

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

SALT 24

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# 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
  - RT's: Bott & Noveck (2004)
  - Visual World: Huang & Snedeker (2009)
- **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

- Simons (2001 and following), Abusch (2002,2010), Romoli (2011):

**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

Derived as Implicature

(Abusch 2010)

(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)

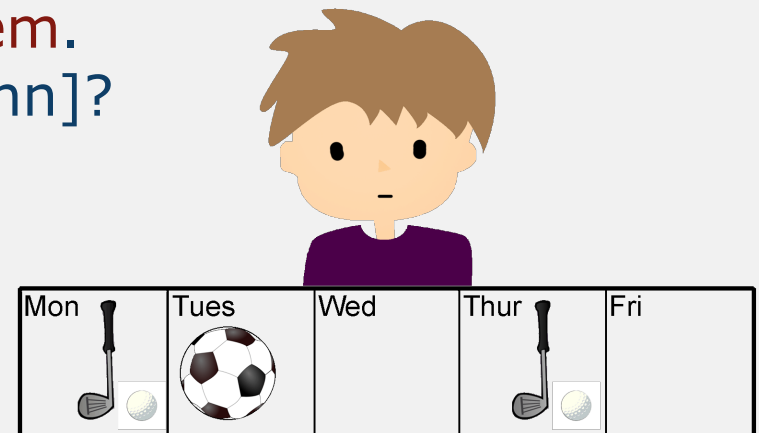
# Expt 1: **Again vs. Twice**

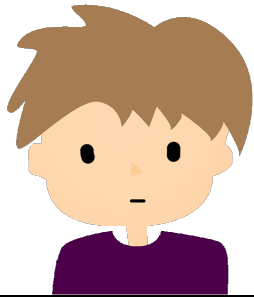
- Adapt **Visual World** method as used for implicatures (also see work by Sedivy & colleagues)
- **Again** & **Twice** both involve two occurrences of an event
- But **first event** presupposed for **Again**
- How does the processing of the inference compare in the two cases?
- **General approach**: 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

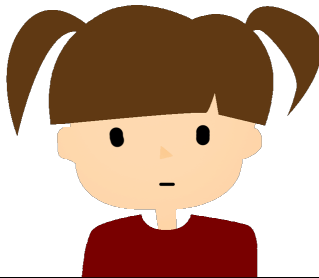


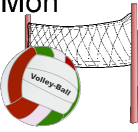




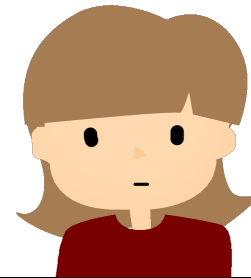
Mon	Tues	Wed	Thur	Fri
				



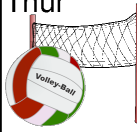


Mon	Tues	Wed	Thur	Fri
				



Mon	Tues	Wed	Thur	Fri
				



Mon	Tues	Wed	Thur	Fri
				

# Again vs. Twice Materials

## Context:

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

## Target:

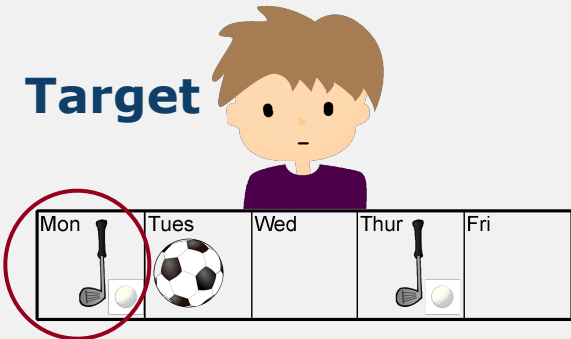
John went to play golf

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

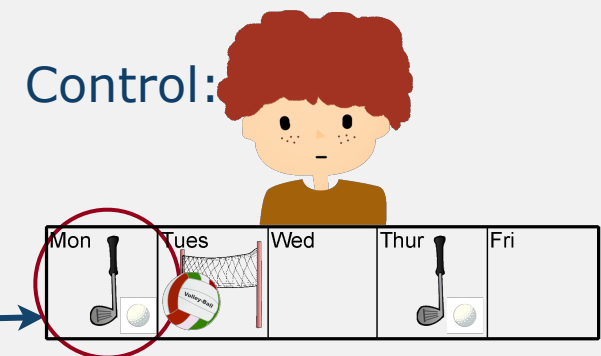
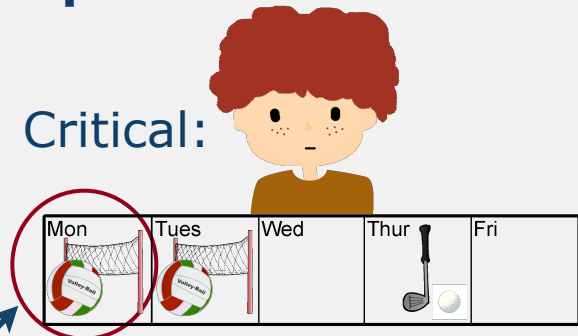
... and also played soccer on Tuesday.

**Disambiguation** only via **inference**

**Ambiguous** during **underlined** portion



## Competitors:



# 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:**

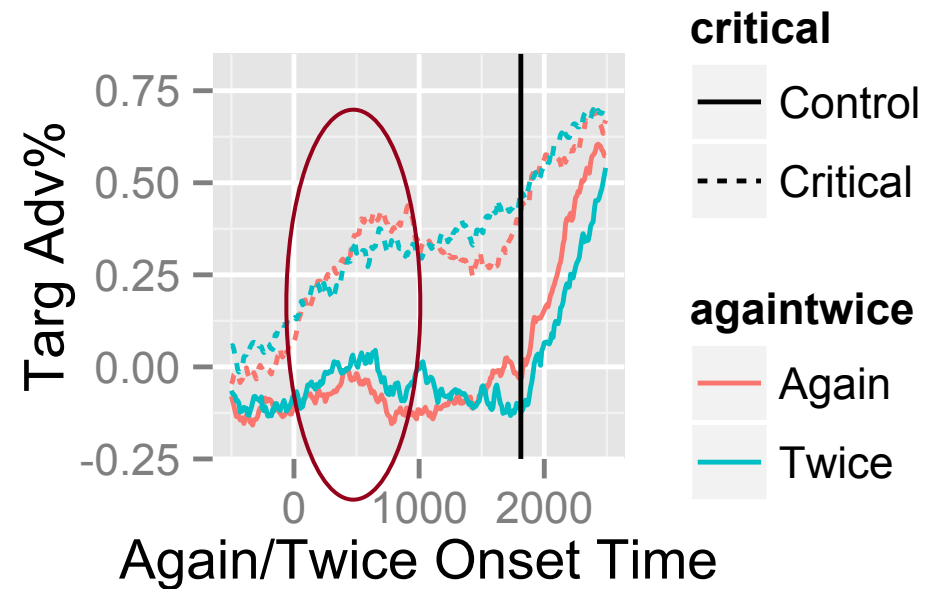
- Proportion of looks to target
- Time-linked to onset of critical word
- **Target Advantage:**  
Looks to target - Looks to Competitor

- **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:

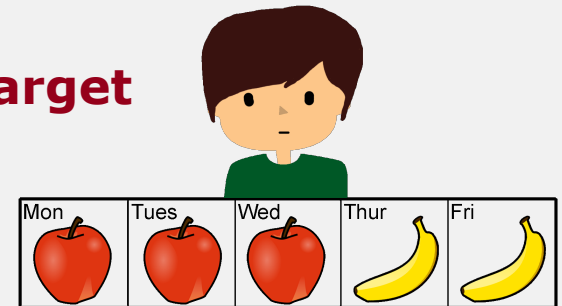
**Henry stopped eating the delicious apples on Thursday.**

[Ps: ate apples before]

**Disambiguated** by presupposition

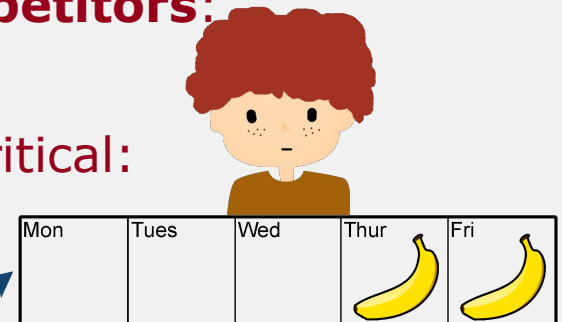
**Ambiguous** up until **apples**

## Target

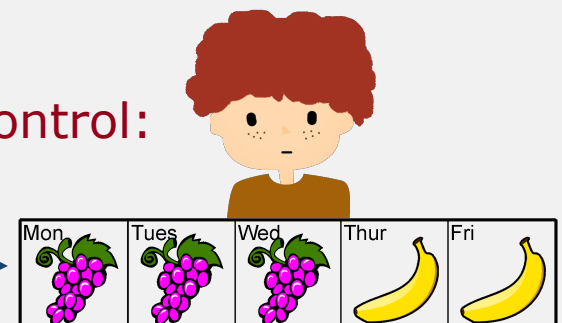


## Competitors:

### Critical:

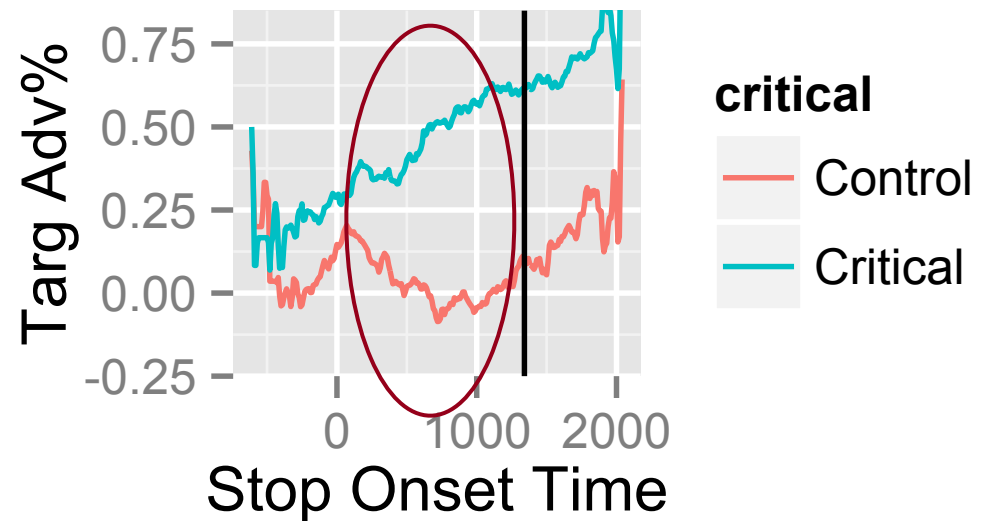


### Control:



# 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)

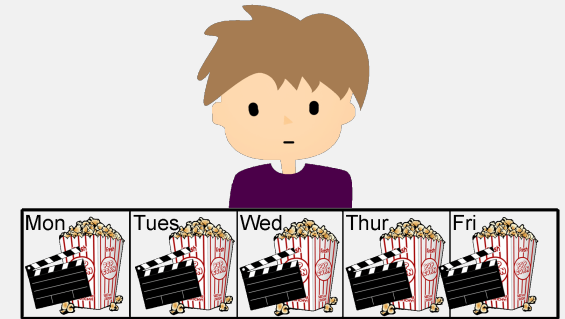
# Rejecting Assertions vs. Presuppositions

[Bill, Romoli, Schwarz (in progress)]

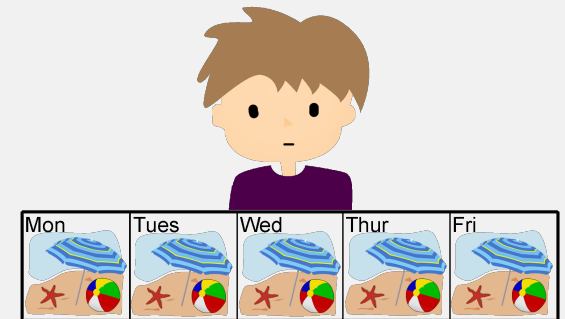
- **Covered Box** design  
(select overt picture / covered box)

**John stopped going  
to the movies on Wednesday**

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



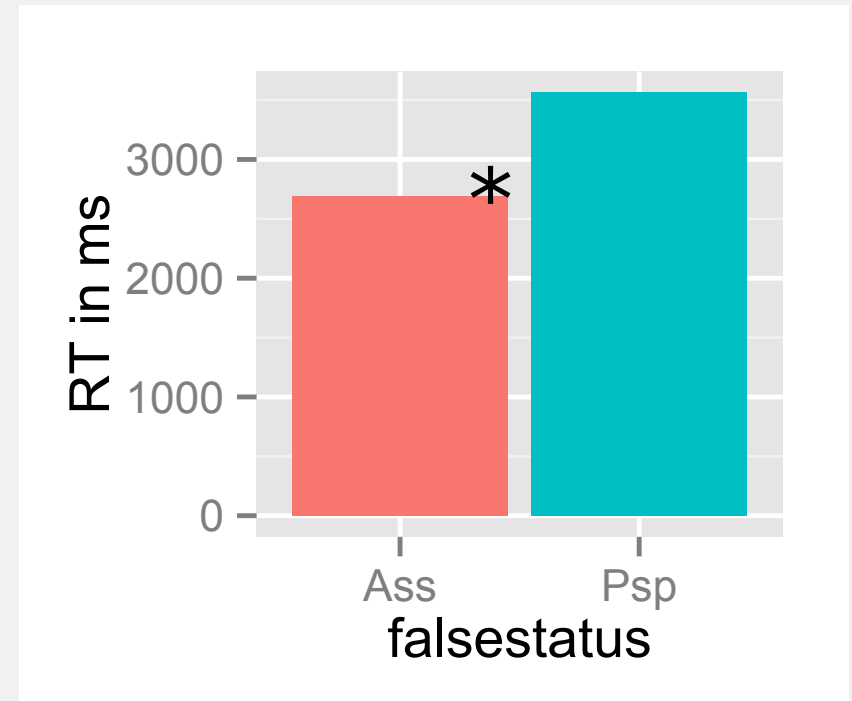
**Ps. TRUE, Ass. FALSE**



**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.

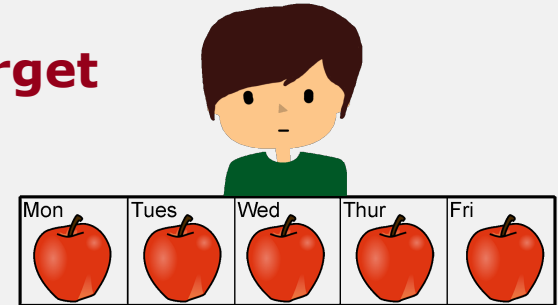
## Target:

**Henry didn't stop eating the delicious apples all week.**

**Disambiguated** by presupposition

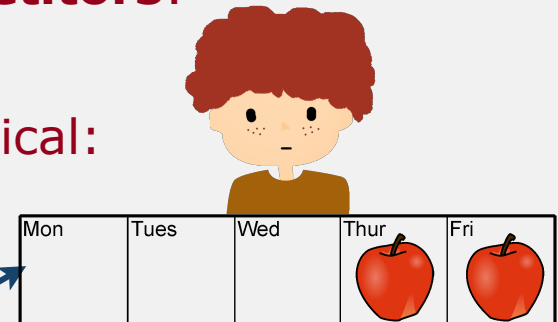
**Ambiguous** up until **apples**

## Target

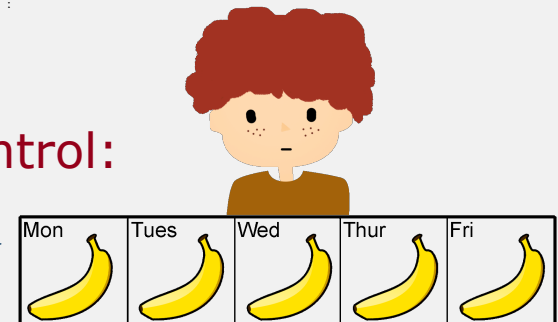


## Competitors:

### Critical:

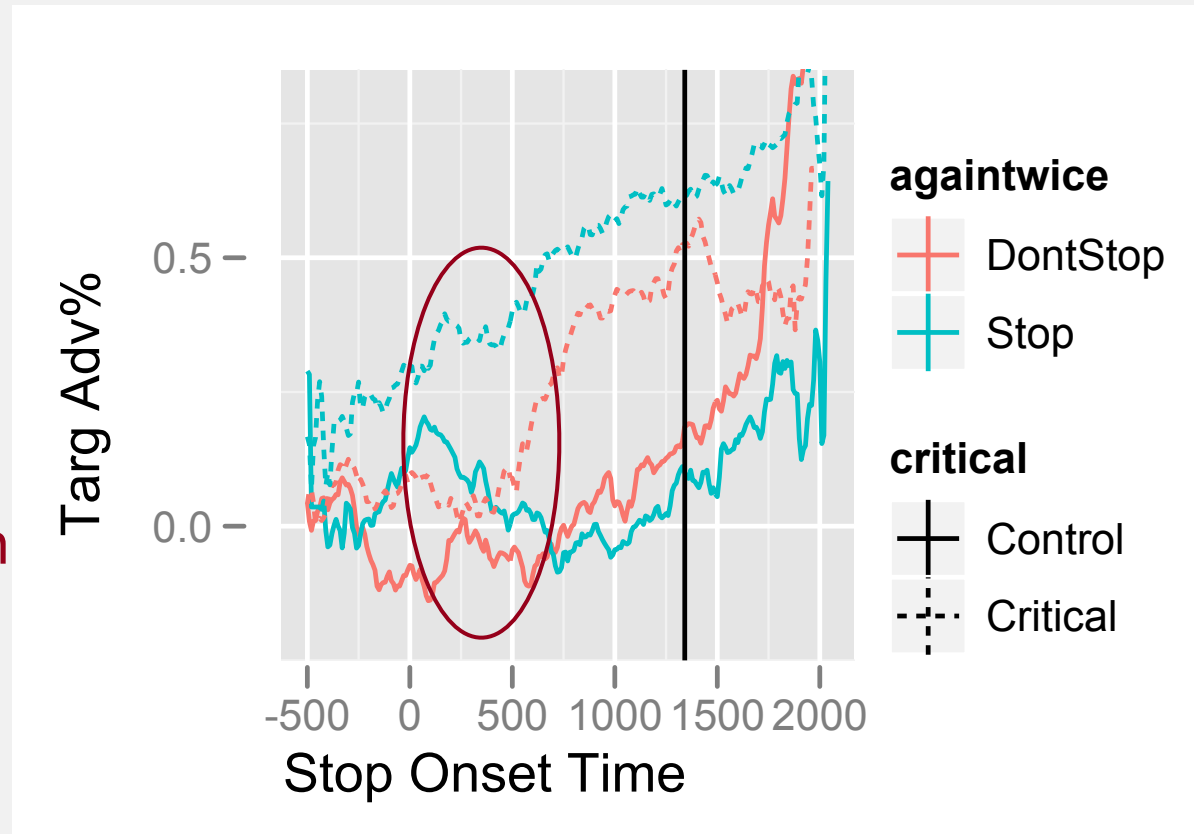


### Control:



# 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:

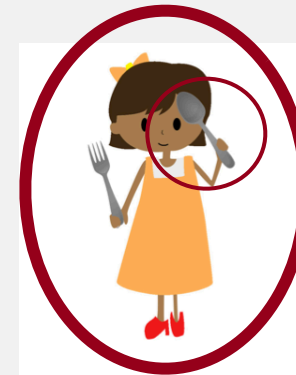
... ALSO is carrying a fork.

## Control Condition:

... is carrying a fork and a spoon.

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

Target



Competitor

# 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

Target



Competitor

# 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**

