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 **general reasoning.**
- Our study focused on two such inferences; scalar implicatures, and presuppositions.

	Sentence		Inference	Type
(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)

- **DSIs** and **ISIs,** 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 **DSIs** have been studied **extensively**: a common result is that **children** are **less likely** than adults to compute **DSIs** (Noveck, 2001 and subsequent work).
- ISIs have been studied less, but recent studies have found a **similar pattern** to DSIs (Musolino & Lidz 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

P(resuppositions) as (a type of) Imp(licatures) [P as Imp]:

- While **traditionally** Ps and SIs have been treated **separately**, **recent** proposals have brought these inferences **closer**. In particular, Chemla (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** (DSIs, ISIs, & Ps).

Method

Participants: 20 adults, 14 4-5 year-olds, and 14 7-year-olds.

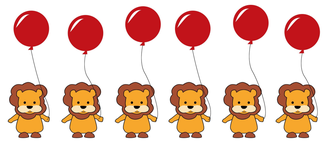
Procedure: Sentence Picture Matching Task

- 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 or covered).
- The participant **chose** which critical **picture** they thought the **test sentence was describing**.

Properties of Overt Target Pictures:

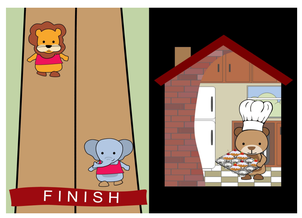
- Visible picture was **only consistent** with the **'bare' meaning** of the sentence, **without the inference** in all critical conditions.
- **Rejection** of overt picture (via selection of the covered picture) is **indicative** of choosing a **reading that includes the inference**.
- Controls included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

Visible Pictures



Direct Scalar Implicature
(1) Some of the lions got balloons

Indirect Scalar Implicature
(2) Not all of the rabbits brought soccer-balls



Presupposition
(3) The bear didn't win the race

Trial Outline

Context Picture

Intro: *"Today, a group of penguins and a group of rabbits went to the park."*

Context picture description: *"All of the penguins brought balls"*

Visible Picture

Covered Picture

Test sentence: *"But, not all of the rabbits brought balls"*
Test sentence repeat: *"So remember, not all of the rabbits brought balls"*

Question: *"Am I talking about the group of rabbits in this picture (visible), or the group of rabbits in this picture (covered)?"*

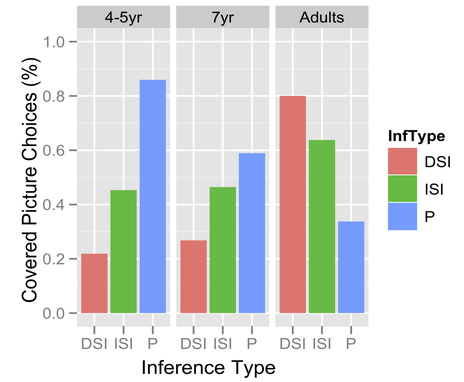
Results: Proportion of covered picture choices

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 DSI / ISI and children (**ISI** > **DSI**) /adults (**DSI** > **ISI**)



Discussion

- **Parts** of results **consistent** with previous work:
  - **Adults** were **more likely** than children to compute **DSIs** and **ISIs** (Noveck, 2001; Musolino & Lidz, 2006).
  - **Children** do **not** appear to be interpreting **presuppositions locally**.
    →Consistent with **adult processing** results (Chemla & Bott, 2013; Romoli & Schwarz, 2014).
- **Evidence against** [**P as Imp**] theories (Chemla, 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 **DSIs** and **ISIs** 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 & Chemla, 2013).

References

Abusch, D. (2009). Presupposition triggering from alternatives. *Journal of Semantics. 27*, 37-80. doi:10.1093/jos/ffp009
Chemla, E. (2008). *Similarity: towards a unified account of scalar implicatures, free choice permission and presupposition projection*. Unpublished manuscript. http://www.emmanuel.chemla.free.fr/Material/Chemla-SIandPres.pdf
Chemla, E. & Bott, L. (2013). Processing presuppositions: Dynamic semantics vs pragmatic enrichment. *Language and Cognitive Processes. 28,* 241-260. doi:10.1080/01690965.2011.615221
Katsos, N., Roqueta, C.A., Estevan, R.A. & Cummins, C. (2011). Are children with Specific Language Impairment competent with the pragmatics and logic of quantification? *Cognition. 119,* 43-57. doi: 10.1016/j.cognition.2010.12.004
Musolino, J. & Lidz, J. (2006). Why children aren't universally successful with quantification. *Linguistics. 44,* 817-852. doi:10.1515/LING.2006.026
Noveck, I. (2001). When children are more logical than adults: Experimental investigations of scalar implicature. *Cognition. 78,* 165-188. http://dx.doi.org/10.1016/S0010-0277(00)00114-1
Romoli, J. (2012). *Soft but strong: Neg-raising, soft triggers and exhaustification*. (Unpublished PhD dissertation). Harvard University, Cambridge.
Romoli, J. (2014). The presuppositions of soft triggers are obligatory scalar implicatures. *Journal of Semantics*. Advance online publication. doi: 10.1093/jos/fft017
Romoli, J & Schwarz, F. (to appear). An experimental comparison between presuppositions and indirect scalar implicatures. To appear in *Experimental Perspectives on Presuppositions*, Florian Schwarz (ed.), Under contract for Springer's Studies in Theoretical Psycholinguistics Series.
Spector, B. (2007). Aspects of the pragmatics of plural morphology: On higher order implicatures. In Sauerland, U. & Stateva, P (eds.), *Presupposition and implicature in compositional semantics,* Palgrave.