Multiple meanings pose challenge to existing word learning theories.

Often there is no single core meaning:

- Many words are polysemous: multiple, related meanings\(^1,2\)
- Fewer are ambiguous/homonymous: have unrelated meanings\(^3,4\)

Cross-situational word learning with multi-feature representation

- each word in a sentence aligned w/ all possible meanings in context
- context is bag-of-features
- not evaluated on more than one sense per word

**Utterance:** She put her cap on.
**Scene:** [head, cloth material, cover, sun]

**Utterance:** The pen had no cap.
**Scene:** [cover, paper, writing, tight-fitting]

**Utterance:** She took the cap off the bottle.
**Scene:** [drink, liquid, bottle, cover, tight-fitting]

\[\text{Cap} = \{ \text{cover}, \text{paper}, \text{head}, \text{cloth material}, \text{writing}, \text{tight-fitting}, \text{bottle, drink, sun} \}\]

- incorrectly predicts:

\[\text{Cap} = \{ \text{cover, cloth material, tight-fitting, bottle, drink} \}\]

**Structured Multi-Feature (SMF)**

**Word meanings associated to sets of features:**

- to compare models on Experimental data, hand-coded 40 features
- features that co-occur are strengthened

\[\text{SMF} = \{ \langle \text{cover, cloth material, head, sun} \rangle, \langle \text{cover, tight-fitting, writing, paper} \rangle, \langle \text{cover, tight-fitting, drink, bottle} \rangle \}\]

- incorrect foil isn’t selected because representation violates co-occurrence statistics

**SMF model takes into account structure of features from exposure**

**References**