WORD-LEARNING MECHANISMS IN INTERACTION

1) Adults use information from the visual context, the linguistic context, and their world knowledge for sentence comprehension (Altman & Kamide, 1999) & word learning (learning based on sentence-level constraints, SLCL, Köhne & Crocker, 2010).

2) Language novices track co-occurring visual referents and spoken words to learn their meanings (cross-situational word learning, CSWL, Yu & Smith, 2007).

3) SLCL and CSWL are used jointly when they provide complementary information (Köhne & Crocker, 2010).

When SLCL and CSWL provide redundant information (i.e., are independently applicable)...

... Are still both mechanisms applied? Does SLCL block CSWL (or vice versa)?

... How is that related to the nature of SLCL and CSWL?

... How are word meanings based on CSWL and SLCL mentally represented?

EXPERIMENTAL PARADIGM & PROCEDURE

German adults learn a mini semi-natural language (based on Indonesian) in four basic phases:

1. Verb learning: Participants are familiarized with four restrictive verbs (e.g., eat) and two non-restrictive verbs (e.g. take).

2. Noun learning: Visual static scenes & auditory SVO-sentences are presented. Adults are asked to understand the sentences & learn the 16 nouns (96 trials).

3. Vocabulary test ('Click on the object matching the spoken noun.') & confidence rating ('How sure are you about your choice?', 1(not sure)-9(sure)).

Type 1: Depicted: 83% object (carrot), 50% object (hat), 2 distractors (pizza and shirt, each 17%) (16 trials)

Type 2: Depicted: 50% object (hat), associate of the 83% object's category (apple), 2 distractors (jeans, shirt, each 17%) (16 trials)

4. Vocabulary-test repetition one day later

Results

Learnings rates (choosing the 83% referent in Type 1): Day1-N 60%, Day1-R 84%, Day2-N 49%, Day2-R 78%

Type 1: In R, learners preferred the 83% referent on both days. In N, the 50% referent got a secondary preference on Day 2.

Type 2: In R, only the category associate was favored, on both days. In N, the associate was favored on the distractors on Day 1 but not Day 2. The 50% referent was favored over the distractors on both days.

> N: fine-grained sensitivity for differences in frequency of co-occurrence (83% vs. 50% vs. 17%) - CSWL is parallel

> R: SLCL blocked this statistical sensitivity (> determinism!) & increases sensitivity for category associations

> Effect of Day: While the likelihood of choosing the category associate (Type 2) was stable in R, it decreased in N: mental representation of R-meanings more based on categories

![Image](image.png)

CONCLUSIONS

- CSWL offers a parallel way of learning & initiates probabilistic mental representations of word meanings.
- SLCL works in a more deterministic manner & initiates category-based mental representations of word meanings.
- When CSWL and SLCL are redundantly applicable, learners rely on SLCL while completely ignoring CSWL > economic word-learning strategy.

References


