

How Much Structure is Required for Structural Priming?

Investigating Priming in Underspecified Structures

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AMLAP16 · Basque Center on Cognition, Brain and Language · September 1st – 3rd, 2016

1. Introduction

Syntactic Priming: Exposure to a syntactic structure facilitates later processing of same structure [1]

- Two types of structural priming:
 - Activation Decay:** Residual structural activation decays; effects short-term
 - Implicit learning:** Priming is function of gradual learning; effects long-term
- Factors typically associated with structural priming include: [2]
 - Proximity to Exposure:** distinguishes between short vs long-term priming
 - Lexical Repetition:** can provide independent priming ‘boost’

‘Good Enough’ Processing: Even for fully grammatical sentences, the parser does not always produce complete and detailed representations; structures are under-specified. [3]

- Prior work shows priming possible for marginally grammatical sentences, but unclear what type of priming is at work [4]

2. Current Study

We use *ungrammatical*, potentially ‘unbuildable’ sentences (cf. satiation) to test how much structure is required for structural priming.

Research Question: Can structural priming occur even in extreme cases of structural under-specification? If so, what type of priming is possible?

3. Experiment Design

Task: Native English speakers rated 12 prime-target pairs on 5-pt scale (1=completely unacceptable; 5 = completely acceptable)

2 Exposure Types (between-subjects):

- Lag1** (n=40): 1 Unrelated sentence between prime & target
- Lag5** (n=44): 5 Unrelated sentences between prime & target

2 Critical Sentence Types:

- CNPC Islands (ex.1)**: ‘Weak’ wh-island; processing-related [4]
- Subject Islands (ex. 2)**: ‘Strong’ wh-island; not processing-related [5]

2 Repetition Types:

Repeated *Island* (ex. a) vs *Unrelated* phrase (ex. c)

2 Trial Types:

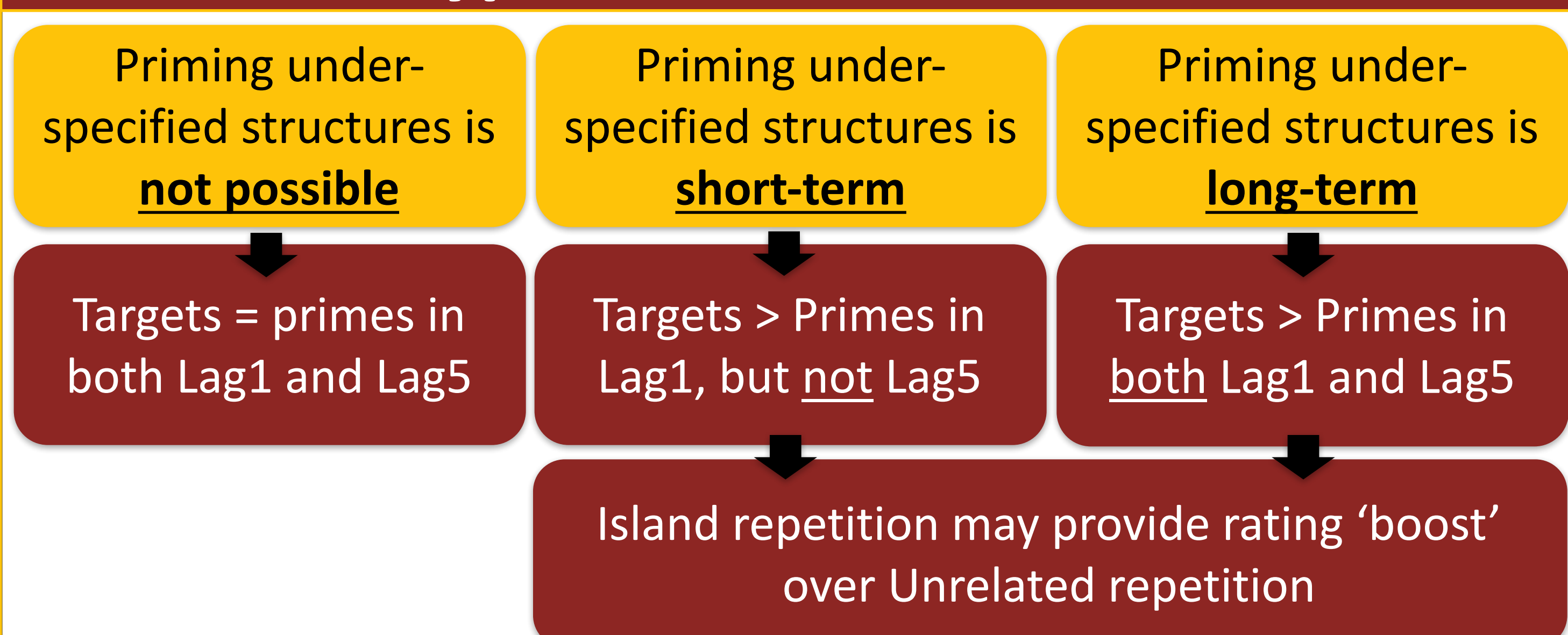
Prime Sentence (ex. a,c) vs Target Sentence (ex. b,d)

Fillers:

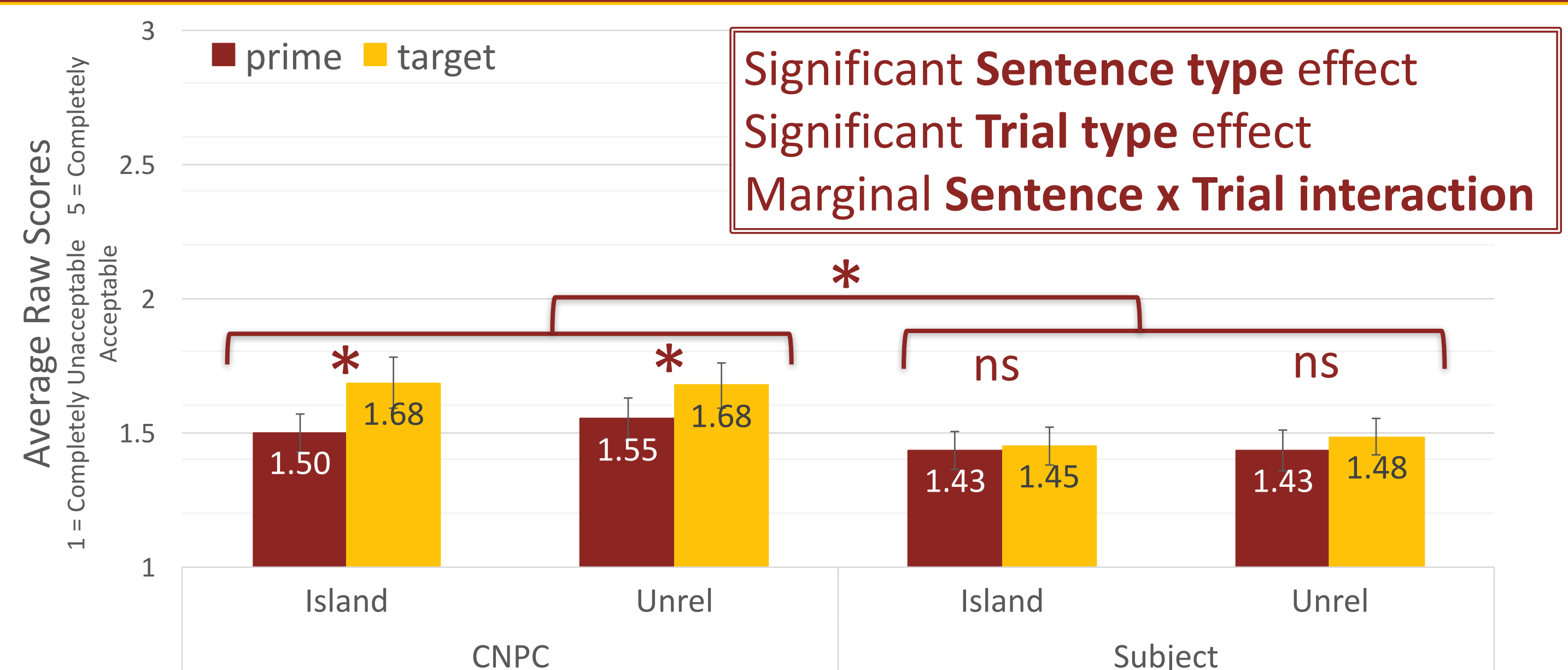
- 54 fillers in Lag1 version; 126 fillers in Lag5 version of study

Sent Rep	Trial	Example
CNPC	Island	Prime 1a Who did Richard dispute <u>the claim</u> that the paparazzi stalked?
		Targ 1b Who did John deny <u>the claim</u> that the princess married?
	Unrel	Prime 1c Who did Richard <i>deny</i> the allegation that the paparazzi stalked?
		Targ 1d Who did John <i>deny</i> the claim that the princess married?
Subject	Island	Prime 2a What did <u>opponents of</u> hang a giant banner at the capitol?
		Targ 2b What did <u>opponents of</u> start a violent riot outside the mall?
	Unrel	Prime 2c What did fans of hang a giant banner <i>outside the mall</i> ?
		Targ 2d What did opponents of start a violent riot <i>outside the mall</i> ?

4. Hypothesis & Predictions

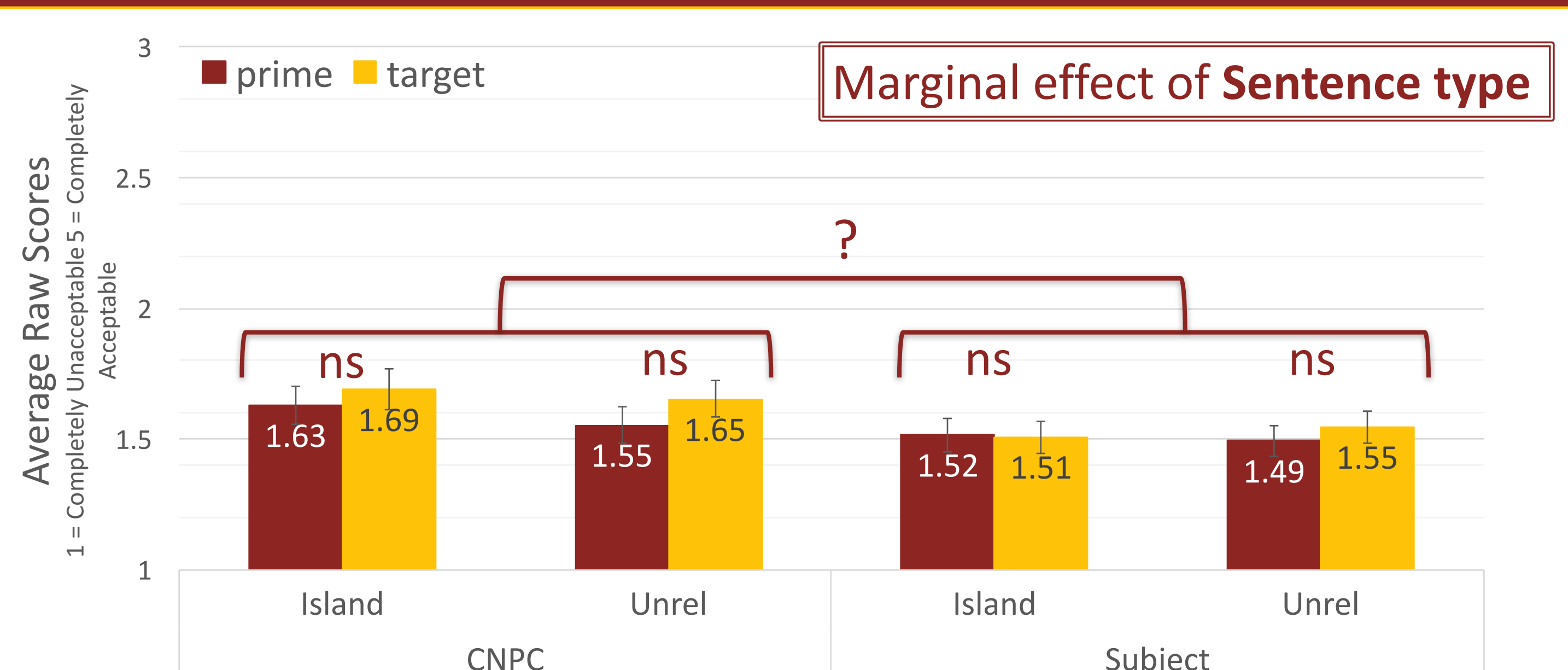


5. Lag 1 Results



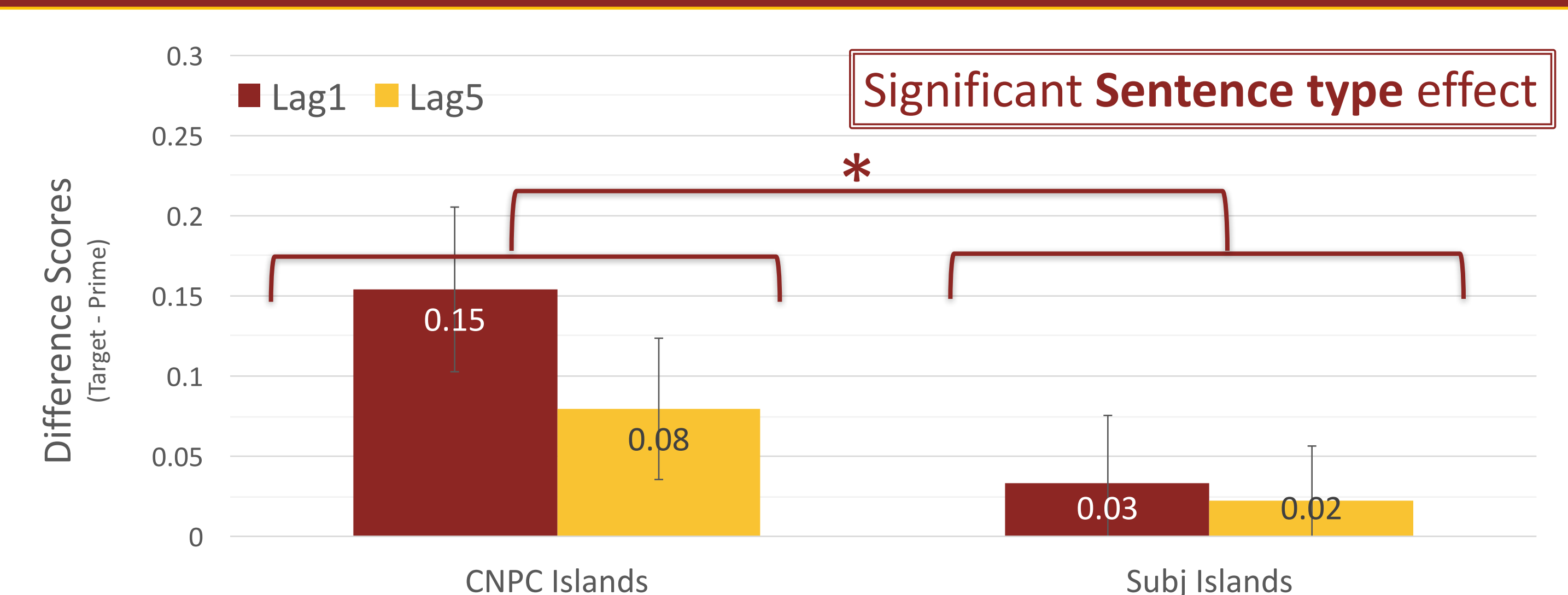
- CNPC Islands rated sig. higher than Subject Islands ($|t| = 2.82$)
- Targets rated sig. higher than prime trials ($|t| = 2.3$)
- Marginally larger rating increase for CNPC than Subject Islands ($|t| = 1.81$)
- Repetition types did not differ from each other

6. Lag 5 Results



- CNPC rated marginally higher than Subject Islands ($|t| = 1.97$)
- Targets and primes did not differ. Repetition types did not differ.

7. Lag 1 vs Lag 5 Comparison



- Difference Scores:** Subtracted Target from Prime Score for each prime-target pair
- Differences sig. larger for CNPC than Subject Islands ($|t| = 2.14$)
- No differences in Lag type or Repetition type

8. Discussion & Conclusion

- Priming when primes & targets very close (Lag1), but effects less clear when pairs were further apart (Lag5).**
 - Priming of under-specified structures is short-lived, initially suggesting activation decay of structural representations
- Observed priming for CNPC islands, but for Subject islands**
 - Type of under-specification & type of grammaticality violation matters for priming
 - Though underspecified, representations were fine-grained enough to distinguish between two grammaticality violations.
- Future Work:**
 - No observed effect of lexical repetition: Perhaps island phrase is too degraded to ‘boost’ priming.
 - What is responsible for two different priming effects observed in CNPC vs Subject islands? (e.g. What is the role of semantic/conceptual priming here?)
 - How generalizable are these priming effects?

References

[1] Bock 1986. Syntactic Persistence in Language Production. *Cognitive Psychol.* [2] Bock & Griffin 2000. The Persistence of Structural Priming: Transient Activation or Implicit Learning? *J. Exp. Psychol.*; Hartsuiker et al. 2008. Syntactic priming persists while the lexical boost decays. *J. Mem. Lang.* [3] Christianson et al 2001. Thematic Roles Assigned Along the Garden Path Linger. *Cognitive Psychol.* [4] Luka & Barsalou 2005. Structural facilitation: Mere exposure effects for grammatical acceptability as evidence for syntactic priming in comprehension. *J. Mem. Lang.*; Kaschak & Glenberg 2004. This construction needs learned. *J. Exp. Psychol.* [5] Sag et al 2007. Processing Complexity in Subjacency Violations: The Complex Noun Phrase Constraint. Proceedings of CLS 43 (cf. Sproule 2009. Revisiting Satiation: Evidence for an Equalization Response Strategy. *Linguistic Inquiry.*) [6] Chaves & Dery 2014. Which Subject Islands Will the Acceptability of Improve with Repeated Exposure? Proceedings of the 31st WCCFL (cf. Jean Crawford 2012. Using Syntactic Satiation to Investigate Subject Islands. Proceedings of the 29th WCCFL)