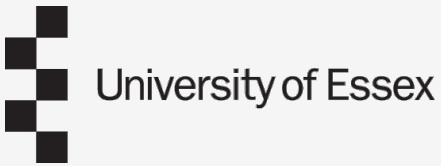
There Is No Age-Related Sentence Processing Deficit

Experimental Evidence and Implications for Aphasiology

Willem S. van Boxtel Laurel A. Lawyer

Academy of Aphasia Annual Meeting

October 24th, 2022



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Language and Aging (1)

Impairment-focused discourse in linguistic aging studies:

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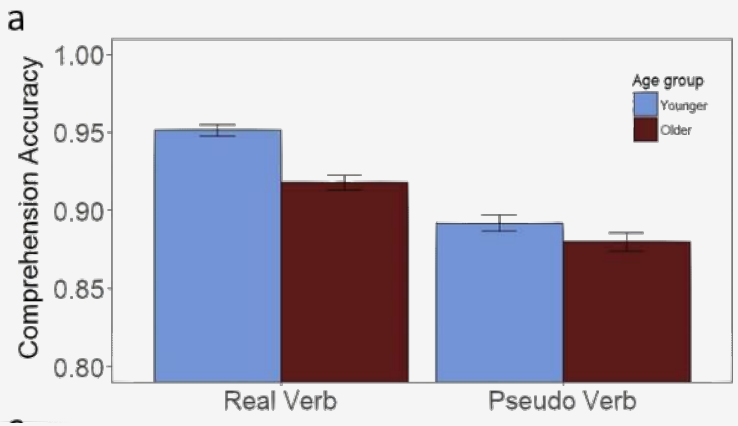

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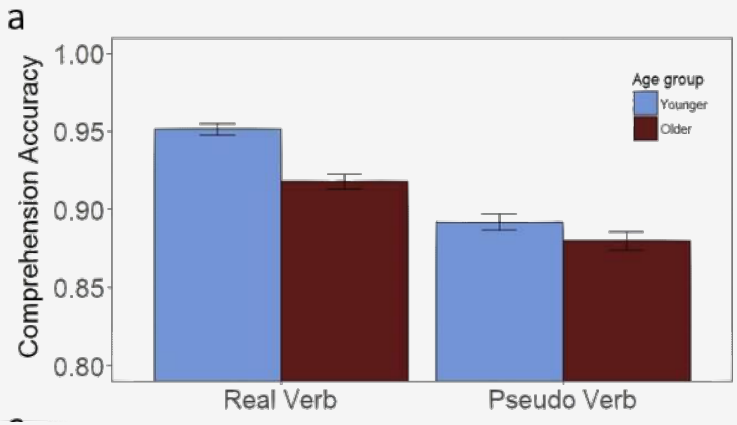

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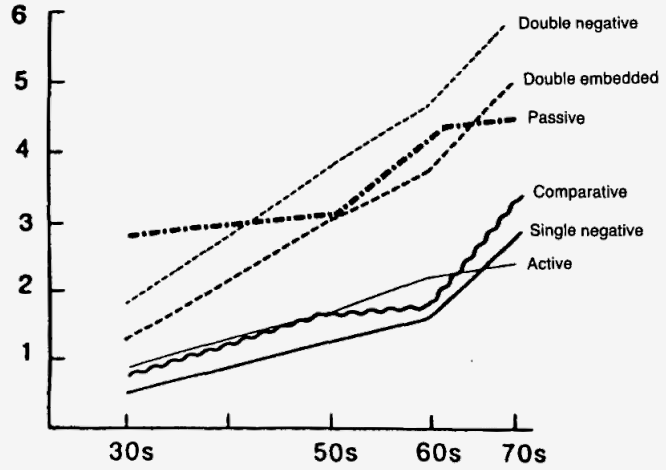

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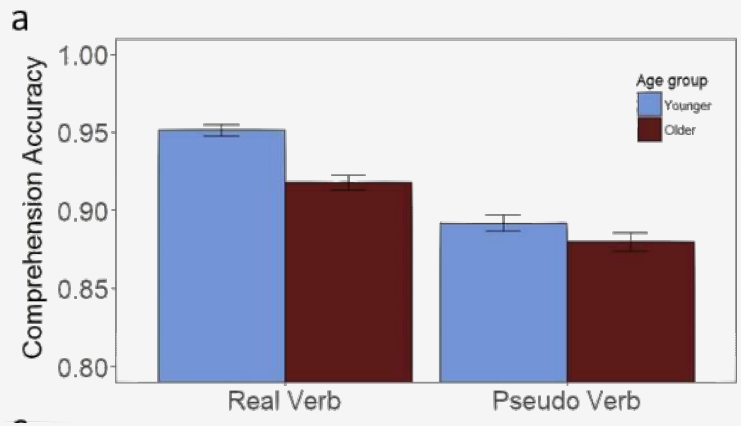

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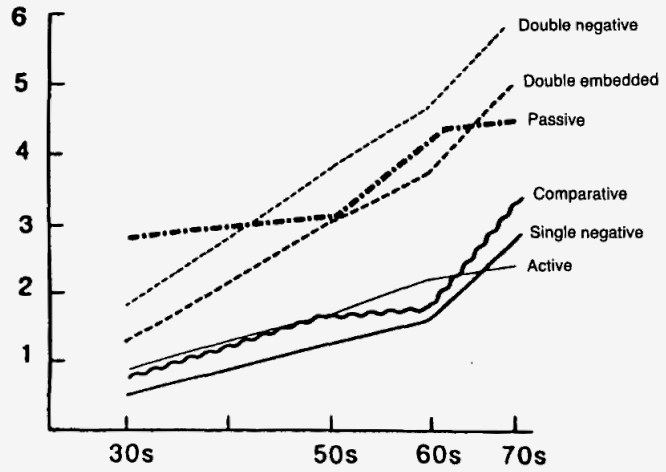

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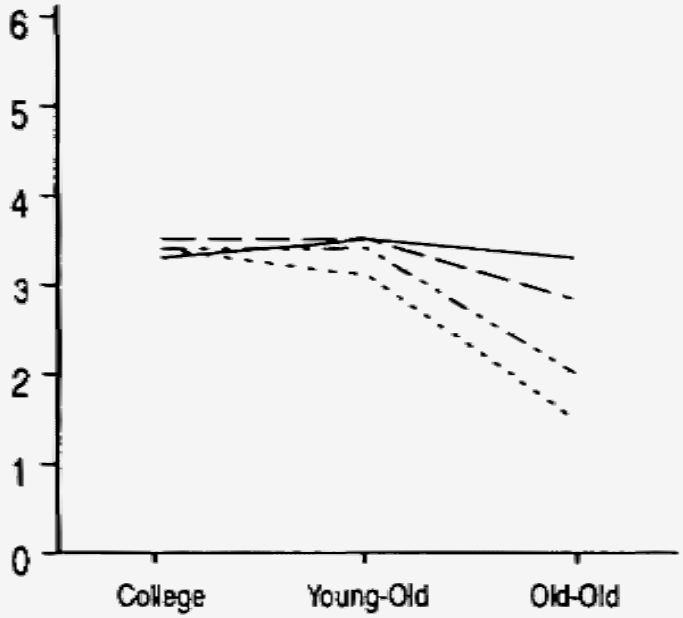

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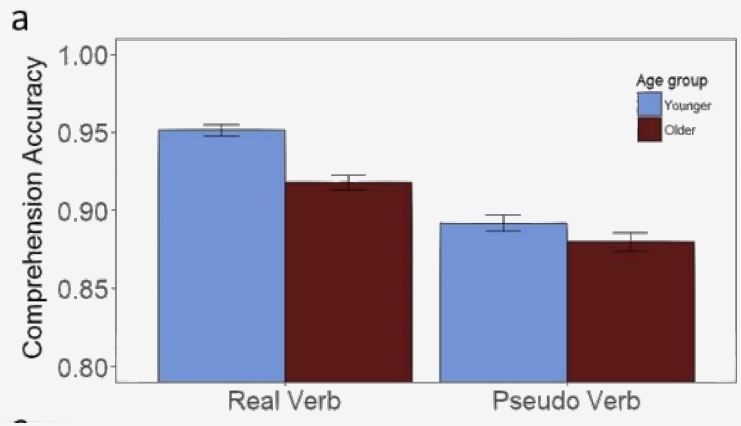

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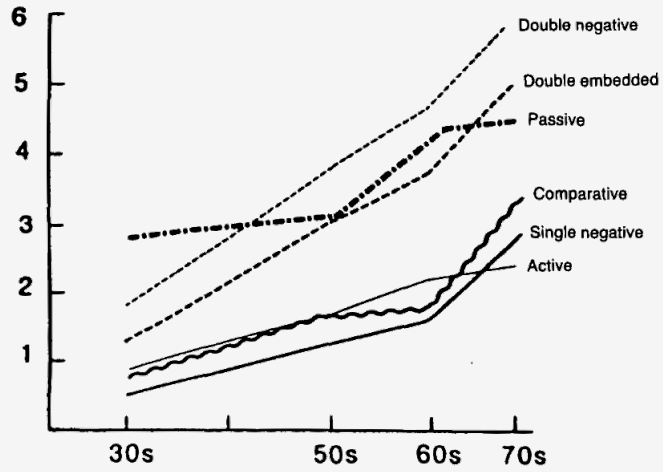

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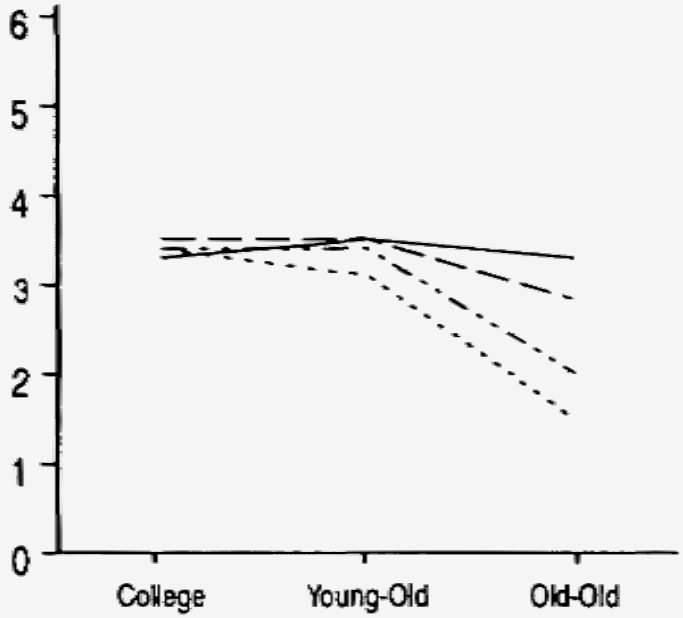

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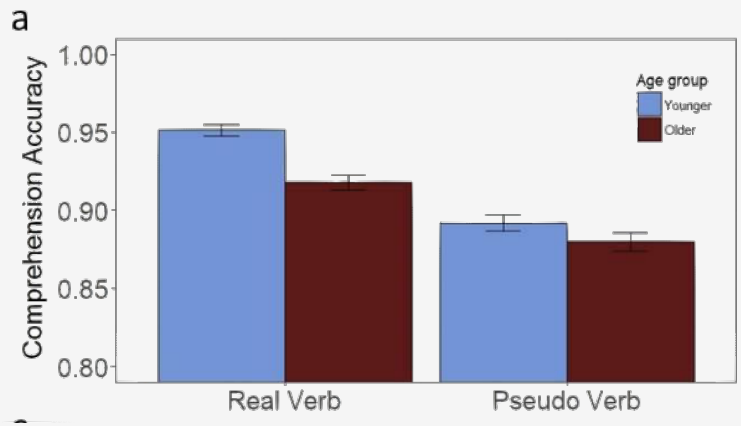

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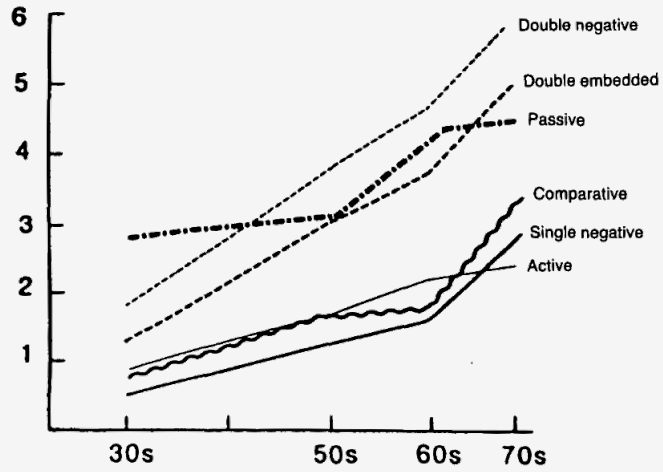

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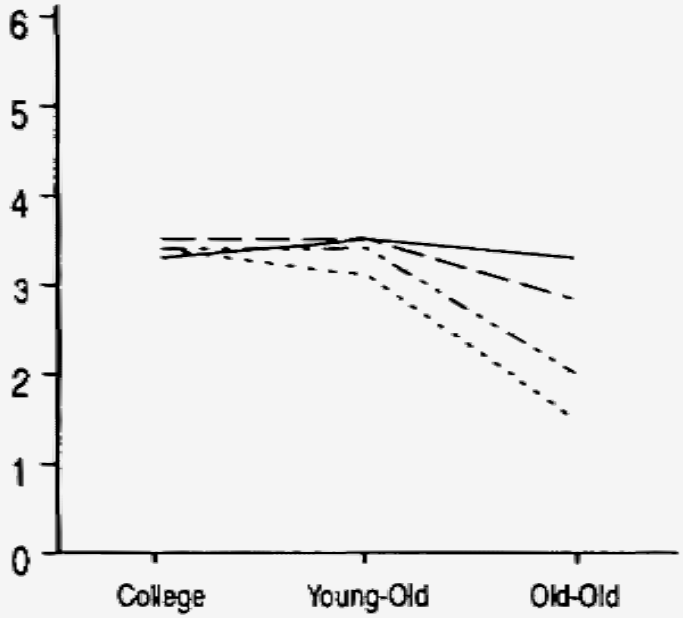

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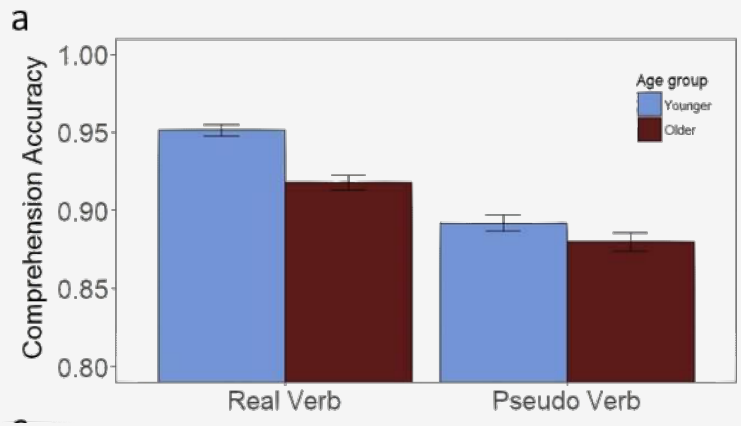

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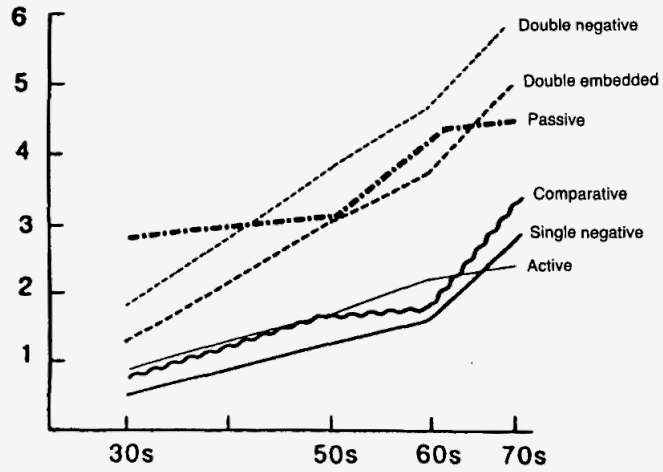

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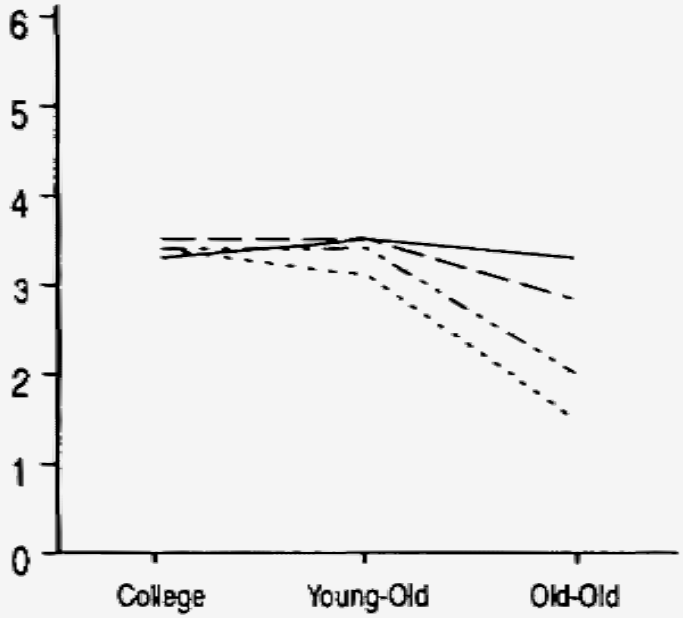

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Language and Aging (2)

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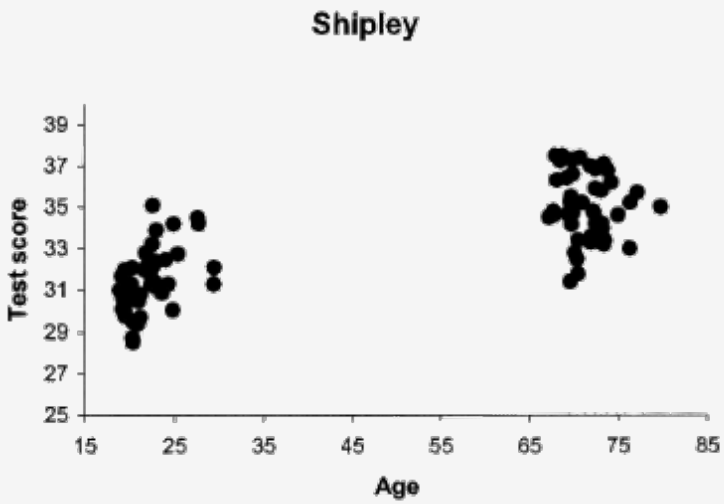

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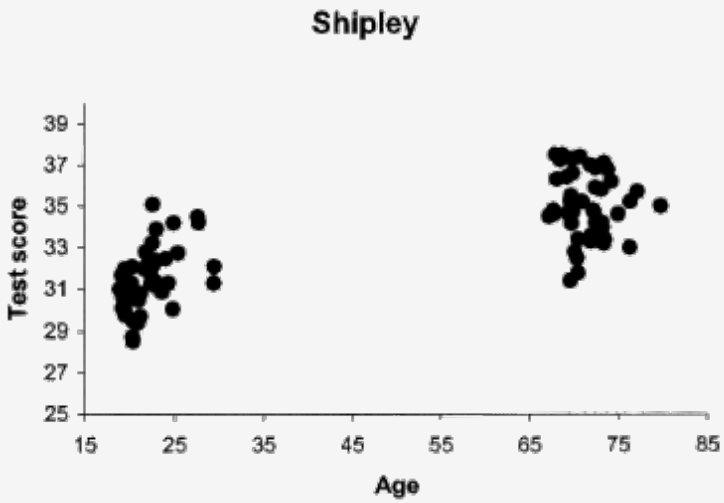

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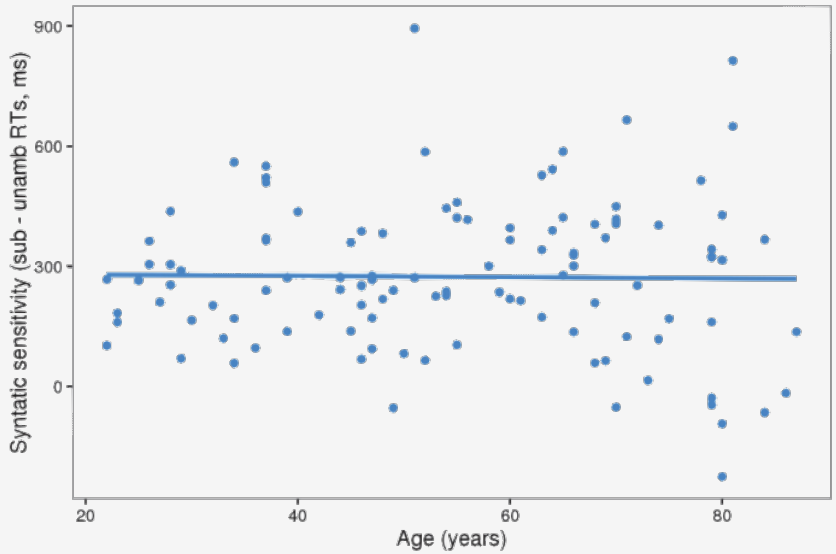

Campbell et al. (2016)

Language and Aging (4)

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Language and Aging (4)

So ...

- How do we expose what aspects of language processing decline (if any)
  - And what role does memory play? (Martin et al., 2018)
- How do we take into account possible explicit/implicit distinctions and variable performance by older adults in past language studies?
- How can answering these questions for typical aging inform studies of aphasia?

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FIRST: By looking at memory from a wider perspective.

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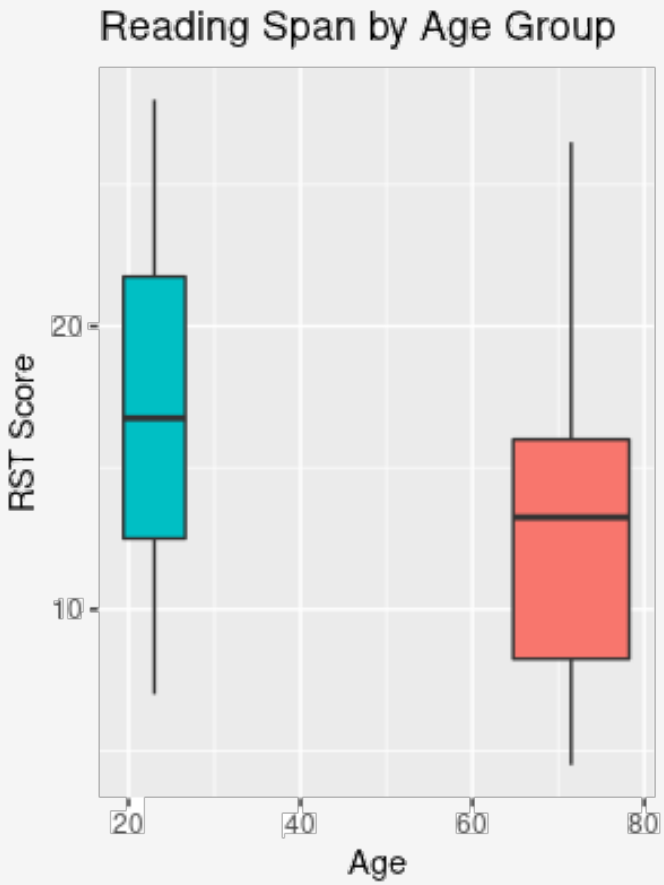

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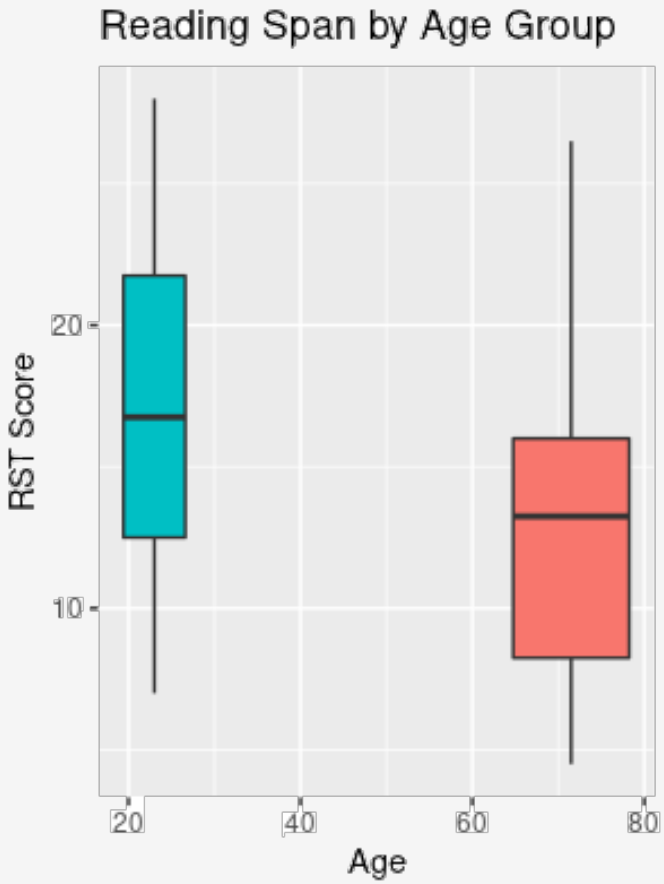

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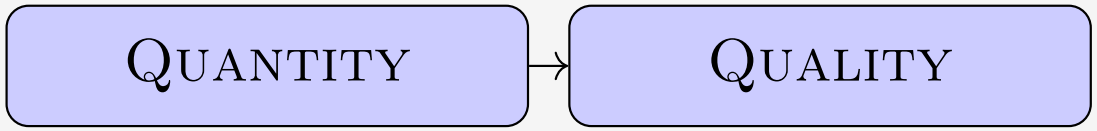

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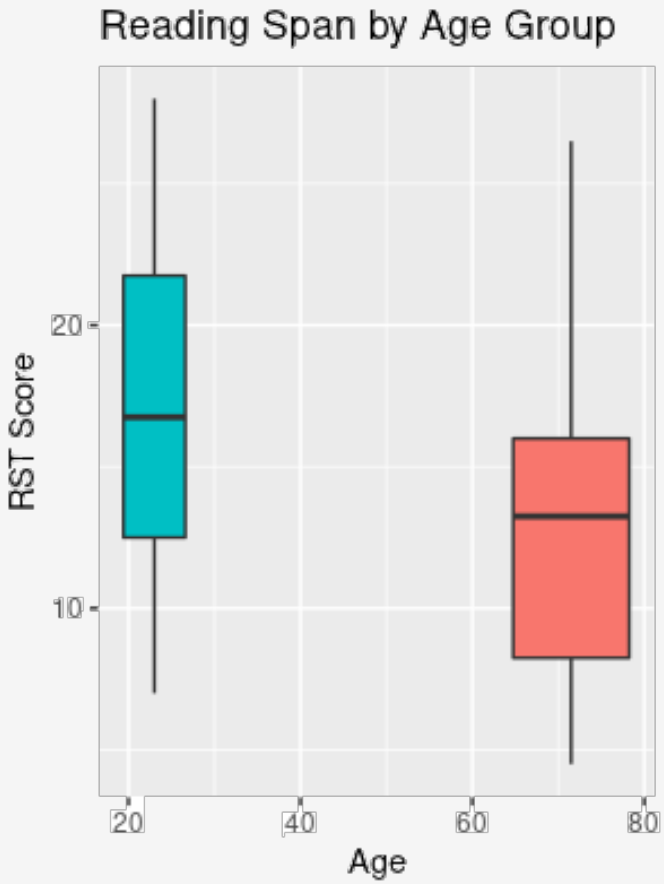

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QUANTITY → QUALITY

Similarity-based interference

Gordon et al. (2002); Van Dyke & McElree (2006)

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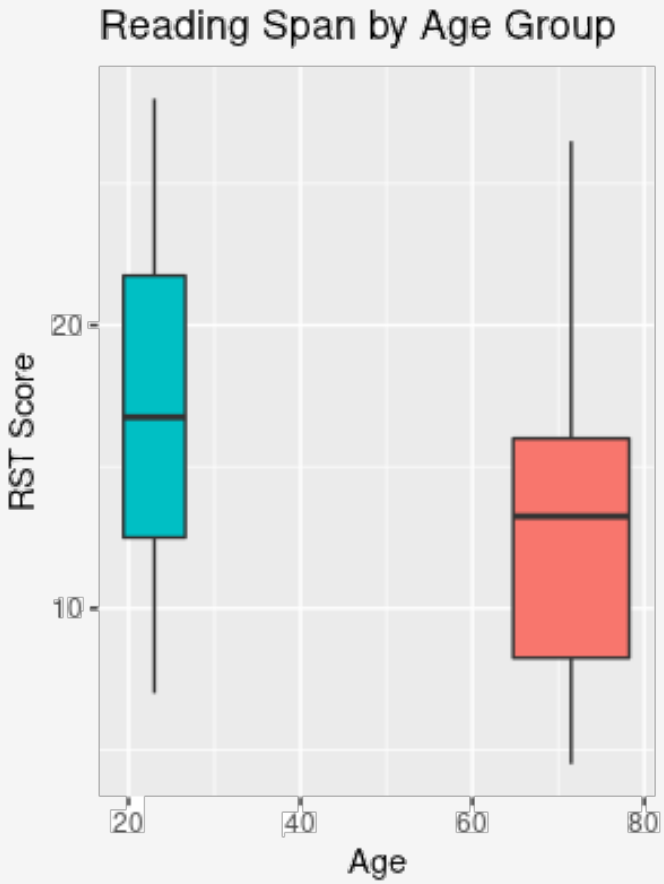

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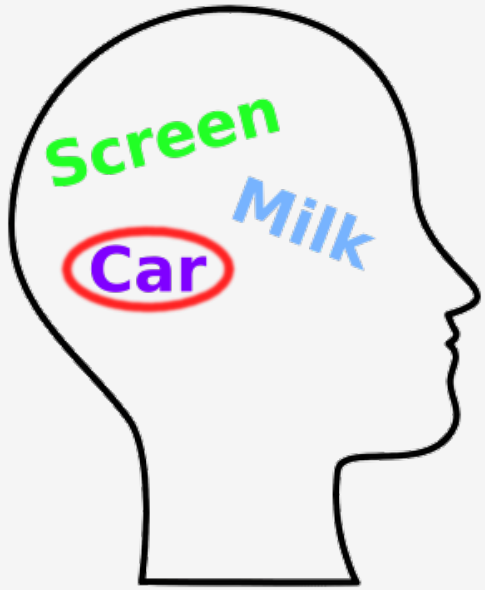

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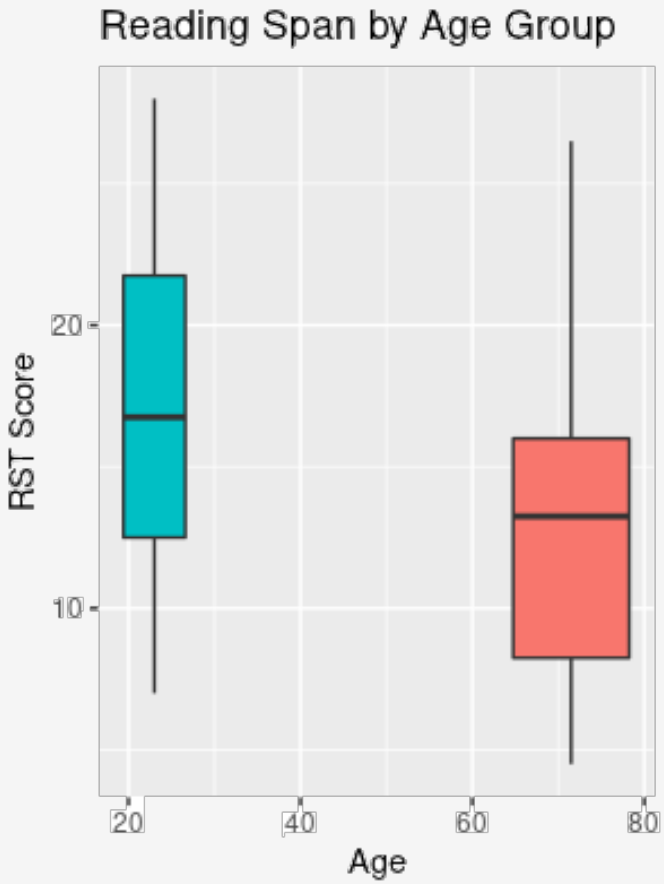

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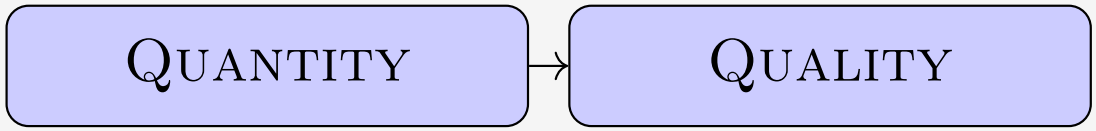

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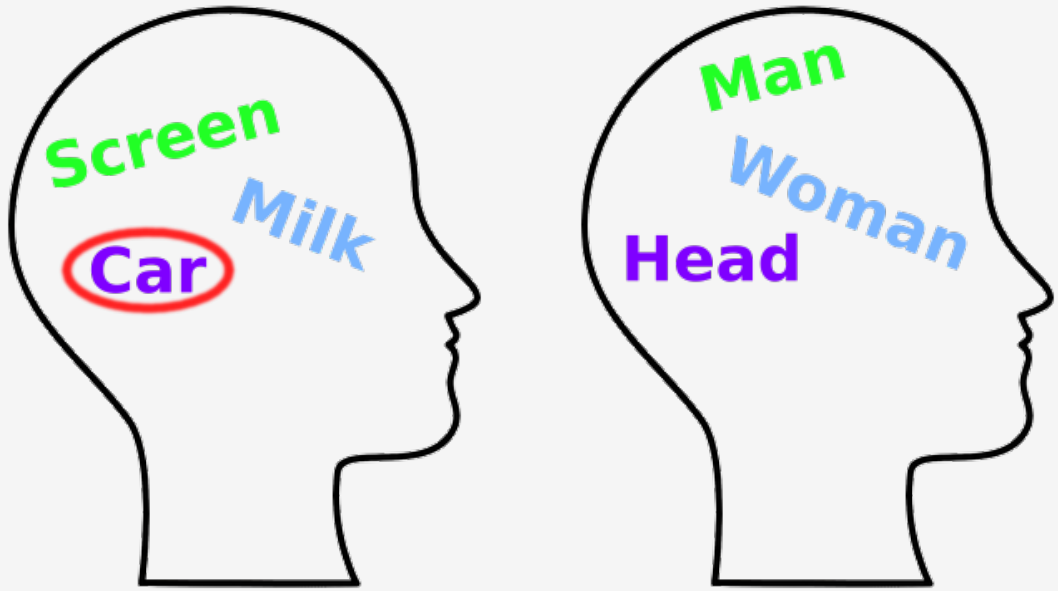

Study 1: Methods (2)

NP1-biased	NP2-biased
The man with the house that had the moustache was admired.	The man with the house that needed renovation was admired.

Van Boxtel & Lawyer (*in prep. (a)*). `https://osf.io/eympz/`

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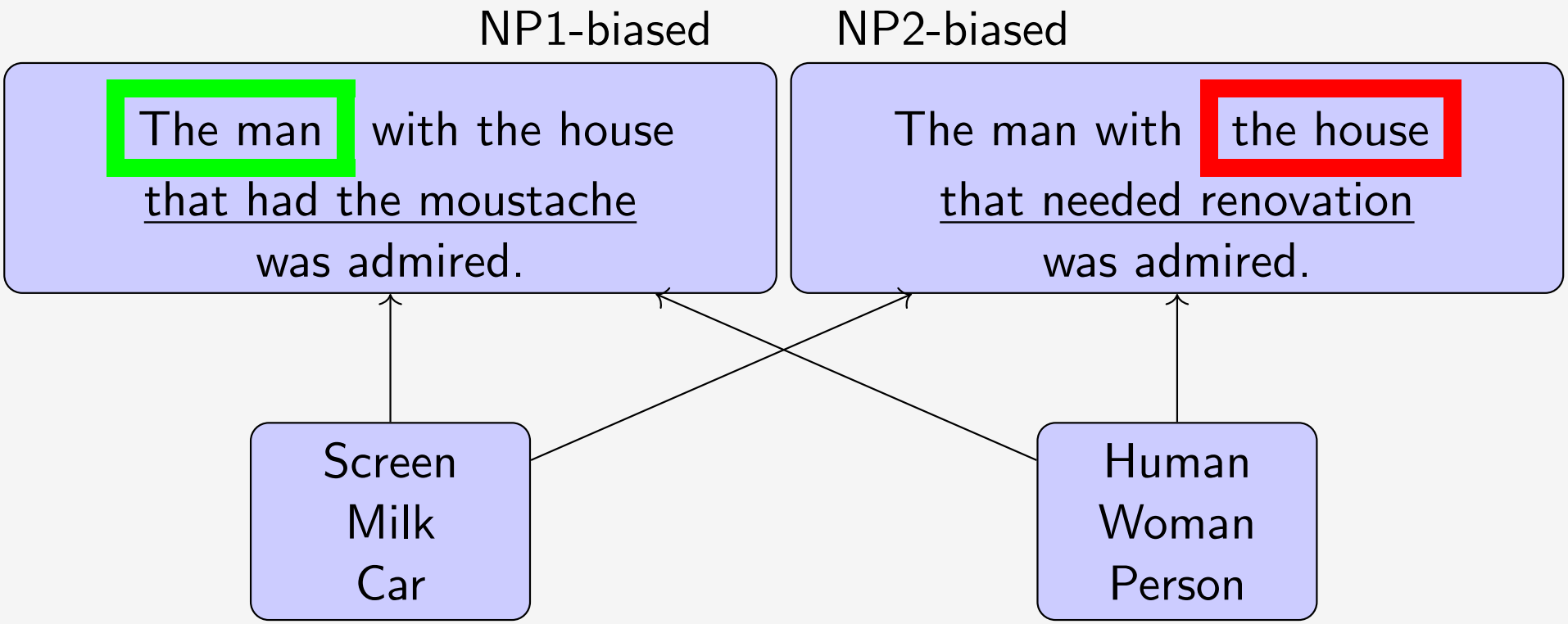

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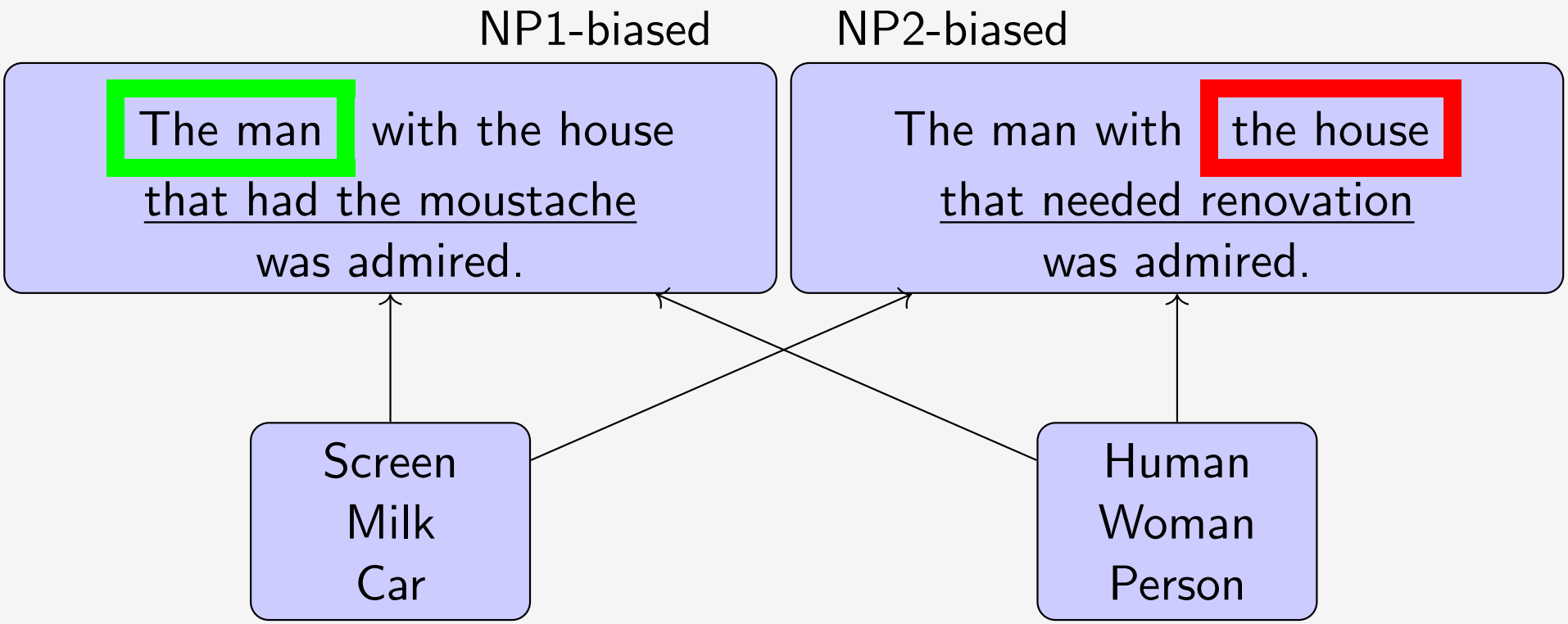

- Older and younger adults ($n = 65$) ($M_{\text{Y Age}} = 21.8$, [18,25]; $M_{\text{O Age}} = 68.5$, [65, 76]) presented with disambiguated relative clauses (RC)

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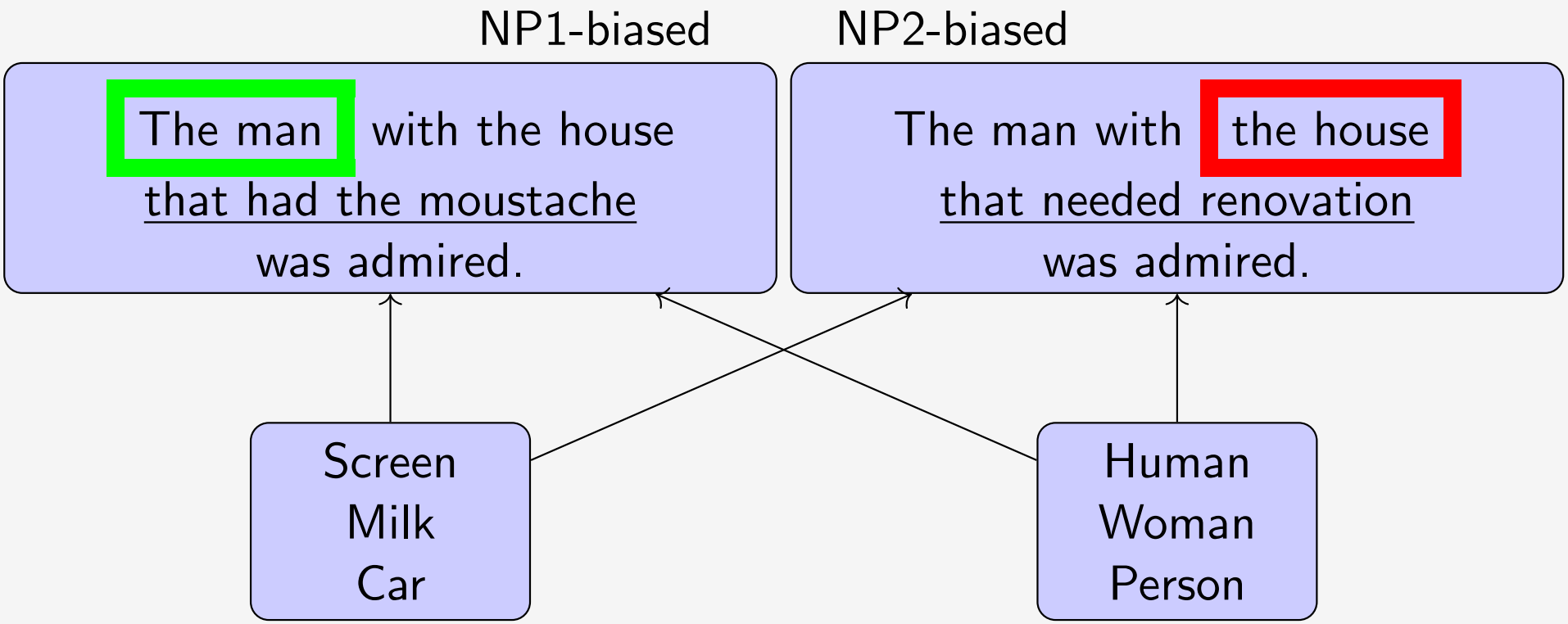

- Older and younger adults ($n = 65$) ($M_{\text{Y Age}} = 21.8$, [18,25]; $M_{\text{O Age}} = 68.5$, [65, 76]) presented with disambiguated relative clauses (RC)
- Interfering or non-interfering memory load before *every* RC sentence $\rightarrow$ prompted for recall;

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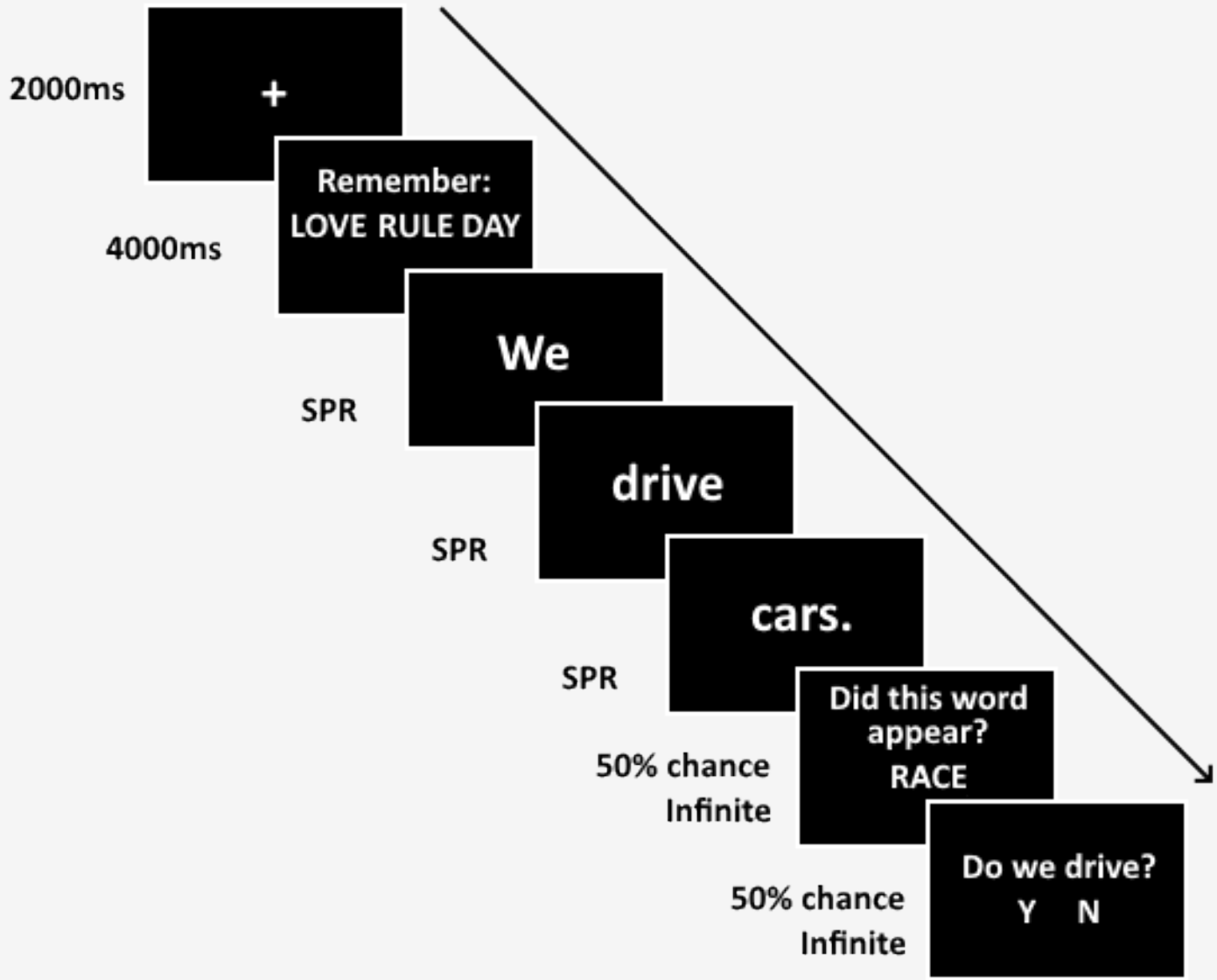
Study 1: Procedure



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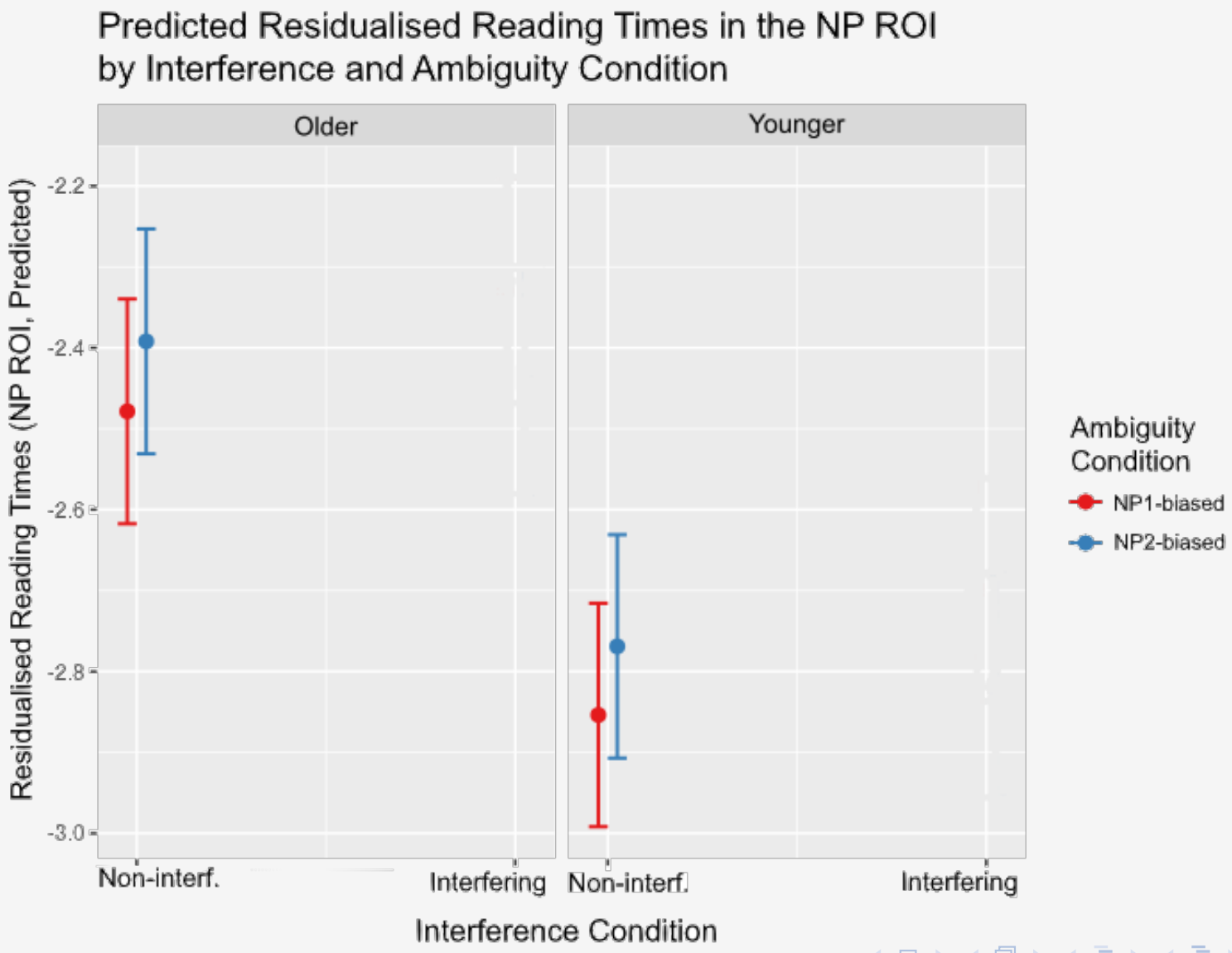

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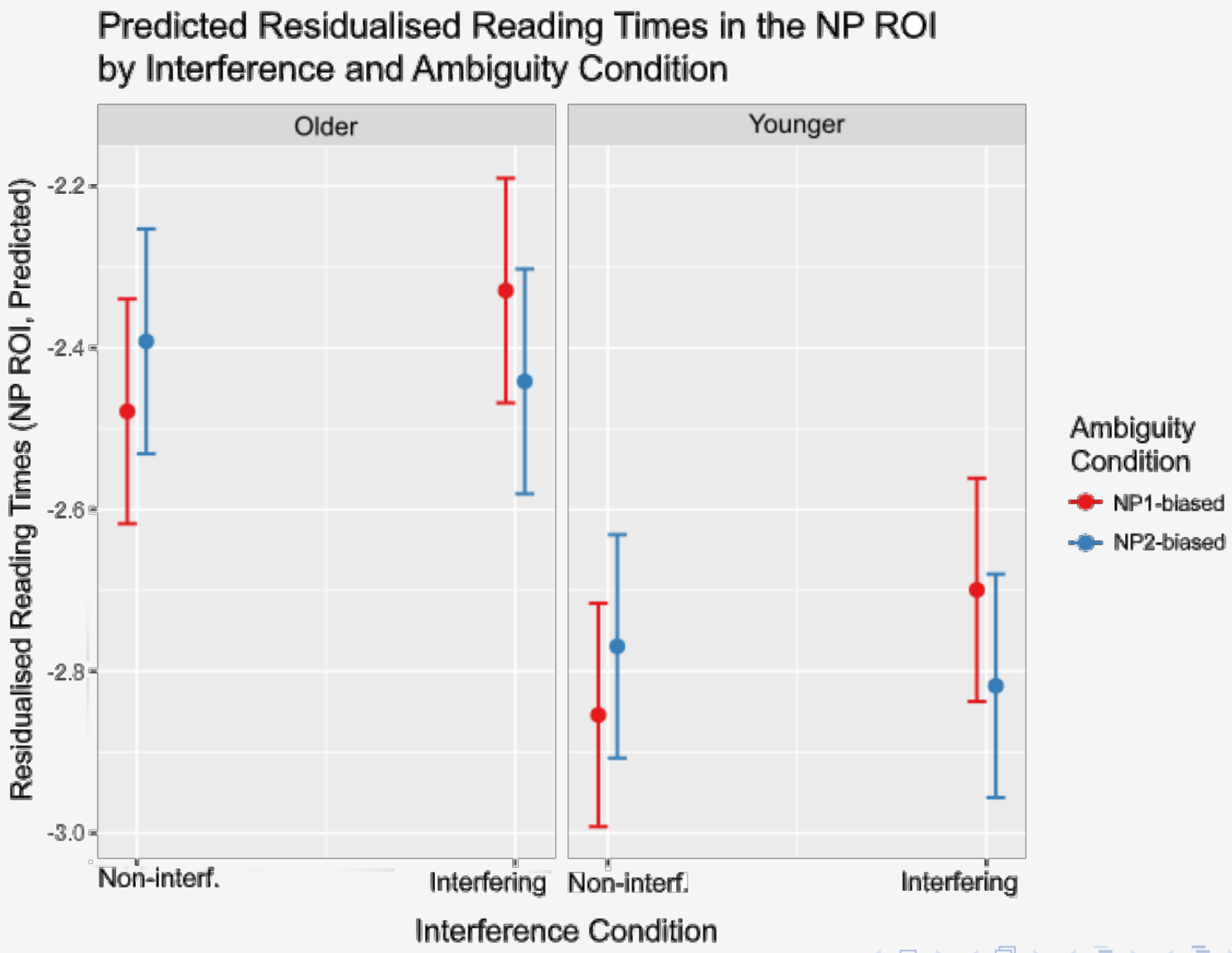

Study 1: Results (2)

Study 2: Methods (1)

~~**FIRST**: By looking at WM from a wider perspective~~
SECOND: By using an implicit task.

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- Structural priming: Repeated structures are read faster and used more

  Bock (1986)

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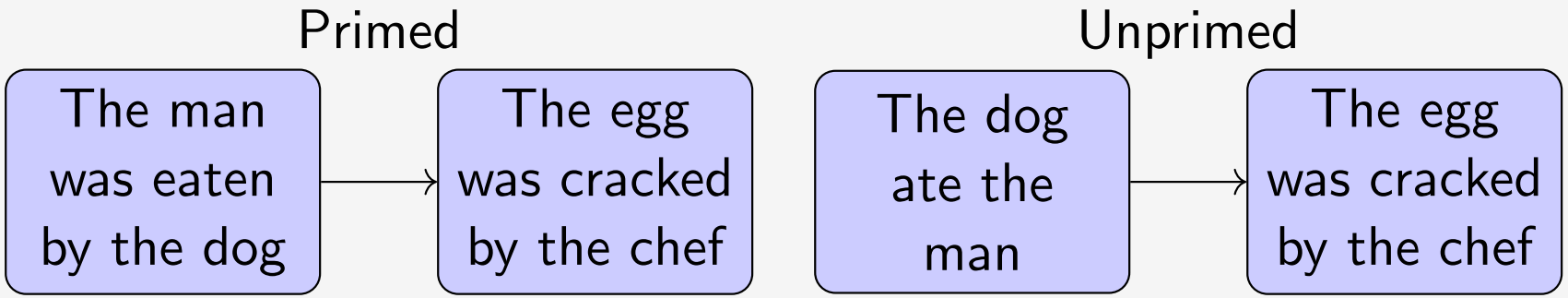

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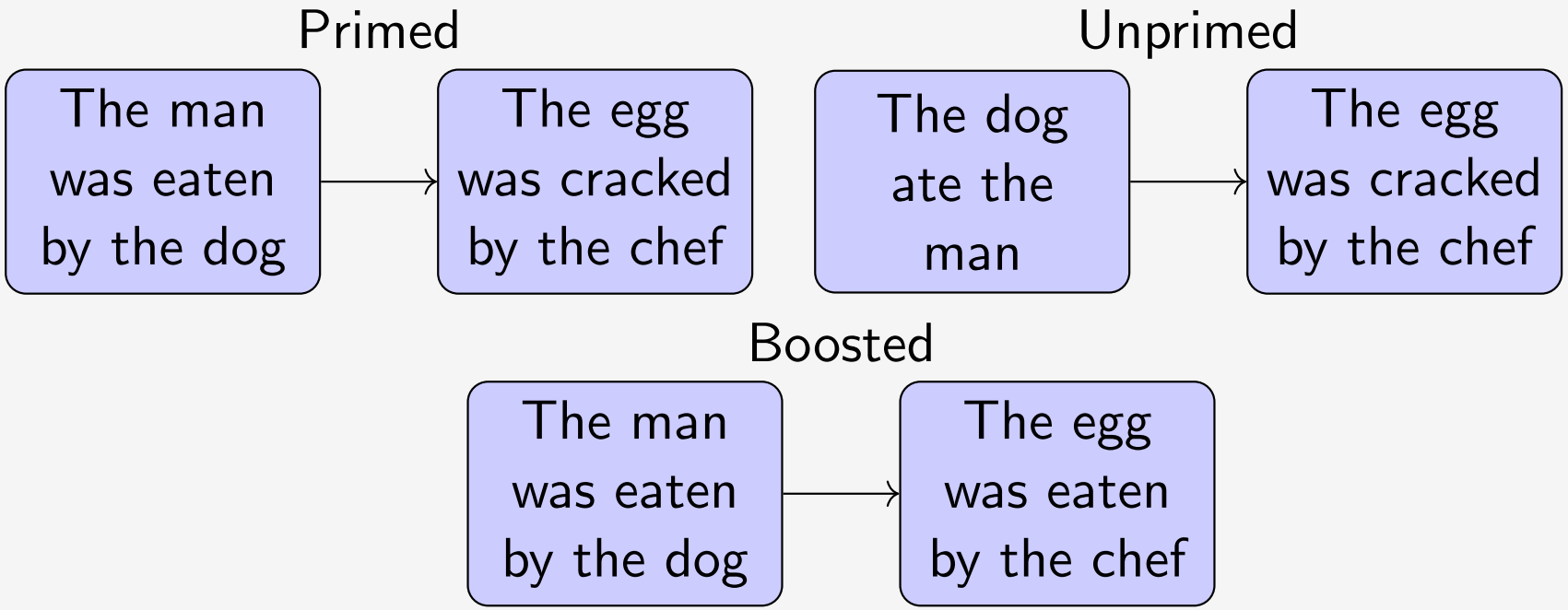

Study 2: Methods (2)

The lawyer insulted by the judge quit her profession.

	Older	Younger
Age	$M = 68.8$ (3.7)	$M = 21.6$ (2.4)
Gender	13 F, 12 M	18 F, 12 M
Years in Edu	$M = 15$ (3.4)	$M = 15.4$ (2.4)
LCT	$M = 16.4$ (5.3)	$M = 26.6$ (5.3)
RST	$M = 22$ (6.9)	$M = 23$ (5.9)

Van Boxtel & Lawyer (2022), *Language, Cognition, Neuroscience*;
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PRIME

Unrelated Structure

RR: no verb match with Target

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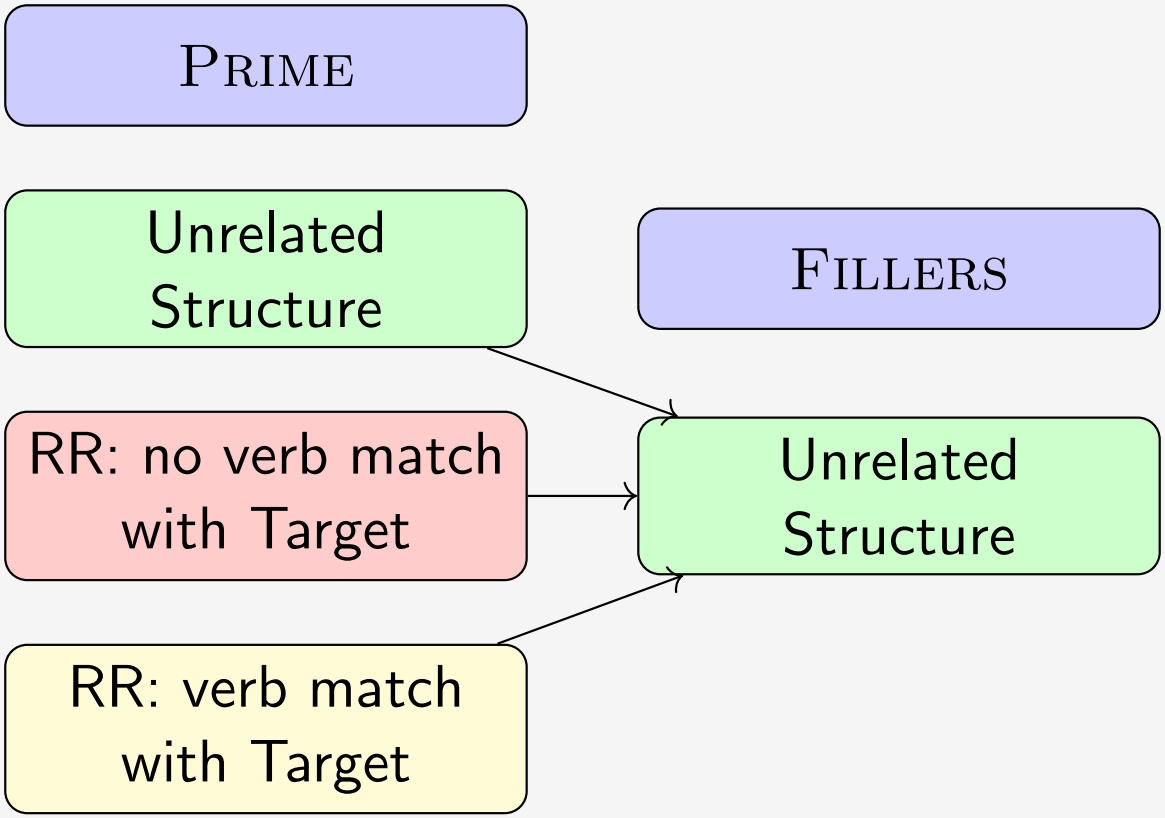
Prime
Unrelated Structure
Fillers
RR: no verb match with Target
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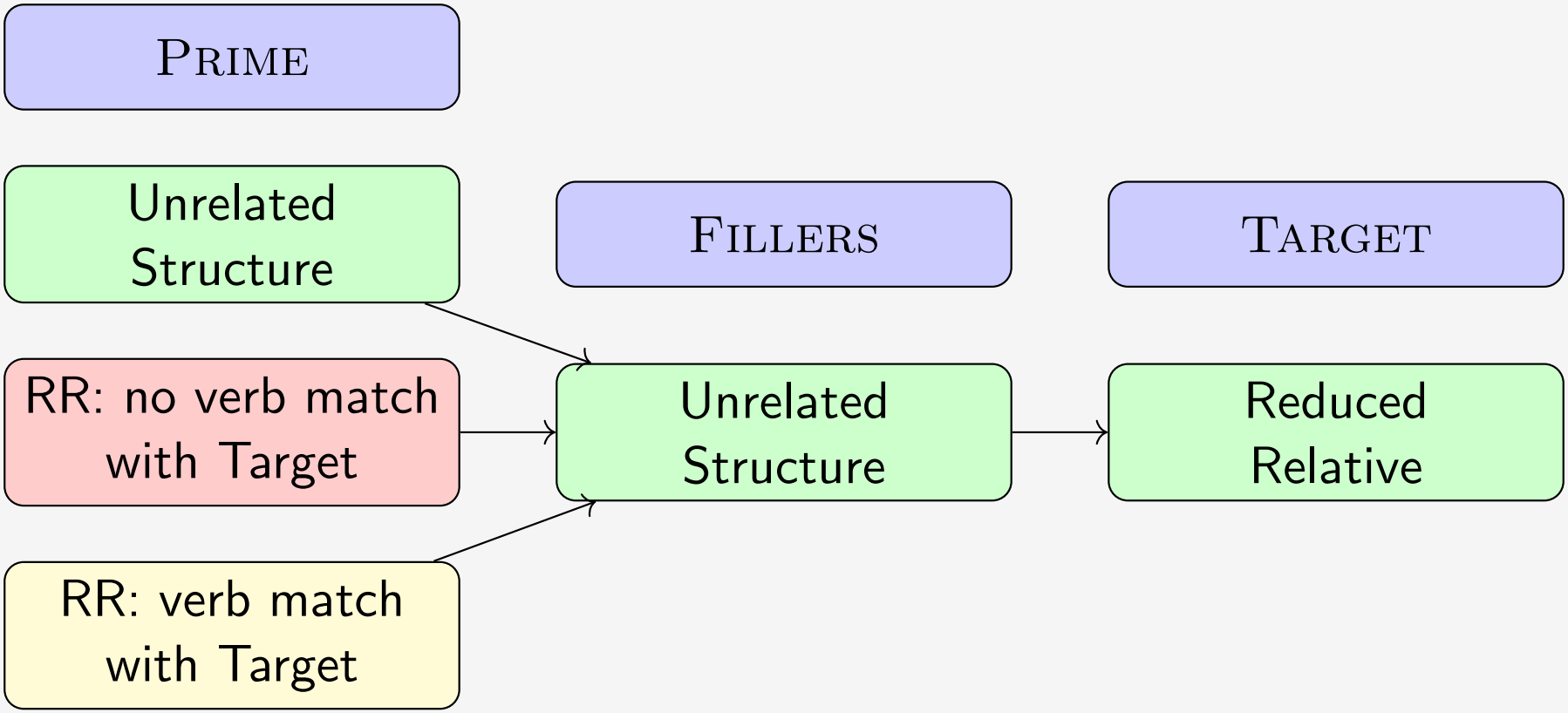
Prime
Unrelated Structure
RR: no verb match with Target
RR: verb match with Target
Fillers
Unrelated Structure
Target
Reduced Relative

Study 2: Results (1)

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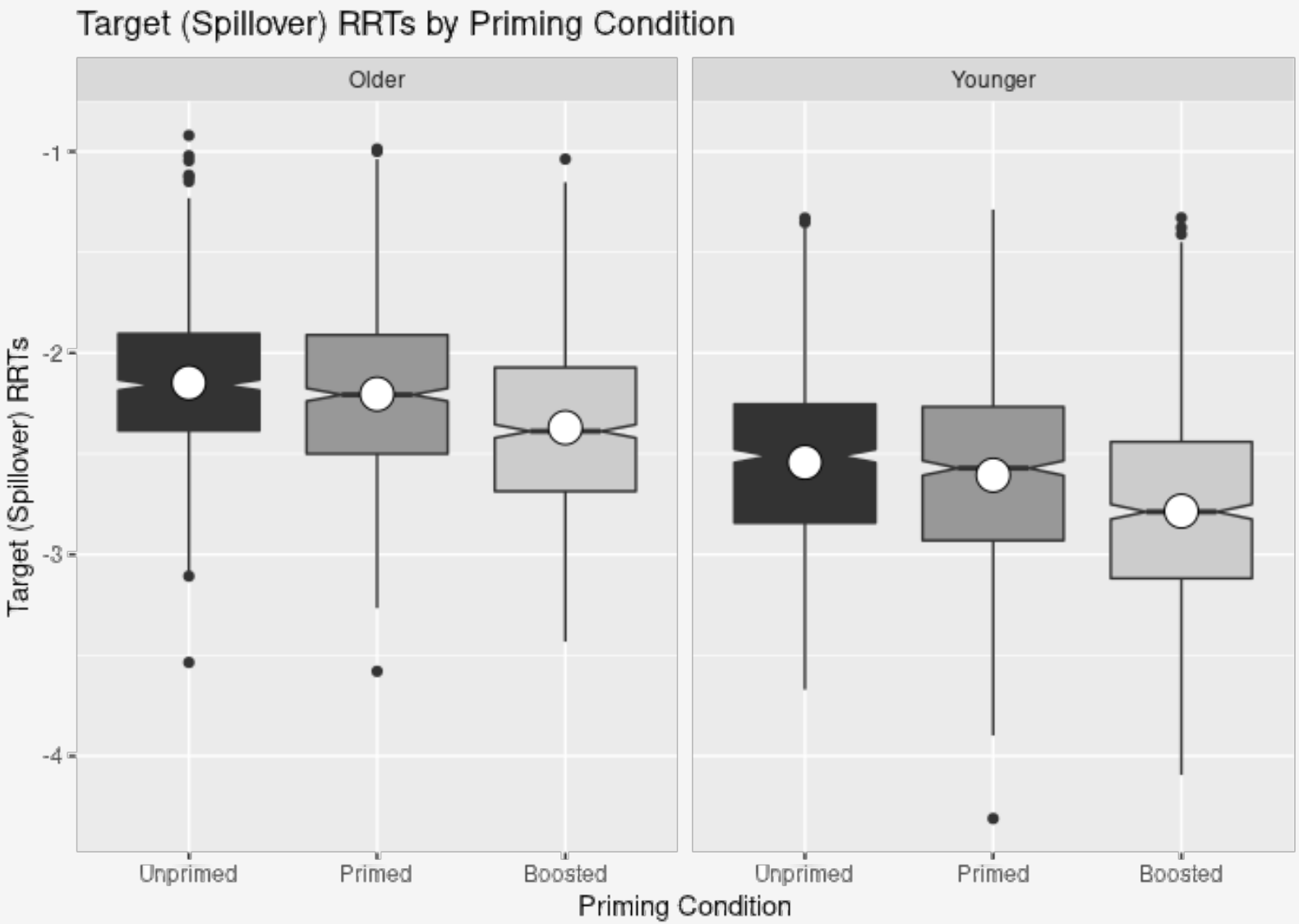

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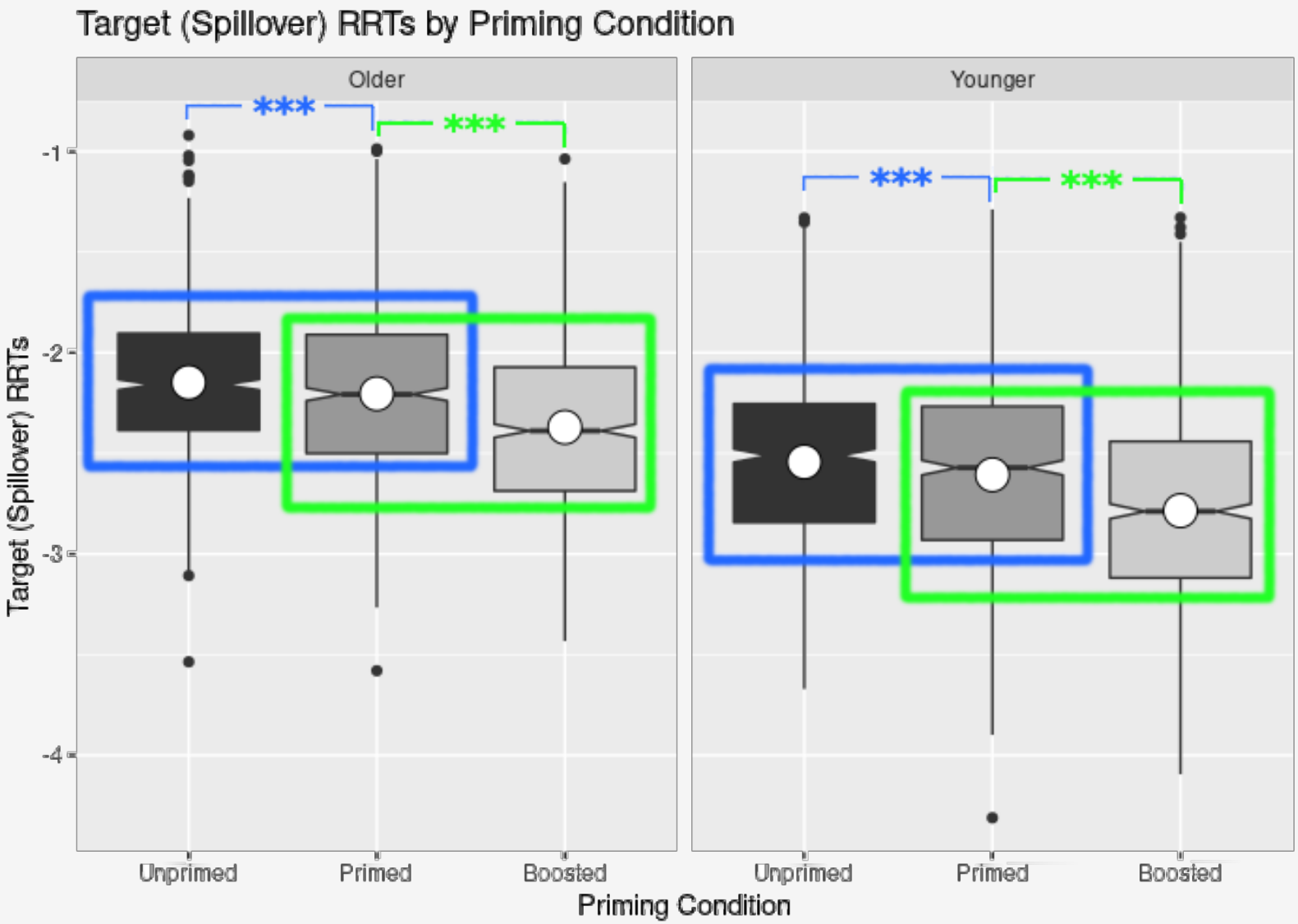

Study 2: Results (2)

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$\rightarrow$ Application of new techniques to old problems worthwhile.

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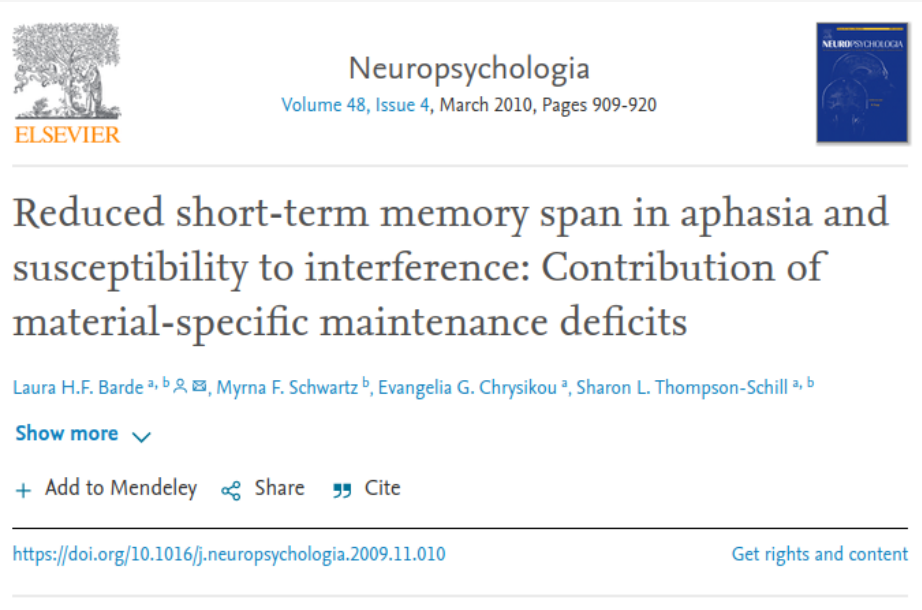

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THIRD: By widespread use of neuroimaging methods in cognitive / linguistic studies.

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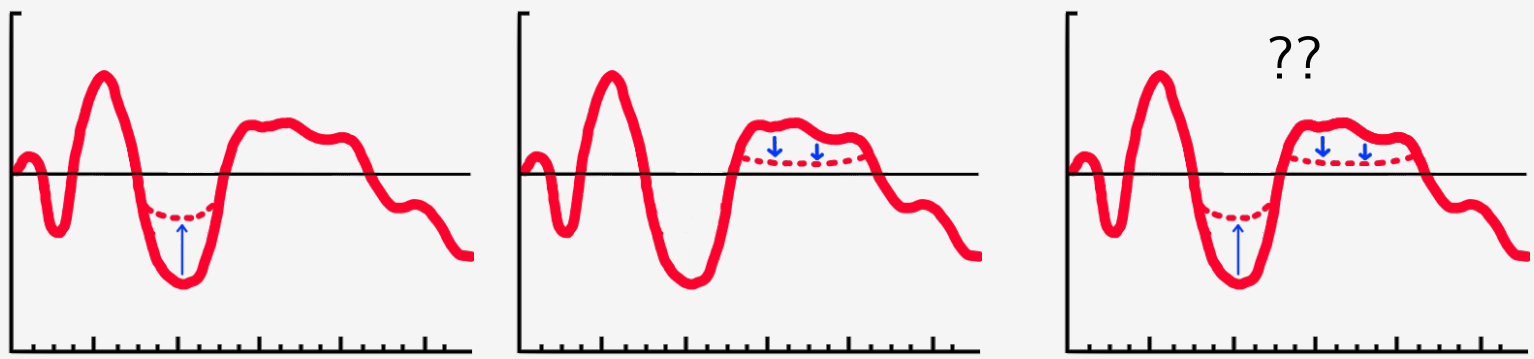
The lawyer | **insulted** | **by** | the | **judge** | quit her profession.



Study 3: Methods (1)

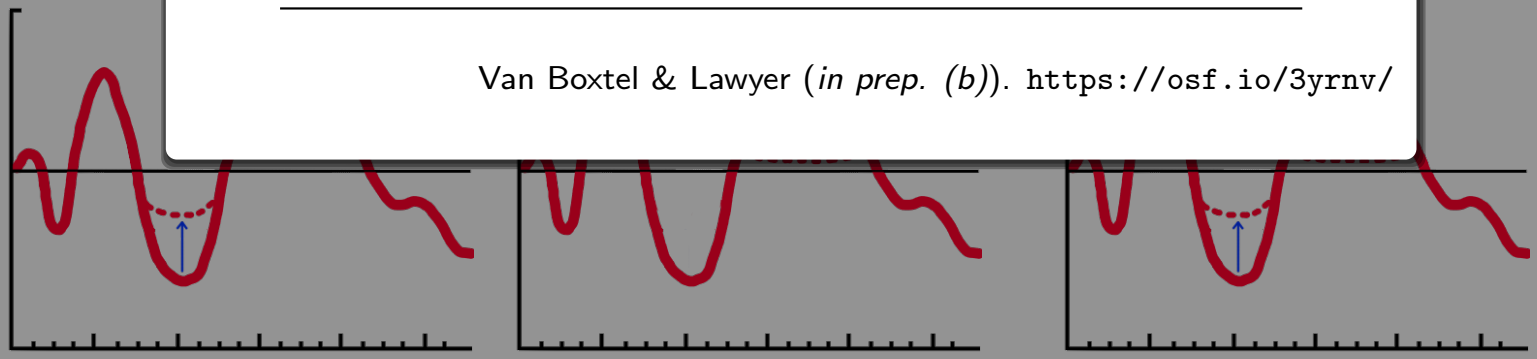
~~**FIRST**: By looking at WM from a wider perspective~~
~~**SECOND**: By using an implicit task.~~
THIRD: By widespread use of neuroimaging methods in cognitive / linguistic stu

The la ssion.

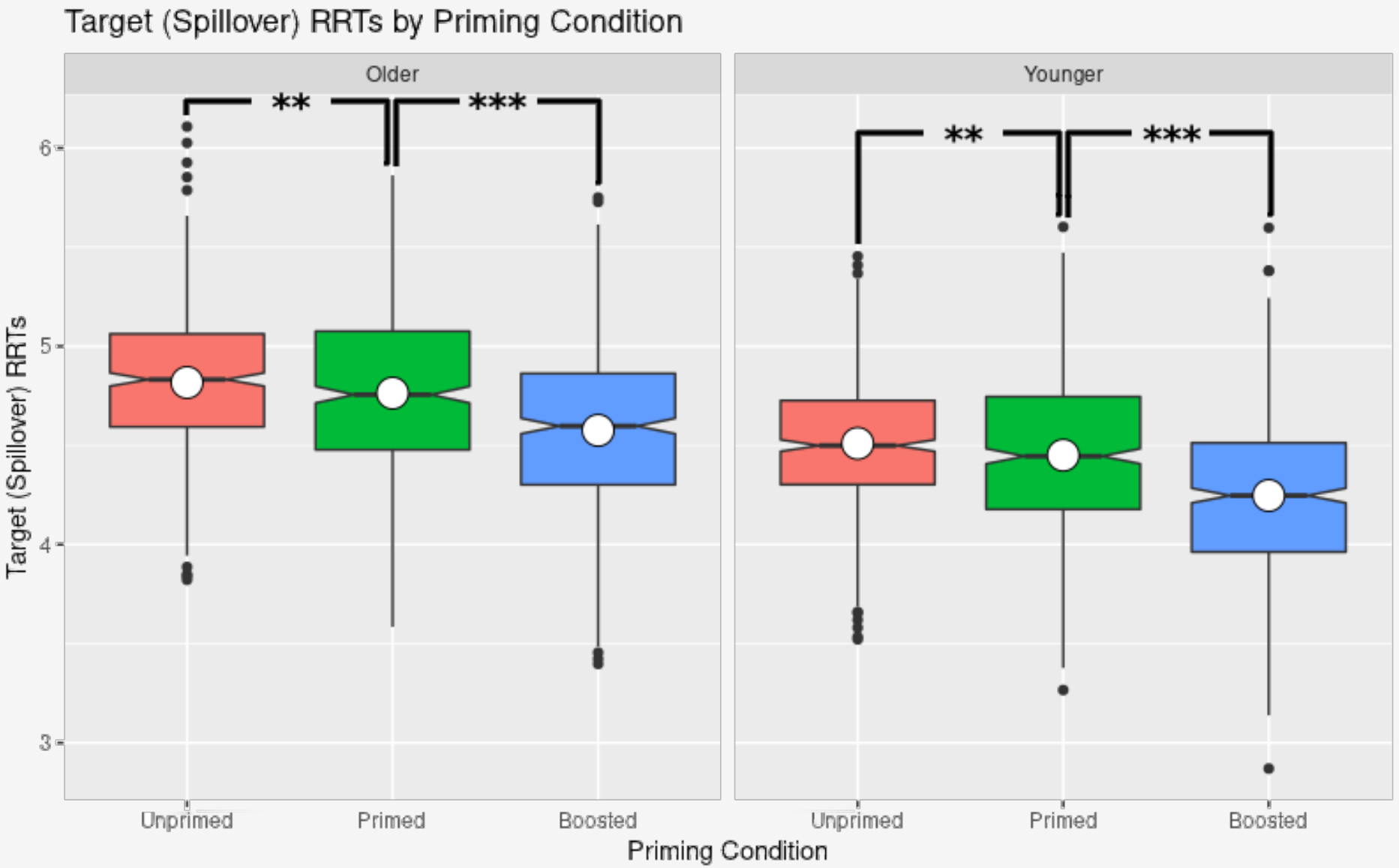
Demographics

	Older	Younger
Age	69.6 (4)	21.4 (2.3)
Gender	13 F, 5 M	18 F, 2 M
Years in Edu	15.7 (4.1)	15.5 (2.5)
LCT	8.4 (4.3)	8.4 (4.3)
RST	13.5 (6)	17.6 (6.1)

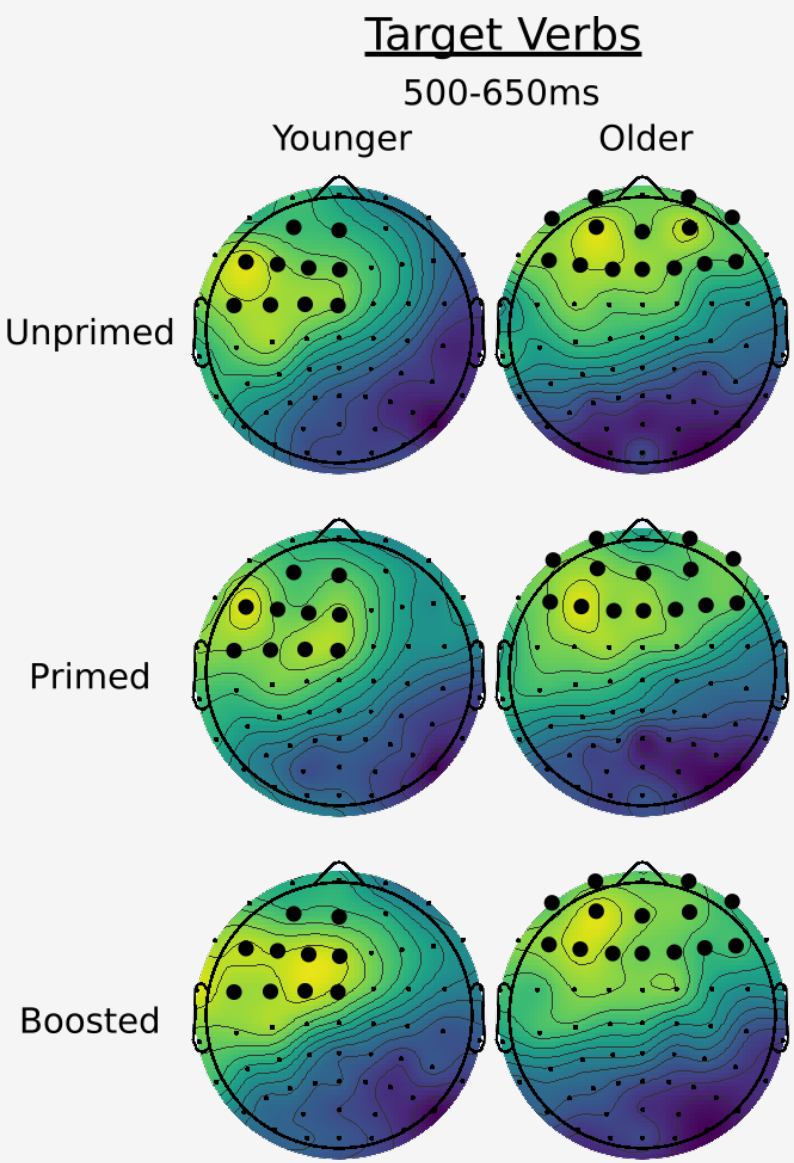
Van Boxtel & Lawyer (*in prep. (b)*). `https://osf.io/3yrnv/`

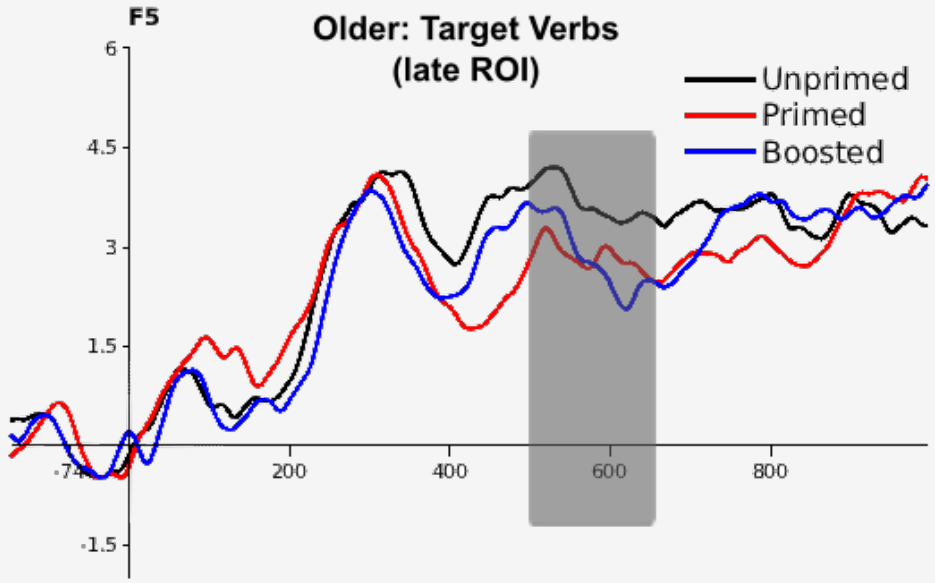


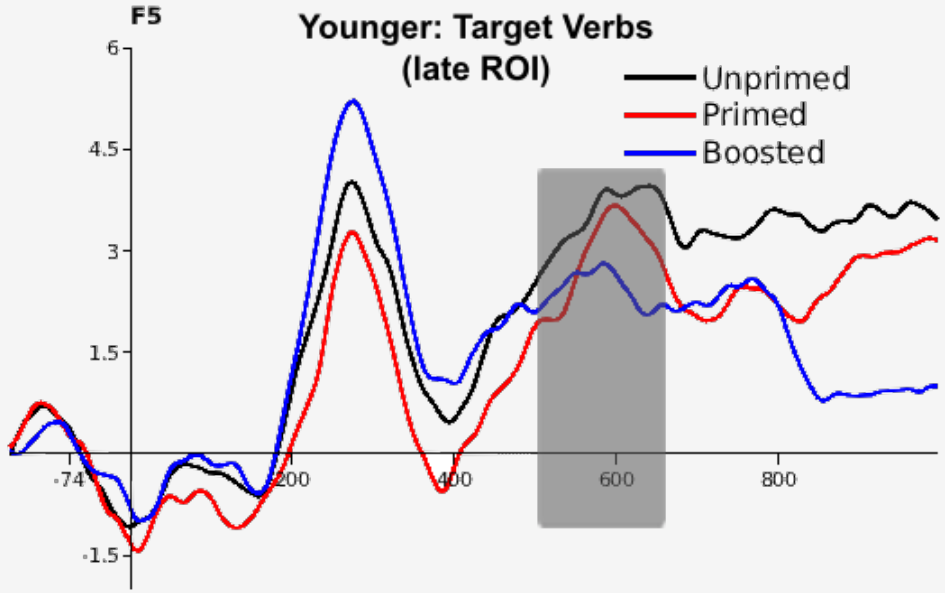
Reading Times



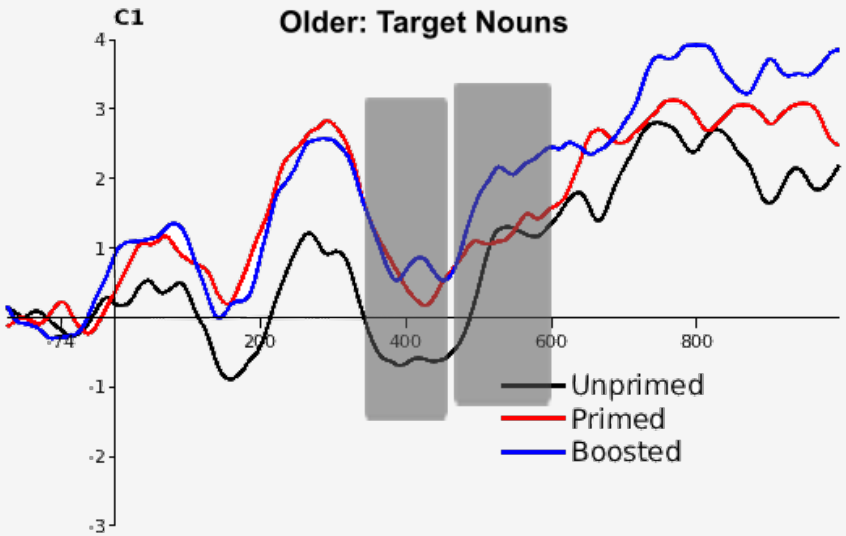
Study 3: Results (ERPs)

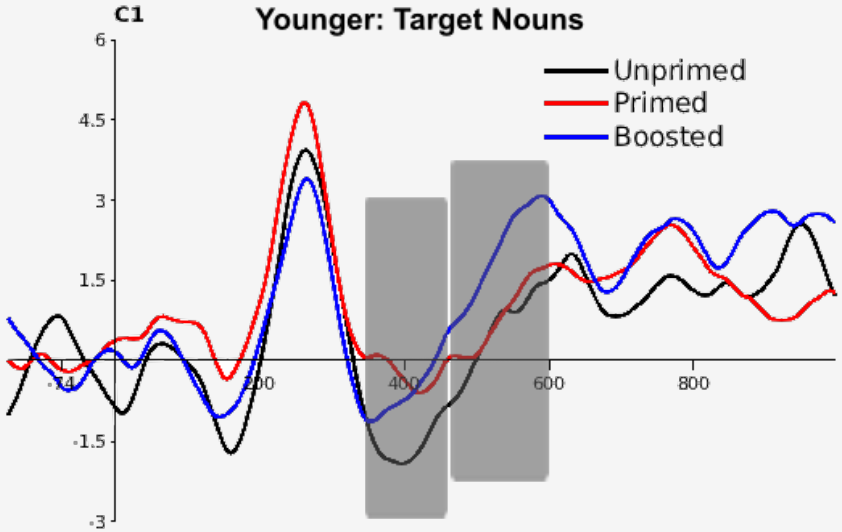






Study 3: Results (ERPs)





Discussion

(1) WM Revisited

Quantity > Quality

Showed surprising patterns:

No age differences.

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(2) Implicit Tasks: Priming

Value of syntactic priming shown;

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Important to delve "beyond";

Age differences in topography

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Consider *interaction* of memory and processing; consider quality of WM operations

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Value of syntactic priming shown;
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→ Employ *implicit* tasks like priming; Consider *explicit* task demands

(3) Use of ERPs
Important to delve "beyond"; Age differences in topography

→ Examine *neural* dimension, even in PWA; Note changing patterns with age

Thank you!

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