Children's sensitivity to subject-verb agreement in comprehension does not require knowledge of specific lexical co-occurrences

Cynthia Lukyanenko and Cynthia Fisher
University of Illinois, Urbana-Champaign
contact: lukyane1@illinois.edu

Background

Incremental Use of Morphosyntactic Cues

Adults and young children rapidly use morphosyntactic cues in online comprehension:

- Listeners use grammatical gender on a determiner to facilitate processing of a noun (Dahan et al., 2000; Lew-Williams & Fernald, 2007; van Heugten & Shi, 2009).
- Listeners use agreeing verbs to anticipate upcoming nouns (Lukyanenko & Fisher, 2010, 2012, 2013).

What knowledge supports this ability?

Semantic or syntactic? Use of grammatical gender, and agreement with non-count nouns → knowledge about how words legally combine, not about meaning.

Lexical or abstract? Do listeners represent knowledge of how words combine in terms of particular word-forms or in terms of grammatical categories?

Informative
Where are the good cookies?
Where is the good apple?
Uninformative
Can you find the good cookies?
Can you find the good apple?

Informative

Where are the pretty glasses?
Where is the pretty phone?
Uninformative

Where are the pretty glasses?
Where are the pretty phones?

Abstract or Lexical Representations?

Grammatical gender

- lexical feature (*la*$_{FEM}$ *galleta*$_{FEM}$, not *el*$_{MASC}$ *galleta*$_{MASC}$)
- gender agreement is amenable to lexical representation (e.g., Arnon & Ramscar, 2012).

Subject-verb agreement

- depends on grammatical number
- grammatical number varies depending on subject noun type and intended meaning
- less amenable to lexical representation

Both adults and young children have and use intricate lexical knowledge:

- Preschoolers produce words more accurately in high-frequency 4-word contexts than in matched low-frequency ones (Bannard & Matthews, 2008; see also, Arnon & Clark, 2011).
- Adults produce words more quickly when the next word is highly predictable in context (Bell et al., 2009).

For simple count-noun subjects, grammatical number aligns with notional number.

Given evidence that a novel noun is a count noun, can adults and children immediately use agreeing verbs to predict the notional number of an upcoming novel target word?

Rapid extension would suggest the existence of a category to which words can be easily added.

Method

Question

Can listeners use an agreeing verb to anticipate the grammatical number of an upcoming novel noun?

Predictions

If children store agreement information in terms of particular word pairs, agreeing verbs should be *unable* to facilitate the processing of novel nouns.

If children represent agreement in terms of grammatical features, agreeing verbs *should facilitate* processing of novel nouns.

Participants

96 3-year-olds (mean 3;0 | range 2;10-3;6)

48 college students (mean 20| range 18-22)

Stimuli

A short intro phase introduced 4 novel nouns as count nouns, and familiarized participants with the task. The novel nouns were never subject of a sentence, and were always singular.

32 test trials: 8 each of the 4 trial types shown.

Each combination of verb-form and noun-form occurred only once.

Introduction Phase

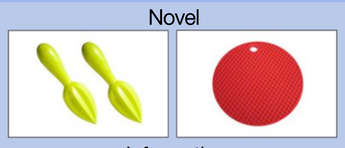
Look! A doll!

Wow! A keppin!

Show me the keppin.
…

Test Trials

Novel



Informative
There are the good keppins!
There is the good lun!
Uninformative
Look at the good keppins!
Look at the good lun!

Known

Informative
There are the nice puppies!
There is the nice butterfly!
Uninformative
Look at the nice puppies!
Look at the nice butterfly!

Results

Measurements of both adults' and children's looking behavior show:

- a trial type (*informative, uninformative*) by condition (*control, experimental*) interaction.
- no interaction with noun type (*novel, known*).

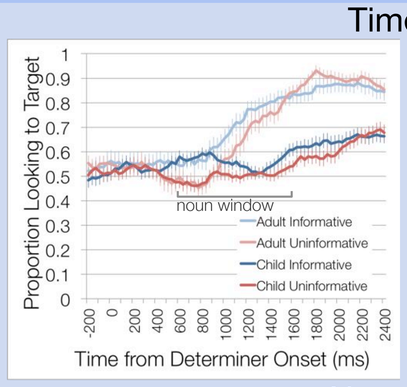
This pattern is clearly visible in

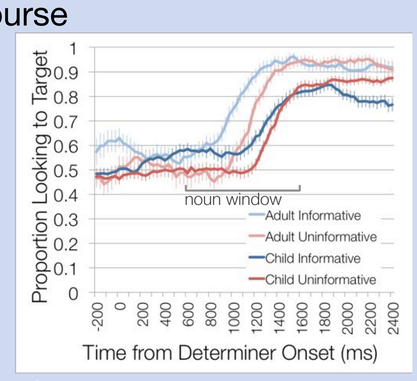
- the overall timecourse of looks to the target
- the proportion of looks to the target in a 1s noun window
- and for the children, even in the proportion of looks to target at noun onset.

The informative advantage appears in both known and novel noun trials, and especially for children, appears before the noun itself could have influenced looking behavior. This is consistent with findings that children and adults can use an agreeing verb to anticipate properties of upcoming nouns.

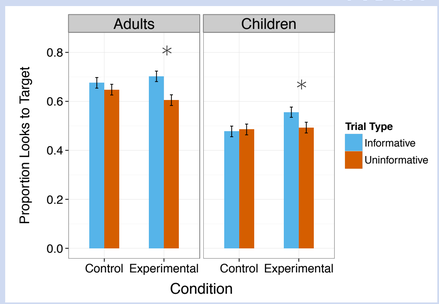
Novel Nouns | **Known Nouns**

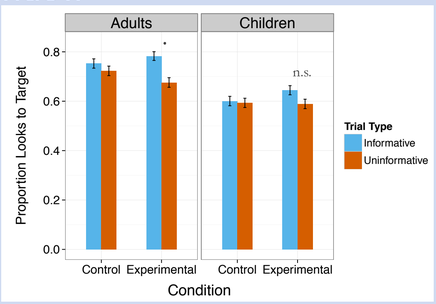
Timecourse



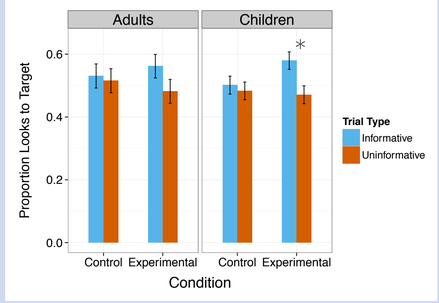


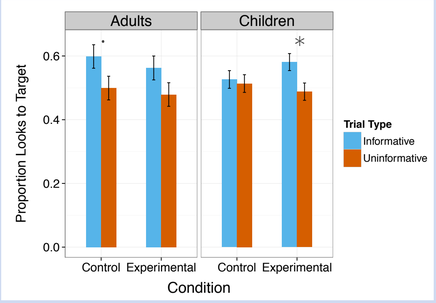
Noun Window





Noun Onset Frame





Conclusions

Consistent with other findings (Lukyanenko & Fisher, 2010, 2012, 2013), an agreeing verb facilitated processing of known nouns.

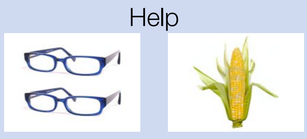
Furthermore, following minimal introduction, listeners were able to use agreeing verbs to facilitate the processing of *novel nouns*. This suggests that by age 3, listeners have a category of number-varying count nouns, to which they can easily add new members.

Thus, listeners' use of agreement in online comprehension is not solely reliant on distributional learning about the co-occurrence of particular noun and verb forms. Agreement appears to be represented in terms of abstract grammatical properties.

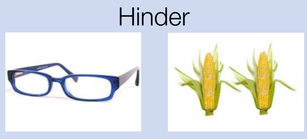
Future Directions

Role of notional number?

Help



Hinder



Where are the nice glasses!
Where is the nice corn!

Novel non-count nouns?

If notional number plays a role, it might partially drive success with novel nouns in the current study.

Do agreeing verb forms also facilitate processing of novel non-count nouns?

Do you see those?
A pair of dags!

Do you see that?
Some kabe!

Where is the nice kabe?
Where are the nice dags?

References

Arnon & Clark (2011) *Language Learning & Development* | Arnon & Ramscar (2012) *Cognition* | Bannard & Matthews (2008) *Psychological Science*
Bell, Brenier, Gregory, Girand & Jurafsky (2009) *J. of Memory and Language*| Dahan, Swingley, Tanenhaus & Magnuson (2000) *J. of Memory and Language*
Lew-Williams & Fernald (2007) *Psychological Science* | Lukyanenko & Fisher (2010) *BUCLD Presentation* | Lukyanenko & Fisher (2012) *CUNY Poster*
Lukyanenko & Fisher (2013) *CUNY Poster* | van Heugten & Shi (2009) *Developmental Science*

Acknowledgments

Grant funding from NSF (BCS 0620257) and NIH (HD054448, T32 HD055272)
Participants and parents
Language Acquisition Lab members