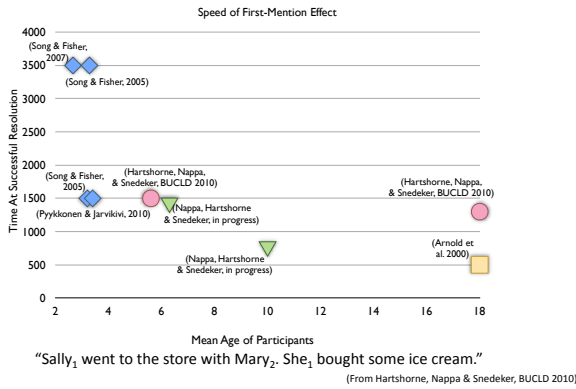


# Not All Pronouns are Resolved Rapidly Online

## Joshua K. Hartshorne & Jesse Snedeker

•Rapid order-of-mention effects are robust in adulthood and childhood.



**Implicit causality** effects also rapid in adults. (Cojzin, Comandeur, Vonk & Noordman, 2011; Koornneef & van Berkum, 2006; Pyykkonen & Jarviki, 2010; Van Berkum et al. 2007)

subject-biased: “Sally<sub>1</sub> frightens Mary<sub>2</sub> because she<sub>1</sub> is from Cambridge.”  
object-biased: “Sally<sub>1</sub> likes Mary<sub>2</sub> because she<sub>1</sub> is from Cambridge.”

BUT implicit-causality studies show resolving to 1<sup>st</sup>-mention is faster than resolving to 2<sup>nd</sup>-mention.  
-Because of an overall first-mention bias?

**Plan:** 1) Replicate NP1 advantage  
2) Control for order of mention.

### Experiment 1

Visual world paradigm (Tanenhaus et al., 1995).

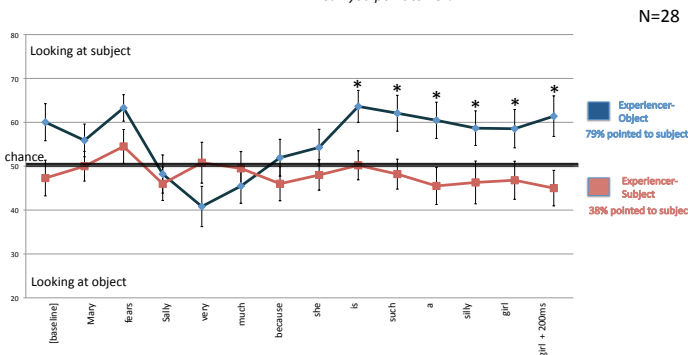
**Task**  
- Listen to stories while viewing scenes containing the mentioned characters  
-Eye movements recorded (Tobii system)

Experiencer-object (subject-biased) verbs confuse, frighten, scare, surprise

Experiencer-subject (object-biased) verbs: admire, like, love, hate



“Dora likes D.W. very much, because she is such a nice girl. Can you point to her?”



**Result:** Faster resolution for experiencer-object verb sentences (replicating previous findings).

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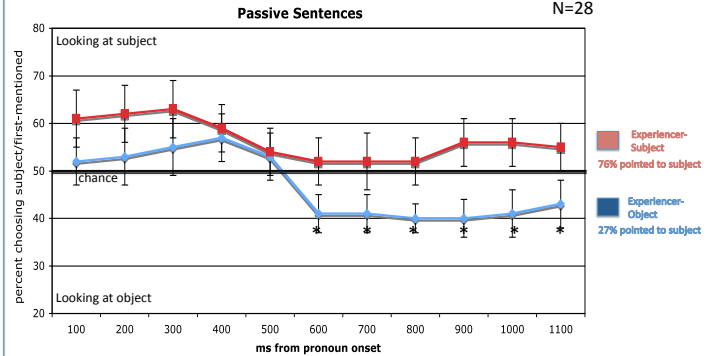
### Experiment 2

Are experiencer-object verb sentences resolved more quickly?  
or  
Are is resolving to 1<sup>st</sup>-mention easier?

#### Design

Use passive sentences instead of active.

“D.W.<sub>1</sub> is liked by Dora<sub>2</sub> very much, because she<sub>1</sub> is such a nice girl. Can you point to her?”



**Result:** 1) Resolving to 1<sup>st</sup>-mention does not make experiencer-subject verb sentences fast.  
2) Experiencer-object verb sentences fast even when resolving to 2<sup>nd</sup>-mention.

BUT Maybe passives of psych verbs are unusual. (Maratsos et al., 1985)

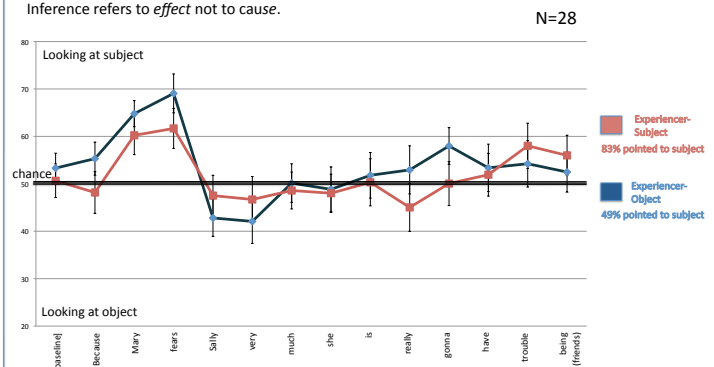
### Experiment 3

Implicit *Consequentiality* (Stewart, Pickering & Sanford, 1998)

object(ish)-biased: “Because Sally<sub>1</sub> frightens Mary<sub>2</sub>, she<sub>2</sub> is really gonna...”

subject-biased: “Because Sally<sub>1</sub> likes Mary<sub>2</sub>, she<sub>1</sub> is really gonna...”

Inference refers to *effect* not to cause.



**Result:** 1) Slow for both verb types.  
2) But no strong bias for experiencer-object verbs.  
-Seems to be due to tense.

### Conclusions

•Pronoun resolution is not always fast.  
-Not even to the 1<sup>st</sup>-mention.

•Rapid resolution in implicit causality may depend on causal semantics for the verb.

Experiencer-object verbs encode cause → fast resolution of implicit *causality*?

Experiencer-subject verbs don't encode cause → slow resolution? (see Pesetsky, 1995)

OR

Experiencer-object verbs are easy to process → fast resolution?

Experiencer-subject verbs are hard to process → slow resolution?

**Future directions:** -Test implicit consequentiality in past tense

-Test other subject-biased implicit causality verbs.

-Test other object-biased implicit causality verbs (e.g., judgment verbs)