Semantic integration of new vocabulary: does learning context matter?

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INTRODUCTION AND RESEARCH QUESTION

▶ In second language teaching, introducing new vocabulary in semantic categories, i.e. *semantic clustering*, has long become the gold standard and remains the most common practice;

▶ Empirical evidence suggests that this practice might have a detrimental effect on word learning [1–4].

Why might the learning context matter?

▶ **Interference Theory** and **Distinctiveness Hypothesis** [5, 6]:
Increase in similarity → increase in difficulty of learning and remembering;

▶ **Contextual Interference Effect** [7, 8]:
Contextual interference due to semantic clustering → more effortful and slower learning BUT better subsequent retention and transfer.

Research question

▶ Does learning context modulate **semantic integration** of novel names for familiar concepts?
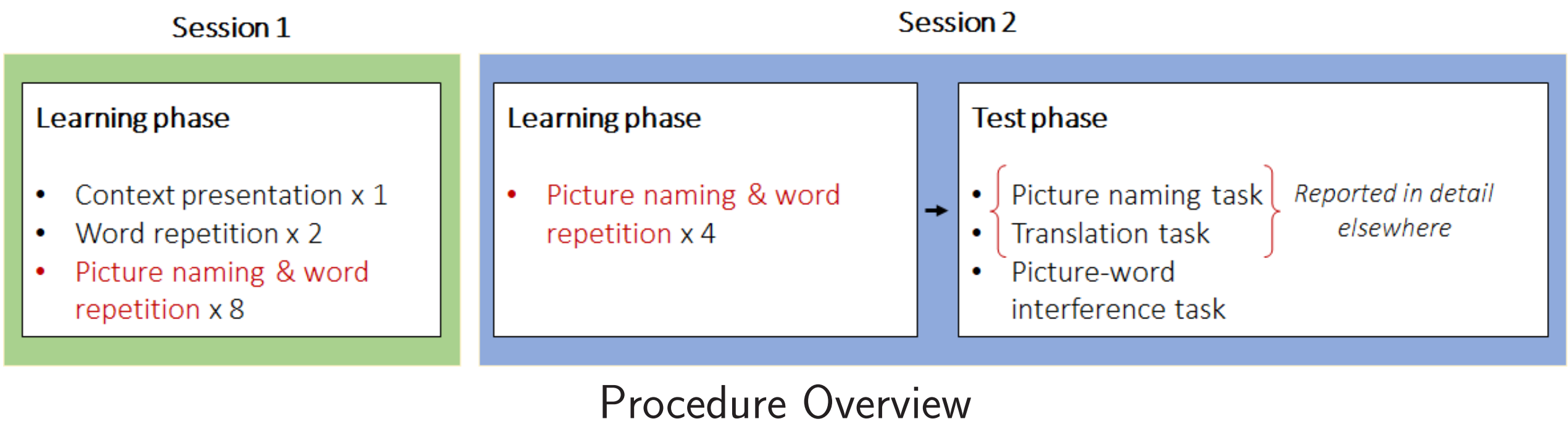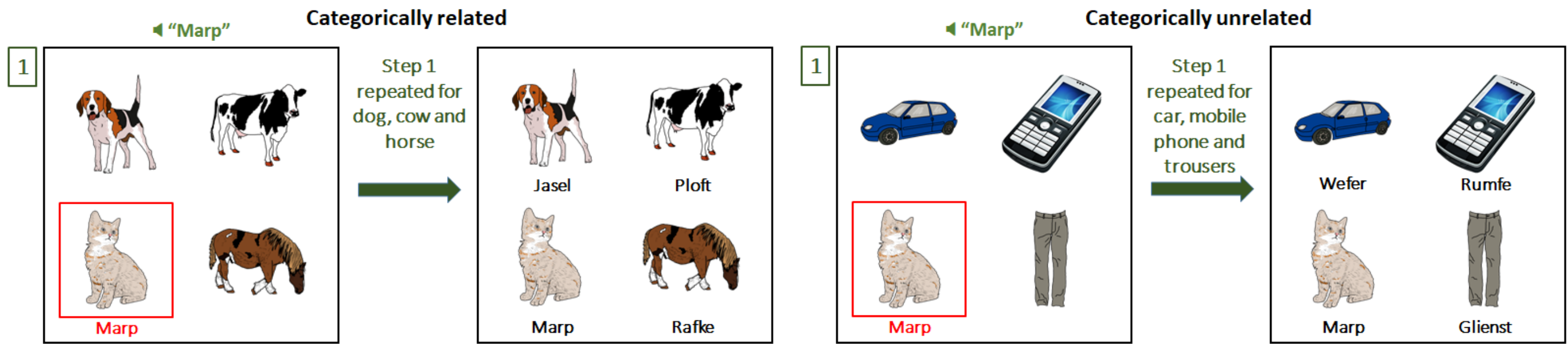
DESIGN AND PROCEDURE Pre-registered at https://osf.io/8crxq on 16 April 2019

Participants

▶ 60 monolingual German native speakers (20% male, mean age 24.3, SD 4.22).
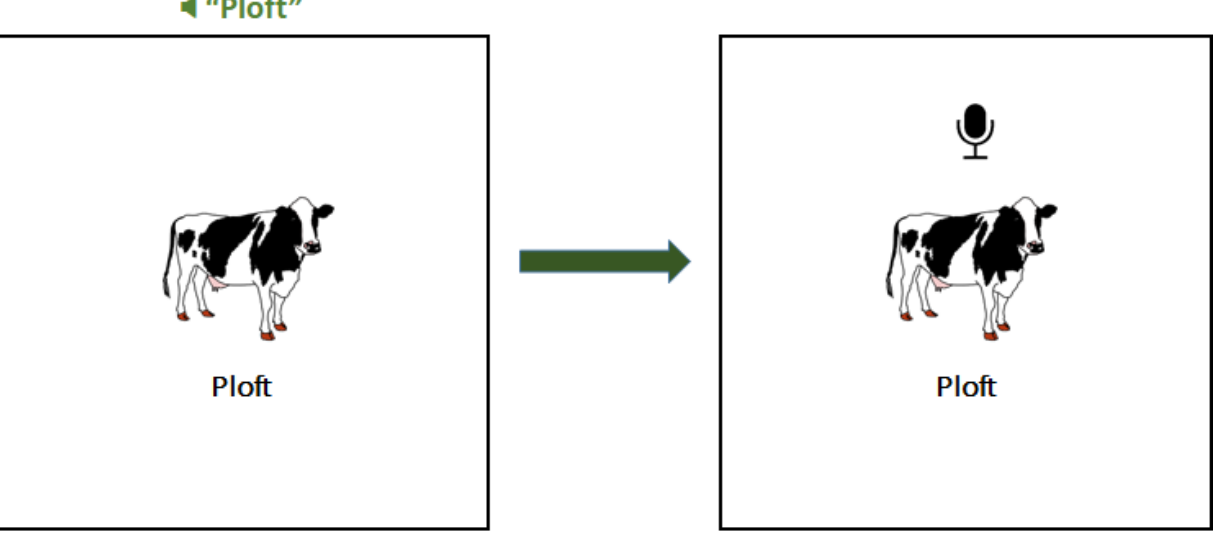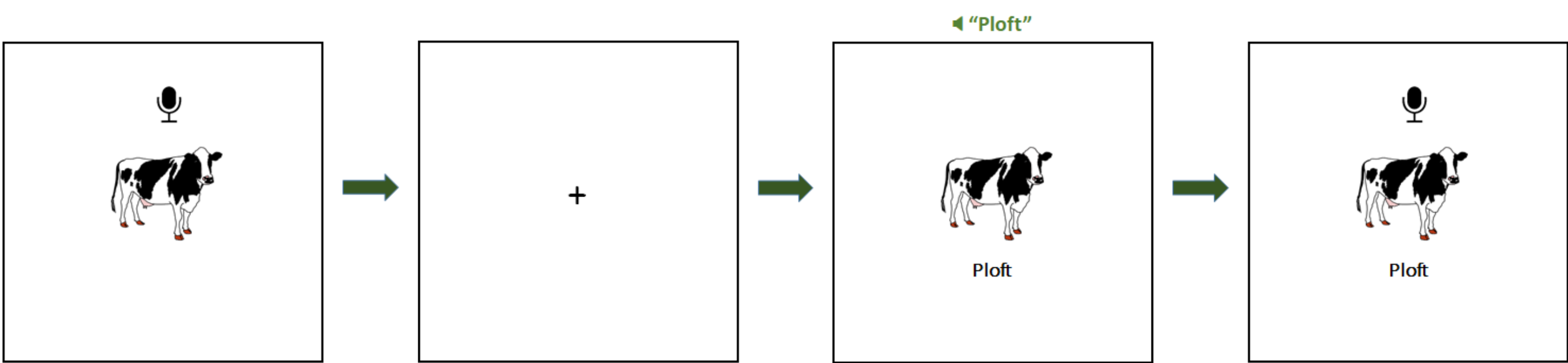
Procedure

Procedure Overview

LEARNING PHASE

Each participant learned novel names for 24 familiar concepts. The novel names were novel phonological forms, phonotactically legal in German.

Exposure 1: Context presentation for categorically related vs. unrelated context

Exposures 2 and 3: Word repetition

▶ 2 conditions: cat. *related* (CRelated) vs. *unrelated* (Unrelated)
▶ 12 words per condition
▶ 24 hours in-between sessions (mean 24.21, SD 2)

Exposures 4-11 (Session 1) and 1-4 (Session 2): Picture naming and word repetition

TEST PHASE: Picture-word interference task

Targets: pictures of objects not used during learning

Distractors:

▶ German words sem. related (1) vs. unrelated (2) to the target

▶ Novel trained words sem. related (3) or unrelated (4) to the target

Katze (1)   Hammer (2)   Marp (3)   Jund (4)
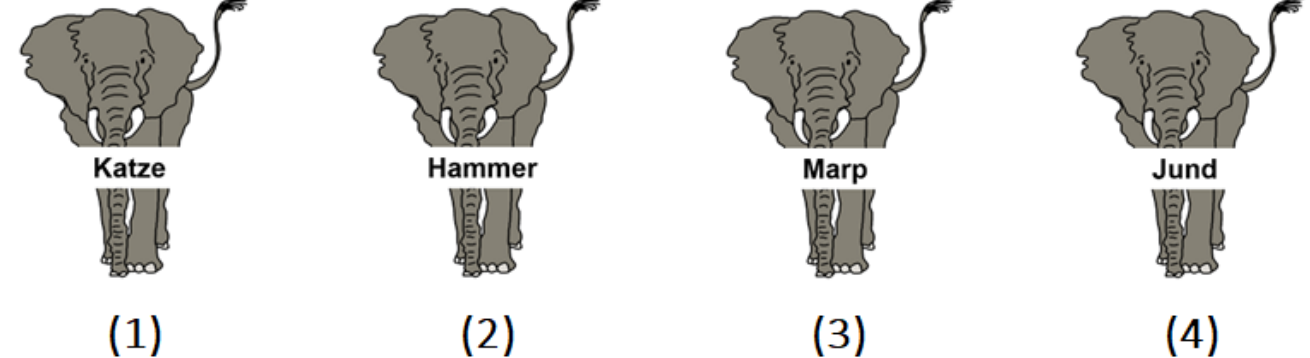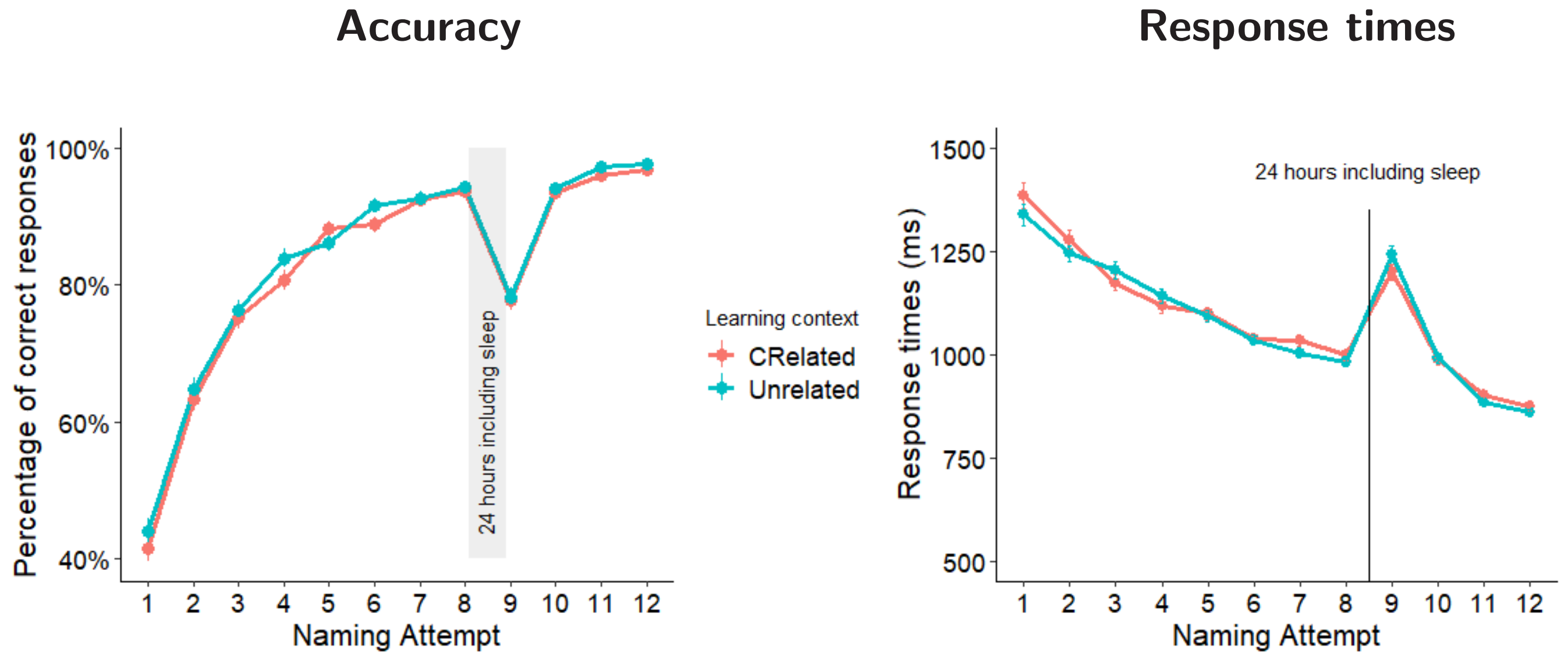
Prediction:

Semantic interference effect (SIE) [9]: Slower naming of target pictures when distractors are related in meaning in comparison to when they are not

▶ In word learning, reflects semantic integration of novel vocabulary [10].

RESULTS (Generalized) linear mixed effects models, R package lme4 [11]

LEARNING PHASE

**Accuracy**   **Response times**

Growth Curve Analysis [12] on accuracy and RTs during learning:

▶ Higher accuracy for words taught in the cat. *unrelated* context;

▶ No effect of learning context on RTs.

	Accuracy				Response times			
	Coef.	SE	z-val.	p-val.	Coef.	SE	t-val.	p-val.
Intercept	2.46	0.19	13.13	<0.001	6.96	0.02	282.53	<0.001
Linear	4.03	0.21	19.19	<0.001	-0.41	0.02	-16.35	<0.001
Quadratic	-0.75	0.11	-6.65	<0.001	0.06	0.01	5.13	<0.001
Cubic	1.53	0.09	15.67	<0.001	-0.15	0.01	-13.46	<0.001
Learn.Cont.	0.07	0.02	2.67	0.008	0.0006	0.008	0.07	0.943

TEST PHASE
Picture-word interference task

German distractors   **Novel trained distractors**
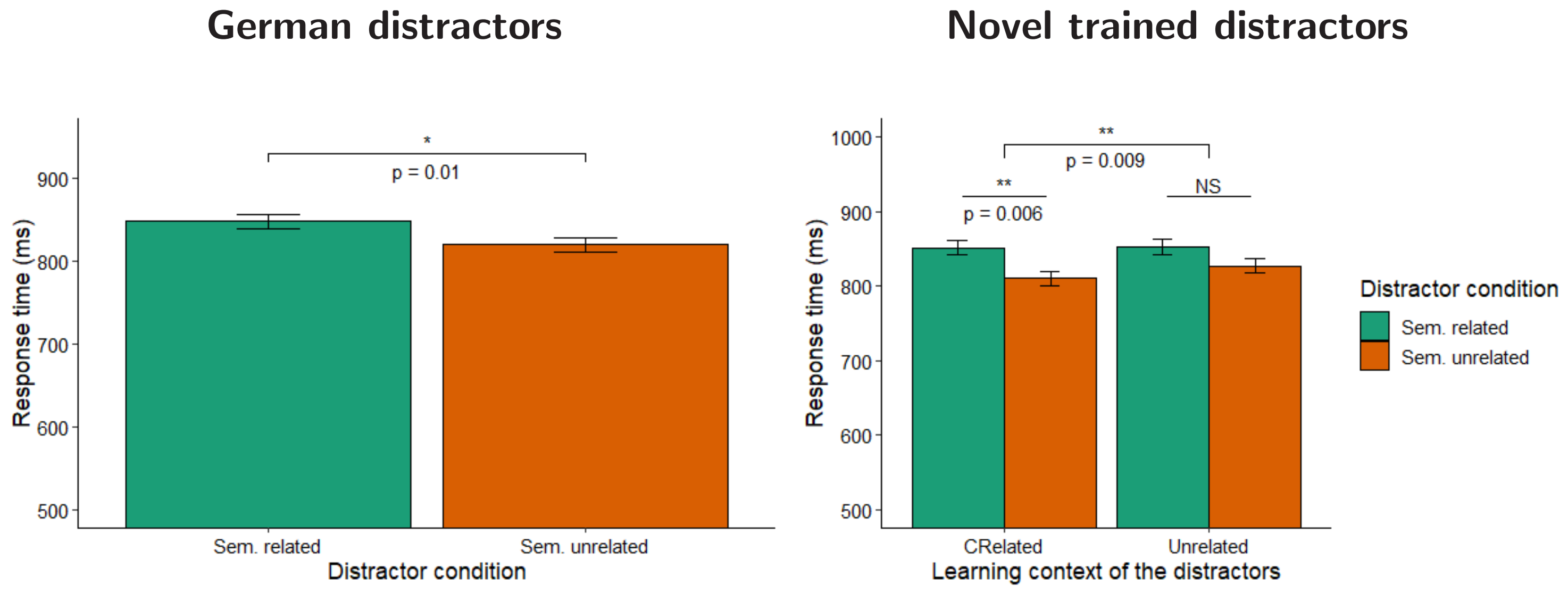
▶ SIE for both German and novel trained distractors;

▶ Novel trained distractors: Interaction *Condition* x *Learning context*;

	German distractors				Novel trained distractors			
	Coef.	SE	t-val.	p-val.	Coef.	SE	t-val.	p-val.
Intercept	-12.7	0.24	-53.25	<0.001	-12.63	0.25	-50.43	<0.001
Condition	0.41	0.16	2.6	0.01	0.19	0.04	4.6	<0.001
Learn.Cont.					-0.02	0.09	-0.2	0.83
Condition:Learn.Cont.					0.11	0.04	2.6	0.009

▶ *Post-hoc analysis*: SIE only for distractors trained in the cat. *related* context:
$\beta = 0.31$, SE = 0.11, t = 2.85, p = 0.006.

DISCUSSION AND CONCLUSION

Semantic clustering leads to

▶ lower accuracy during learning → **a less efficient learning process;**
  ▷ This is in accord with the *Interference Theory*, *Distinctiveness Hypothesis* and *Contextual Interference Effect*;

▶ stronger semantic interference effect in the PWI task → **faster semantic integration of new vocabulary.**

→ **Increased interference due to semantic clustering leads to a slower learning process BUT stronger connections within the mental lexicon and facilitated integration of new material.**

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