Implicatures in uncooperative contexts: Evidence from a visual world paradigm.

Anna.Pryslopska@uni-tuebingen.de, Sonderforschungsbereich 833

EBERHARD KARLS UNIVERSITÄT TÜBINGEN

Background

Neo-Griceans: semantic and pragmatic meanings are processed in two hierarchically ordered stages, causing implicatures to be delayed in comparison to purely semantic quantifiers like *all*. (Geurts 2009, M&L)

Defaultists: listeners arrive at the pragmatic meaning automatically and not later than e.g. for *all*. (Grodner et al. 2010, *Cognition*)

Contextualists are divided in their assessment; some ([1] Breheny et al. 2013, *Cognition*) claim implicatures can be computed immediately and effortlessly, while others ([2] Huang & Snedeker 2009, *Cognitive Psychology*) consider it a time and resource consuming process.

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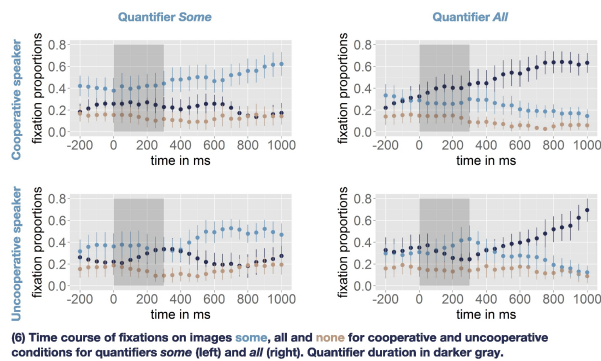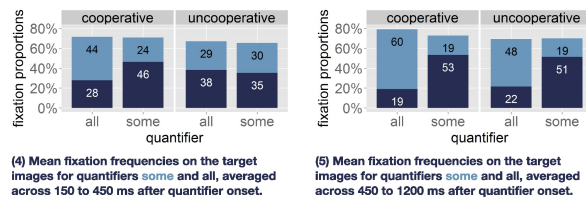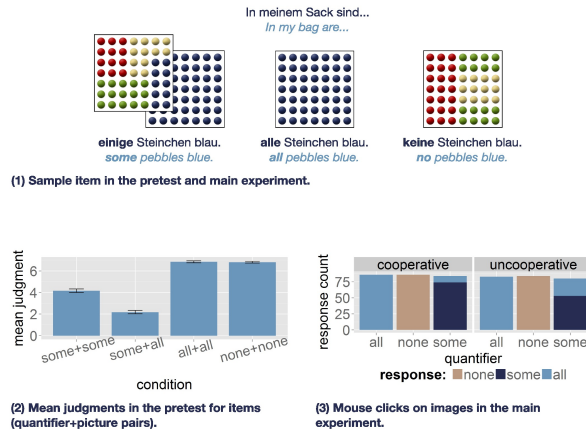
Pretest

The pretest aimed at confirming that the German quantifier *einige* ("some") carries an implicature, as it does not fully equal *some* (eg. "Some cat sat on the table").

64 fillers, 16 items, 4 conditions (see (1)) 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% (F), items <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* (F1(1,29)=132.4) but worse than *all* and *none* (4.16 and 2.19, see (2)). Results are in line with Degen & Tanenhaus (CUNY 2009).

In meinem Sack sind...
In my bag are...

einige Steinchen blau.   alle Steinchen blau.   keine Steinchen blau.
some pebbles blue.   *all pebbles blue.*   *no pebbles blue.*

(1) Sample item in the pretest and main experiment.

(2) Mean judgments in the pretest for items (quantifier+picture pairs).

(3) Mouse clicks on images in the main experiment.

(4) Mean fixation frequencies on the target images for quantifiers some and all, averaged across 150 to 450 ms after quantifier onset.

(5) Mean fixation frequencies on the target images for quantifiers some and all, averaged across 450 to 1200 ms after quantifier onset.

Quantifier *Some*   Quantifier *All*

(6) Time course of fixations on images some, all and none for cooperative and uncooperative conditions for quantifiers some (left) and all (right). Quantifier duration in darker gray.

Eye-tracking experiment

Materials were almost identical to the pretest (see (1)). Recordings were spliced (quantifiers started/ended in the same ms). *Some* pictures contained a ratio of 10:39 of target color to rest. 112 fillers, 24 items, 6 conditions, counterbalanced for speaker gender. Pictures positions were permuted. Factors: speaker (cooperative, uncooperative), picture (all, none, some), quantifier (all, none, some), time (50 ms bins).

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

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

Predictions for implicatures

	Cooperative conditions	Uncooperative conditions
Defaultism	computed as quickly as *all*, automatic	computed automatically, cancelled
Contextualism	computed as quickly as *all* [1], delayed [2]	not computed
Neo-Gricean	computed but more slowly than *all*	not computed

In my bag are four blue pebbles.   I was asked about *blue* pebbles.   In my bag are *some* blue pebbles.

Voice recognition exercise   Utterance information   Utterance playback

Results

Some was paired more frequently with the *all*-picture when the speaker was uncooperative (z=-3.6, see (3)).

GLMM analysis (post-quantifier region vs. baseline) found a *some* vs. *all* interaction 150 to 450 ms post-quantifier onset: more fixations on target in cooperative than uncooperative cases. Later (450-1000 ms), target fixations on the picture corresponding to the quantifier are prevalent in both contexts (see (4)-(6)).

None was always delayed in comparison to both *all* and *some*, possibly due to negation.

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

Discussion

The factor quantifier seems to only have played a role if the speaker was cooperative. In cooperative contexts implicature computation was fast and automatic, as predicted by Defaultism and Contextualism (Breheny et al. 2013). The results replicate Grodner et al. (2010).

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. Possibly: with enough contextual support, quantifier computation can be put on hold until the hearer decides whether to trust the speaker.