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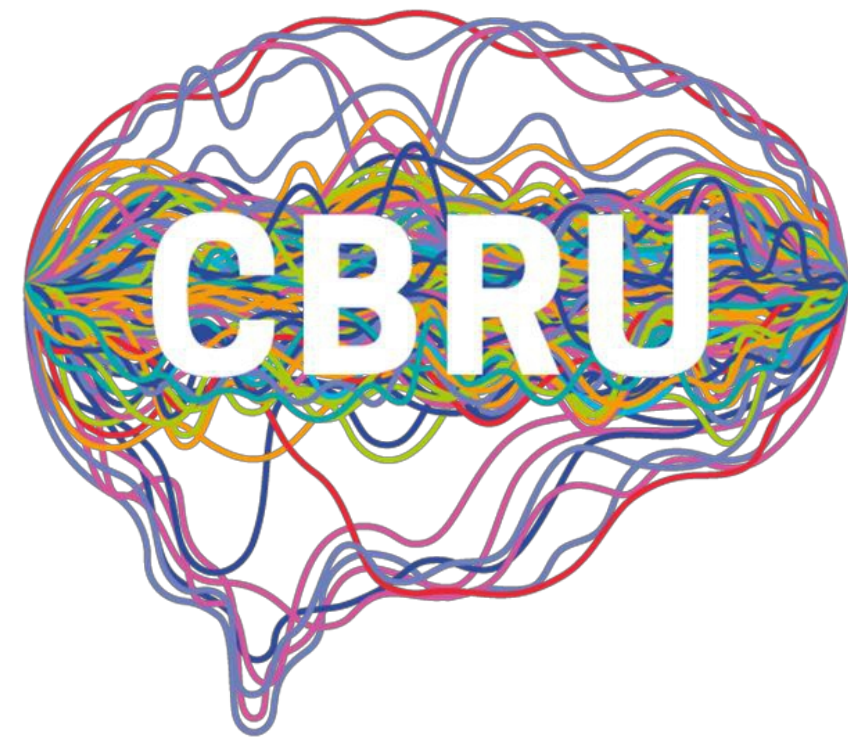
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SEMANTIC INFORMATION FACILITATES THE ACQUISITION OF NOVEL MORPHEMES: MEG EVIDENCE

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BACKGROUND

- Memory traces for novel monomorphemic words can develop rapidly [1] and independently from attention [2].
- Memory trace formation for novel suffixes benefits from semantic information during learning [3].
- The left fronto-temporal networks play an important role in the processing of morphologically complex words [4]
- However, **neural correlates of online acquisition of novel morphology remain unexplored** [5].

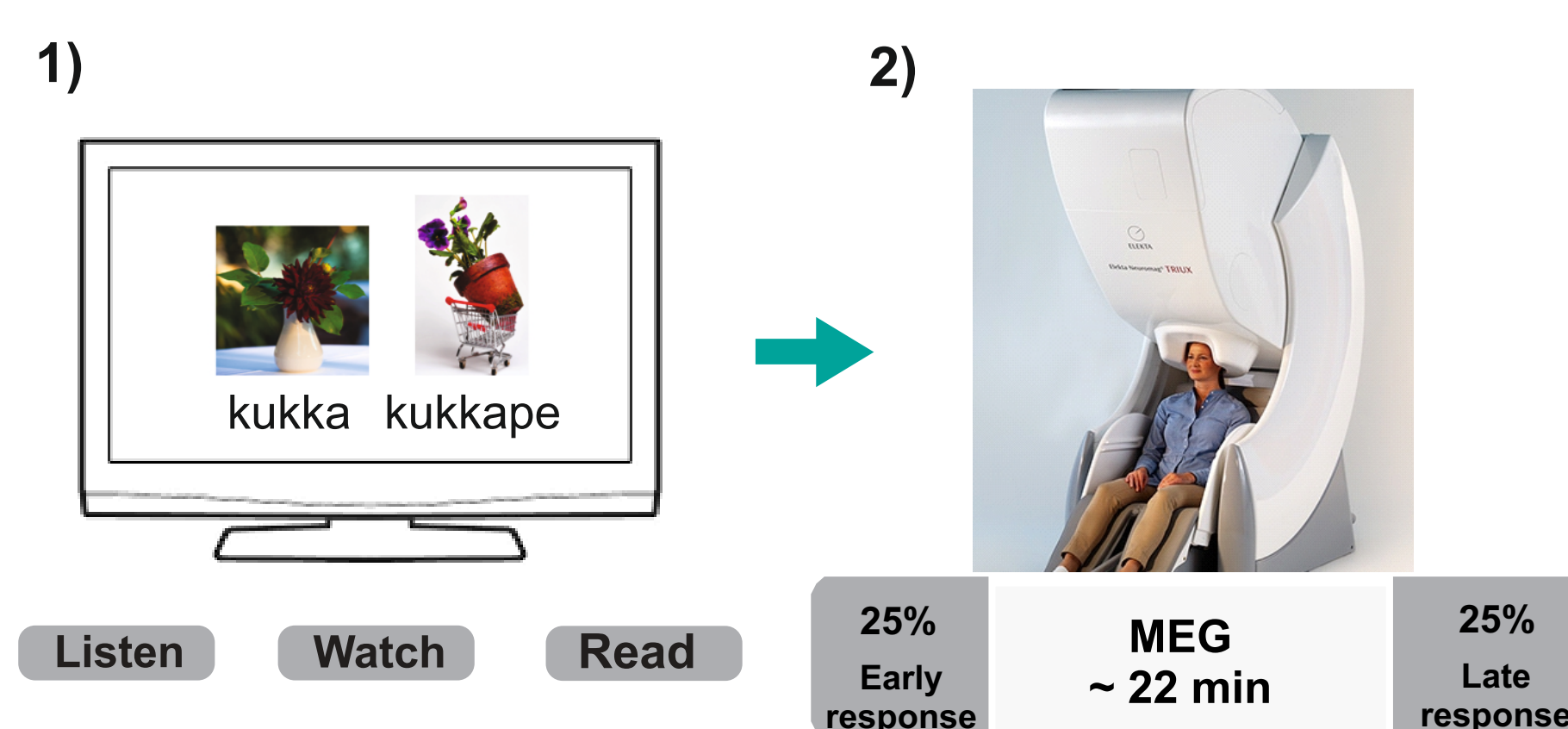
OBJECTIVES

- Do memory traces for novel affixes form during a short perceptual exposure?
- Does providing semantic information yield more efficient acquisition of novel morphology?
- What is the functional role of the inferior frontal, superior and middle temporal brain networks in affix learning?

METHODS

Participants: 19 Finnish native speakers (age: 20-34 yrs.)

Stimuli: 4 real stems and 4 pseudostems paired with 4 novel suffixes (-pe, -tu, -ku, -ti) and real suffixes (-ke, -ko). Two of the novel suffixes were semantically trained (i.e., given meaning) and two were untrained.



Procedure:

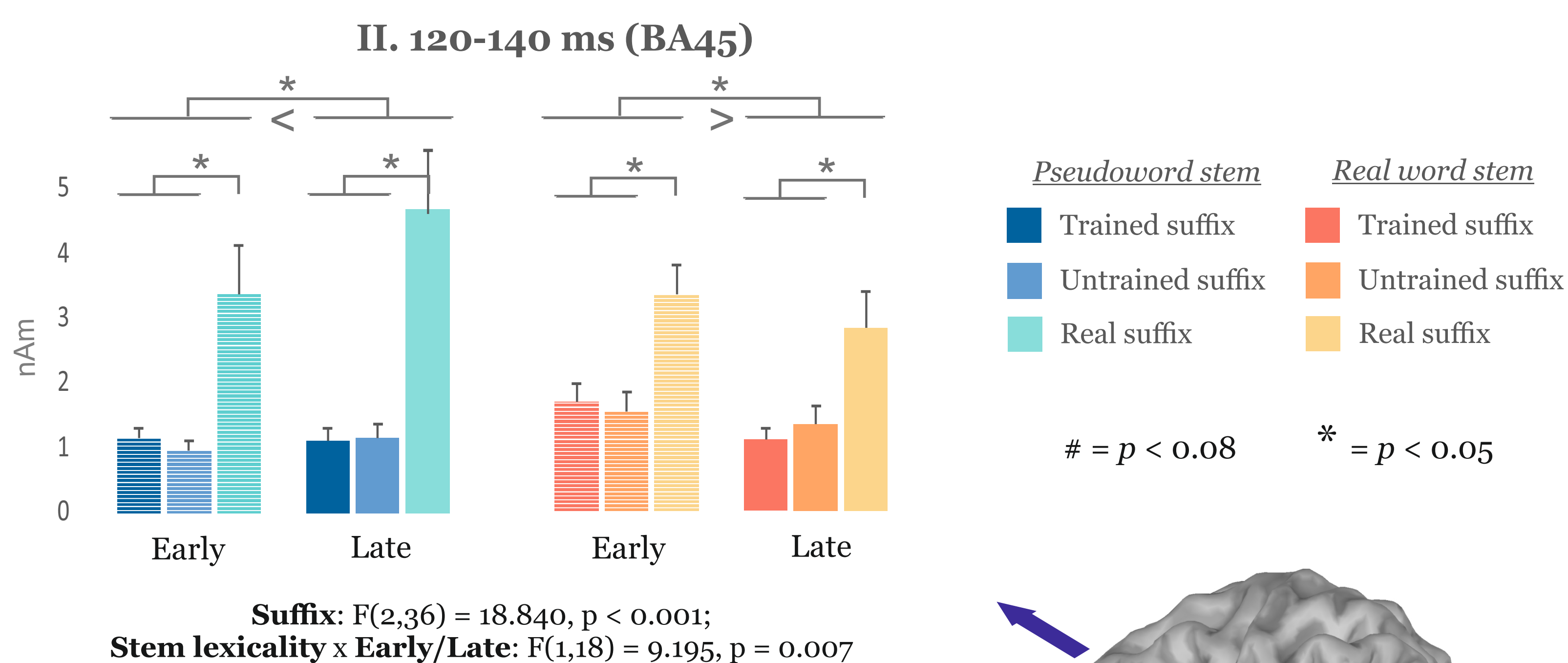
- 1) Semantic training session
- 2) Task-free MEG recording: auditory passive exposure

Left Inferior Frontal Gyrus

I-III. **Real suffixes** elicit **higher** activation than novel suffixes

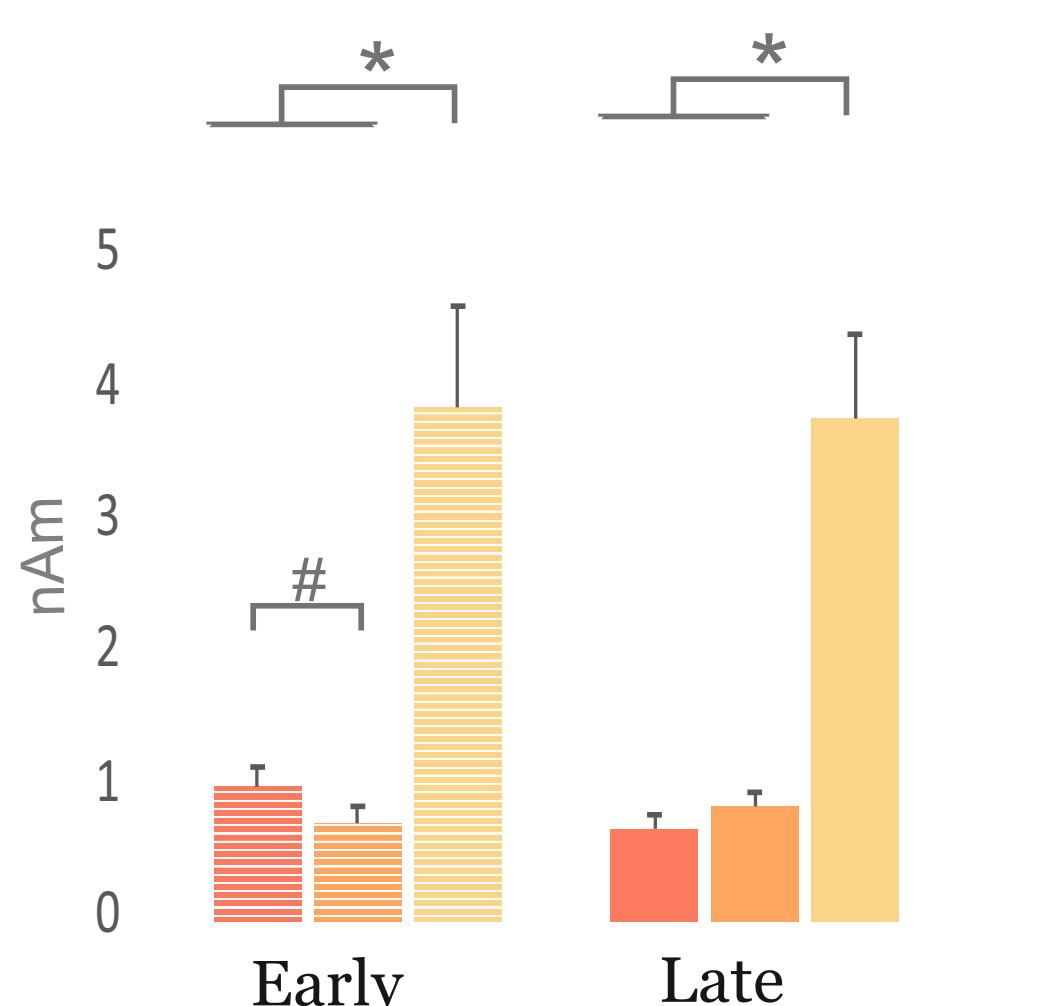
I-III. Activation for suffixes with

- **real word stems attenuates**
- **pseudoword stems increases** over time



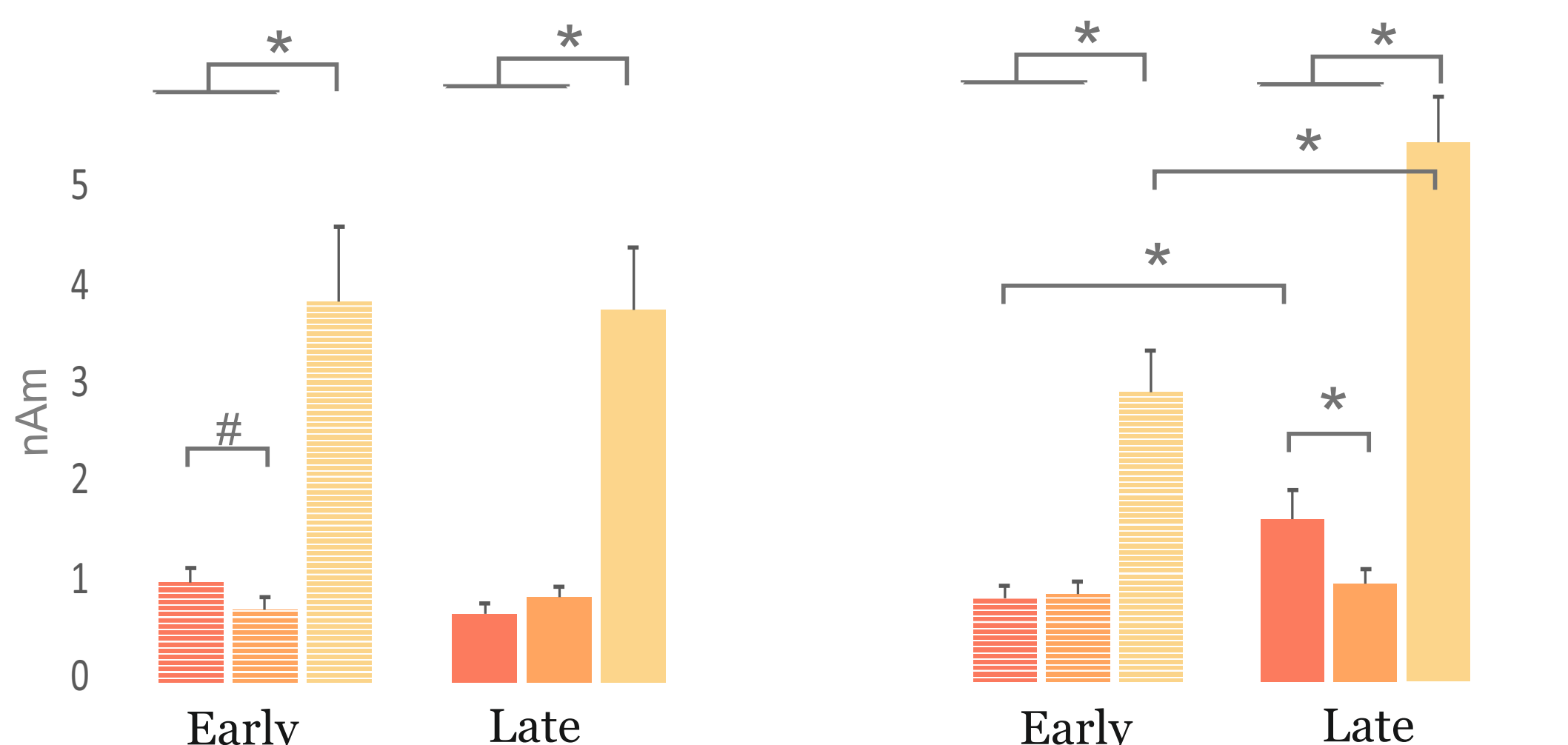
(The same effects are present in all three time-windows and in both BA44 and BA45.)

I. 60-80 ms (ant. MTG)



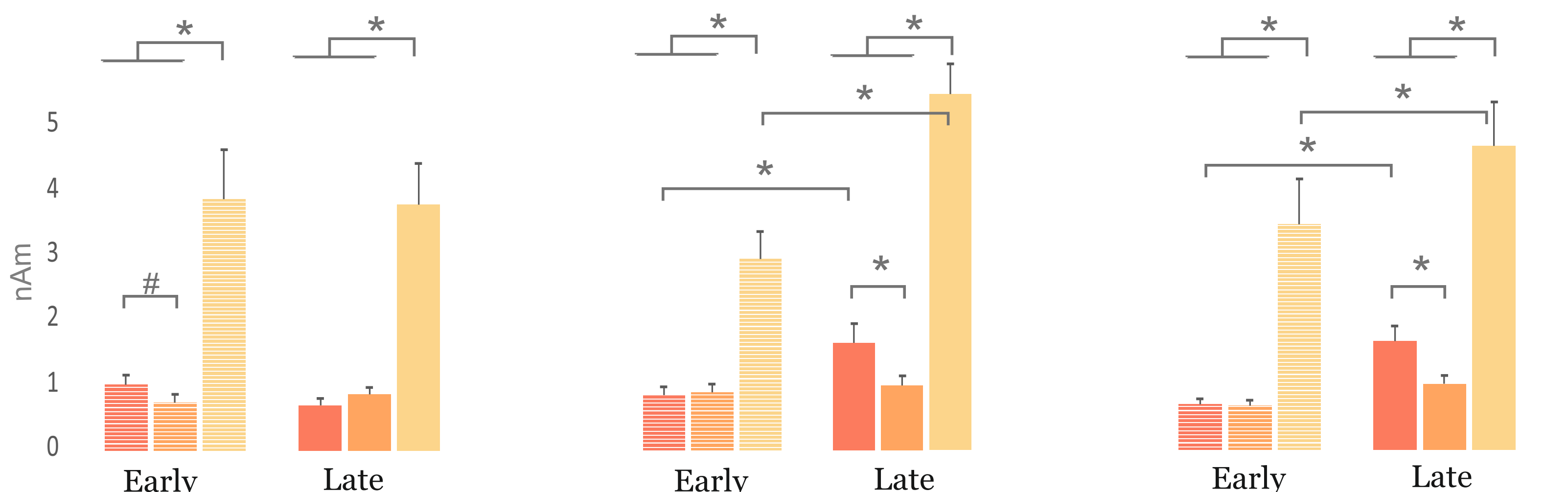
Suffix: $F(2,36) = 46.598, p < 0.001$;
Suffix \times Early/Late \times ROI: $F(6,43.402) = 3.693, p = 0.026$

II. 120-140 ms (post.MTG)



Suffix: $F(2,36) = 115.603, p < 0.001$;
Suffix \times Early/Late \times ROI: $F(6,49.702) = 4.142, p = 0.013$

III. 220-260 ms (post.MTG)



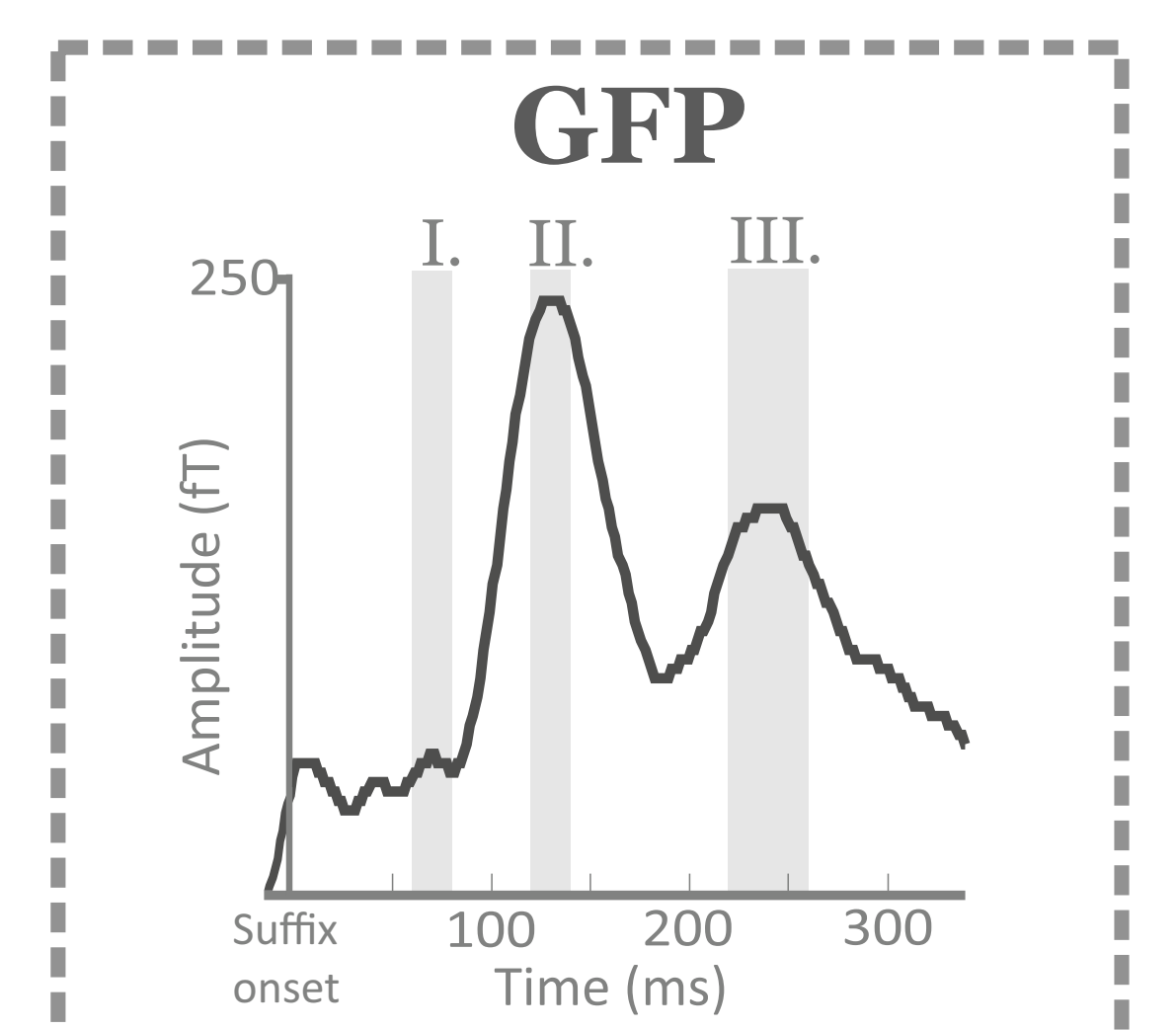
Suffix: $F(2,36) = 73.786, p < 0.001$;
Suffix \times Early/Late \times ROI: $F(6,40.070) = 2.839, p = 0.065$

Left Middle Temporal Gyrus

- I-III. **Real suffixes** elicit **higher** activation than novel suffixes
- I. **Early** in exposure, **trained suffixes** elicit **higher** activation than untrained suffixes in ant. MTG
- II-III. Activation for **trained and real suffixes increases** over time in post. MTG

(The effects are most prominent for real word stems, but they are also present in case of pseudoword stems.)

RESULTS



CONCLUSIONS

- ➔ **Attenuation** over time for **real word stems** (LIFG) → increasing *predictability* of the presented suffix or *repetition suppression*
- ➔ **Increasing activation** over time for suffixes with **pseudoword stems** (LIFG) → *application of morphological decomposition*
- ➔ **Increasing activation** over time for **trained suffixes** (posterior MTG) → *online memory trace formation*
→ *mapping the newly learned input onto existing lexical representation*
- ➔ **Trained vs real suffixes:** *similar activation pattern* → *a brief perceptual exposure is not sufficient for the full integration into lexical memory, but a short explicit semantic training has a facilitative effect*

REFERENCES

