

# Investigating the use of alternatives in incremental processing



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## Background and research questions

### Gricean Pragmatics and Focus Semantics

Theories of implicature and focus both make use of alternatives when computing the interpretation of a given utterance.

A: Mary was planning to wash the car and cut the grass on the weekend. I wonder how she got on.

B: Mary (only) cut the grass.

*Implication: Mary did not wash the car.*

- Quantity Implicature (QI) arises by deriving the negation of the alternative utterance that the speaker might have used [1].
- The focus particle 'only' is interpreted as an exhaustivity operator, with respect to a set of alternatives [2].

### Research questions

To date, little is known about how comprehenders use alternatives in real time. Using the visual world paradigm, we want to investigate:

- Whether comprehenders draw their visual attention to the depicted alternative when interpreting QI and 'only'?
- Does the online use of alternatives differ between QI and 'only'?

### Experimental overview

German-speaking adults (N=24) tested with 18 experimental items, 6 per condition. 30 filler items. 48 items in total.

Dependent variable of interest: visual bias to the competitor

## Visual world eye-tracking experiment

### Context



A: Mia wollte vor dem Abendbrot zwei Dinge erledigen.

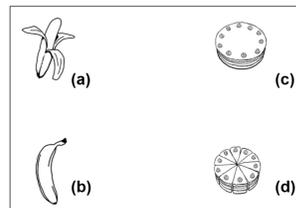
'Mia wanted to do two things before dinner.'

B: Wie weit ist sie gekommen?

'How far did she get?'

### Critical display

contextually restricted alternatives = {peeled banana, cut cake}



Condition	Target	Competitor
QI	(c)	(d)
Only	(c)	(d)
Also	(d)	(c)

1st sentence

2nd / Target sentence

QI Mia hat die Banane geschaeelt.

*Mia has the banana peeled.*

Sie hat die Torte nicht geschnitten.

*She has the cake not cut.*

Only Mia hat nur die Banane geschaeelt.

*Mia has only the banana peeled.*

Also Mia hat auch die Banane geschaeelt.

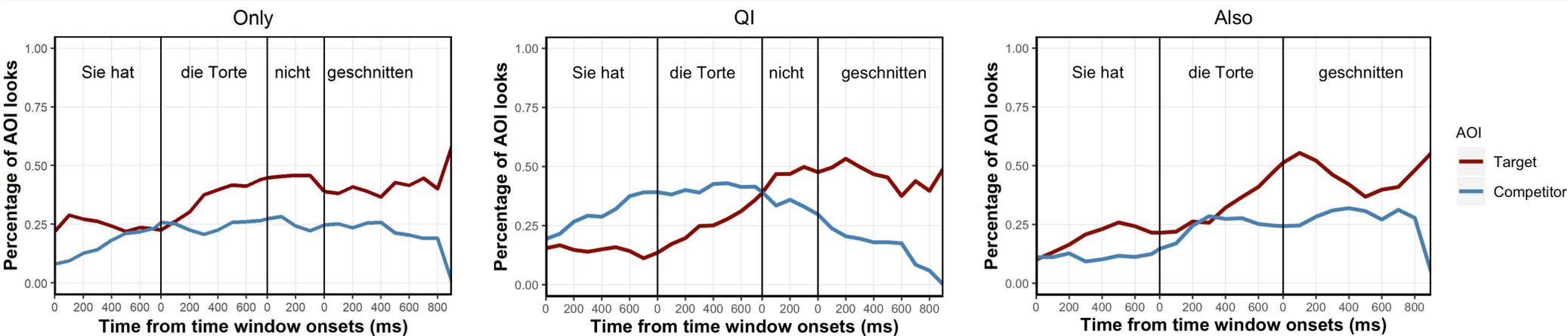
*Mia has also the banana peeled.*

Sie hat die Torte geschnitten.

*She has the cake cut.*

**Baseline:** 'also' condition. The competitor is irrelevant to either at issue or non-at-issue content of the target sentence.

## Results



Critical time windows: 'Sie hat' (she has), 'die Torte' (the cake)

- Looks to the competitor (QI vs. 'also')**: there was a greater bias to the competitor in the QI condition compared to the 'also' condition in both windows ( $p = .02$ ;  $p = .04$ ). In addition, the QI condition showed a steeper linear increase during the 'Sie hat' window ( $p < .001$ ).
- Looks to the competitor ('only' vs. 'also')**: Although the overall bias to the competitor was not different between the 'only' and the 'also' conditions, the effect on the linear component suggested a faster changing bias towards the competitor in the 'only' condition compared with the 'also' condition in 'Sie hat' window ( $p = .053$ ).
- Looks to the competitor (QI vs. 'only')**: There were more looks to the competitor in the QI condition than in the 'only' condition for both windows ( $ps < .01$ ).
- Target anticipation**: In the 'only' and 'also' conditions, participants anticipated the target by the offset of 'die Torte' ( $p = .01$ ;  $p = .02$ ). In the QI condition, they anticipated the target 150ms after the onset of 'geschnitten' ( $p < .01$ ). In the QI condition, growth curve analysis suggested a marginally significant shift of attention to the target ( $p = .06$ ) from 'Sie hat' onset to 'die Torte' offset

## Discussion

- Our results suggest that listeners make use of alternatives when interpreting QI and 'only' in real-time.
- The difference between the QI and 'only' conditions is not predicted by formal theories. However, our results are in line with previous results on comparison between scalar implicatures and 'only' [3-4], where the processing of scalar implicatures associates with a greater cognitive cost. [3] suggests a greater cost for scalar implicatures might be due to more attention to context. Likewise, in our QI condition, the competitor could be viewed as the representation of the context under discussion.

### References

[1] Geurts, B. (2010). Quantity implicatures. [2] M. Rooth. (1992). *Natural Lang Sem*, 1(1), 75-116. [3] Bott, L., Bailey, T., & Grodner, D. (2011). *J Mem Lang* 66, 123-142. [4] Marty, P., & Chemla, E. (2013). *Frontiers in Psychology*, 4, 1-12.

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