EXPERIMENTS ON NEGATIVE POLARITY ITEMS

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WHAT ARE NPIs?

Many languages contain a number of items (expressions) that are polarity sensitive (Huddleston and Pullum 2005, 822).

- Negative polarity items are only grammatical in a sentence with negative polarity:

(1) a. I have **never** ***ever*** visited Twin Peaks.
b. *I have ***ever*** visited Twin Peaks.

(2) a. Jeg har **aldrig** ***nogensinde*** besøgt Twin Peaks.
I have never ever visited Twin Peaks
'I have **never** ***ever*** visited Twin Peaks.'

b. *Jeg har ***nogensinde*** besøgt Twin Peaks.
I have ever visited Twin peaks
* 'I have ***ever*** visited Twin Peaks.'

LICENSING AND C-COMMAND

- NPIs must be properly *licensed* (= 'allowed') by some other element in the clause for the NPI to be licit, and the sentence to be acceptable.
- It might seem that NPIs can occur anywhere in a negative sentence. However, sentential negation *not* can license an NPI object, but not an NPI subject.

  (3) Laura Palmer did **not** understand ***anything***.

  (4) ****Anyone*** did **not** understand Twin Peaks.

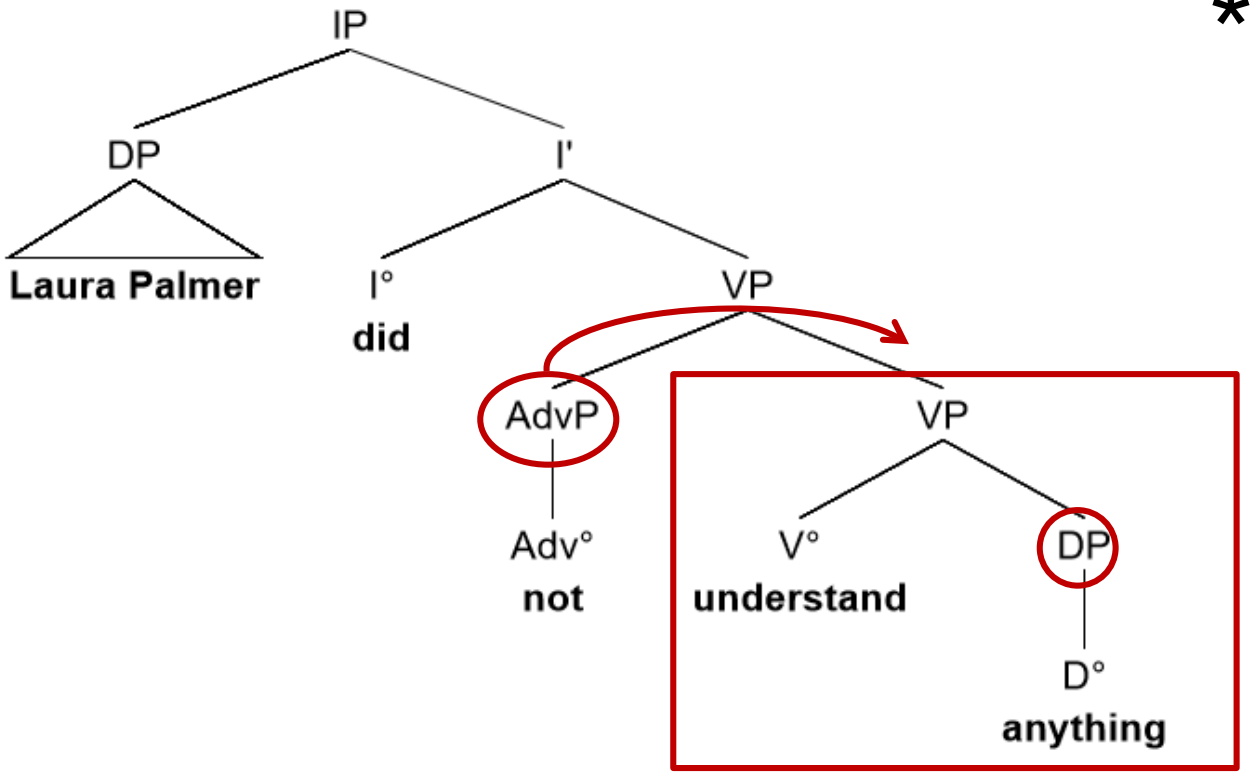
- Furthermore, a linearly preceding licensing element is not enough either:

  (5) *Laura Palmer, who did **not** survive, ***ever*** visited the Great Northern Hotel.

  - An NPI and its licensing element must be in a specific structural configuration for the sentence to be acceptable (Fromkin 2000, 223, 404; Vikner 2011, 46). This structural relationship can be described with *c-command* (short for 'constituent command').

C-COMMAND

- ***C-command***: 'Node X c-commands node Y iff the first branching node dominating X also dominates Y' (Haegeman and Guéron 1999, 214).
  - A node X c-commands its sister node Y and everything contained within Y.



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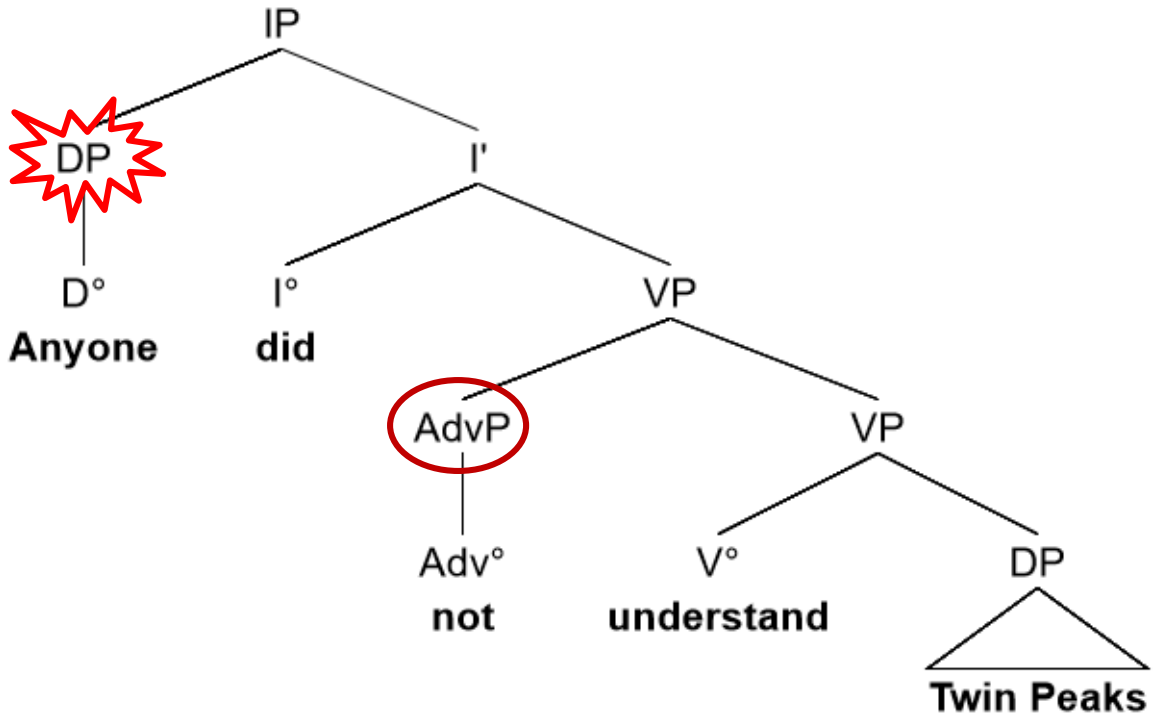


STUDY MOTIVATION

- Drenhaus, Frisch, and Saddy (2005), conducted a speeded acceptability study on the German NPI *jemals* 'ever' with sentences corresponding to the three English ones below:

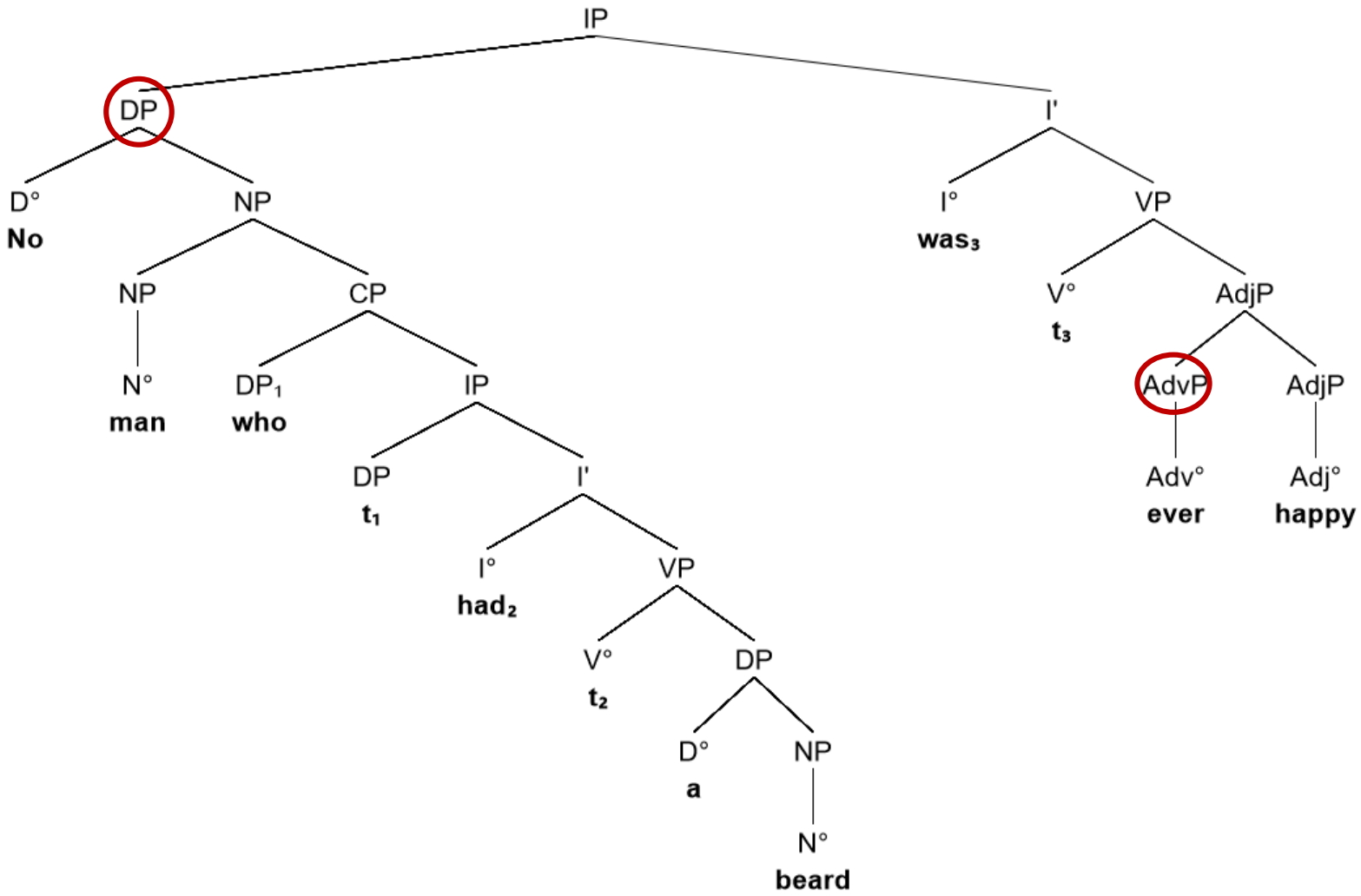
  (6) **No** man who had a beard was ***ever*** happy. (Properly licensed)

  (7) *A man who had a beard was ***ever*** happy. (No licensing)

  (8) *A man who had **no** beard was ***ever*** happy. (Inaccessible negation)

- The study consisted of two parts:
  - Native German speakers judged how acceptable they found sentence types like 6-8 above.
  - A concurrent ERP study of how the sentences are processed.

(6) PROPERLY LICENSED NPI



(7) NO LICENSING

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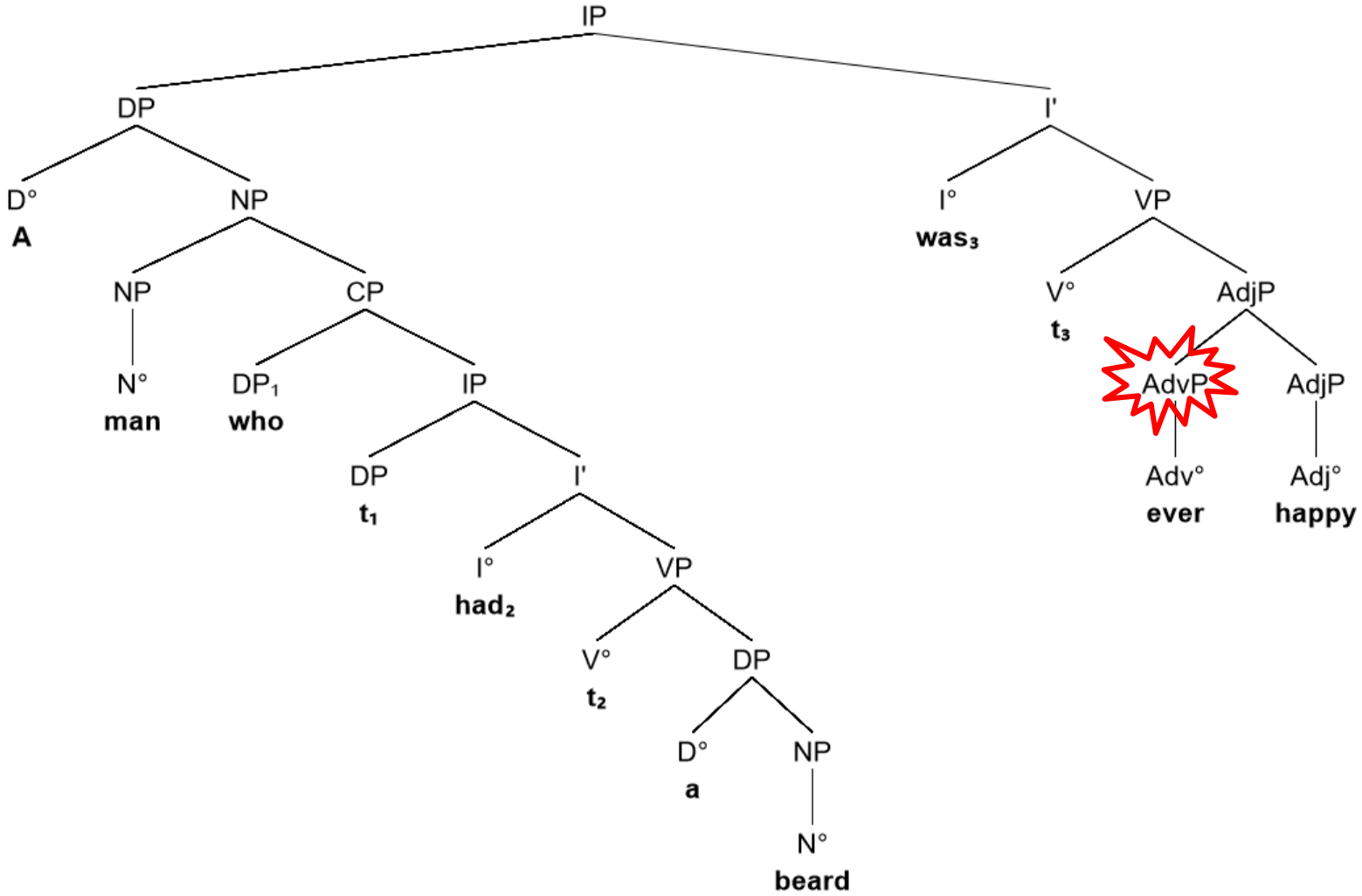

(8) INACCESSIBLE LICENSER

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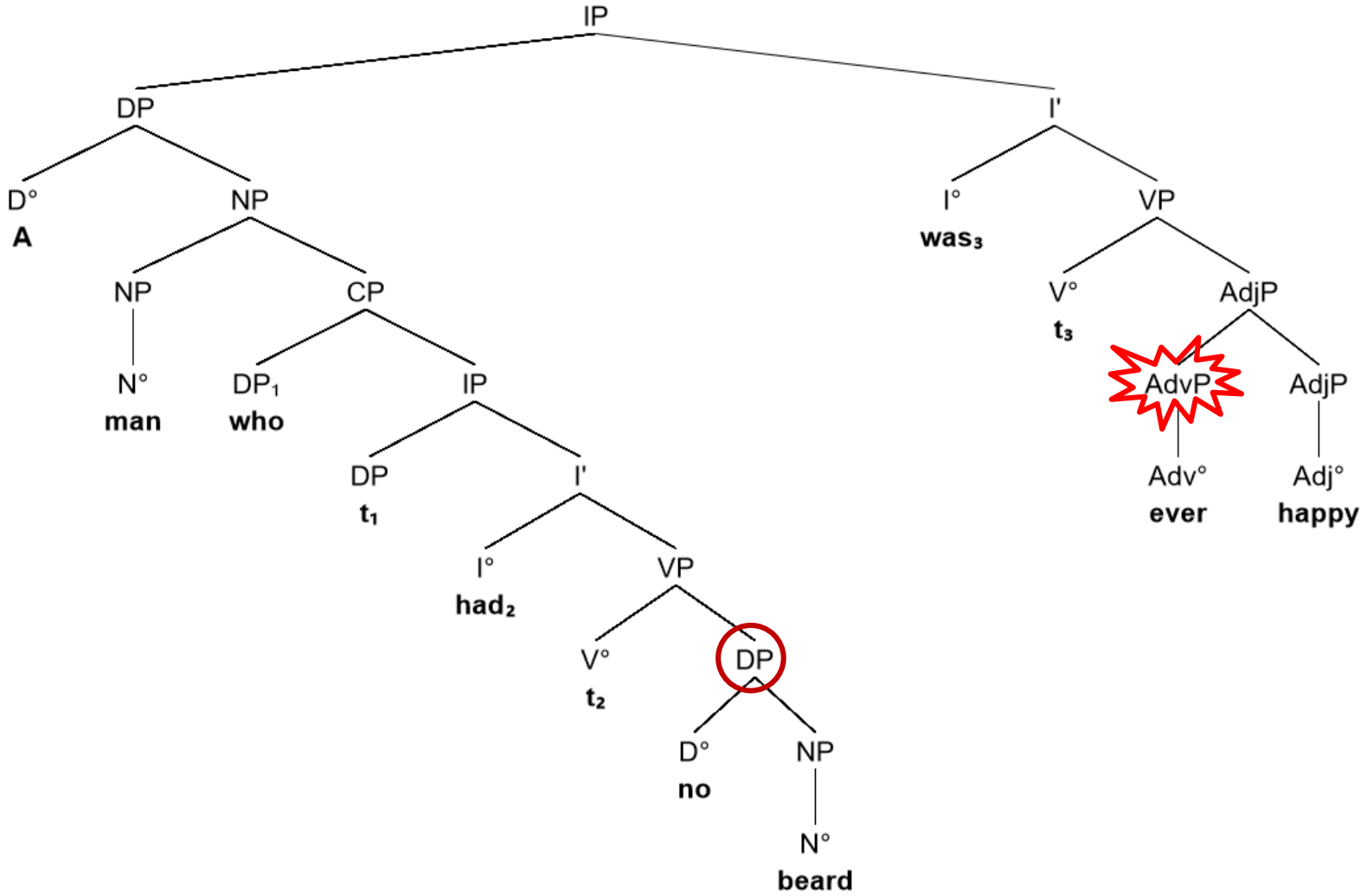


MOTIVATION CONT'D

Summary of German study (Drenhaus, Frisch, and Saddy 2005, 159-160):

- Unlicensed NPIs (7) are unacceptable on both semantic and syntactic grounds.
- Linearly preceding but **structurally inaccessible** licenser (8) can slightly increase the acceptability compared to (7).
- Existence of a **potential** licenser for an NPI sufficient to alter both the time course and efficiency of processing.

EXPECTATIONS AND AIM

Predictions

- Structural requirements are the same across different languages.
  - Hypothesis: The German findings can be replicated in Danish.
    - Inaccessible, linearly preceding licensing elements slightly (but not completely) increase the acceptability of otherwise ungrammatical sentences.

Aim

- Use the German study framework with modifications.
  - 7-point Likert scale instead of binary acceptable/unacceptable responses.

THE STUDY

Participants

- 30 participants (22 women, 8 men).
  - Mean age: 26.3 years.
  - Median age: 24 years.
- Native speakers of Danish.
- Self-reported ‘normal’ reading speed.
- Predominantly students from Nobelparken (majority from the English Dept.).

Stimuli

- 8 conditions/sentence types: 6 critical sentences + 2 unrelated fillers.
  - 3 NPI conditions.
  - 2 PPI (Positive polarity item) conditions.
  - 1 baseline without any (positive or negative) polarity items.
  - 2 unrelated filler sentence types (Christensen and Nyvad 2023).

NPI STIMULI

- Structure of NPI stimuli akin to Drenhaus, Frisch, and Saddy (2005) (cf. (6)-(8) above):

(9)	**Ingen** haver	der	ofte	har	mange muldvarpeskud	er	***nogensinde***	smukke.
	No gardens	*that*	*often*	*have*	*many molehills*	*are*	*ever*	*beautiful.*
(10)	*Mange haver	der	ofte	har	mange muldvarpeskud	er	***nogensinde***	smukke.
	**Many gardens*	*that*	*often*	*have*	*many molehills*	*are*	*ever*	*beautiful.*
(11)	*Mange haver	der	**ikke**	har	mange muldvarpeskud	er	***nogensinde***	smukke.
	**Many gardens*	*that*	*don't*	*have*	*many molehills*	*are*	*ever*	*beautiful.*

PPI STIMULI

- Positive polarity items (e.g., *still, already*, *somewhat*) cannot occur in a negative context and are sensitive to the wide discourse context:
  - English adverb *still* incompatible with local sentential negation, (12), but not if negation is not local, (13), or if the sentence is positive due to double negation (Christensen 2020, 731-32):

  (12) *Mary is (*__not__) ***still*** single.

  (13) I __can't__ believe [that Mary is ***still*** single].
- PPI sentences added to determine the processing cost of negation (Yurchenko et al. 2013, 133).

(14)	Mange haver	der	ofte	har	mange muldvarpeskud	er	***særdeles***	smukke.
	Many gardens	*that*	*often*	*have*	*many molehills*	*are*	*particularly*	*beautiful.*
(15)	?__Ingen__ haver	der	ofte	har	mange muldvarpeskud	er	***særdeles***	smukke.
	No gardens	*that*	*often*	*have*	*many molehills*	*are*	*particularly*	*beautiful.*

BASELINE AND FILLERS

Baseline (16)

- Same structure as NPI/PPI stimuli with no violations.
- Examines sentence structure difficulty and examination of the effect of negation (Yurchenko et al. 2013, 133).

Fillers (17)-(18)

- Unrelated sentence structures. Helps determine whether the participants understand the task or not.
- Multiple syntactic violations (movement out of coordinate structure + no main clause V2)

(16)	Mange haver	der	ofte	har	mange muldvarpeskud	er	faktisk	smukke.
	Many gardens	*that*	*often*	*have*	*many molehills*	*are*	*actually*	*beautiful.*
(17)	Hun	anbefaler	så	tilsyneladende	praktikanten	og	sekretæren.	
	She	*recommends*	*then*	*apparently*	*the intern*	*and*	*the secretary.*	
(18)	*Sekretæren	hun	anbefaler	praktikanten	og	så	tilsyneladende.	
	The secretary	*she*	*recommends*	*the intern*	*and*	*then*	*apparently.*	

ALL CONDITIONS

a)	**Ingen** haver	der	ofte	har	mange muldvarpeskud	er	***nogensinde***	smukke.
b)	*Mange haver	der	ofte	har	mange muldvarpeskud	er	***nogensinde***	smukke.
c)	*Mange haver	der	**ikke**	har	mange muldvarpeskud	er	***nogensinde***	smukke.
d)	Mange haver	der	ofte	har	mange muldvarpeskud	er	***særdeles***	smukke.
e)	?**Ingen** haver	der	ofte	har	mange muldvarpeskud	er	***særdeles***	smukke.
f)	Mange haver	der	ofte	har	mange muldvarpeskud	er	faktisk	smukke.
g)	Hun	anbefaler	så	tilsyneladende	praktikanten	og	sekretæren.	
h)	*Sekretæren	hun	anbefaler	praktikanten	og	så	tilsyneladende.	

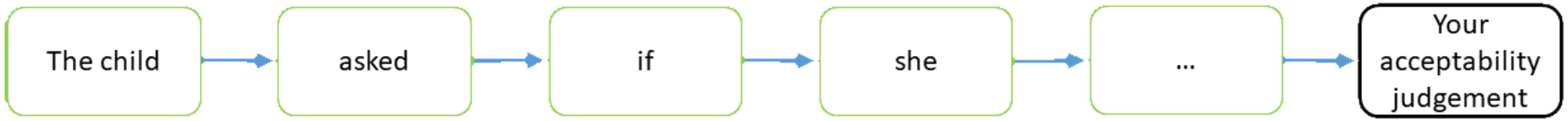
MATERIALS AND PROCEDURE

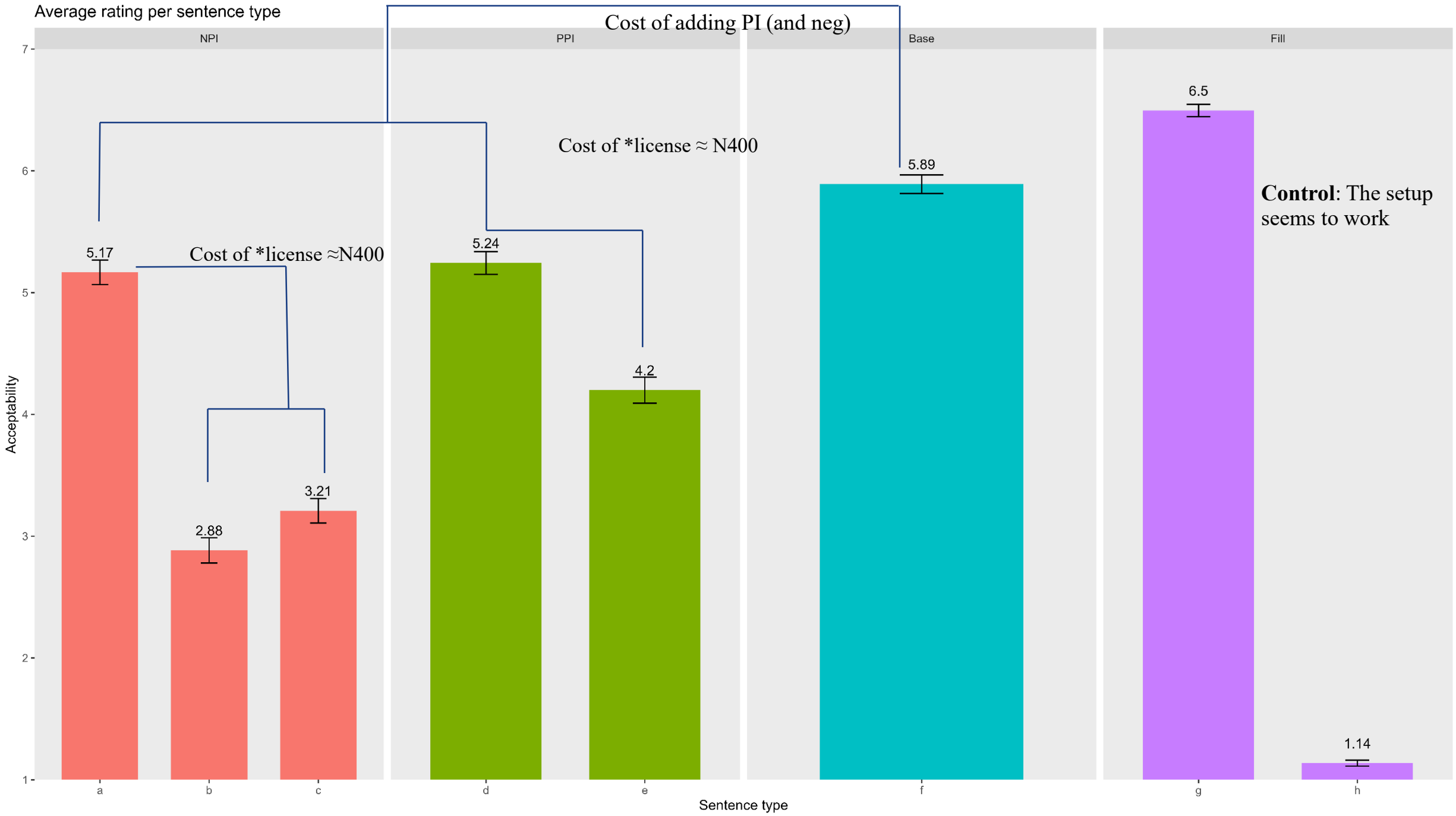
Materials

- 22 sets the six critical conditions (a-f) + fillers (g-h).
  - A total of 176 experimental sentences.
  - The sentences were split into two lists with a Latin square design.
  - Each participant saw a subset of 88 sentences (11 per condition) in a randomised order.

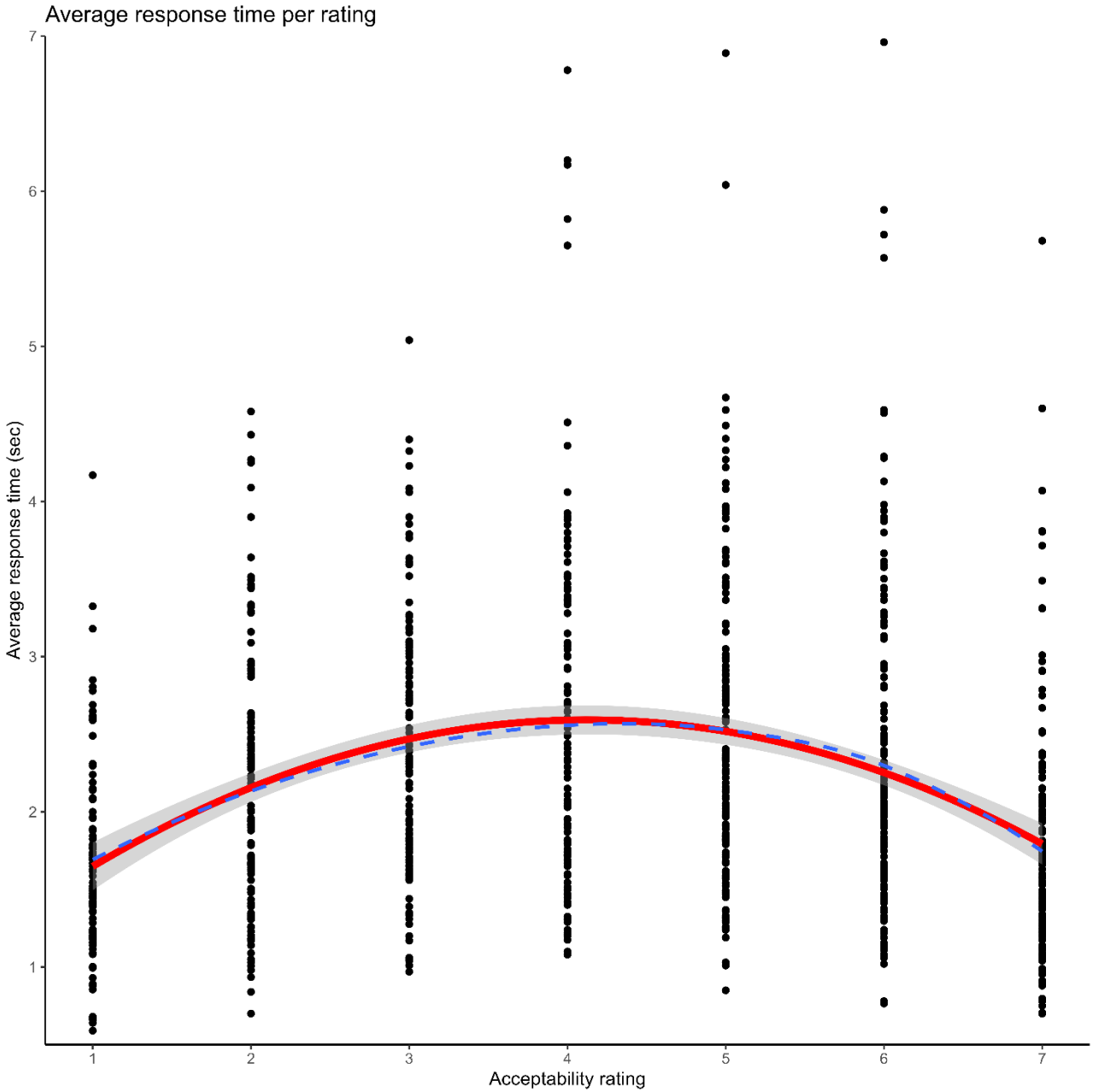
Procedure

- Speeded acceptability judgement with self-paced reading. After each button press, the participant was presented with the next constituent in isolation.
- At the end of each sentence, they were asked to rate the sentence on a Likert scale from 1 (completely unacceptable) to 7 (completely acceptable) on a slider with the laptop trackpad.
- Two small breaks were incorporated to alleviate participant fatigue.

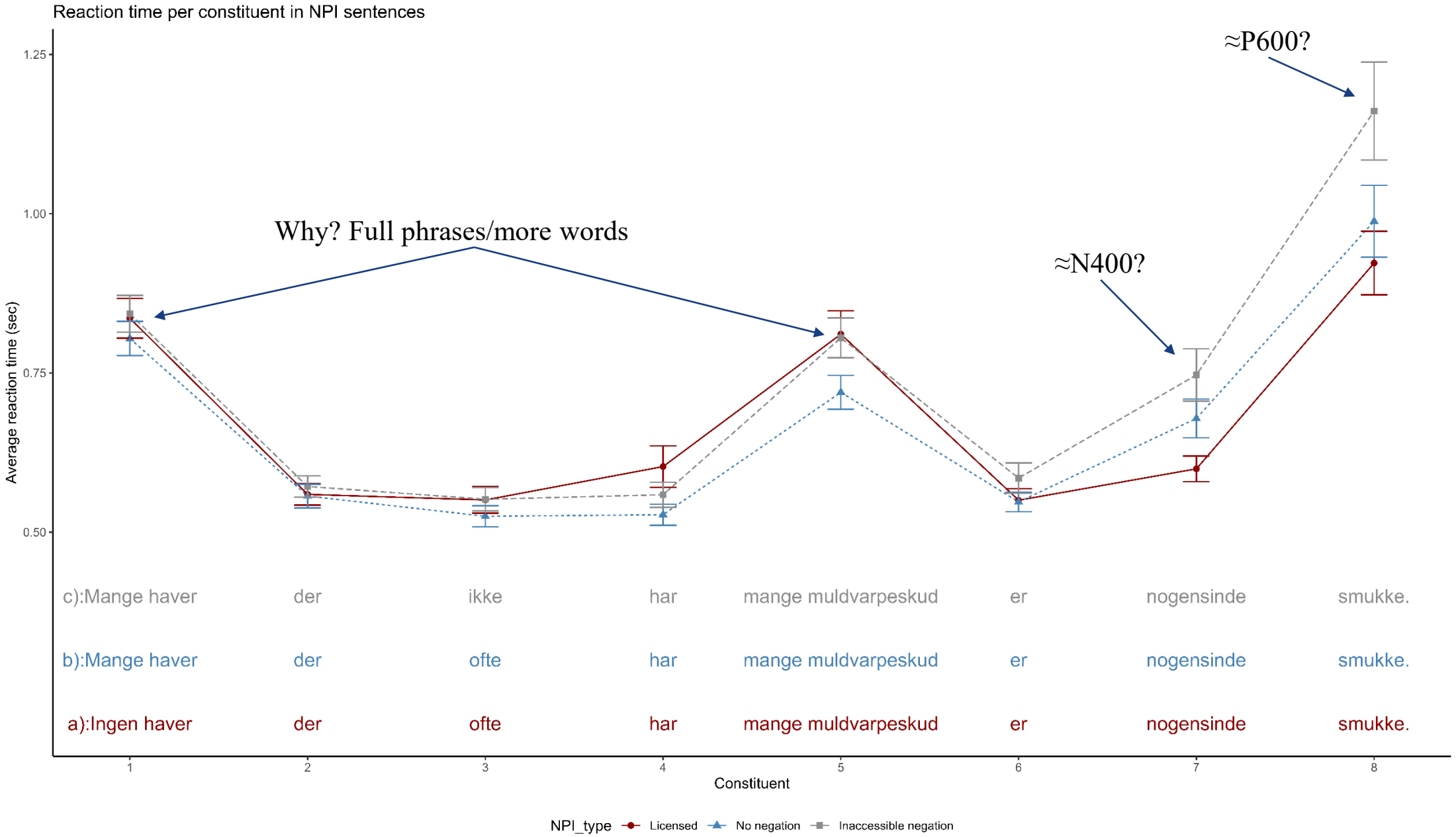




Control: The setup seems to work



- Non-linear relation between reaction time and rating
- Consistent with earlier literature (Christensen and Wallentin 2011; Christensen, Kizach, and Nyvad 2013)


Reaction time per constituent in NPI sentences
≈P600?
Why? Full phrases/more words
≈N400?
Average reaction time (sec)
1.25
1.00
0.75
0.50
c):Mange haver der ikke har mange muldvarpeskud er nogensinde smukke.
b):Mange haver der ofte har mange muldvarpeskud er nogensinde smukke.
a):Ingen haver der ofte har mange muldvarpeskud er nogensinde smukke.
1
2
3
4
5
6
7
8
Constituent
NPI_type
Licensed
No negation
Inaccessible negation

SUMMARY

- The presence of a potential, yet inaccessible licensing element shows a trend towards a higher acceptability (Simple t test p = 0.02433, *real* stats pending.)
  - Participants appear to react more favourable towards those sentences due to the presence of a potential licenser.
- Participants are slower on average at evaluating those NPIs whose licensing element was either completely absent or inaccessible (i.e. not c-commanded).
  - Sentences with inaccessible licensing elements lead to significantly higher reaction time at the end of the sentences. Possibly due to attempts at a structural reanalysis.

STUDY CHALLENGES

- Unnatural presentation of stimuli.
- Finding acceptable sentences.
  - Must work in all permutations.
  - Sentences need to be semantically coherent.

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