

Linear order and syntactic structure in sentence priming

Hezekiah Akiva Bacovcin & Meredith Tamminga
 bacovcin@ling.upenn.edu & tamminga@ling.upenn.edu



Introduction

- What impact do surface and structural properties have on syntactic priming?
- Our focus comes from the assumption in theoretical linguistics that there are transformations that operate on syntactic constructions.
- Is structural priming able to be triggered by pre-transformational structures, even if the evidence of that construction has been manipulated by a transformation?

Background

- Bock (1986) showed that hearing a structure can prime future production
- Since 1986, the scope of syntactic priming has been investigated:
 - Priming in ditransitives occur independently of which preposition ("to" vs "for") is used (Bock and Loebell 1990)
 - Complementizer and demonstrative "that" do not prime one another (Ferreira 2003)
 - These show that some type of abstract structure can be primed
- Transformational Grammar or Movement:
 - One unifying notion across syntactic frameworks in generative grammar is the notion of transformations
 - **Transformations** relate surface forms to earlier derivational steps
 - Most generative grammars derive passive subjects from an object position
 - "The book was read by me" is derived from "I read the book"
 - In the current minimalist program this is implemented with the operation of Move (Chomsky 1995)
- Bock et al. (1992) tried to investigate if earlier derivational steps could act as primes
 - Tested underlying object vs surface subject in passives
 - Did not find any evidence for role of underlying object
 - They did find an effect of linear order of thematic roles
 - **Problem:** The earlier derivational stage in the passive is the priming alternative (i.e. active)
 - **Solution:** Rely on transformations that are orthogonal to target property

Questions

- Experiment 1:** Do passive questions prime passive descriptions in production?
- Experiment 2:** Do passive ditransitives prime active ditransitives in comprehension?

Highlights

- Experiment 1
 - **Discovery:** Tentative evidence for both surface and derivational priming
 - **Problem:** Derivational effect could be driven by passive morphology
- Experiment 2
 - **Discovery:** Only linear order was primed in comprehension priming
 - **Problem:** Could reflect task specific aspects of chunking

Extensions and References

Future work will investigate:

- Trying new paradigms to investigate the question behind experiment 2.
- Look for other syntactic variables that surface priming cannot explain
- Possibly particle verb questions:
 - "What did John read over?" from "John read (what) over (what)".

Selected References

- Bock, K. (1986). Syntactic persistence in language production. *Cognitive Psychology*, 18:355–387.
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- Bock, K., Loebell, H., and Morey, R. (1992). From conceptual roles to structural relations: bridging the syntactic cleft. *Psychological Review*, 99:150–171.
- Chomsky, N. (1995). *The minimalist program*. MIT Press, Cambridge, MA.
- Ferreira, V. (2003). The persistence of optional complementizer production: Why saying "that" is not saying "that" at all. *Journal of Memory and Language*, 48:379–398.

Experiment 1 – Design

Experiment 1	
Primes	What did the squirrel eat? [Pat. Act.] What was eaten by the squirrel? [Pat. Pass.] What ate the acorn? [Agt. Act.] What was the acorn eaten by? [Agt. Pass.]
Targets	Picture of baseball breaking a window "break"

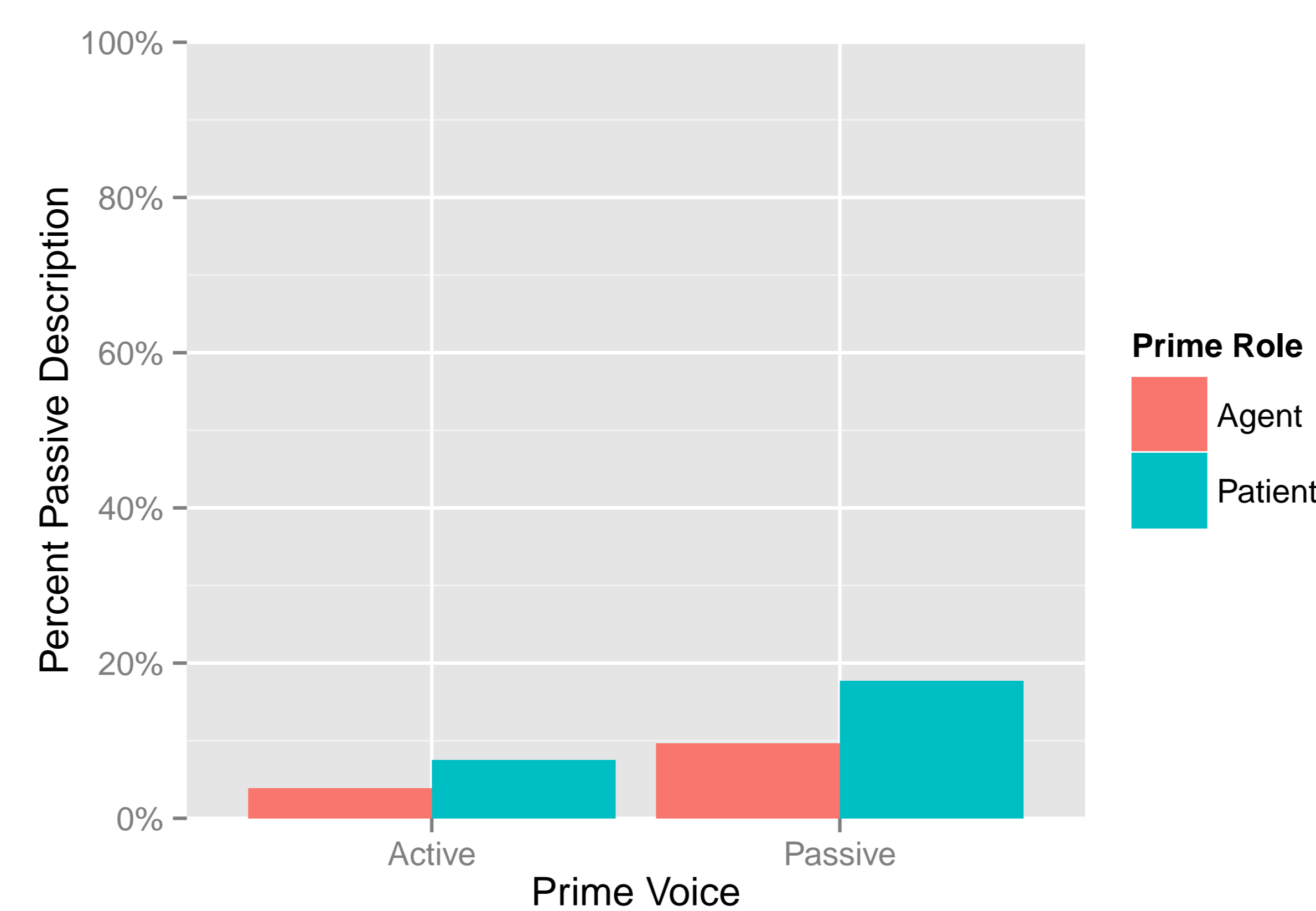
- **Experiment 1:**
 - Do passive questions prime passive declaratives?
 - 131 sbjs (subject pool and ProlificAcademic); 12 critical items; 12 filler pairs
 - Two Tasks:
 - * Question Answering (Primes)
 - * Picture Description (Targets)
 - All targets had inanimate agents and patients (better distribution of active/passive, see Bock 1986)
 - Primes included animals but no human agents
 - Pictures taken from Denkinger and Koutstaal (2014)

Experiment 1 – Example

	Question Answering	Picture Description
Picture:		
Shown Text:	What ate the acorn?	"break":
Response:	The squirrel	The baseball broke the window.

Experiment 1 – Results

- Passive questions do prime passive descriptions
- Patient questions also prime passive descriptions
- These effects are independent



- **Results from Mixed Effects Models (Random Intercepts for Subject and Items):**
 - Significant effect of wh-type ($p = 0.024$) and prime voice ($p = 0.002$)
 - No significant interaction ($p = 0.151$)

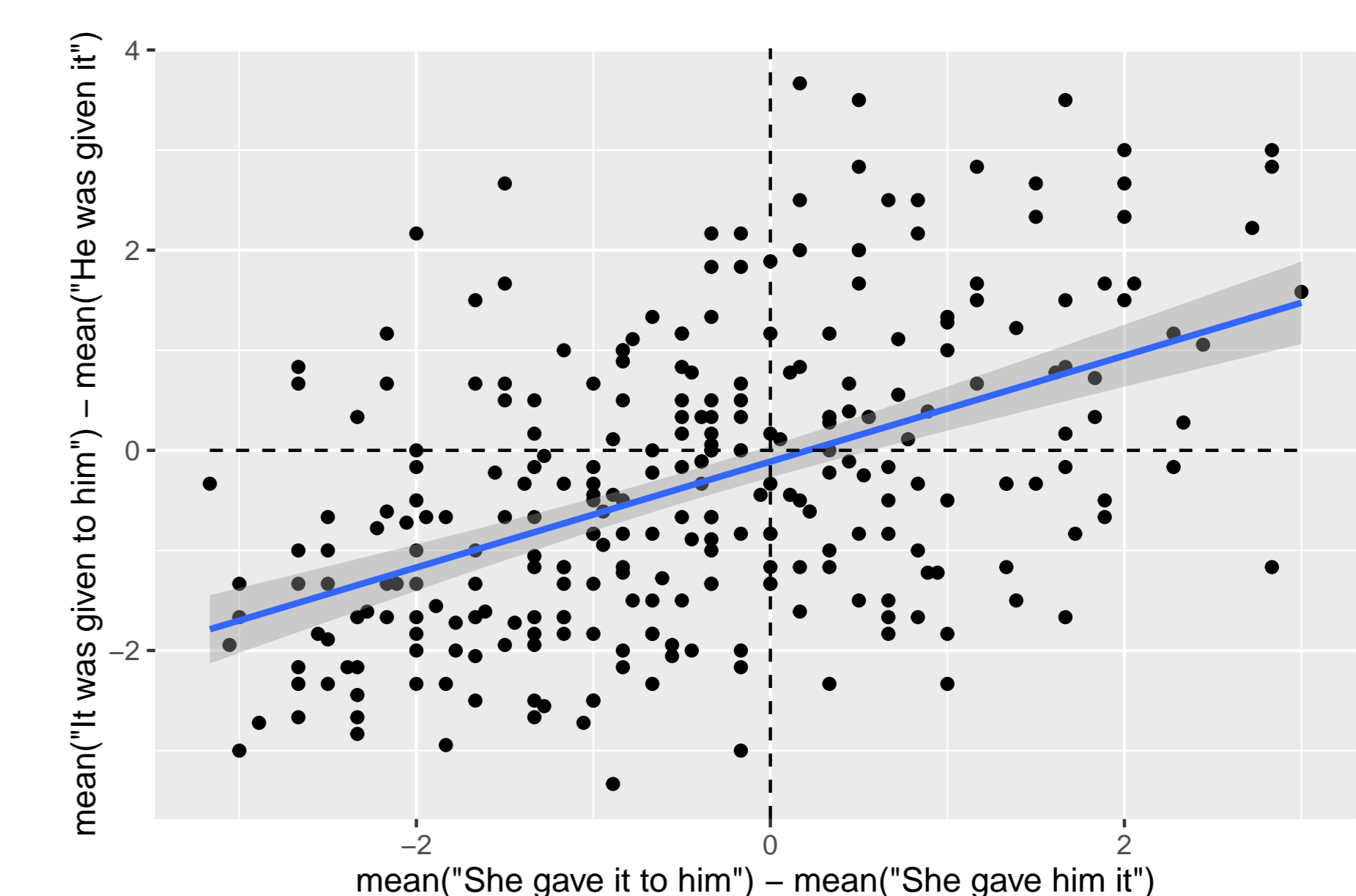
Experiment 2 – Design

Experiment 2	
Primes	(She was) (given it) (on Tuesday) (It was) (given to her) (on Tuesday)
Targets	(They gave) (him it) (in January) (They gave) (it to him) (in January)

- **Experiment 2:**
 - Do passive DOC prime declarative DOC?
 - Two sub-experiments:
 1. Each subject saw each item once
 2. Each subject saw each item three times
 - 180/100 sbjs (subject pool); 9 critical items; 9 filler pairs
 - Two Tasks For Each Item:
 - * Self Paced Reading; () indicate chunks
 - * Acceptability Judgement; 1-7 Likert scale

Experiment 2 – Rating Results

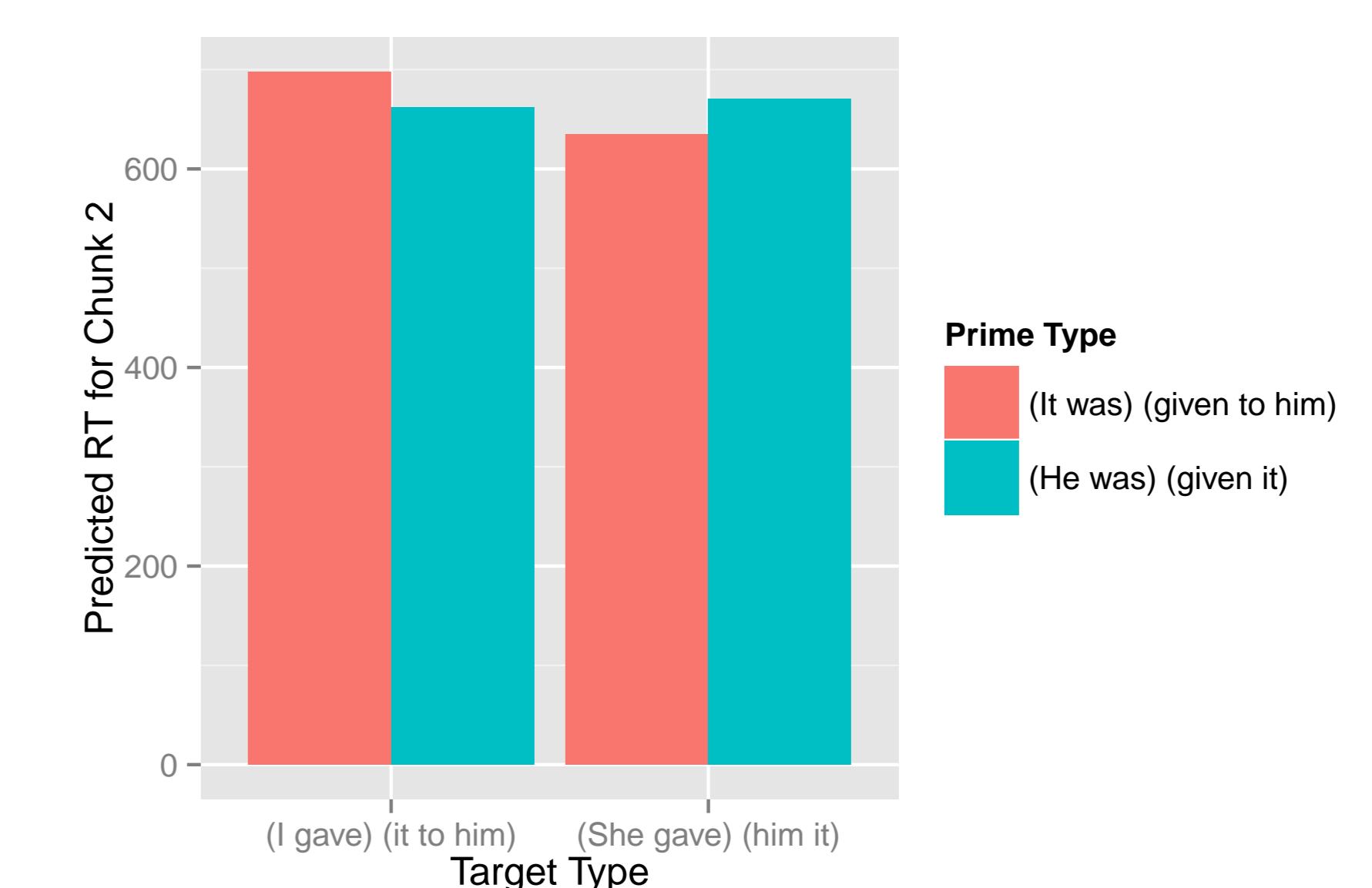
- Both word orders are given reasonably high ratings
- "She gave it to him" is rated slightly higher than "She gave him it"



- Average scores of about 5.8 (collapsing across conditions)
- Correlation of 0.490 between by-sbj passive and active differences
- **Results from Wilcoxon tests (on raw ratings):**
 - Him-it orders rated 1 (CI .99–1.01) point lower than it-him orders

Experiment 2 – RT Results (Highly Rated Trials Only)

- Comprehension priming did occur
- (It was) (given to him) primed (She gave) (him it)
- (It was) (given to him) did NOT prime (She gave) (it to him)



- Normalised RT by subject (interested in by-subject relation between times)
- **Results from Mixed Effects Models (Random Intercepts for Subject and Item):**
 - Significant effects:
 - * Prime type [matches/not matches target] ($p = 0.044$)
 - * Target type ($p = 0.032$)
 - No significant interaction ($p = 0.841$)