

Theoretical background

Neo-Griceans[4] argue that semantic and pragmatic meanings are processed in two hierarchically ordered stages, causing implicatures to be delayed in comparison to purely semantic quantifiers like all.

Defaultists[3] claim that listeners arrive at the pragmatic meaning automatically and not later than e.g. for all.

Contextualists are divided in their assessment; some [2] claim implicatures can be computed immediately and effortlessly, while others [1] consider it a time and resource consuming process.

Are implicatures computed when a prerequisite for communication in Gricean terms - cooperativity - is lacking?

Pretest

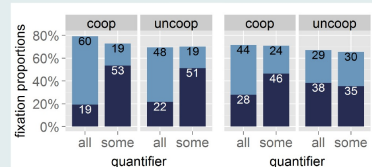
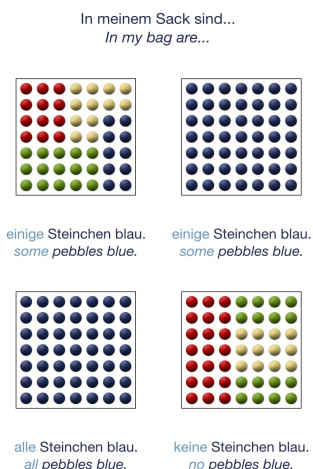
The pretest aimed at confirming that the German quantifier *einige* (some) carries an implicature, as it does not fully equal some.

64 fillers and 16 items in 4 conditions were distributed over 4 lists in a WebEx2 online questionnaire. A condition of false pairs was added for control. 32 German native speakers judged the pairs' truth value (T/F). If the pair was true, they had to rate its acceptability (7-point scale).

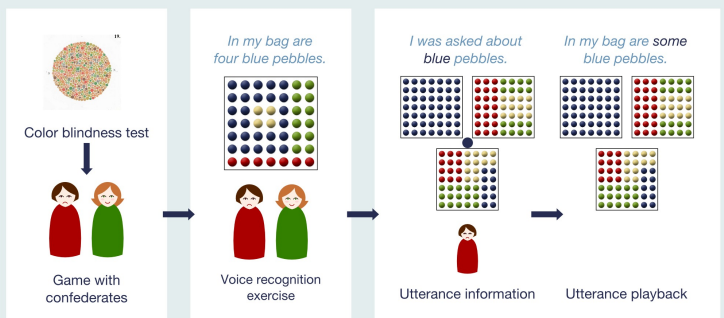
Results

False controls were rejected 92.4% as false, whereas items only <11% of the time. *All* and *none* conditions were judged at ceiling (6.85 and 6.81). Some+some conditions judged better than some +all (F(1,(29)=132.4) but worse than *all* and *none* (4.16 and 2.19.) Results are in line with [5].

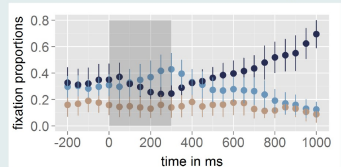
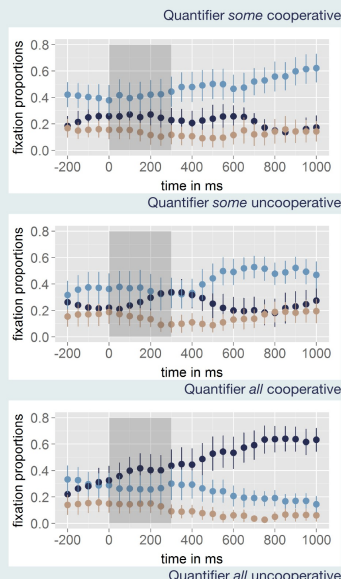
Sample pretest/experiment items.



Fixations in early (150-450 ms, right) and late (450-1000 ms left) periods. Pictures: some, all



Procedure in main experiment.



Timecourse of fixations on images during utterances. Pictures: some, all, none

Eye-tracking experiment

Materials were almost identical to the pretest. Recordings were spliced (all quantifiers started and ended in the same millisecond.) The some pictures contained a ratio of 10:39 of target color to rest. 112 fillers and 24 items in 6 conditions, counterbalanced for speaker gender. Fillers were utterance pairs like "more than half" or "exactly 4" which were judged as truthful and had a very high (cooperative) or very low (uncooperative) score on the acceptance scale. Pictures positions were permuted.

The experiment was divided into 4 phases and lasted approx. 45 minutes:

- Scripted game with 2 confederates: understand the background, familiarize with player types/genders, plausibility of all/none quant., confederate never mentioned *all*, *some*, *none*.
- Exercise: introduction of speaker voices, participants distinguish between players, 20 rounds.
- Main experiment preceded by 2 dummy trials
 - speaker & color information, picture display (all information for sentence parsing but quant.)
 - clicking on a blue circle in the middle of the display triggered sound file playback.

Predictions

	Implicatures in cooperative conditions	Implicatures in uncooperative conditions
Defaultism	computed as quickly as <i>all</i> , automatic	computed automatically, later cancelled
Contextualism	computed as quickly as <i>all</i> [2] or delayed [1]	not computed
Neo-Gricean	computed but more slowly than <i>all</i>	not computed

Results

Some quantifiers were paired more frequently with all-pictures when the speaker was uncooperative ($z=-3.6$.)

2 participant groups: 4 semantic (paired uncooperative quantifier *some* with picture *all*) + 3 undecided (50/50); rest paired quantifier *some* with picture *some* irrespective of the speaker.

GLMM analysis (picture, quantifier, cooperation, time vs. baseline) found a *some* vs. *all* interaction 150 to 450 ms post-quant. onset: more fixations on target corresponding to the quantifier in cooperative than uncooperative cases (quantifier appears to play a role for fixations only if the partner was cooperative.) Later (450-1000 ms), target fixations on the picture corresponding to the quantifier are prevalent in both contexts, as expected.

None was always delayed in comparison to both all and some. This is possibly due to negation. (?)

Discussion

In coop. contexts implicature computation was fast and automatic, as predicted by Defaultism and Contextualism [2]. The results replicate Grodner et al. In uncooperative cases the implicature was computed late. This result was not predicted by any of the theories. Moreover, *all* was also unexpectedly computed late.

References & Acknowledgements

[1] Huang, Y.T & J. Snedeker (2009). 'Online interpretation of scalar quantifiers: Insight into the semantics/pragmatics interface.' Cognitive Psychology [2] Breheny, R. et al. (2013). "Taking the epistemic step: Toward a model of on-line access to conversational implicatures", Cognition. [3] Grodner, D.J. et al. (2010). 'IsSome, and possibly all, scalar inferences are not delayed: Evidence for immediate pragmatic enrichment.' Cognition. [4] Geurts, B. (2009). "Scalar Implicature and Local Pragmatics." M&L. [5] Degen, J. and M. Tanenhaus (2009). Naturalness of lexical alternatives influences interpretation of isomel. CUNY 2009. First and foremost I would like to thank Oliver Bott and Fabian Schlotterbeck for their patience, knowledge and encouragement. I am truly indebted and thankful to Michael Franke for the conceptual inception and many fruitful discussions. A great many thanks to my supervisor, Wolfgang Sternfeld, for his continuous support, from initial advice and contacts to the very last sentence, whilst allowing me to work in my own way. Besides, I am most grateful to Robin Hrnig for his help in analyzing the vast amounts of eye-tracking data. Lastly, thank you Aleksandar Dimitrov for reading though so many drafts. Research was funded by SFB 833.