Partial use of available information in the early stages of verb prediction

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**Prediction step-by-step**

Comprehenders use **contextual information** to anticipate upcoming input.

We isolate different sources of contextual constraints and examine how they impact predictive computations in real time.

**Goal**: To spell out the steps and timing of predictive computations.

**Case study: Verb prediction**

The N400 is sensitive to a word’s predictability.

- More expected words → smaller N400s.

However, the same difference in offline predictability (cloze probability) can lead to very different N400 outcomes depending on the source of the constraint.

**Our proposal**: Initial verb predictions are affected by what words precede the verb in the sentence, but not by the structural roles of the arguments.

**Evidence #1**: Substituting different words has an immediate impact on the N400, whereas reversing the same words does not.

**Evidence #2**: Reversing the same words (the arguments) impacts the N400 only when the verb is further away.

**Research question**

Initial verb predictions are based on somewhat superficial information – but how superficial?

If initial verb predictions are based on...

- a bag-of-words mechanism → argument substitution should elicit an N400 effect only when the sentences contained different sets of words (“different words” conditions).
- the arguments of the verb (or words in the local clause) → argument substitution should elicit an N400 effect even when the sentences contained an identical sets of words.

**Results**

**“Different words” argument substitution**

The tenant inquired [which exterminator the landlord had hired]...

The neighbor inquired [which exterminator the landlord had hired]...

**“Same words” argument substitution**

The tenant inquired [which exterminator the landlord had hired]...

**Summary and discussion**

Argument substitution had the same effects on the N400 regardless of whether the sentences contained identical sets of words.

Initial verb predictions are based on the meaning of the words in the local clause.

Future work will need to examine the role of argumenthood – Do initial verb predictions distinguish arguments from adjuncts in the same clause?

A note on the late positivity:

- A P600 effect was observed only in the “different words” conditions.
- Potentially due to a more sustained N400 effect in the “same words” conditions.

**Towards an explicit model of verb prediction**

Word meaning of the arguments

... [Argument 1] [Argument 2]

t = ?

Structural roles of the arguments

t = ??

Many more questions to ask:

- How do comprehenders identify the arguments?
- Why does information about the arguments’ structural roles have a delayed impact on verb predictions?

**References**

2. Van Berkum et al. (2005). JoCN, 25, 300-500 ms 300-500 ms 700-900 ms 700-900 ms

**Methods**

n = 24, 30 trials / condition + 120 fillers
RSVP (530ms SOA), binary plausibility judgment
Average cloze probability of the target verb:
- 22% vs. <1%
All nouns in the sentence context are animate.

We have two pairs of conditions, which have
- an identical change in the local clause (argument substitution)
- different changes in the whole sentence (their contained the same vs. different sets of words)

⇒ The same / different ERP effects can tell us whether the local clause vs. the whole sentence is to blame.

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