Cross-word priming during sentence reading

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Individual word identification

Computational models

- DRC (Coltheart et al., 2001)
- CDP++ (Perry et al., 2010)
- LTRS (Adelman, 2011)
- Spatial Coding (Davis, 2010)

Sentence reading

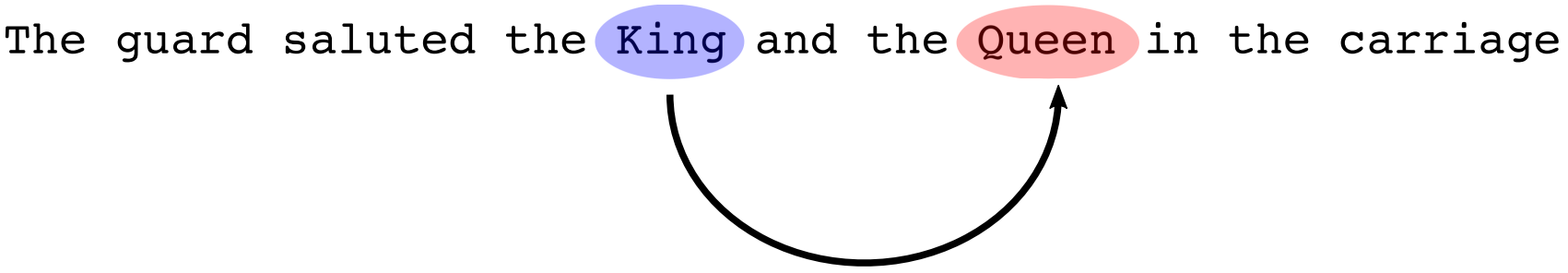
- Several words at the same time
- In close temporal succession (e.g., we read $\sim$ 250 words per minute, Brysbaert (2019))

- Interference

Possible solutions

- Keep the flows separate, either temporally (serial models?) or computationally
- Let activation flow freely, and implement protections against disruptive cross-word interference (OB1; Snell et al. (2018))

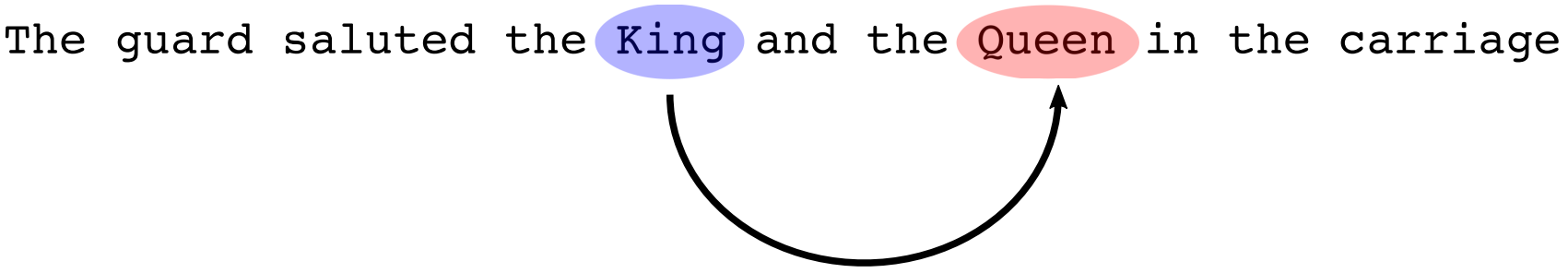
Cross-word priming



Priming:

- Semantic
- Morphological
- Orthographic
- Repetition

Cross-word priming



Priming:

- **Semantic**
- **Morphological**
- Orthographic
- Repetition

Existing evidence

- Violations (e.g., "John eats an apple**s**"; ERP)
- Minimal contexts (e.g., word pairs, nominal phrases)
- One word at a time (RSVP)

Dimigen et al. (2012)

kitchen forest tree blur drive

Dimigen et al. (2012)

kitchen forest tree blur drive

kitchen sugar tree blur drive

- Eye tracking and EEG co-registered

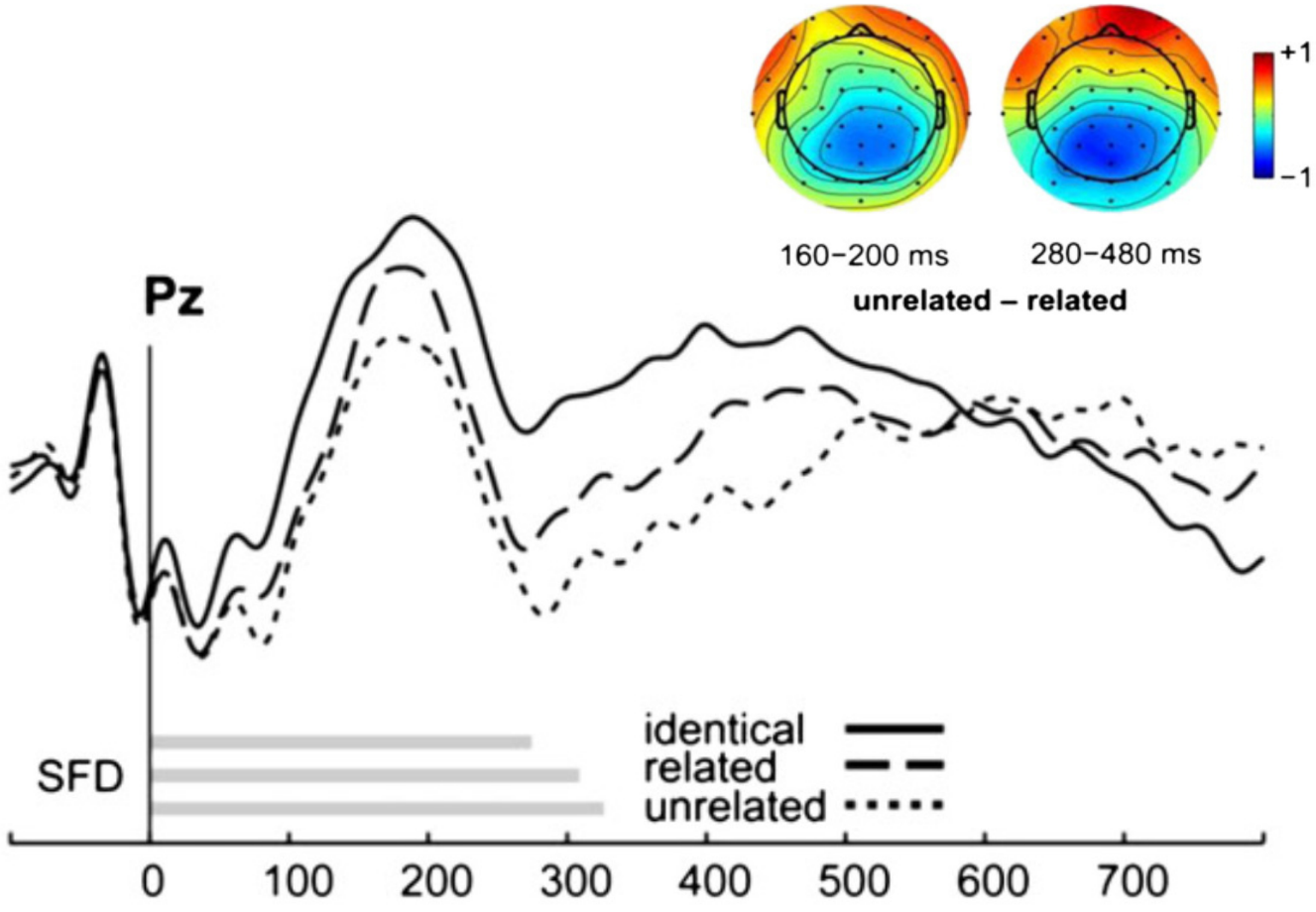
Dimigen et al. (2012)

Eye tracking

	Related	Unrelated
First fix	291*ms* (23)	301*ms* (23)
Single fix	309*ms* (29)	327*ms* (30)
Gaze dur	335*ms* (29)	355*ms* (34)

Dimigen et al. (2012)

Fixation-Related Potentials (FRPs)



Kretzschmar et al. (2009)

The opposite of black is white

Kretzschmar et al. (2009)

The opposite of black is white

The opposite of black is yellow

The opposite of black is nice

- Eye tracking and EEG co-registered

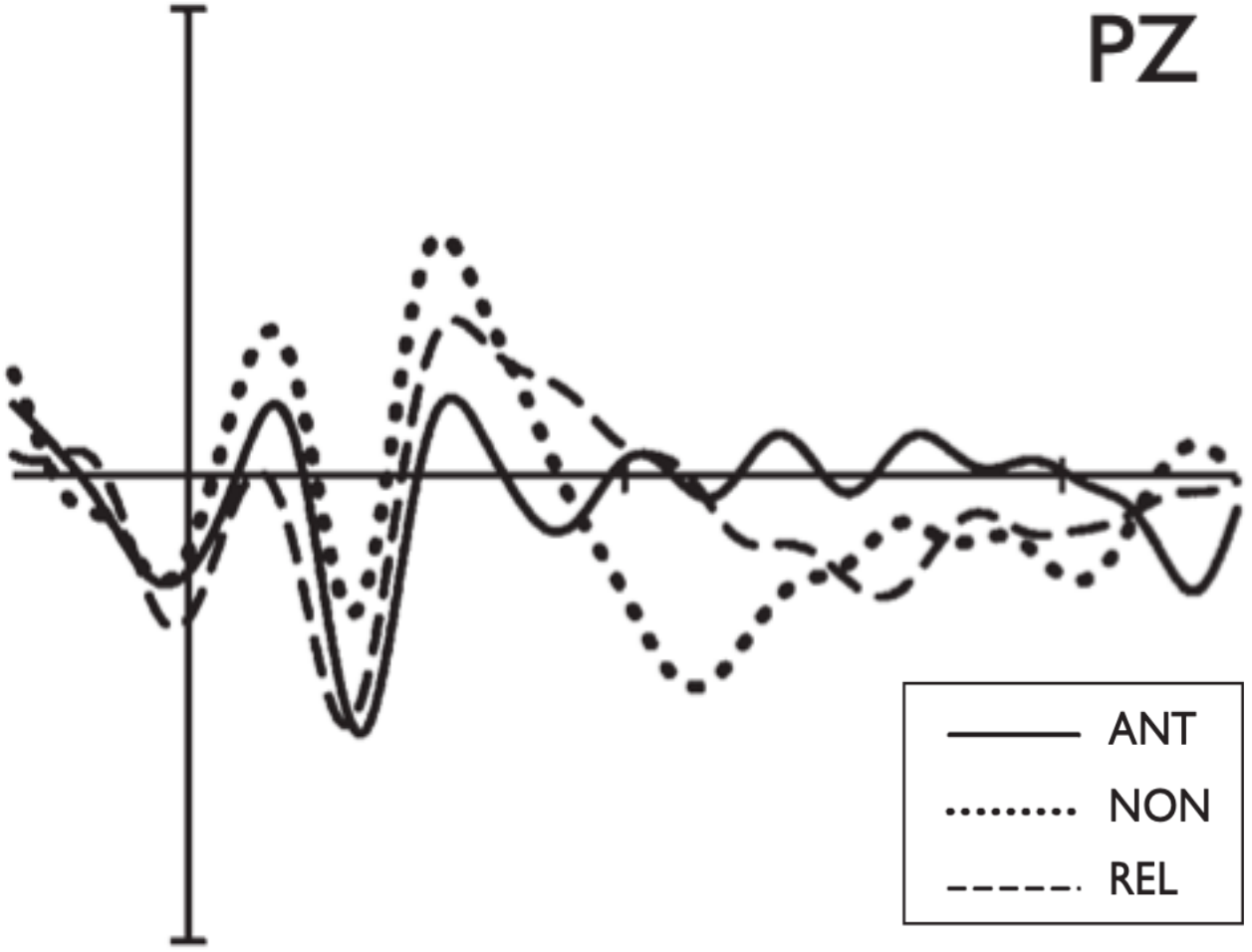
Kretzschmar et al. (2009)

Eye tracking

	Predicted	Related	Unrelated
First fix	213*ms* (63)	232*ms* (69)	229*ms* (70)
Single fix			
Gaze dur			

Kretzschmar et al. (2009)

FRPs



So, overall. . .

- Data not entirely consistent
- Methodological limitations

Our paradigm

Paul entered a room with **a table** and **a chair**, which didn't really look like a kitchen

Our paradigm

(S+M+) Paul entered a room with **a table** and **a chair**, which didn't really look like a kitchen

(S-M+) Paul entered a room with **a dog** and **a chair**, which didn't really look like a kitchen

(S+M-) Paul entered a room with **some tables** and **a chair**, which didn't really look like a kitchen

(S-M-) Paul entered a room with **some dogs** and **a chair**, which didn't really look like a kitchen

- Eye tracking and EEG co-registered

Slovene

(S+M+) Kolesar ni bil pozoren na **avto** in **tovornjak** in je zato povzročil nesrečo

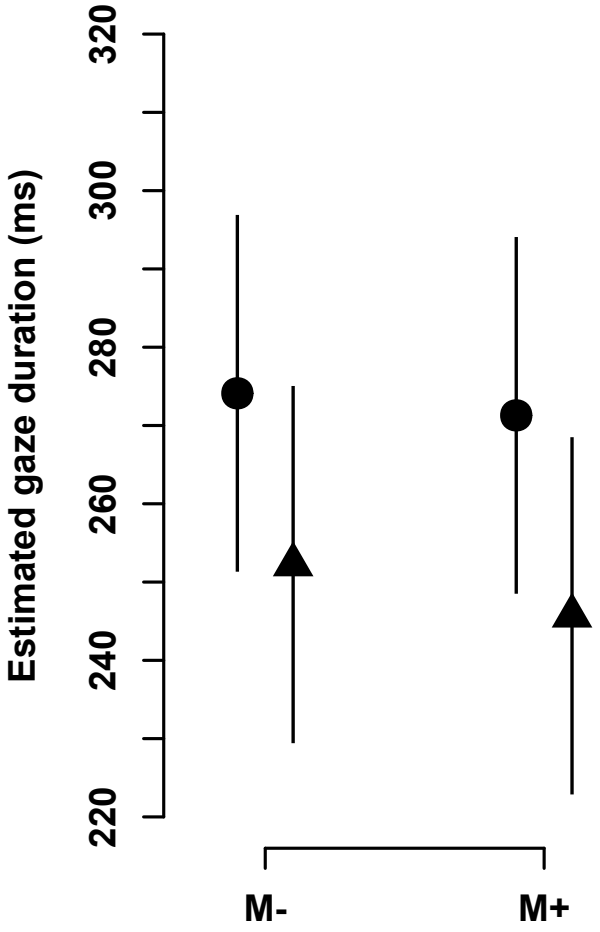
(S-M+) Kolesar ni bil pozoren na **lužo** in **tovornjak** in je zato povzročil nesrečo

(S+M-) Kolesar ni bil pozoren na **avte** in **tovornjak** in je zato povzročil nesrečo

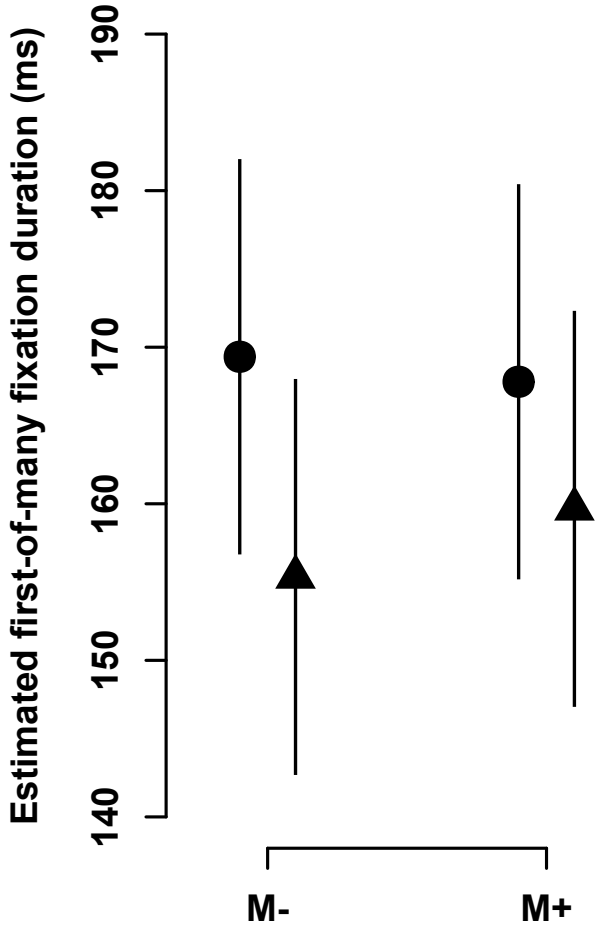
(S-M-) Kolesar ni bil pozoren na **luže** in **tovornjak** in je zato povzročil nesrečo

Eye tracking

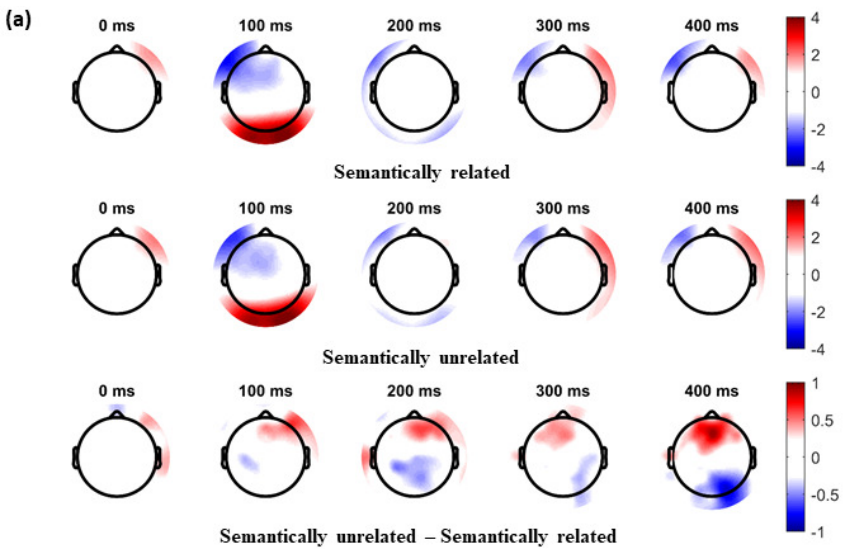
Gaze

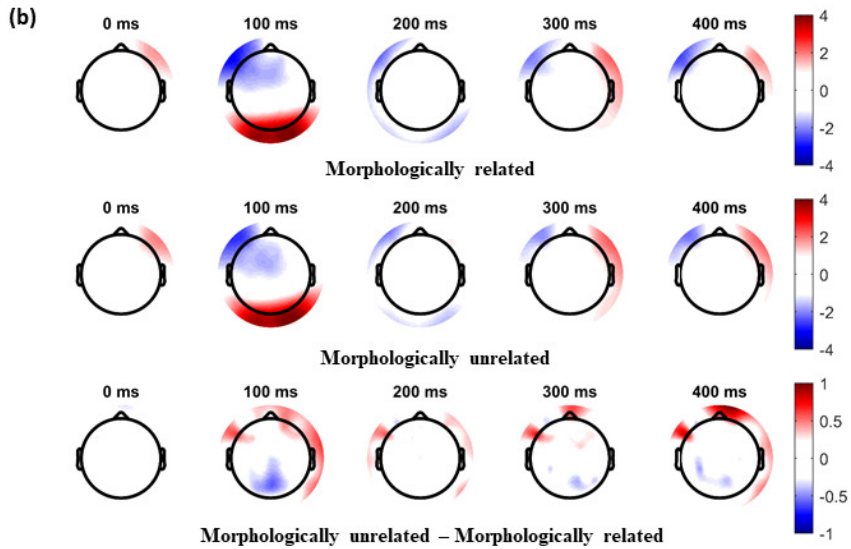


FoM

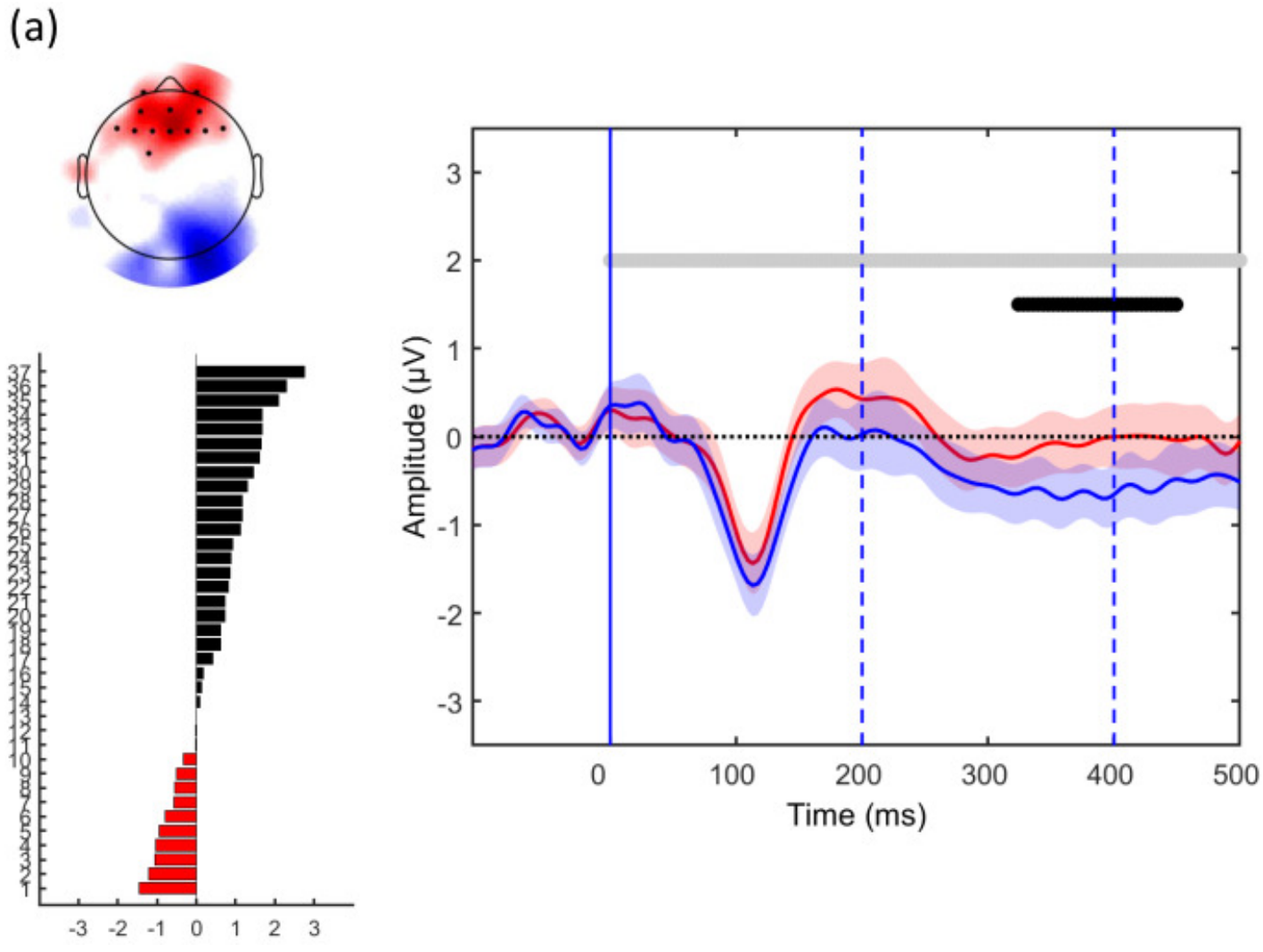


FRPs


(a)
0 ms
100 ms
200 ms
300 ms
400 ms
4
2
0
-2
-4
Semantically related
Semantically unrelated
1
0.5
0
-0.5
-1
Semantically unrelated – Semantically related


(b)
0 ms
100 ms
200 ms
300 ms
400 ms
4
2
0
-2
-4
Morphologically related
Morphologically unrelated
1
0.5
0
-0.5
-1
Morphologically unrelated – Morphologically related

FRPs, cluster-based permutation



Interaction in the lexicon

- Cross-word semantic priming

- Compatible with OB1 (Snell et al., 2018)
- Parallel vs. serial, difficult to say

Morphology

Caveat:

- Abstract morpheme (see, e.g., Paterson et al., 2011)

- No abstract morpheme representations in the lexicon
- Stronger locality than semantics

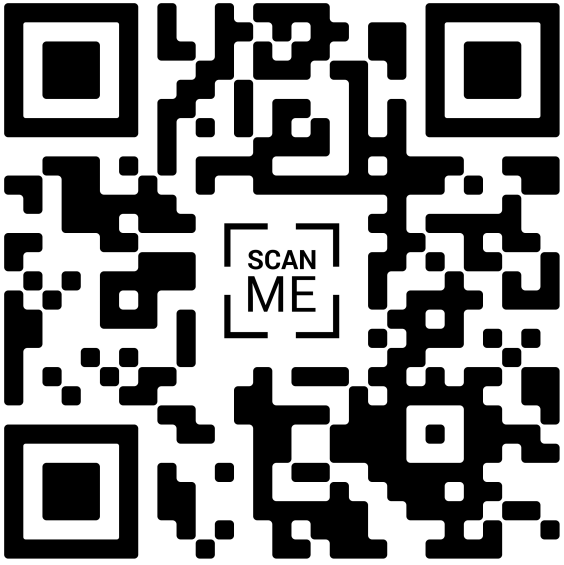
The team

Katarina Marjanovič

Yamil Vidal

Get in touch!

The slides



My Twitter account

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References I

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Stimuli and design

Primes and targets

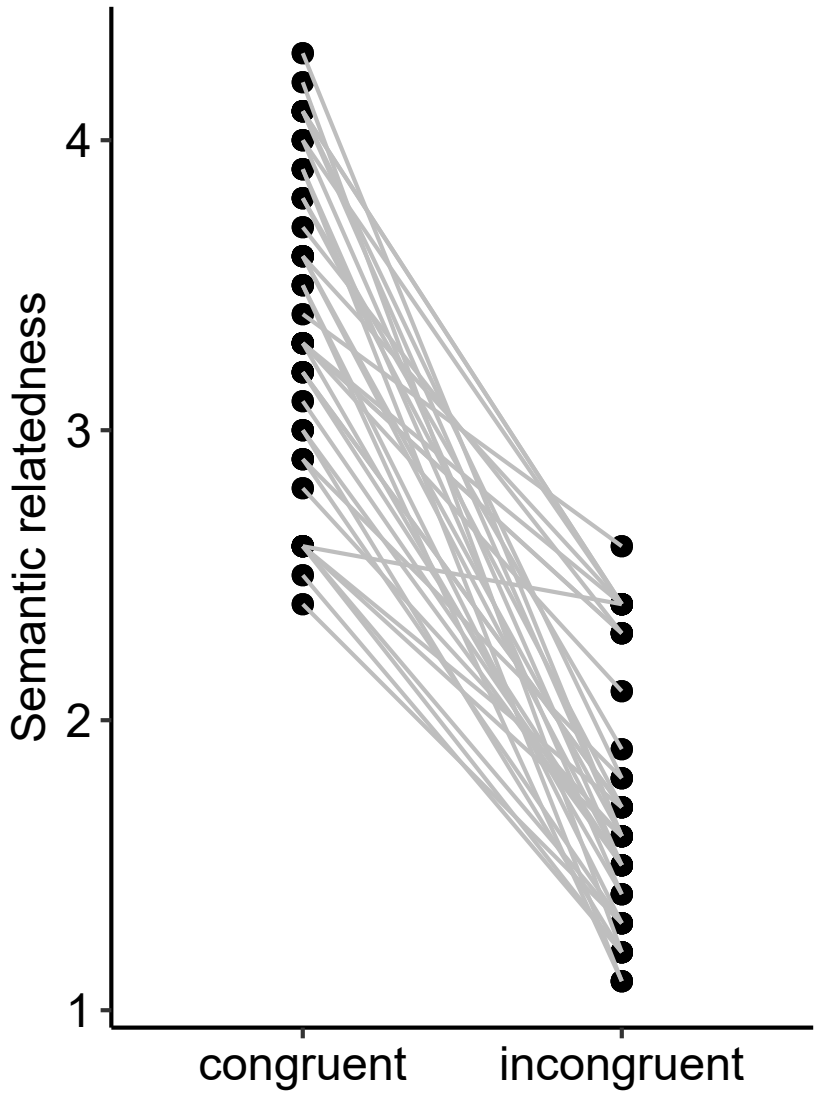
- always in the same clause
- never shared the same orthographic suffix
- never in initial or final position
- never followed by a comma
- never at the beginning or at the end of a line

- (Partial) Latin Square design: each participant saw two of the four corresponding sentences
- Two blocks, corresponding sentences never in the same block
- Each block included 40 experimental trials and 60 fillers

Matching

	S+M+ prime	S+M- prime	S-M+ prime	S-M- prime	Target
Frequency	1.46 (0.54)	1.35 (0.53)	1.34 (0.58)	1.36 (0.52)	1.32 (0.50)
Length	6.60 (2.10)	6.57 (2.09)	6.97 (2.11)	7.25 (2.32)	6.57 (2.04)

Semantic relatedness



Predictability

Cloze Probability Task

	S+M+	**S+M-**	**S-M+**	**S-M-**
Cloze probability	.05 (.05)	.06 (.07)	.01 (.03)	.01 (.03)

Eye tracking

	S+M+	S+M-	S-M+	S-M-
Prime	231 (146)	230 (146)	241 (154)	251 (153)
FoM	160 (97)	155 (86)	168 (101)	169 (107)
GD	248 (136)	255 (149)	273 (159)	275 (168)
TLT	395 (233)	421 (249)	503 (344)	516 (371)