Indirect scalar implicatures are neither scalar implicatures nor presuppositions (or both)

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Introduction
- Comprehension of utterances in context involves a variety of inferences, which are based either on conventionally encoded linguistic meaning or pragmatic meaning.
- Our study focused on two such inferences: scalar implicatures, and presuppositions.

Sentence | Inference | Type
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1. Some giraffes have scarves | Not all giraffes have scarves | Direct Scalar Implicature (DSI)
2. Not all giraffes have scarves | Some giraffes have scarves | Indirect Scalar Implicature (ISI)
3. The giraffe didn’t win the race | The giraffe participated in the race | Presupposition (P)

- DSI and ISI, while distinguished terminologically, are treated uniformly: Ps, on the other hand, are traditionally assumed to be of a different nature to scalar implicatures.
- Both types of inferences are optional, but in different ways:
  - Implicatures are a form of pragmatic enrichment that can be cancelled (or fail to arise in the first place).
  - Presuppositions can be interpreted locally relative to negation (NOT [The giraffe participated in the race]) (Assumed to be dispreferred option in theoretical literature).

The acquisition of scalar implicatures and presuppositions
- The acquisition of DSI and ISI has been studied extensively: a common result is that children are less likely than adults to compute DSI (Novick, 2001 and subsequent work).
- Studies have been done since, and most recently there have been found a similar pattern to DSI (Musolino & Lititz 2006; Katsos et al. 2011).
- However, these studies were not designed to compare the two types of scalar implicature directly.
- Little research on children’s computation of Ps (other than definite descriptions).

Our Study
(Presuppositions) as (a type of) Implicatures (P as Imp):
- While traditionally Ps and ISIs have been treated separately, recent proposals have brought these inferences closer. In particular, Chelma (2009) and Romoli (2012, 2014) have proposed a unified account of ISIs and Ps.

Prediction
- [P as Imp] theories predict that, everything being equal, the responses of each age group will be parallel for ISIs and Ps.

Aim:
- Investigate the explanatory power of these recent, [P as Imp] theories by comparing the way adults and children interact with these three inferences (ISIs, Ps).

Method
Participants: 20 adults, 14-45 year-olds, and 14 7-year-olds.

Procedure: Sentence Picture Matching Task
- Sequential presentation of a) one context picture and b) two critical pictures.
- Covered Box Design: One critical picture was ‘hidden’ from sight.
- Participants were told that only one of the two critical pictures would match the sentence.
- If a reading compatible with the overt picture exists, they should choose it.
- Otherwise, they should choose the covered picture.
- Experimenter produced a short description of the context picture (designed to make the test sentence felicitous), and then a test sentence, which was understood to be describing one of the two critical pictures (visible, covered).
- The participant chose which critical picture they thought the test sentence was describing.

Properties of Overt Target Pictures:
- Visible picture was only consistent with the ‘bare’ meaning of the sentence, without the inference in all critical conditions.
- Rejection of overt picture (via selection of the covered picture) is indicative of choosing a reading that includes the inference.
- Controls included target pictures consistent with a reading that included the inference.

Direct Scalar Implicature
- Some of the bears get balloons

Indirect Scalar Implicature
- All of the bears brought scarves

Presetuposition
- The bear didn’t win the race

Results: Proportion of covered picture choices
Rate of covered picture choices (indicating presence of inference) varied, based on both age and type of inference, with 2x2 cross-over interactions between pairs of factor levels.

Key significant effects:
1) Interaction between P and ISI (DSI) for adults vs. children (for both groups).
2) Planned Comparisons for Children (4-5 & 7):
   a) Between all three inference types, in the following pattern: P > ISI > DSI
   b) Age effect in presupposition condition: 4-5 > 7
3) Planned Comparisons for Adults:
   Reverse pattern from that found in children:
   DSI > ISI > P.

Additional Finding: Interaction between ISI and children (ISI > DSI) adults (DSI > ISI)

Discussion
- Parts of results consistent with previous work:
  - Adults were more likely than children to compute DSI and ISIs (Novick, 2001; Musolino & Lititz, 2006).
  - Children do not appear to be interpreting presuppositions locally.
  - Consistent with adult processing results (Chelma & Bolt, 2013; Romoli & Schwarz, 2014).

- Evidence against [(P as Imp) theories] (Chelma, 2009; Romoli, 2012, 2014) aligning Ps with ISIs: strong difference between ISIs and P (cross-over interaction).

- Results more compatible with traditional perspective: ISIs and Ps as two separate inferences based on distinct mechanisms.

- Differences between DSI and ISI is a puzzle for all theoretical accounts we are aware of.
  - Perhaps caused by ISIs being a different type of scalar implicature, namely, an ‘obligatory scalar implicature’ (Spector, 2007 a.o.).
  - Recent results in the adult sentence processing literature have also investigated differences between these two types of SI, with conflicting results (Schwarz & Romoli, 2014; Cremers & Chelma, 2013).

References