

Information integration and domain restriction: Interpreting *only* in context

Keywords: focus, eyetracking, domain restriction, context

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]. But what kinds of contextually available information do listeners actually use to restrict interpretive domains? Two visual world eyetracking experiments show that listeners use both preceding linguistic context (Experiment 1) and implicit conceptual knowledge (Experiment 2). In Experiment 1, mentioned items restricted the alternatives of a subsequent focused element in the scope of *only*. In Experiment 2, context about a specific scenario resulted in a referential garden-path. Recovery was slower when the presence of *only* required committing to a referential domain that could serve as an alternative set, suggesting that reanalyzing contextually-sourced domains is most costly when those domains are required for interpretation.

Experiment 1 compared pairs of sentences like (1a) and (2), where the focused item is included in the set of things mentioned in (1a) (*Overlap* condition), with pairs like (1b) and (2), where a discourse-new item is focused (*NoOverlap* condition). Participants viewed a 4-item display, and were instructed to click on the items Jane has. Overlap was crossed with presence or absence of *only*. On *NoOverlap* trials, *only* disambiguated the intended referent from a phonological cohort competitor after the entire word (600 ms after direct object onset). However on *Overlap* trials, with *only*, fixations converge on the target item 200 ms after target word onset—well before the input disambiguates the target and the cohort. At 200-400 ms, there are more looks to the target in *Mention-Only* than *Mention-NoOnly* trials ($t=10.4, p<.001$), while *NoMention* trials did not differ ($t=.9, p=.35$). Thus, after hearing only the initial sound of the target word, listeners have a strong expectation that the set of possible referents will be constrained by the set mentioned in the previous sentence.

In Experiment 2 the linguistic context provided listeners with information about the goals of a character in a short scenario (3). We compared how the presence of *only* (4a-b) modulated the effect of context. The contextual information biased listeners to narrow the set of referents down to the two quadrants containing items relevant to the scenario given. Looks to context-relevant quadrants (those with bakesale-appropriate items in 3) exceed looks to unrelated quadrants early in the sentence. The earliest looks occur in the *Only* condition (872 ms prior to target onset for *only* vs. 676 ms without *only*). As in Experiment 1, *only* prefers to be interpreted with respect to information in the preceding linguistic context. Once the referential context had been restricted to the two relevant quadrants, there was a preference to look at display with a two-item display compared to a 1-item display. Recovery from this garden path (at “cake” for “chocolate cake” was faster when *only* was not present (566 ms after direct object onset) than when it was (638 ms). We suggest that interpretation of *only* requires listeners to commit to a referential domain AND to compute contrast. Therefore recovering from a referential garden-path requires both reanalyzing the target referent and the relevant alternatives.

A third experiment (in-progress) addresses the relative strengths of different information types in restricting focus alternatives. Participants first hear a sentence like (5a) while viewing a display like (5b); then their eye movements are tracked as they hear (6a) while viewing both (5b) and (6b) on two halves of the screen. Unlike Experiments 1 and 2, participants are asked whether the second sentence is True or False given the visual display. The experiment varies whether the display contains something that counts as a falsifier because it is previously mentioned (6b), in the same conceptual category as the focus element (6c), or simply visually co-present with it (6d). The latency to the True-False response will be an indicator of whether there is any processing cost associated with using a contextually restricted domain to accept or reject sentences like (6a). In addition, fixation patterns while the sentence is unfolding will tell us which of the available types of information are most important for restricting the alternatives with respect to which the truth/falsity of a sentence is calculated.

- (1)
 - a. Mark has *some candy and some pencils*.
 - b. Mark has *some toothpicks and some pencils*.
- (2) Jane only has [*some candy*]
 display: *candy* (target), *candles* (competitor),
anchors (unrelated), *sneakers* (unrelated)
- (3) Jill is at the supermarket. While she's there, she needs to pick up some stuff for the bakesale.
- (4)
 - a. She's getting *some chocolate cake*.
 - b. She's only getting *some chocolate cake*.
 display: *chocolate cake* (target), *chocolate donuts & apple pie* (competitor),
carrots (1-item distractor), *celery & onions* (2-item distractor)
- (5)
 - a. Greg has an apple and a pear.
 - b. display 1: Greg, apple, pear.
- (6)
 - a. Anne only has an apple.
 - b. display 2a: Anne, apple, pear.
 - c. display 2b: Anne, apple, orange.
 - d. display 2c: Anne, apple, pencil

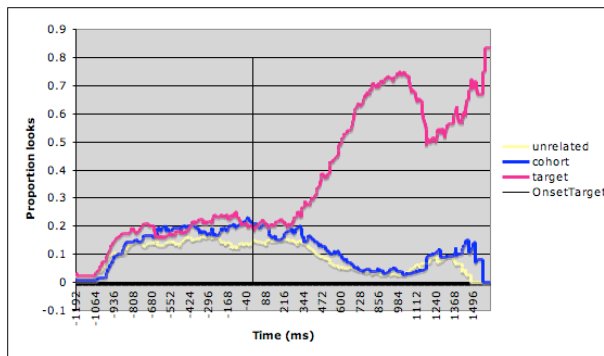


Fig 1a. Exp 1: Overlap-NoOnly condition.

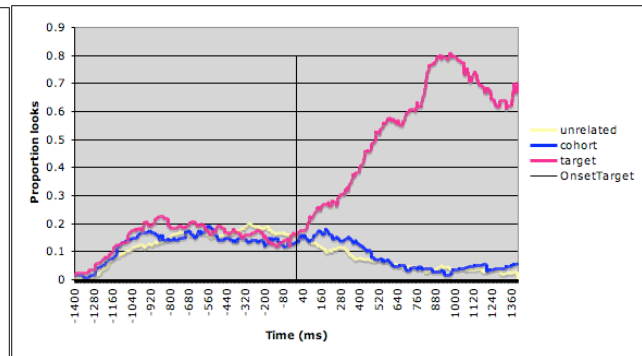


Fig 1b. Exp 1: Overlap-Only condition.

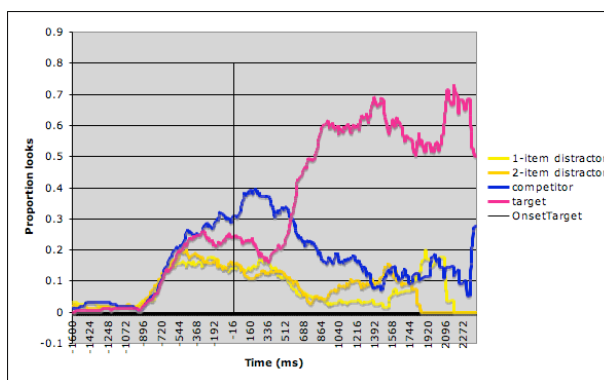


Fig 2a. Exp 2: NoOnly condition.

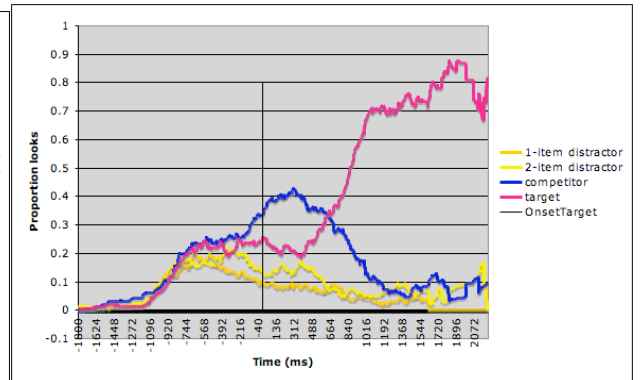


Fig 2b. Exp 2: Only condition.

Reference

- [1] Rooth (1992). A theory of focus interpretation. *Natural Language Semantics*, 1:1, 75-116.