How we teach vocabulary matters: Do gestures used during word learning influence reading?

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INTRODUCTION

- Vocabulary learning places a heavy demand on cognitive resources (Sweller, 1994)
- Representational gestures (Figure 1) aid vocabulary learning by splitting the cognitive load between the visual (gesture) and verbal (word) representation systems (Paivio, 1991)

Figure 1. Representational drinking gesture

- It is currently unknown how words learned with representational gestures are later integrated into context during reading

CURRENT STUDY

- **Purpose**: to investigate how learning words with matching vs mismatching representational gesture affects subsequent comprehension
  - Within both semantically-congruent and semantically-incongruent sentential contexts.
- **Predictions**: participants will spend a longer time reading newly-learned words in sentences when the words were learned with mismatching gestures than when they are learned with matching gestures

METHODS

Participants:

- 32 native English-speakers (M age = 19.59; SD = 2.07)

Method:

- Design included a succession of interleaved word learning and self-paced reading (SPR) blocks
- Participants learned a total of 96 fake words broken into 24 blocks of 4 words each and subsequently read them in sentential contexts
- In the SPR blocks, time participants spent reading the fake words was measured as SPR latency

Word Learning Blocks:

- Word learning trials occurred in the sequence shown in Figure 2
- In one block, participants learned 2 pairs of fake words randomly assigned to occur with either matching or mismatching gestures

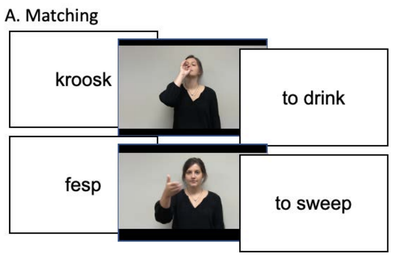

Figure 2. Matching word learning trail. In a mismatching trial the gesture videos would be flipped

Self-Paced Reading Blocks:

- After learning 4 fake words, participants read them in sentences
- Participants viewed the context sentence before seeing the critical sentence one word at a time which ended with one of the fake words

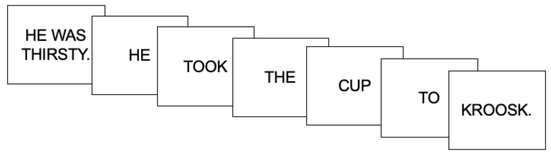

Figure 3. Sentence reading trial sequence

- Each fake word was randomly assigned to 4 possible sentence-reading conditions (Table 2) which varied in the semantic congruency of
  (1) the **definition** of the word in the sentence
  (2) the **gesture** with which the word was learned in the sentence

Table 1. Congruency of fake words in SPR trials

Congruency (Definition, Gesture)	Context Sentence	Critical Sentence *Fake word*	Definition (Gesture)
Congruent, Congruent	She was thirsty.	She used the cup to *kroosk*.	Drink (Drinking)
Incongruent, Incongruent	She was thirsty.	She used the cup to *fesp*.	Sweep (Sweeping)
Congruent, Incongruent	She was thirsty.	She used the cup to *kroosk*.	Drink (Sweeping)
Incongruent, Congruent	She was thirsty.	She used the cup to *fesp*.	Sweep (Drinking)

RESULTS

- Contrary to the hypothesis, there was no difference between SPR latency of words learned with matching vs mismatching gestures, B=1.84, SE= 2.31, t=0.80, p=.42
- When words were learned with mismatching gestures, SPR latency was higher when definitions were incongruent and gestures were congruent than when definitions were congruent and gestures were incongruent with the critical sentence, B=9.83, SE=3.27, t=3.00, p=.003
- When words were learned with matching gestures, SPR latency did not differ, B=0.25, SE=4.32, t=0.06, p=.96

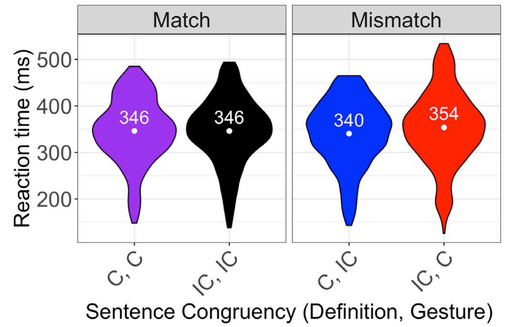

Figure 4. SPR latency for fake words

REFERENCES

Paivio, A. (1991). Dual coding theory and education. *Educational Psychology Review*, *3*(3), 149–210.

Sweller, J. (1994). Cognitive load theory, learning difficulty, and instructional design. *Learning and Instruction*, *4*(4), 295–312.