Presuppositions are Fast, whether Hard or Soft - Evidence from the Visual World

SALT 24
NYU
May 31st, 2014

Florian Schwarz

Penn University of Pennsylvania
Structure of Talk

- General Background
- Presuppositions: Theory & Processing
- Experiments
  - Expt 1: Again vs. Twice
  - Expt 2: Stop (vs. Don’t Stop)
- Discussion
- Outlook
Ingredients of Meaning

- Overall conveyed meaning results from conglomerate of inferences
  - What classes are there?
  - Key properties of inferences in each class?
  - How do they arise?
Classifying Inferences

- Extensive theoretical literature, with at least some consensus. A toy example:

  **Some of the students failed the damn exam again.**

- The traditional picture:
  - Literal asserted content [a subset failed]
  - Conversational Implicatures [not all]
  - Presuppositions [it happened before]
  - Conventional Implicatures [speaker has negative attitude towards exam]
Experimental Perspectives

- **Testing and refining classification:**
  - Systematic empirical evaluation of properties across expressions and languages
  - Potential re-drawing of boundaries, more fine-grained distinctions

- Extend understanding of actual cognitive processes
  - Time course of access to types of meaning (in particular in relation to one another)
  - Insights into mechanisms giving rise to each type of meaning and combining them
Scalar Implicature Processing

- **Some** --> **Some but not all**
  (based on Quantity Implicature)

- **Pragmatic Enrichment:**
  pre-encoded or computed online?

- (One set of) Empirical Results:
  implicature **slower than literal** meaning

  

- **Evidence** for online pragmatic reasoning?

- **BUT:** Recent Visual World **evidence** for
  rapid implicature effects

  (Grodner et al., Breheny et al., a.o)
Presuppositions - Theoretical Background
Theoretical Tradition: Stalnaker

Properties:

- (Typically) **taken for granted**
- Presupposition **Projection**: Presuppositions escape various embedding operators

Analysis:

- **Communication** as information update
- **Common Ground** (CG) as set of possible worlds consistent with established propositions in discourse
- Presuppositions are **required to be in (local) CG**
- Essentially **pragmatic**, but may be semantically triggered
Dynamic Semantics & DRT

- **Dynamic Semantics** (Heim 1983)
  - Semanticized Stalnaker Picture
  - **Meanings** as context updates
  - Presuppositions as update **definedness conditions**
  - **Projection** built into update procedure for operators

- **DRT** (Kamp 1981, van der Sandt 1990, Geurts 1999)
  - Same **dynamic spirit**
  - Additional layer of **Discourse Representation**
  - Presupposition as **Anaphora**
New Pragmatic Accounts

  
  **Assimilation to Implicatures**  
  (at least for certain cases)

- Schlenker’s (2009) **Local Contexts**:
  
  - Re-cast of Heim (1983) in non-dynamic terms
  - Turns on **Local Contexts** for presupposition evaluation
  - Incorporates incremental interpretation in a more flexible way [a Processing Preference?]
Differentiating Triggers

- Triggers **differ** in various ways (projection, accommodation, relation to context)

- Theoretical proposals in the literature:
  - Resolution vs. Lexical triggers (Zeevat 1992)
  - **Hard** vs. **Soft** Triggers  
    (Abusch 2010, Romoli to appear)
  - (Also see Jayez 2013 & Tiemann 2014)

- **Comparison today:**
  - **again** (hard) vs. **stop** (soft)
Hard vs. Soft Illustration

- I don’t know whether John ever played golf.
  # But if he played golf again, ...
  OK But if he stopped playing golf, ...

- Difference in **theoretical status**:

  **Hard**: Lexically encoded

  **Soft**: Based on reasoning about alternatives (Abusch 2010)
  Derived as Implicature (Romoli 2014)
Experimental Approaches to Presuppositions
Experimental Approaches to Presuppositions

- **Questions** similar to implicatures:
  - Pragmatic or semantic status?
  - Processing time-course relative to assertion

- **Additional complexities**:
  - Status of rejection judgments (also: accommodation)
  - Dynamic interaction with linguistic context: projection
    - cognitive status of projection
    - nature of specific projected meanings
  - **Differences** between triggers

[See Schwarz 2014c for recent developments]
Focus for today

- **Time-course** of Presupposition Processing
- **Differences** between triggers (or lack thereof)
Previous Work: Reading Studies

- **Vary contextual support** - measure reading times

  - Schwarz (2007) on also:
    a. The congressman/ who wrote to John/...
    b. The congressman/ who John wrote to/...
       ...had also written to the mayor/...

  - Tiemann et al. (2011 and following):
    - additional triggers
    - word by word data
    - vary lack of support vs. inconsistency

- Schwarz & Tiemann (2012): **Eyetracking** in reading

- **General result**: infelicity leads to delays as soon as possible (compared to controls!)
Previous Work: Differences between Triggers

• Various **behavioral results** on types of triggers:
  
  • Amaral & Cummins (2013, 2014): Difference in **acceptability** of ‘yes, but...’ vs. ‘no, because...’ continuations
  
  • Jayez et al. (2014): **too** can be **accommodated** in antecedent of conditional
  
  • See also Smith and Hall (2011), Velleman et al. (2011), Destruel et al. (2014), among others

• **Today**: online processing of **again** and **stop**
Comparing Triggers in Online Processing

- **Aim**: assess *availability of presuppositions* of soft. vs. hard triggers via online measures

- **Reading time studies** generally based on failure / inconsistency with context

- **Visual world paradigm**: observe unfolding interpretation in felicitous contexts

- **Uniform experimental paradigm** to make results as comparable as possible
Visual World Paradigm

- **Timing of fixation(s)** (shifts) relative to visual scene during auditory stimulus presentation

- **Typical setup:**

  Set up **time period** where only one piece of information could affect shift in fixations

- **Advantages:**
  - Very **close** to real time-course
  - No conscious decisions involved (in initial eye movements)
Expt 1: *Again* vs. *Twice*

- Adapt **Visual World** method as used for implicatures (also see work by Sedivy & colleagues)

- **Again** & **Twice** both involve two occurrences of an event

- But **first event** presupposed for **Again**

- How does the processing of the inference compare in the two cases?

- **General approach**: 2x2 Design
  - manipulate whether crucial inference narrows choice to target or not
  - manipulate whether inference is presupposed or asserted
Setup & Instructions

- **Calendar strip** paradigm
- Iconic **representation of events** in time (versatile format for various triggers)

**Instructions:**
Multiple characters shown. Sentence describes one of them. Which one is subject [e.g., John]?

**Next:** Example Trial
Again vs. Twice Materials

Context:
Some of these children went to play golf on Monday, and some to play volleyball.

Target:
John went to play golf

a) ... again later on ...
b) ... twice this week ...

... and also played soccer on Tuesday.

Disambiguation only via inference

Ambiguous during underlined portion
Details

- **3000ms preview** to familiarize with picture
- **Audio**
  - Identical for control / critical
  - 1st sentence identical for both recordings
- 24 items (4 conditions), 27 subjects (+ 24 fillers)
- Presupposition **not necessary** for disambiguation overall
- **Target & Competitor** always with `repeat events`
Visual World Analysis

- **Dependent measures:**
  - Proportion of looks to target
  - Time-linked to onset of critical word
  - **Target Advantage:**
  Looks to target - Looks to Competitor

- **Statistical Analysis:**
  mixed-effect models using logistic regressions on proportions for time-windows of interest
Again vs. Twice: Results

- **Main** and **Simple** effects of Control vs. Critical
- **Significant** from 200ms after onset of **Again/Twice**
- **No** interaction
- Clear **evidence** for rapid presupposition utilization
- **No difference** from assertion of same content
- **Note**: No effect of trial order - evidence against practice effects!
- [Parallel results for **also** vs. **only** (Schwarz 2014a)]]
Expt 2: Stop - a soft trigger

- **Theoretical Issue:**
  
  are some triggers (e.g., ‘soft’ ones) derived via pragmatic inferencing similar to implicatures?

- If so, this **might lead** to slower processing (if such inferencing is slow compared to conventional content)

- Calendar-strip paradigm extended to **stop**
Stop VW Materials

**Context:**

These children got nice treats for their snacks this week.

**Target:**

Henry stopped eating the delicious apples on Thursday.

[Ps: ate apples before]

**Competitors:**

**Control:**

**Disambiguated** by presupposition

**Ambiguous** up until apples
StopVW: Results

- **Critical > Control**
- **Significant** from 200ms after onset of **stop**

- Again: **evidence** for rapid presupposition utilization

- Note: No effect of trial order - evidence against practice effects
Entailed Presuppositions?

- **Possible objection:**
  
  (Certain) *presuppositions* (including *stop’s*) are commonly assumed to be entailed as well

- Probably not applicable to *again* (e.g., Sudo 2013)

- Also doesn’t apply under *negation*

  *Initial evidence* suggests parallels between *stop* and *again* under negation as well

- Further *potential counter-evidence* for *stop*:

  *Rejection* of presupposed content slower than of *asserted* content (Schwarz 2014e: Definites)
Rejecting Assertions vs. Presuppositions

- **Covered Box** design (select overt picture / covered box)

  John stopped going to the movies on Wednesday

- **Presupposition:**
  Movies before Wednesday

- **Assertion:**
  No movies from Wednesday on (& possibly: Movies before Wednesday)

Ps. TRUE, Ass. FALSE

Ps FALSE, Ass. ??
Stop Rejection Results

- Significant **increase** in `False` RTs based on presuppositionality
- Also holds in negated cases
- Potentially **problematic** for accounts where the presupposition is also entailed (in affirmative case):

  **Why bother with presupposition** if rejection is possible based on assertion alone? (especially if optional pragmatic inference)
Conclusions

- **Evidence** for rapid availability of presuppositions
- **Again vs. Twice**: As rapid as asserted content
  
  (see also **Also vs. Only**, Schwarz 2014a)

- In line with prior **reading time evidence**, but
  
  - more detailed, and
  - without infelicity
Conclusions (II)

- **No evidence** for online processing differences between triggers

- **No support** for presuppositions as delayed pragmatic inferences

- **Consistent** with semantic account or rapid pragmatics

- More generally:
  
  **Proof of concept** - useful tools for investigating more intricate presuppositional phenomena
Further Lines of Investigation
Projection in the Visual World

- Schwarz & Tiemann (2014): Presupposition Projection delayed (reading, rating, and stops-making sense results)

- Extension within StopVW:
  
  Stop under negation in Stop VW
Don’t Stop VW Materials

Context:
These children got nice treats for their snacks this week.

Target:
Henry didn’t stop eating the delicious apples all week.

Disambiguated by presupposition

Ambiguous up until apples

Competitors:

Critical:

Control:
Don’t Stop VW - Results

- **Not stop delayed** relative to affirmative

- **Interaction** (as early as 400-600ms)

- Parallel **projection delay** effect to reading study on **again** (Schwarz & Tiemann 2014)
Other work in progress

Includes:

- Local accommodation under negation and in other embedding environments
- Comparison with *implicatures* under negation
- Different populations (acquisition, disorders) (with Cory Bill & Jacopo Romoli)
- Presuppositions under attitude verbs (with Yasu Sudo)
- **Bulk of the work** still ahead, but wide range of tools in place
Thank You!
Acknowledgments

- **Collaborators:**
  - Sonja Tiemann
  - Jacopo Romoli
  - Cory Bill

- **RA’s:**
  - Robert Wilder
  - Jamie Fisher
  - Elizabeth Shay
  - Amy Goodwin-Davies
  - Dorothy Ahn
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Also Materials

**Context:**
One of the boys is carrying a fork.

Click on the girl who...

**Critical Condition:**
... **ALSO** is carrying a fork.

**Control Condition:**
... is carrying a fork and a spoon.

During **underlined part**, presupposition of **also** is only lead to target
Only Materials

**Context:**
One of the boys is carrying a fork and a knife.

Click on the girl who...

**Critical Condition:**
...only is carrying a fork.

**Control Condition:**
...is carrying a fork.

During underlined part, **asserted exclusivity** of only is only lead to target.
Also vs. Only Results

- **Also < Only**

- **Interaction in** 400-600ms time window

- Presupposition before Assertion?

- **Caution:** Further differences could be behind difference in effects

- **Certain:** **Also** presupposition available immediately