both groups processing language for meaning, language production seems to benefit information retention more than language comprehension
- This suggests that, even in natural language learning, skills based on production training can be transferred to the domain of comprehension despite the greater complexity of agreement paradigms in natural compared to artificial languages
- Important implications for teaching of grammatical features in L2 classroom: complex grammatical markers should be taught early on using production exercises

## 5. Future directions

- The training is time-intensive; can it be adapted for implementation in a classroom?
- What are the long-term effects for comprehension and production of grammatical gender markers for L2 German learners? Can the advantages of production training be maintained over a longer period of time?