

# Here comes the subject!

## Listeners use number-marked verbs to predict subject number

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### Background

#### Prediction during Comprehension

What predictions are made during comprehension?

- Syntactic category predictions
  - *The beautifully...* (Dikker, et al., 2010)
- Semantic predictions
  - *It was windy, so the boy went outside to fly [a kite/an airplane].* (DeLong, Urbach & Kutas, 2005)
  - *The boy will [eat/move] the cake.* (Altmann & Kamide, 1999)

#### Subject-Verb Agreement

- Syntactic dependency, not semantic.
- Verb-form depends on grammatical number of subject.
- Involves two major constituents, often inverted.

How much syntactic detail can predictions contain?

#### Agreement in Comprehension

Comprehenders are often sensitive to agreement.

- Agreement errors elicit a P600. (*The elected officials \*hopes...*; Osterhout & Mobley, 1995)
- Russian listeners use informative agreement during language comprehension. (Sekerina & Kurtukova, 2012)
- Informative gender agreement does not prevent garden paths in Dutch. (Brown, van Berkum & Hagoort, 1999)

### Experiment 1: Regular and Irregular Verbs

#### Question

Can listeners use number-marked verbs to anticipate the grammatical number of an upcoming referent?

#### Method

2 picture visual-world paradigm

#### Participants

- 48 college-aged native English speakers in two groups
- Experimental (n=24): design at right
  - Control (n=24): distractor matched target number

#### Stimuli

64 trials: 8 each of eight types

Yoked pairs of pictures:

- Irregular trials: *apple-cookie, turtle-kitty, dog-baby, bike-truck*
- Regular trials: *bunny-frog, horse-pig, car-train, boat-plane*

#### Results

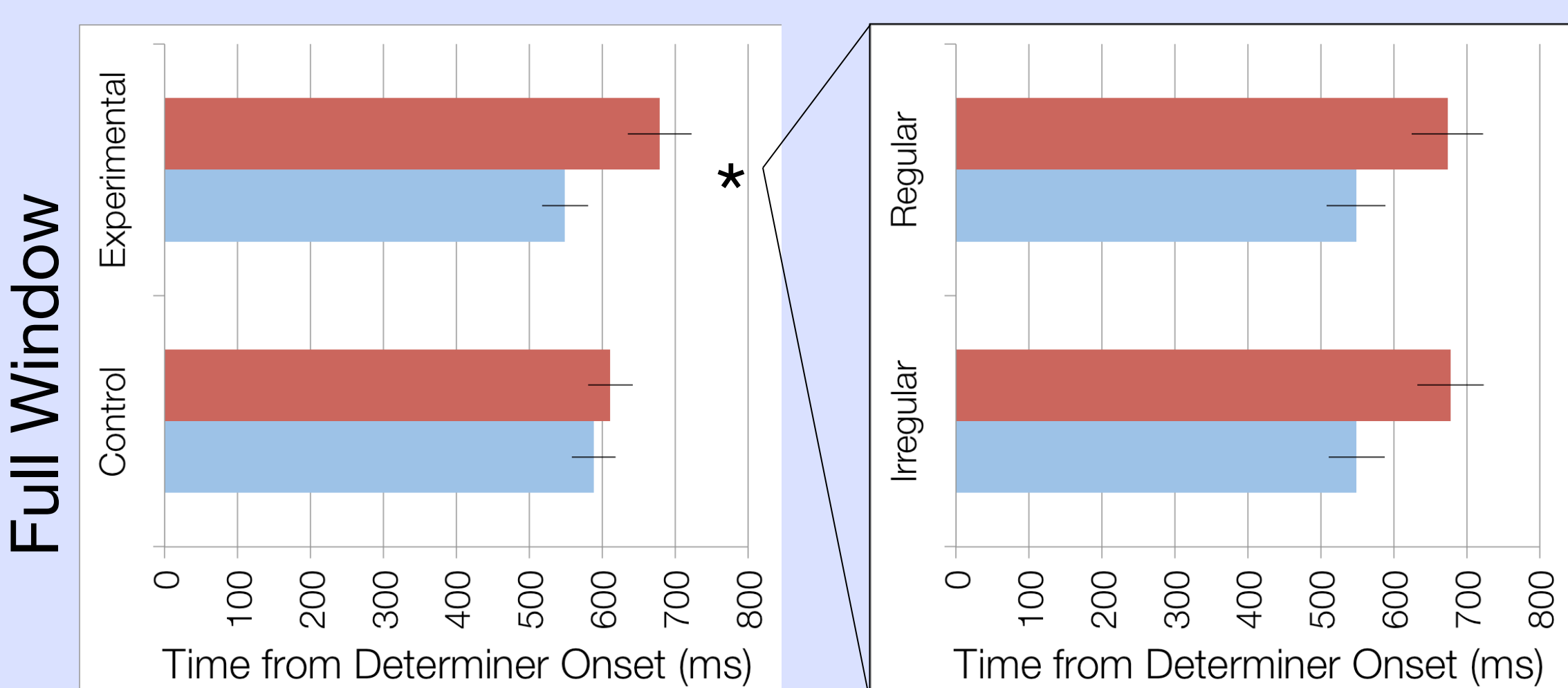
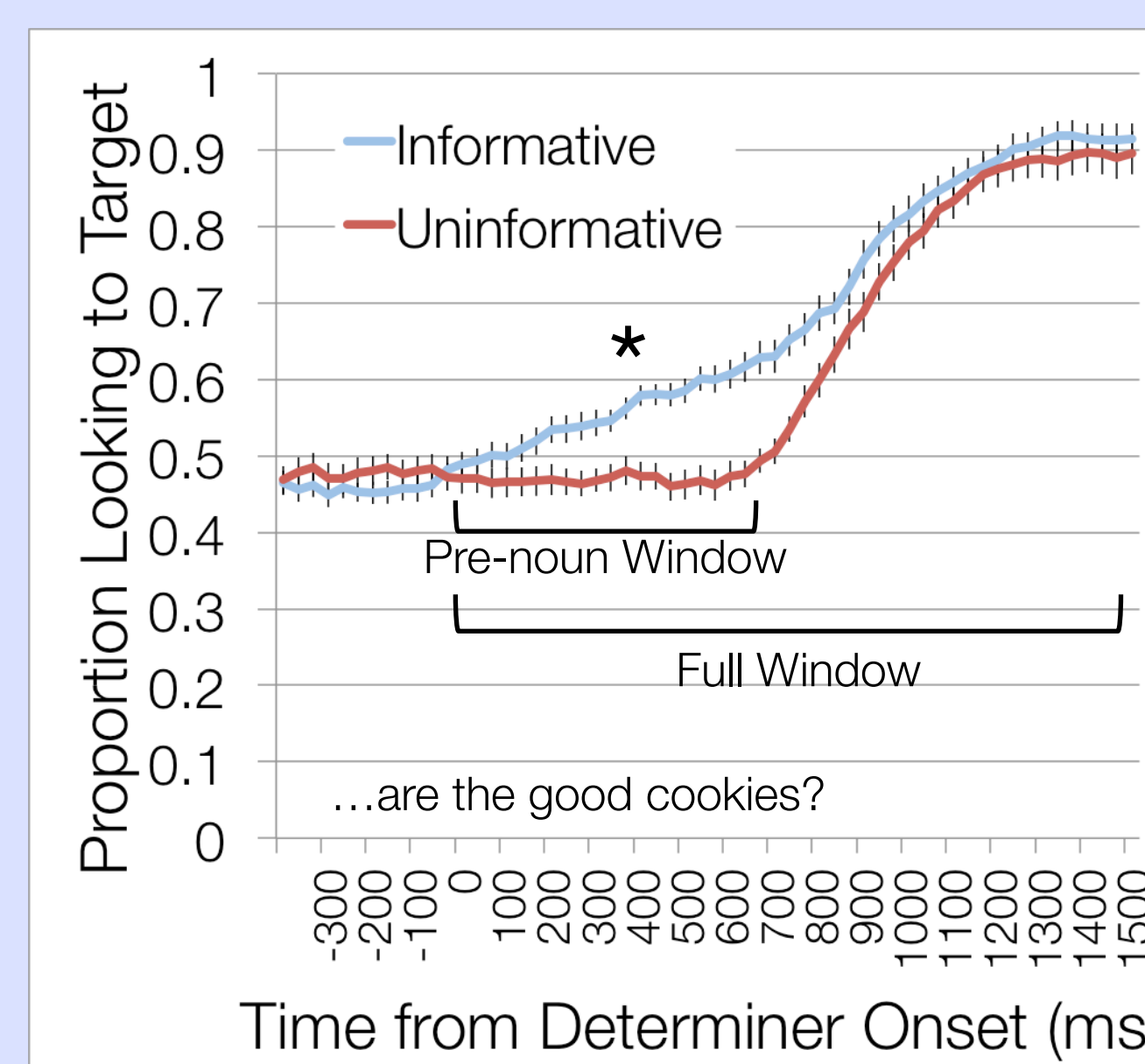
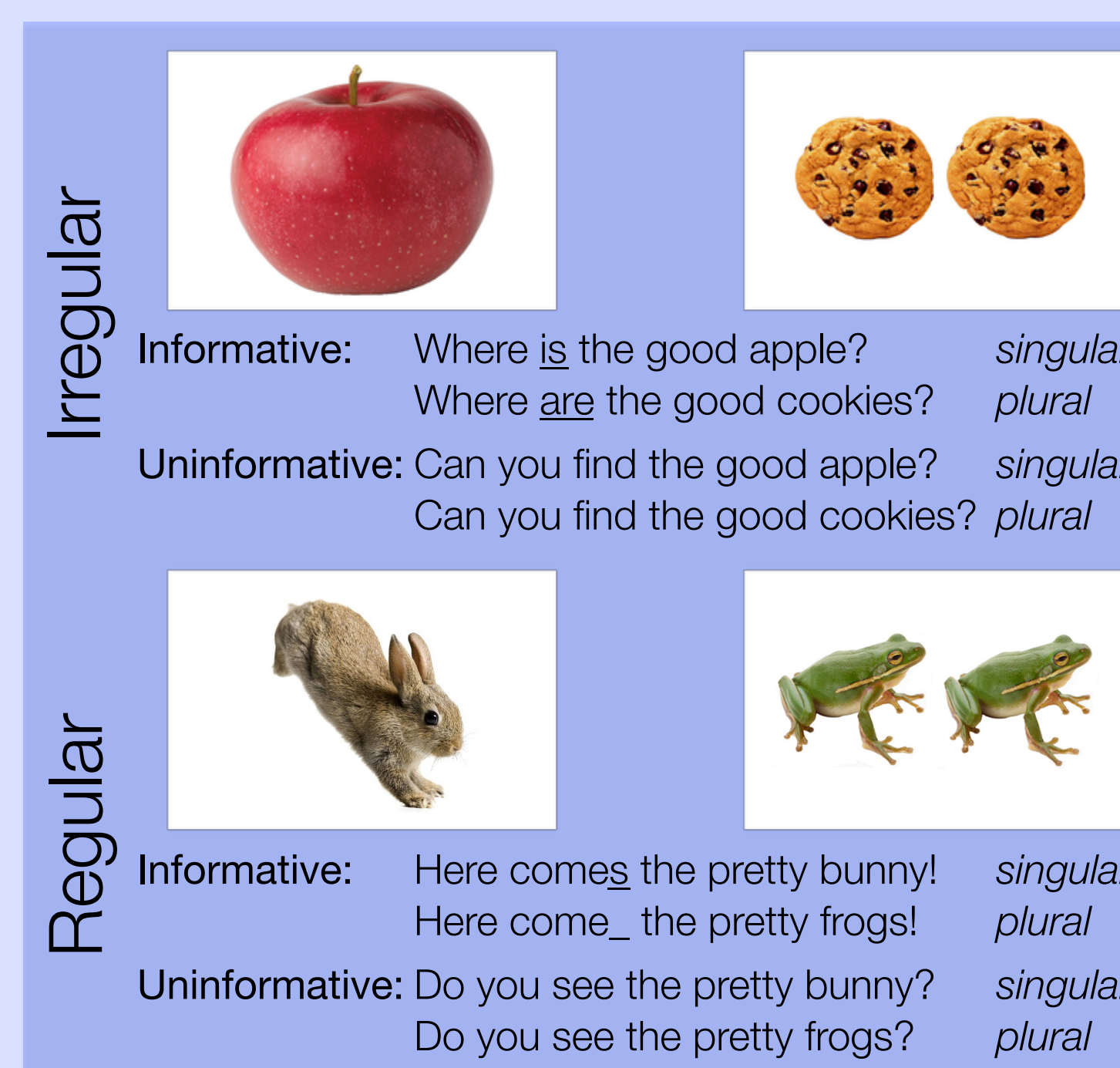
Listeners used number-marked verbs in online processing.

In informative, compared to uninformative trials, listeners:

- were *reliably faster* to shift from distractor to target
- were *more likely to switch* from distractor to target before noun onset
- *looked more to target* than distractor before noun onset

Informative advantage appears in experimental group only.

No interaction of informative advantage and verb type.



### Experiment 2: Notional or Grammatical Number?

#### Question

In Experiment 1, grammatical and notional number align. Are listeners relying on this minimal semantic content?

#### Method

2 picture visual-world paradigm

#### Participants

16 college-aged native English speakers

#### Stimuli

32 trials: 8 each of four types

Yoked pairs of pictures:

- Invariant Plural *glasses-phone, pants-shirt*
- Mass *toast-banana, corn-apple*

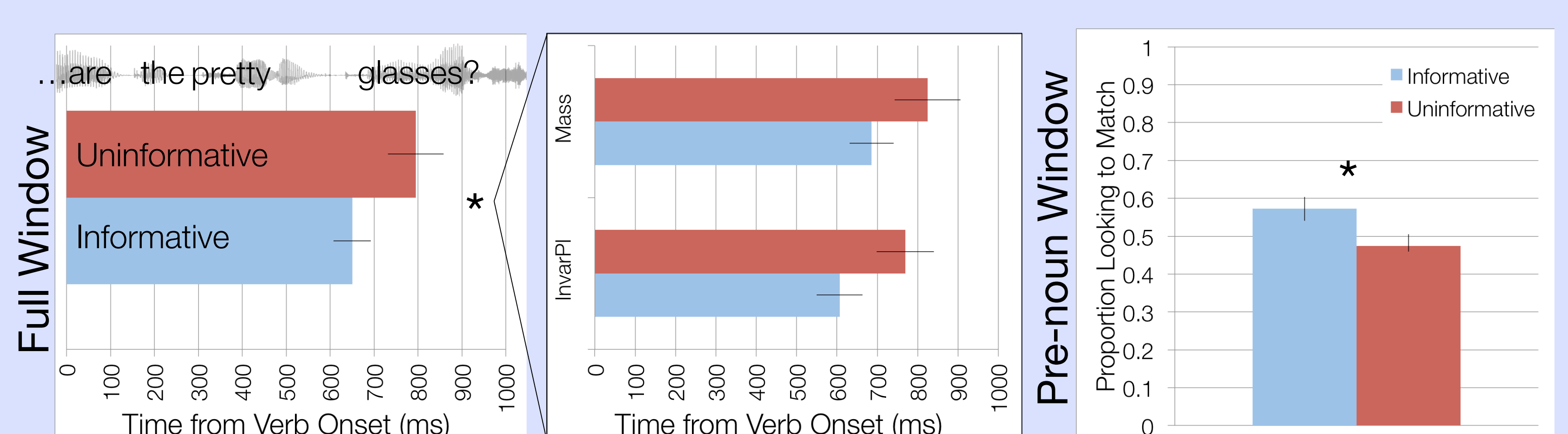
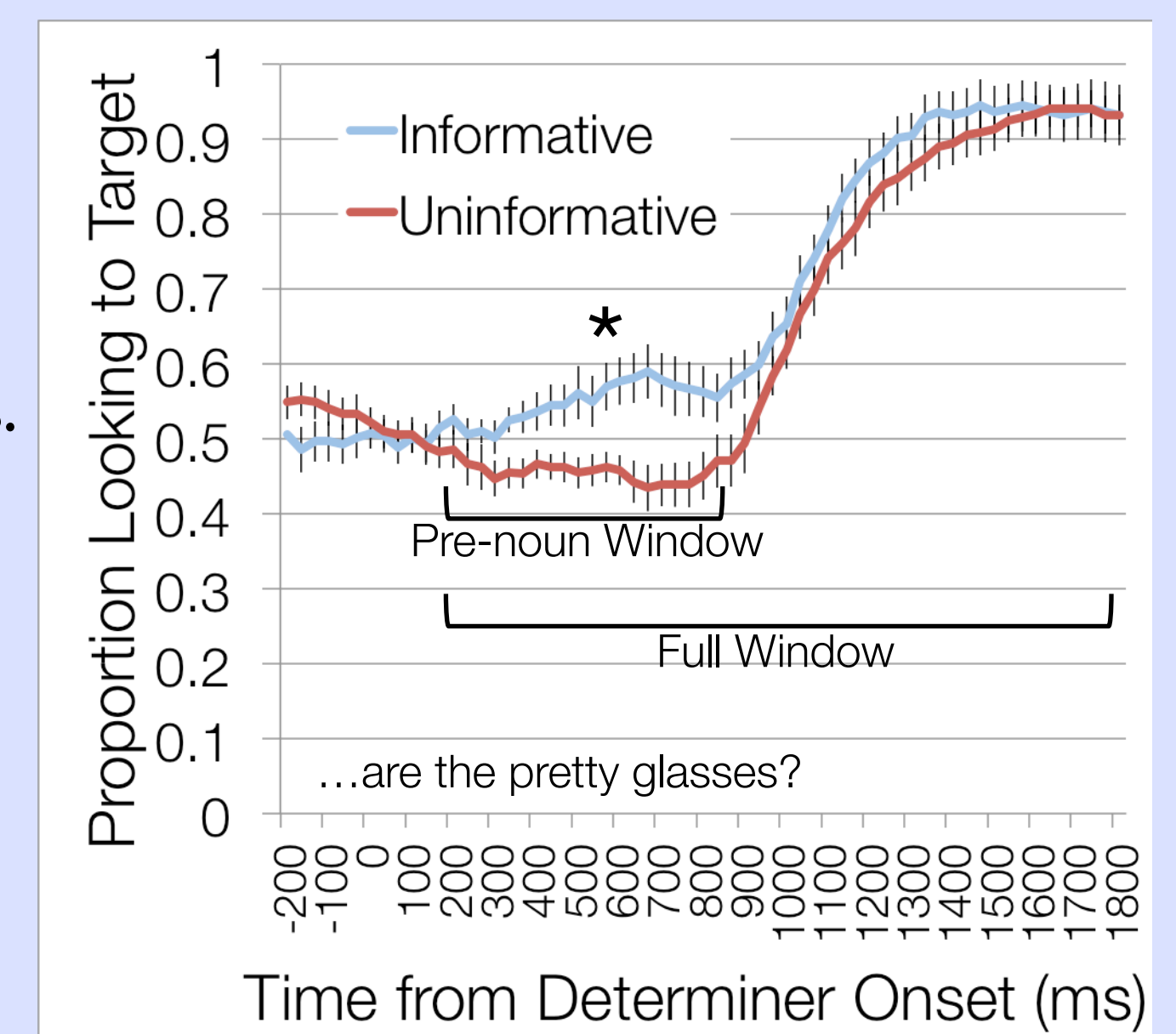
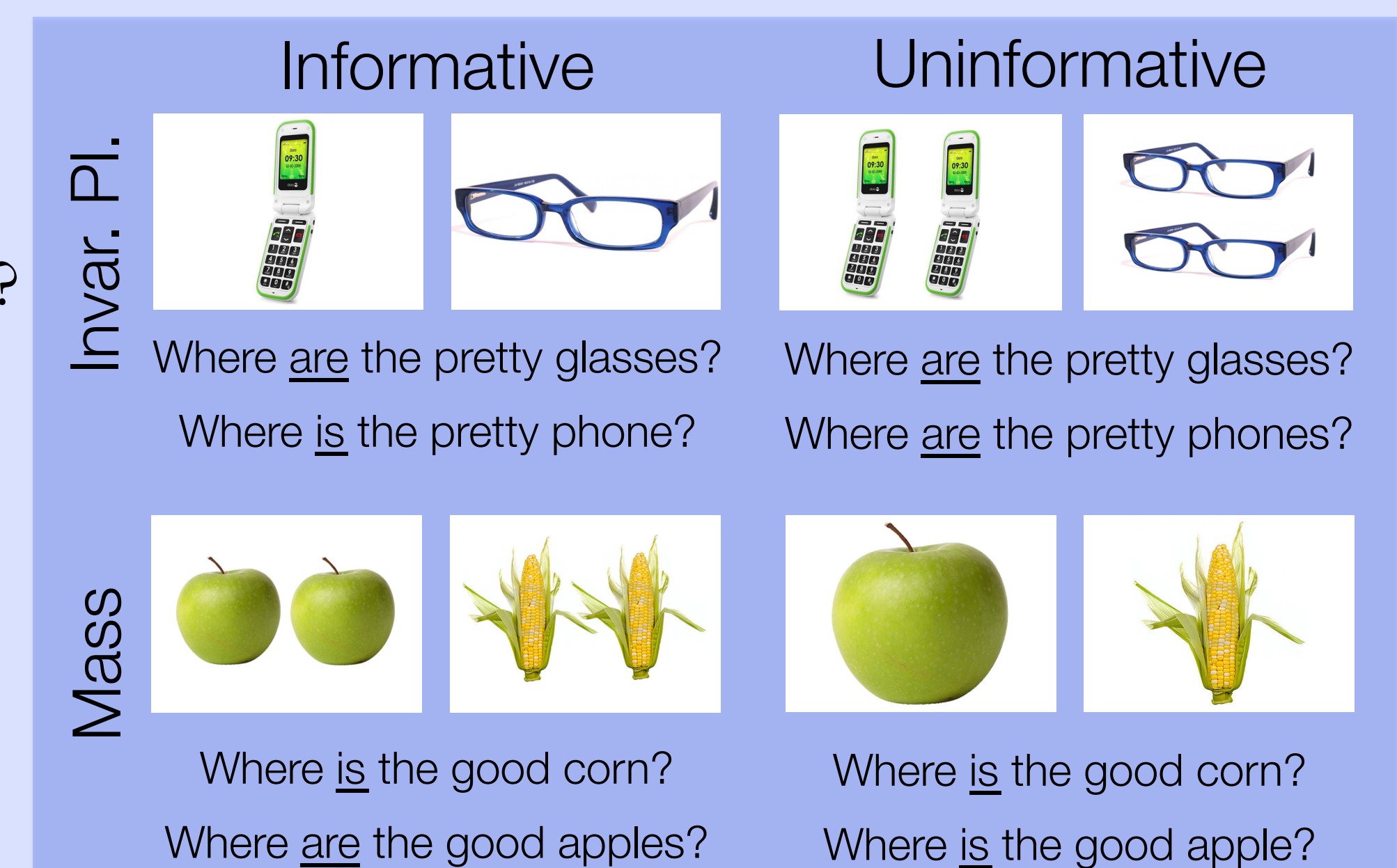
#### Results

Even in the absence of semantically informative number-marking, listeners used agreeing verbs to make predictions.

In informative compared to uninformative trials, listeners:

- were *reliably faster* to shift from distractor to target
- were marginally *more likely to switch* from distractor to target before noun onset
- *looked more at the target* than distractor before noun onset

The informative advantage did not interact with noun class.



### Future Directions

#### Any Effect of Notional Number Match?

Results in Experiments 1 and 2 are similar.

Is there any benefit to having consistent conceptual number?

Help vs. Hinder



Where are the nice glasses?  
Where is the nice corn?

#### Lexical Cooccurrence?

Lexical knowledge

- necessary for classifying nouns (count/mass/invar. plural)
- may include relevant statistical information

Do participants rely on cooccurrence probability?

Preliminary data with novel nouns suggests not.

- notional number + count noun = informative advantage
- but advantages appear late:
  - something gained with familiarity speeds processing

### Conclusions

Listeners can make skeletal predictions about properties of an upcoming noun on the basis of a number-marked verb.

Such skeletal predictions:

- are sufficient to drive anticipatory eye-movements to the upcoming referent
- can be made based on regular affix-based agreement and on irregular suppletive agreement
- are not solely reliant on number meaning

### Acknowledgements

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Participants | Language Acquisition Lab members

### References

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