Information Integration and Domain Restriction: Interpreting Only in Context

Christina Kim, Christine Gunlogson, Michael Tanenhaus and Jeffrey Runner
University of Rochester

Introduction

The interpretation of sentences with focus-sensitive elements like ‘only’ depends on context to restrict the domain of relevant alternatives for evaluating the focused expression [1]. For instance, in the following pair of sentences, the speaker can be construed as meaning she only owns a bike of the set of things relevant to the current situation (excluding the implausible reading that a bike is the only thing in the universe that she owns).

Jill has a car and a bike, plus she lives near a bus line. I only have a bike.

But what kinds of contextually available information do listeners actually use to restrict intersentential domains? Two visual world eyetracking experiments show that listeners use both preceding linguistic context (Experiment 1) and implicit conceptual knowledge about real world scenarios (Experiment 2).

Experiment 1

Do comprehenders interpret ‘only’ with respect to the items mentioned in the preceding linguistic context?

On each trial, participants heard a context sentence mentioning two items followed by a target sentence mentioning one item; the target item was either discourse-new, or overlapped with a previously mentioned item. The target sentence also varied in the presence or absence of only.

Context sentence
Mark has some candy and some pencils

Target sentence
Mention-NoOnly: Jane has some candy.
Mention-Only: Jane only has some candy.
NoMention-NoOnly: Jane has some anchors.
NoMention-Only: Jane only has some anchors.

A four-picture display appeared concurrently with the target sentence. Participants were instructed to click on the items Jane had, and their eye movements were tracked as they listened to the sentence and performed the task.

In experimental trials, two of the four pictures were members of the same phonological cohort (here, candy and candles). In the absence of any biasing cues, phonological overlap leads to late disambiguation between target and competitor. Early disambiguation in favor of the target indicates the presence of some additional cue.

Predictions for Experiment 1:
- Late looks to target item—no bias due to Mention or Only
- Early looks to target item—bias toward target due to Mention and/or Only

Experiment 1 results

- Main effect of Mention (F(1,21)=15.2, p<0.001) 200-500 ms post target word onset (black vertical line=target word onset; green vertical line=average onset ‘only’).
- Main effect strengthened by the presence of only (Mention x Only interaction, F(1,21)=4.0, p<0.05)

Experiment 2

Experiment 1 showed that listeners tend to interpret ‘only’ with respect to recently mentioned items—they use the discourse context to restrict their interpretive options. Experiment 2 asks whether enriching the contextually available information has a further restrictive effect on top of the Mention-Only effect in Experiment 1.

Mention x Only conditions were embedded under an Context Quality manipulation: the two sentences from Experiment 1 were preceded by a (relatively) Uninformative or Informative context sentence, yielding 8 experimental conditions.

Possible outcomes:
- (1) More informative contexts function in the same way as previous mention, by restricting the domain of interpretation specifically when a focus-sensitive item like ‘only’ is present.
  - Expect faster convergence on target item only in Only conditions, on top of the Only-Mention effect from Experiment 1.
  - Enriching the context conceptually has a restrictive effect on subsequent interpretation, but in a general way that isn’t specific to the presence of ‘only’ in the way that Mention is in Experiment 1 (see Chambers et al 2001 and others, for similar effects).
  - Expect across-the-board faster convergence on target item in informative conditions, irrespective of the presence of ‘only’.

Experiment 2 results

- Uninformative Context: conditions pattern like Experiment 1, as expected:
  NoMention-NoOnly > Mention-NoOnly > NoMention-Only > Mention-Only (time to point at which target looks significantly exceed cohort competitor looks). Only looks to target item are plotted below, for each of the four Mention x Only conditions.

- Informative Context: general restrictive effect—average 250 ms earlier convergence on target relative to corresponding Uninformative Context condition.
- Extra benefit in the presence of ‘only’:
  300 ms advantage due to Informative context for Only conditions vs. 200 ms for No Only.
- Largest advantage for Mention-Only condition: 332 ms earlier target disambiguation in informative vs. Uninformative Context.

Conclusions

- In Experiment 1, mentioned items restricted the alternatives of a subsequent focused element in the scope of only.
- Experiment 2 finds that conceptually enriching the information available in the context has a general restrictive effect that speeded target identification. This effect was strongest in the presence of ‘only,’ suggesting that focus-sensitive items like ‘only’ function as cues to be extra attentive to information in the context.

References
[1] Roehn 1892, A Theory of Focus Interpretation, NL 3.1. 75-116