Pragmatic Narrowing in Reference Resolution: Domain Restriction & Perspective Taking

Florian Schwarz
florians@ling.upenn.edu
University of Pennsylvania

Dan Grodner
dgrodne1@swarthmore.edu
Swarthmore

Abstract

- Various sources of contextual information help to narrow down reference resolution for definites, e.g.
  - Contextual **Domain Restriction** and
  - **Perspective** Taking
- Both require **social coordination** by considering shared goal structure and availability of information
- We investigate the **time-course** of types of **pragmatic narrowing** in an interactive game
- Eye-tracking results indicate **immediate** availability of **both types** of contextual information
- Domain Restriction **stronger** than Perspective

Perspective Taking

- Fixing reference for definite expressions requires identifying which candidate referents are in **Common Ground** (mutually known by speaker and addressee)

  Hand over the gun typically refers to a mutually known gun, not a privileged gun known only to speaker.

- **Two Basic Views** of Processing Perspective:
  - **Egocentric First** – Addressees initially consider all candidate referents ignoring privileged/shared status
  - **Immediate Use** of Perspective – Shared referents should be favored relative to privileged ones

Domain Restriction

- **Definites** require **uniqueness**, but uniqueness is almost always **relativized to context**
- Contextual **Domain Restriction** standardly captured by assuming **covert variables**

  [The table$_C$] is overed with books (C= in this room)
- **Choice of Domain Restriction** is crucially informed by shared goal structure / **Question under Discussio**n (Roberts 1996)
- **Processing Question**: Is **contextual** information integrated **from the start**, or is there an **initial** stage of **literal processing**?

Experimental Designs & Task

Question 1: Are incoming linguistic expressions…

- initially evaluated literally, independently from contextual considerations?
- Or are contextual constraints immediately applied?

Question 2: Are Domain Restriction and Perspective different facets of the same underlying process of social coordination, or do they draw on separate resources?

Methods & Design

Interactive Game:

- **Participant matcher** carried out instructions of confederate director, transmitted via mic/headphone from another room (one-way communication only)
- **Goal**: Minimize like accessories in adjacent cells
- Participant had to keep track of number of violations
- **Context** sentence sets Domain Restriction (boots!)
- Some cells **hidden** from Director (Perspective) (indicated by shading on Participant's screen)

  → 2x2 Interaction design
- Live instructions, but critical sentences pre-recorded,
- Participants' eye movements recorded throughout

Target sentences:

Hidden: *Move the alligator to the bottom right.*

Not-Hidden: *Move the alligator on the top left to the bottom right.*

Perspective Manipulation

- **Director's perspective:**
  - Hidden cells unknown.
  - Hidden animals never moved
- **Participant's perspective:**
  - Hidden cells relevant for counting violations
  - **Not a plausible target** for moving instructions in Hidden condition

Domain Restriction Manipulation

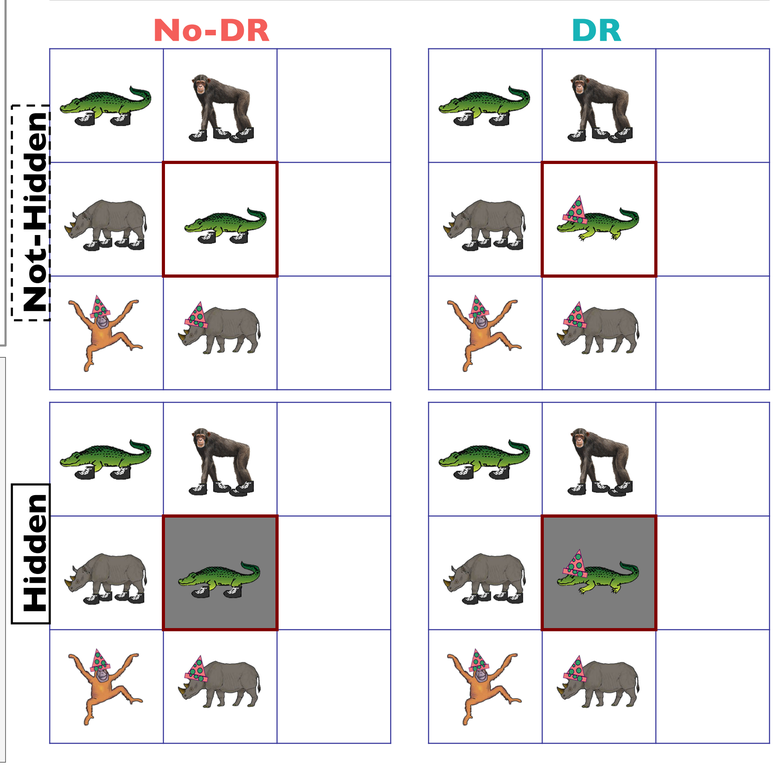
Context sentence established domain restriction:

Let's start by dealing with the boots

Picture Variation for Competitor (Center)

Left Panels: **Boots Matches** domain restriction established by context

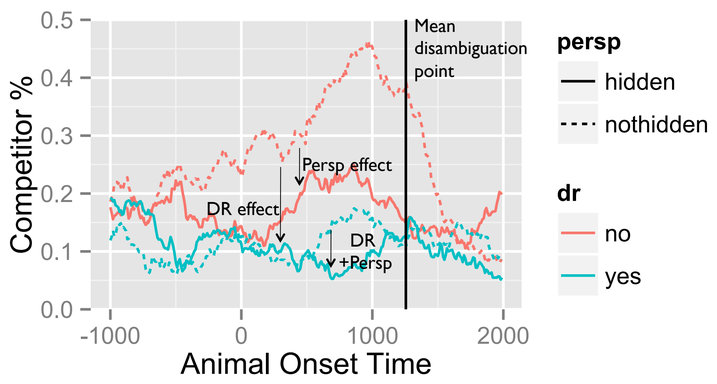
Right Panels: **Hat Doesn't match** domain restriction established by context



Results

Data Analysis

- Eye movement data collected from 26 participants
- Time-locked to onsets of critical definite
- Analyzed Elogit-transformed Proportions during ambiguous time-window (noun-onset to next onset)
- Mixed effect model analyses: looks to **Competitor**



Key Results

- Effect of **Domain Restriction** (beginning 200-400ms): **DR**:Not-Hidden > **No-DR**:Not-Hidden
- Effect of **Perspective Taking** (beginning 200-400ms): **No-DR**:Hidden > **No-DR**:Not-Hidden
- DR and Perspective are **additive**
- But **DR** effect appears **stronger**:
  - **DR** adds to Perspective **throughout**
  - **Perspective** adds marginally to DR from 600ms

Domain Restriction

- As participants hear *the alligator*, their **choice of referent** is informed by **Domain Restriction**
- Context Sentence limits referential choices to animals with boots

  → *The alligator* is effectively understood as *the alligator **with boots***
- This restriction is imposed **immediately**, and not construed after an initial literal interpretation
- Adding further support to findings by Schwarz 2012:
  - Domain Restriction is **informed by discourse goals**, which can be framed as Question Under Discussion (Roberts 1996)
  - Incoming linguistic input is **immediately evaluated** in light of Domain Restriction.

Perspective Taking

- Information about **shared** vs. **privileged** ground is utilized in reference resolution
- **Privileged** Ground is **hardly considered** for choice of referent in Director instructions
- **Advantage** for **Shared** Ground referent **emerges immediately**

  → Evidence against initial egocentric processing stage (cf. Barr 2008)
- The effect of **Perspective** was **weaker** than for **Domain Restriction**, perhaps because shared ground was established via perceptual co-presence.
- **Physical co-presence** is a probably less common and possibly **less reliable cue** to shared knowledge than linguistic mention

(Grodner, et al. 2012)

Summary

- **Immediate effects** of both
  - **Domain Restriction** and
  - **Perspective Taking**
- Comprehension of definites is **relativized immediately** to considerations about **state of the discourse**
- Linguistic **Domain Restriction** seems **stronger** than Perspective from physical co-presence

Selected References

Barr, D.J. 2008. Pragmatic expectations and linguistic evidence: listeners anticipate but do not integrate common ground. Cognition, 109 (1). pp. 18-40.

Grodner, D., Dalini, M., Pearlstein-Levy, S. & Ward, A. 2012. Factors that contribute to the use of perspective in referent identification. Paper presented at the 25th CUNY conference on human sentence processing. New York, NY.

Roberts, C. 1996. Information structure in discourse: Towards an integrated formal theor of pragmatics. In J. H. Yoon and Andreas Kathol, eds., Papers in Semantics, number 49 in OSU Working Papers in Linguistics, 91–136. OSU.

Schwarz, F. 2012. Domain Restriction and Discourse Structure – Evidence from Processing. presented at the 25th CUNY conference on human sentence processing. New York, NY.

Acknowledgments:
Thanks to Robert Wilder for his crucial help in implementing the experimental design, and to Elizabeth Shay and Jamie Fisher for assistance with the data collection. Many thanks also to Sarah Brown-Schmidt for sharing her visual stimuli.

27th Annual CUNY Conference on Human Sentence Processing
March 13-15, 2014

Available Online at http://florianschwarz.net/wp-content/uploads/papers/CUNY2014_PosterDRPersp-Final.pdf