The Alternative Activation Theory: A Unified Account of the Processing of Focus and Implicature?

Radim Lacina (Masaryk University, Potsdam) & Nicole Gotzner (Potsdam)

Scales, Degrees & Implicature: Novel Synergies between Semantics & Pragmatics

May 26, 2021

Alternatives: focus and implicature

(1) Sue $[\text{read a book}]_F$ ⇝ Sue did not read a magazine (adhoc SI)

ALT: <reading a magazine,…> (vs. <writing a book,…>)

(2) Sue read some of the books ⇝ Sue did not read all of the books (SI)

ALT: <some, all>

Research questions

1. Do focus and implicature share the same computational mechanism?
2. What is the level of representation of alternatives?

Outline

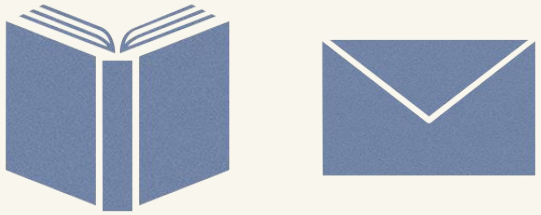
1. Alternatives: Theory and processing data
2. Arguments for a unified account of focus and implicature
3. Case study: Experiment on broad focus
4. Outlook

Focus alternatives

- Focus evokes alternatives of the same semantic type (Rooth, 1992)

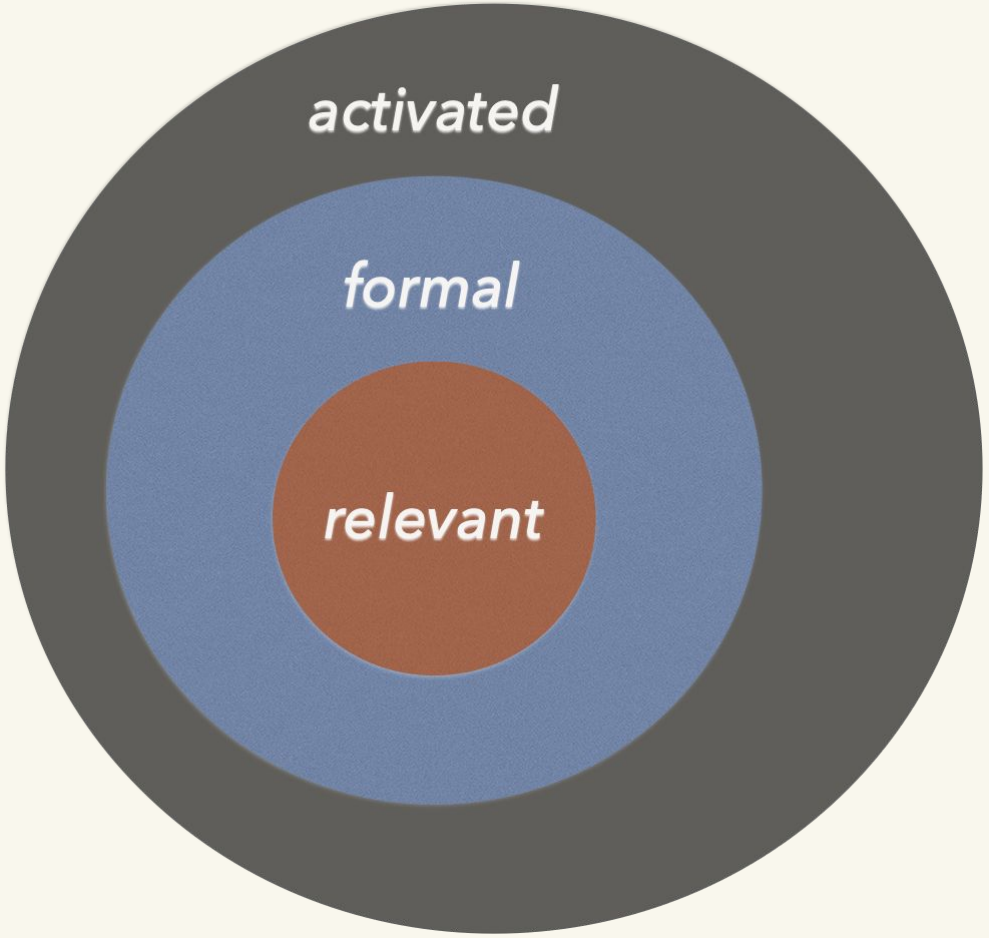
(3) Sue read [a book]$_F$

ALT: {Sue(read)(x) | x ∈ E}



- Focus primes alternatives during online processing (Braun & Tagliapietra, 2010, Gotzner et al., 2013; Husband & Ferreira, 2015)
- Focus operators like *only* interact with contextually evoked and umentioned alternatives (e.g., Gotzner et al., 2016)

Types of alternatives
(Gotzner, 2017; Gotzner & Romoli, 2021)



Domain-general cognitive mechanisms

e.g., spreading activation (e.g. Husband & Ferreira, 2015)

grammatical mechanisms

e.g. structural account (Fox & Katzir, 2011)

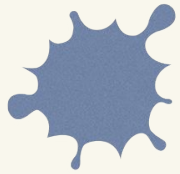
pragmatic mechanisms

e.g. answers to QUD (Groenendijk & Stokhof 1984)

Alternative activation account
(Husband & Ferreira, 2015; Gotzner, 2017)

(1) Domain general mechanisms generate broad set of alternatives including all semantic associates (words/concepts)

Sue read [a book]$_F$



semantic associate

alternative

time

(1) Grammatical and pragmatic mechanisms single out relevant alternatives (subconstituents or entire utterances?)

Constraints on alternatives:

- Discourse context (Kim, 2012)
- Verb selectional restrictions and world knowledge (Gotzner & Spalek, 2016)

Scalar implicature: Computational steps

- Focus feeds into implicature by activating alternatives (Gotzner, 2019)
- Formal theories assume activated alternatives as crucial component (e.g., Neo-Gricean: Sauerland, 2004; Grammaticalism: Chierchia, 2013)
- Assume different levels of representation for alternatives

The Symmetry Problem for SI

(4) Sue read some of the books

(5) Sue all of the books

(6) Sue did not read all of the books

<some, all> **Horn scale** to break symmetry (e.g., Horn, 1972)
Neo-Gricean alternatives: utterance level

The Symmetry Problem for focus

(7) Sue [read a book]$_F$

(8) Sue read a book and saw a movie

(9) Sue read a book and didn´t see a movie

Structural alternatives: sub-constituents of similar complexity
Same alternatives for focus and scalar implicature (Fox & Katzir, 2011)

Future research (Emmy Noether)

- Extend alternative activation account and priming paradigms to (adhoc) SI
- What kinds of alternatives become activated during processing?
  - structural, ad hoc scales
  - words, larger constituents, entire utterances
  - symmetric alternatives
- First step: probing different constituents within a focused phrase

A case study on broad focus

- Symmetry problem arises for broad but not narrow focus

Semantic type activation hypothesis:

- Rooth's (1992) theory provides a clear prediction for cases of broad focus. Just as in narrow focus, alternatives are defined as the set of contextually restricted elements of the same semantic type

→ We should observe the activation and representation of alternatives to both the verb and the noun within the focused phrase

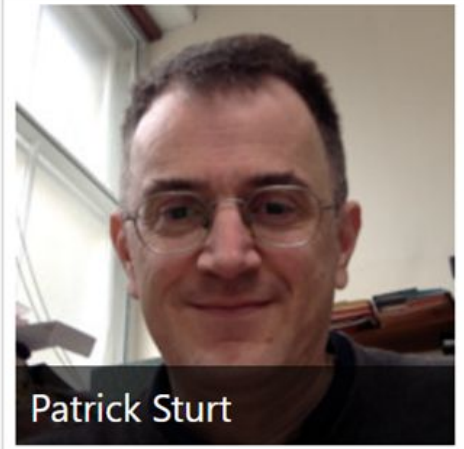
Lacina, Gotzner, & Sturt

No study to-date has tested whether the alternative activation approach **generalises** to larger focused constituents (Gotzner & Spalek, 2019)

We tested whether both the **verb** and the **noun** within a focused phrase activated, selected, and represented their alternatives.

2 probe recognition experiments

- Experiment 1 – nouns
- Experiment 2 – verbs



Rationale and Predictions

Gotzner et al., 2016: Unmentioned alternatives were found to be rejected slower with *only*
→ interference effect indicative of focus alternatives being represented and selected among

Prediction: Unmentioned alternatives accessed by *only* should be **rejected slower** when compared to unrelated words (interaction of alternative status and particle condition)

Methods

IbexFarm

Rapid serial visual presentation

2000ms SOA

Native speakers of English

Experiment 1: N = 62

Experiment 2: N = 60

Probes controlled for letter length, word-form frequency, and LSA

Materials (Experiment 1)

1) Nigel is a hunter.
2) In the forest, Nigel could catch and cook the hare and the pheasant.
3) Nigel surely cooked the pheasant.
4) No, he only/_ **caught <u>the hare</u>**.

Particle present/absent

BOAR

Alternative

MALT

Unrelated

Materials (Experiment 2)

1) Nigel is a hunter.
2) In the forest, Nigel could catch and cook the hare and the pheasant.
3) Nigel surely cooked the pheasant.
4) No, he only/_ **caught the hare**.

Particle present/absent

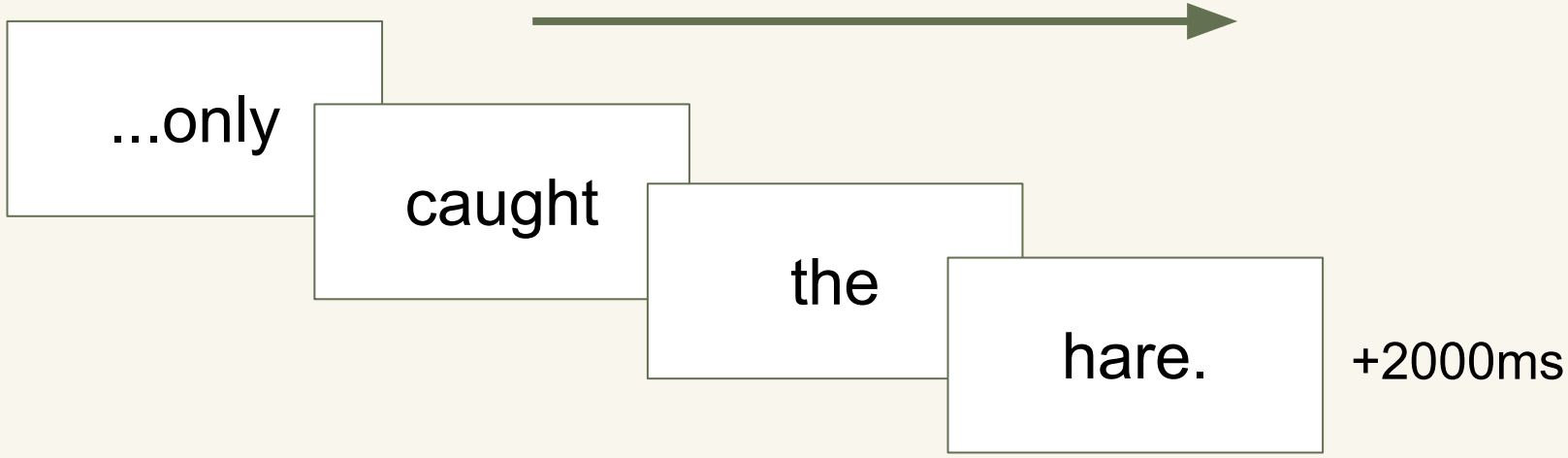
SHOT

Alternative

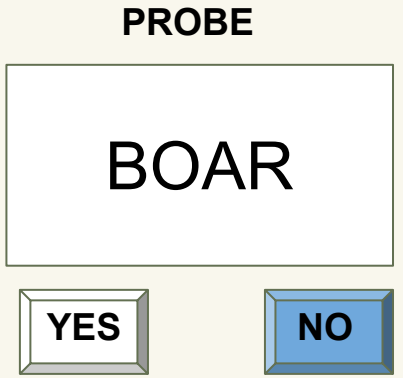
APPLIED

Unrelated

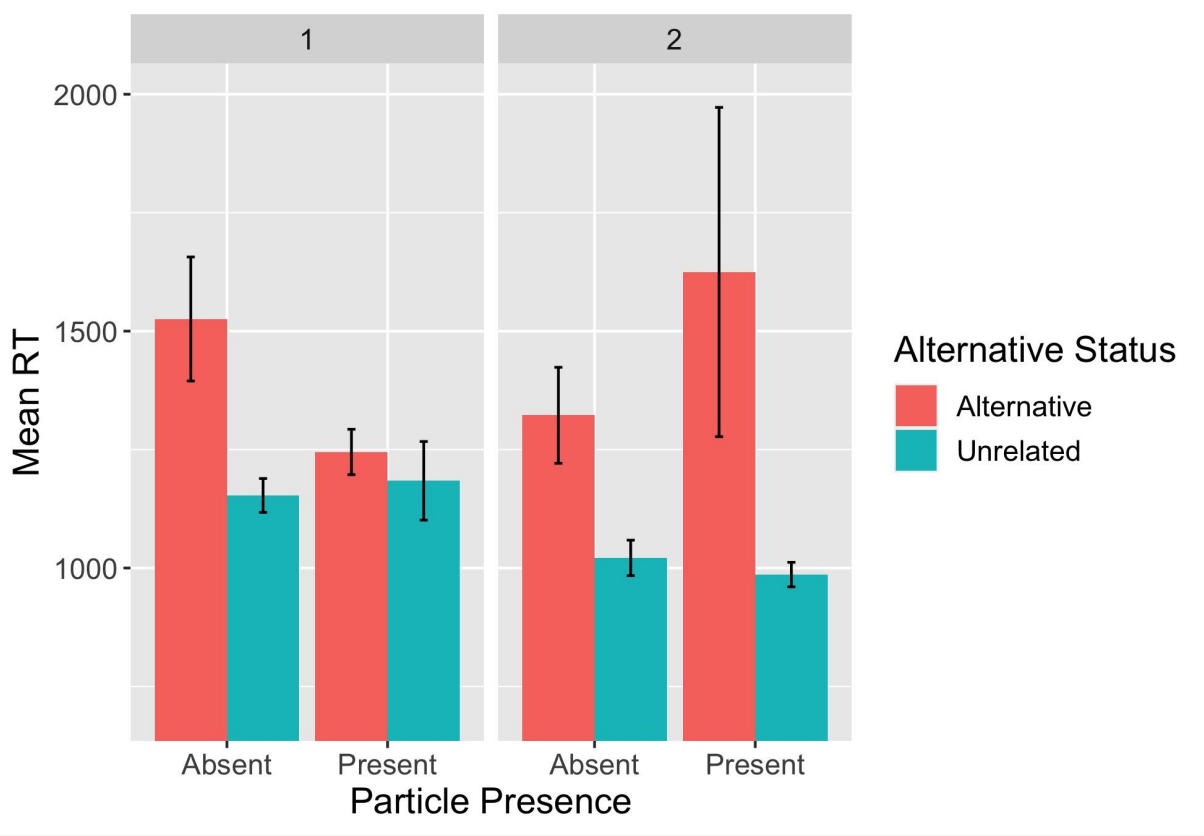
Procedure

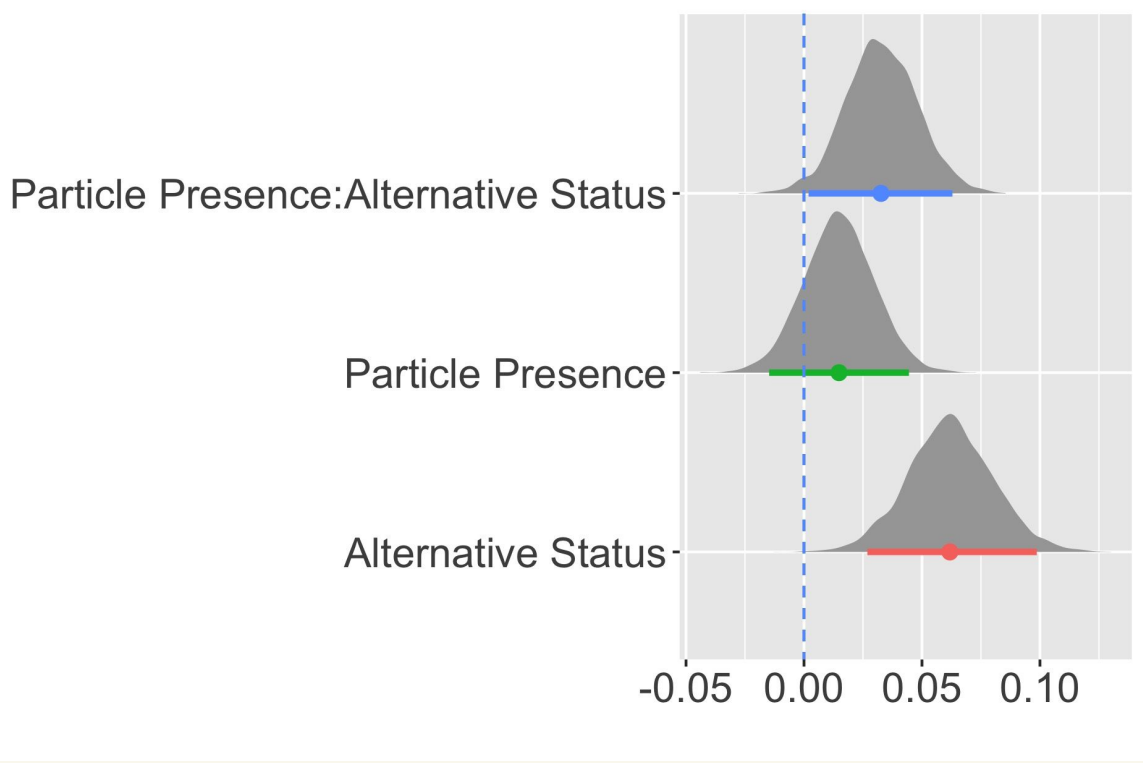


Was this word anywhere in the previous discourse?



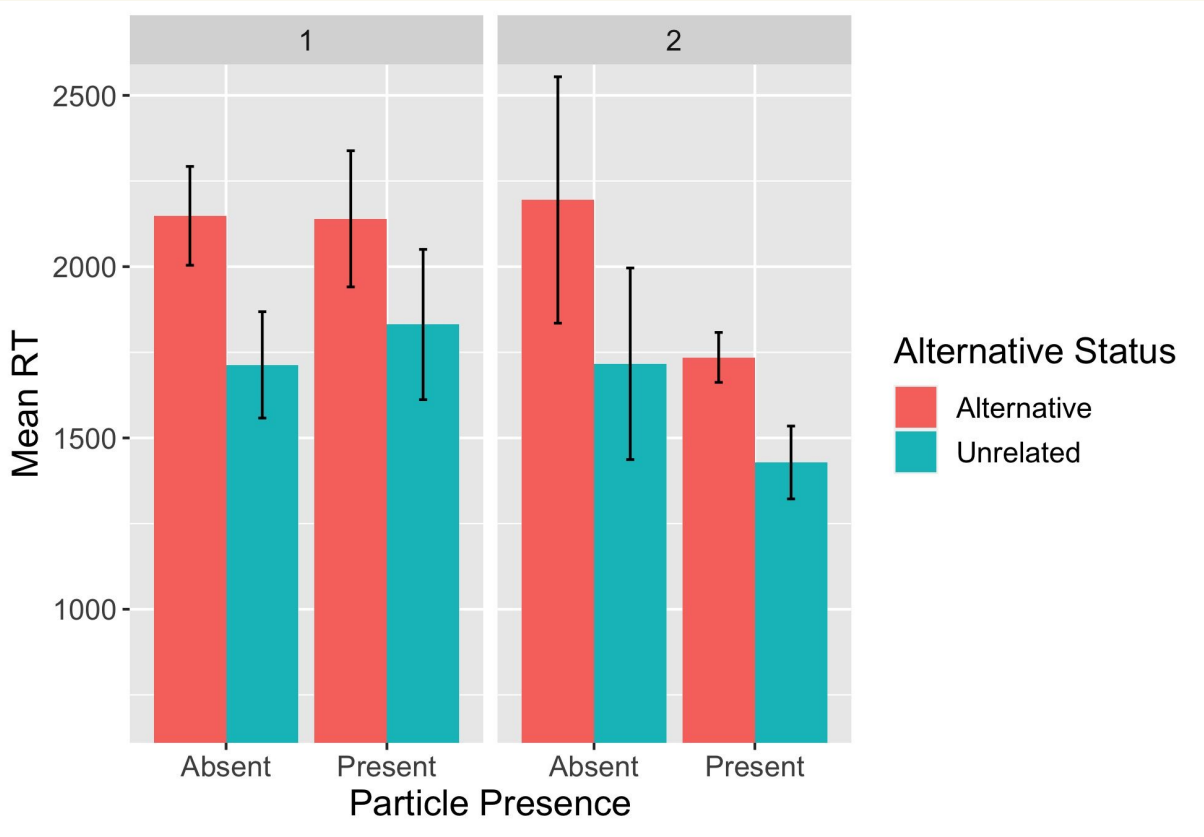
Results (Experiment 1: nouns)

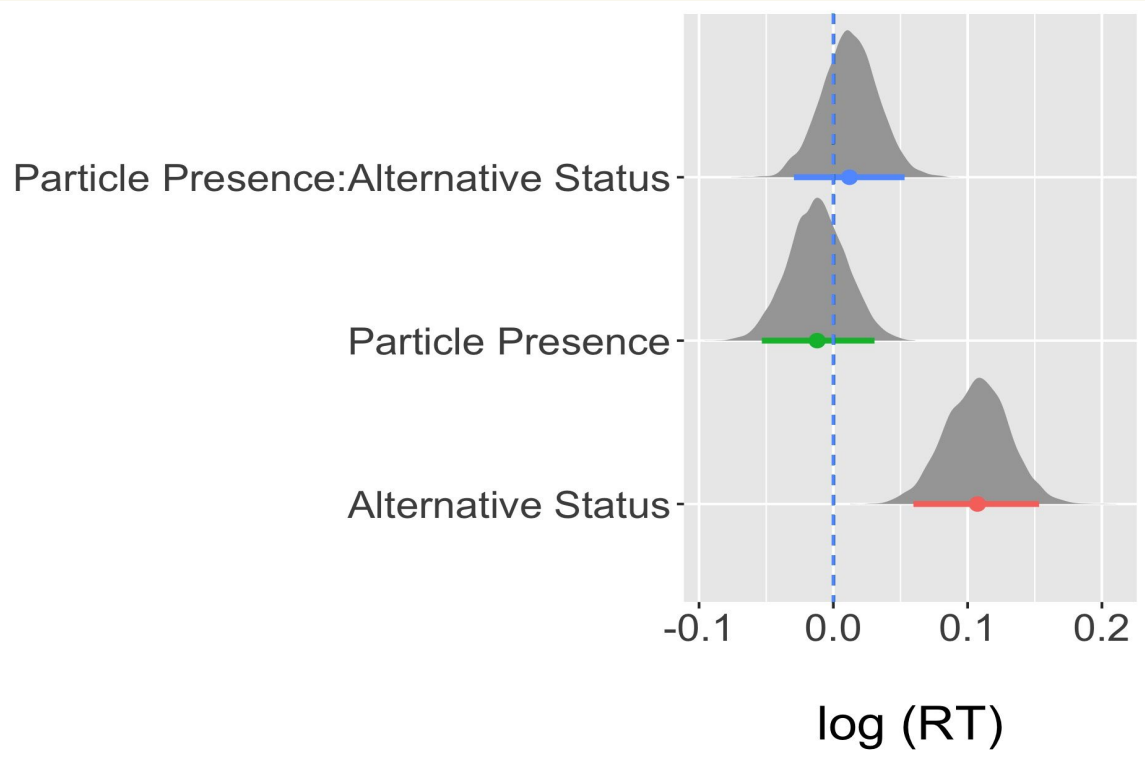




Bayesian hierarchical modeling:
alternative: β = .03 [.01,.06])
particle: alternative β = .06 [.03,.09]

Results (Experiment 2, verbs)





Bayesian hierarchical modeling:
alternative: β = .11 [.07,.15]

Results summary

Main effect of **alternative status** found in **Exp 1 and 2**

- Plausible unmentioned alternatives were rejected slower

There was no main effect of particle presence

Compelling evidence for interaction of **particle presence** and **alternative status** in **Exp 1 (nouns)**

No such interaction in **Exp 2 (verbs)**

Discussion

- Results **inconsistent** with the semantic type activation hypothesis: *only* accesses noun alternatives but not verb alternatives

- Caveats:
  - Do participants assign **narrow focus** on noun but not verb?
  - How do effects vary across experiment (in web-based presentation)?

→ Need to replicate results and probe entire constituents

Extensions:
Focus alternatives in Czech

A study (in collaboration with Radek Šimík) in progress asking:

→ Can these effects be **induced by word order manipulations** in the written domain only?

→ Does focus alternative activation **replicate in another language with syntactic focus marking**, namely Czech?

Extensions: Linking activation and inference

Can we establish a direct link between the activation of focus alternatives and whether or not comprehenders interpret narrow focus exhaustively (as for intonation, see Gotzner, 2019)?

→ Does the **strength of activation** of plausible alternatives in narrow focus **predict likelihood** and **speed** comprehenders are to embrace an interpretation that excludes these alternatives?

→ Unified account of focus and implicature?

Conclusions

Priming paradigms can be used to determine:

1. Which alternatives are considered during online processing
2. When some subsets of them are selected
3. What this selection is based on

→ Novel perspectives on long-standing theoretical debates about the nature of alternatives