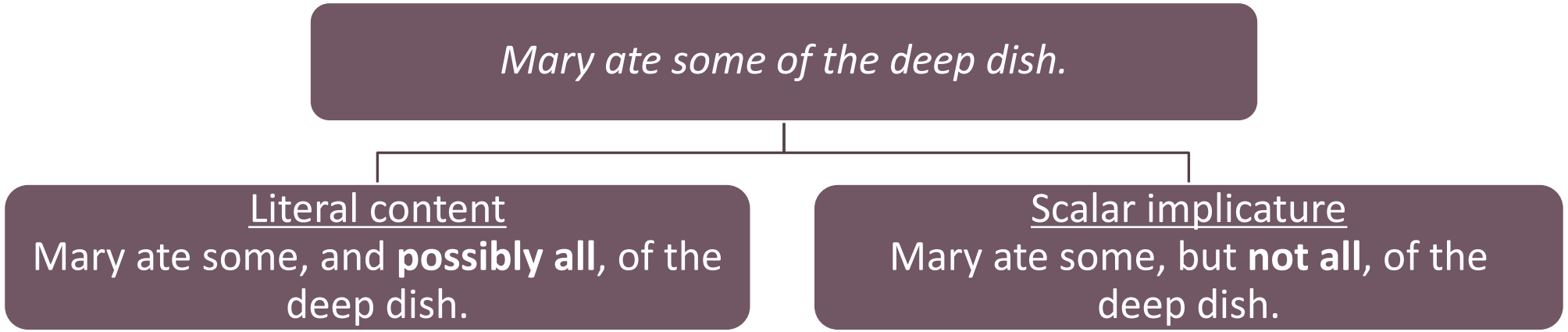
Tracking the activation of scalar alternatives with semantic priming

ESZTER RONAI & MING XIANG (THE UNIVERSITY OF CHICAGO)

EXPERIMENTS IN LINGUISTIC MEANING 2

Scalar implicature (SI)



Comprehenders reason about **stronger unsaid alternatives**: *all*

(Grice, 1967; Horn, 1972)

Alternatives in processing

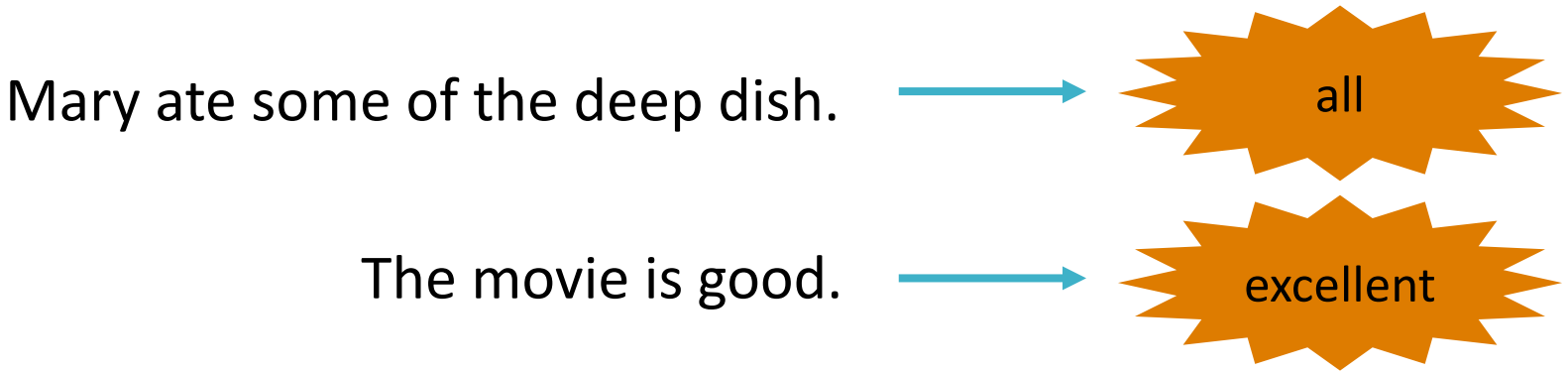
Alternatives:
psychologically real, or just a useful theoretical tool?

- Operationalization: Are alternatives activated in processing?

Semantic priming with lexical decision

Goal: Track the **retrieval and activation of alternatives**

Do we activate the meaning of *all* when we access *some*?



Alternatives in processing: previous work

Alternative activation in the processing of...

- Focus (i.a., Fraundorf et al., 2010, 2013; Gotzner & Spalek, 2017, 2019; Braun & Tagliapietra, 2010; Yan & Calhoun, 2019; Husband & Ferreira, 2016; Spalek et al., 2014; Kim et al., 2015)
- Negation (i.a., Kaup & Zwaan, 2003; Kaup et al., 2006; Tian et al., 2016)
- Counterfactuals (i.a., Ferguson et al., 2008; de Vega & Urrutia, 2012)

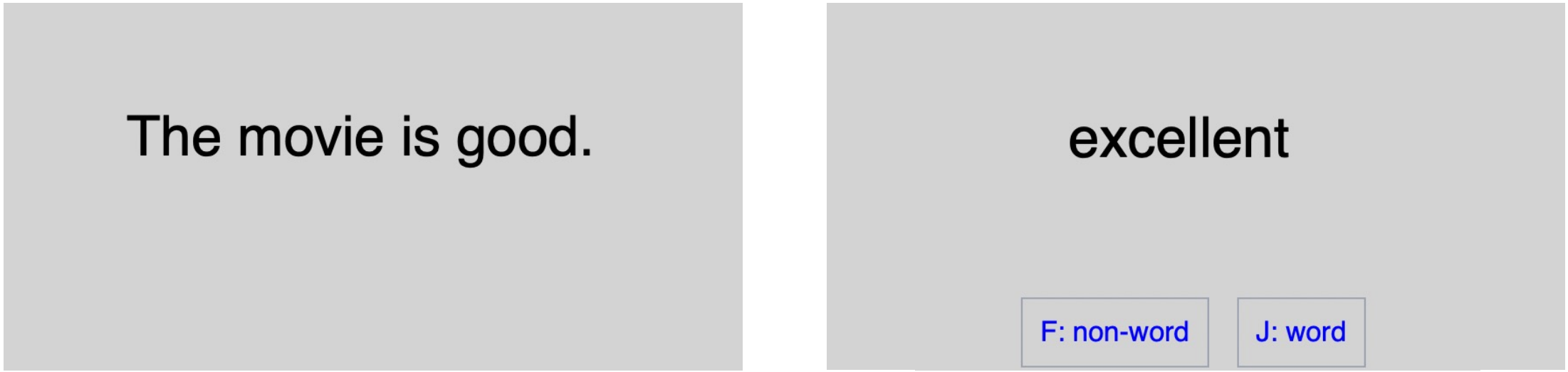
Previous priming studies on SI

Lexical priming (Schwarz et al., 2016; de Carvalho et al., 2016)

Priming the mechanism of SI calculation (i.a., Bott & Chemla, 2016; Rees & Bott, 2018; Bott & Frisson, 2022)

Experiment 1: Sentential semantic priming

PRIME ⟶ 650 ms ⟶ TARGET



- **Task**: decide whether *excellent* is a word or non-word
- **Dependent measure**: reaction time (RT)
- **Items**: 60 different lexical scales

Item N=60
Participant N=46
(recruited online)

Sentential semantic priming: conditions

Condition	Prime	Target
Related (scalar)	The movie is good.	excellent
Unrelated	The movie is foreign.	excellent
Filler (non-word)	Susan decorated the cookies.	kleens

Experiment 2: Priming with *only*

- Previous work has found alternative activation

Item N=60
Participant N=43
(recruited online)

PRIME ⟶ 650 ms ⟶ TARGET

Experiment 3: Lexical semantic priming

- What if the priming effect is not due to SI?
- Ruling out effect of meaning similarity

Item N=60
Participant N=44
(recruited online)

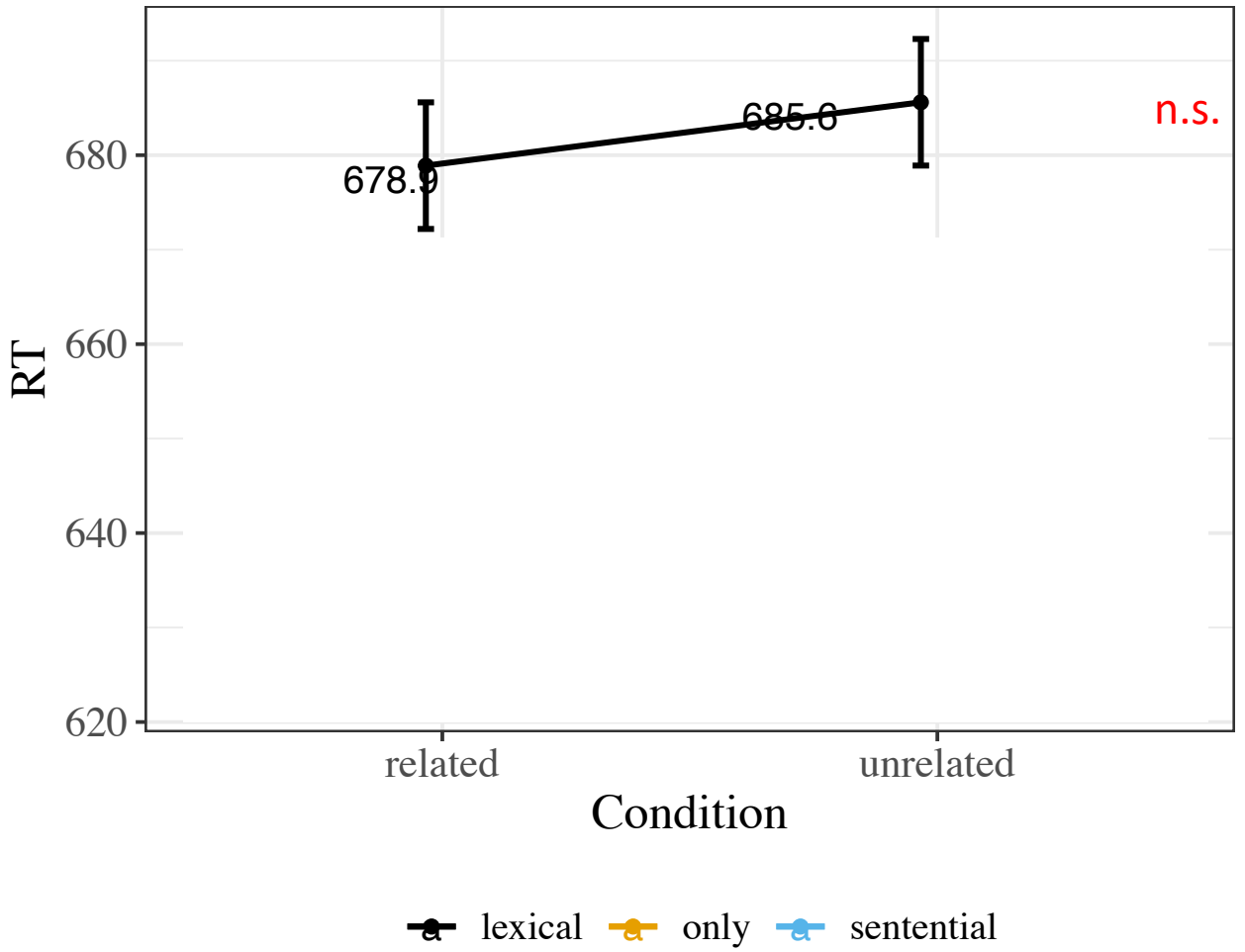
PRIME ⟶ 650 ms ⟶ TARGET

Results

No effect in lexical experiment

Linear mixed effects regression model:

Estimate=11.46
SE= 9.94
t=1.15
p=0.26

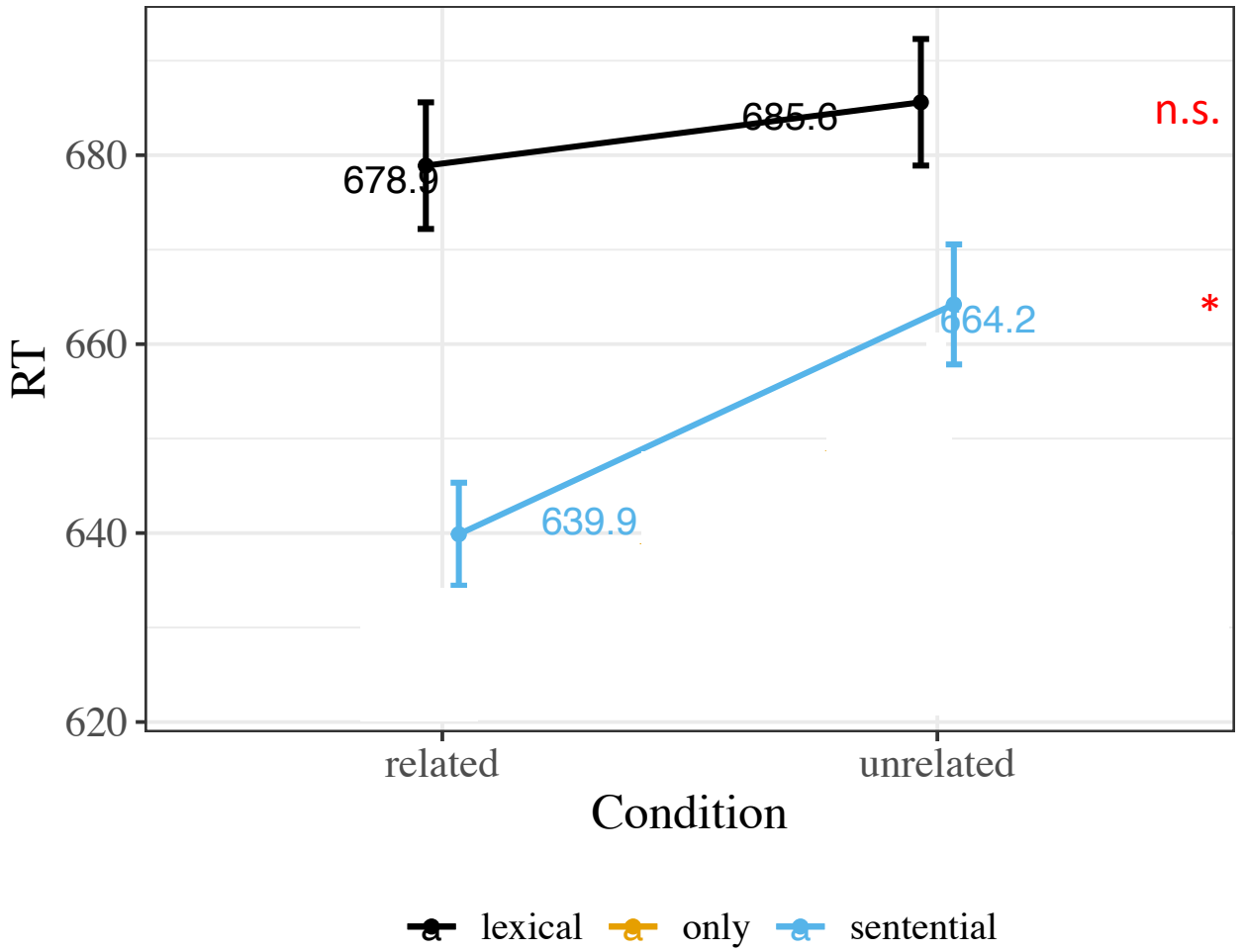


Results

Facilitated RT to alternatives in sentential experiment

Linear mixed effects regression model:

Estimate=21.62
SE= 8.65
t=2.5
p<0.05

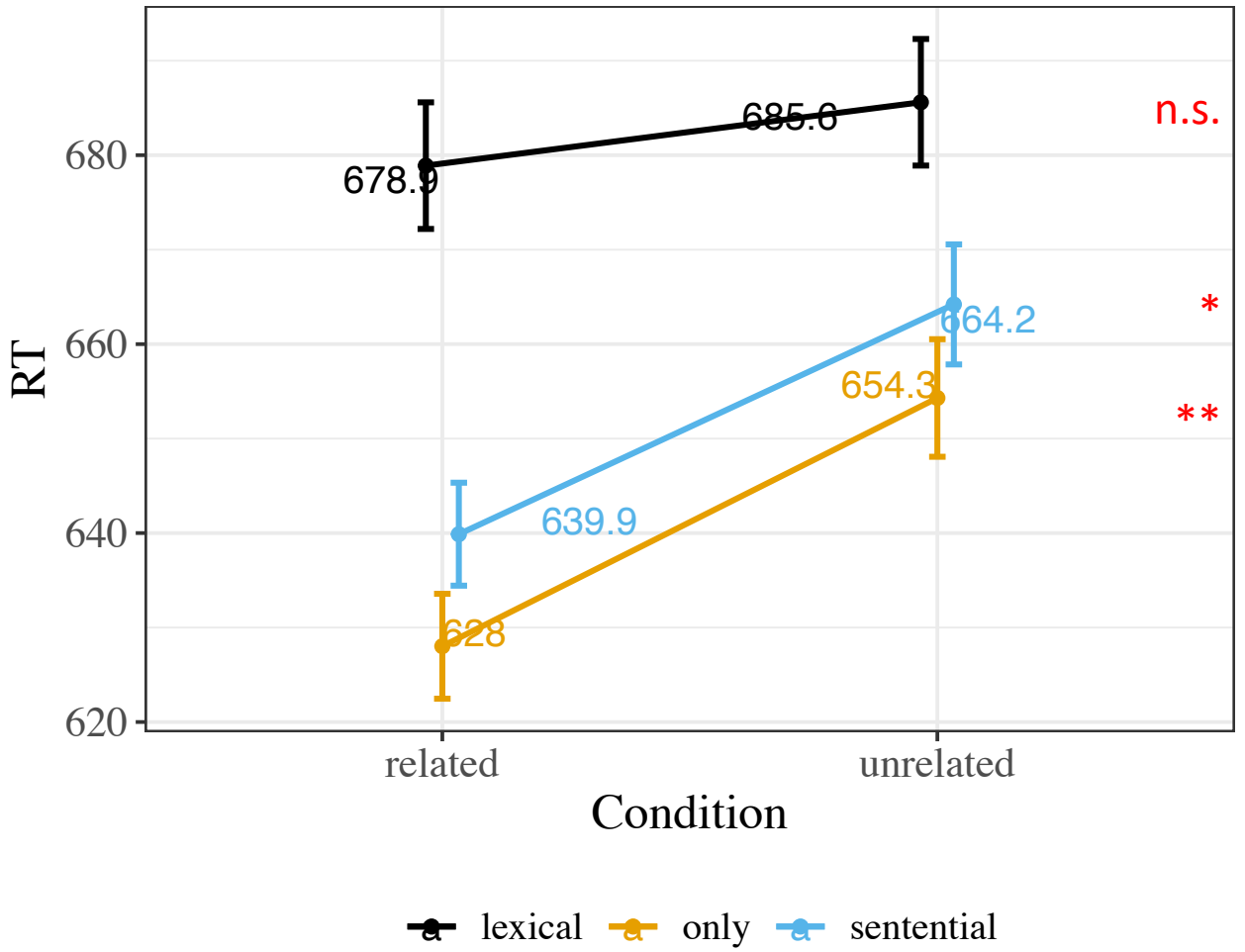


Results

only: similar facilitation

Linear mixed effects regression model:

Estimate=24.47
SE= 8.01
t=3.06
p<0.01

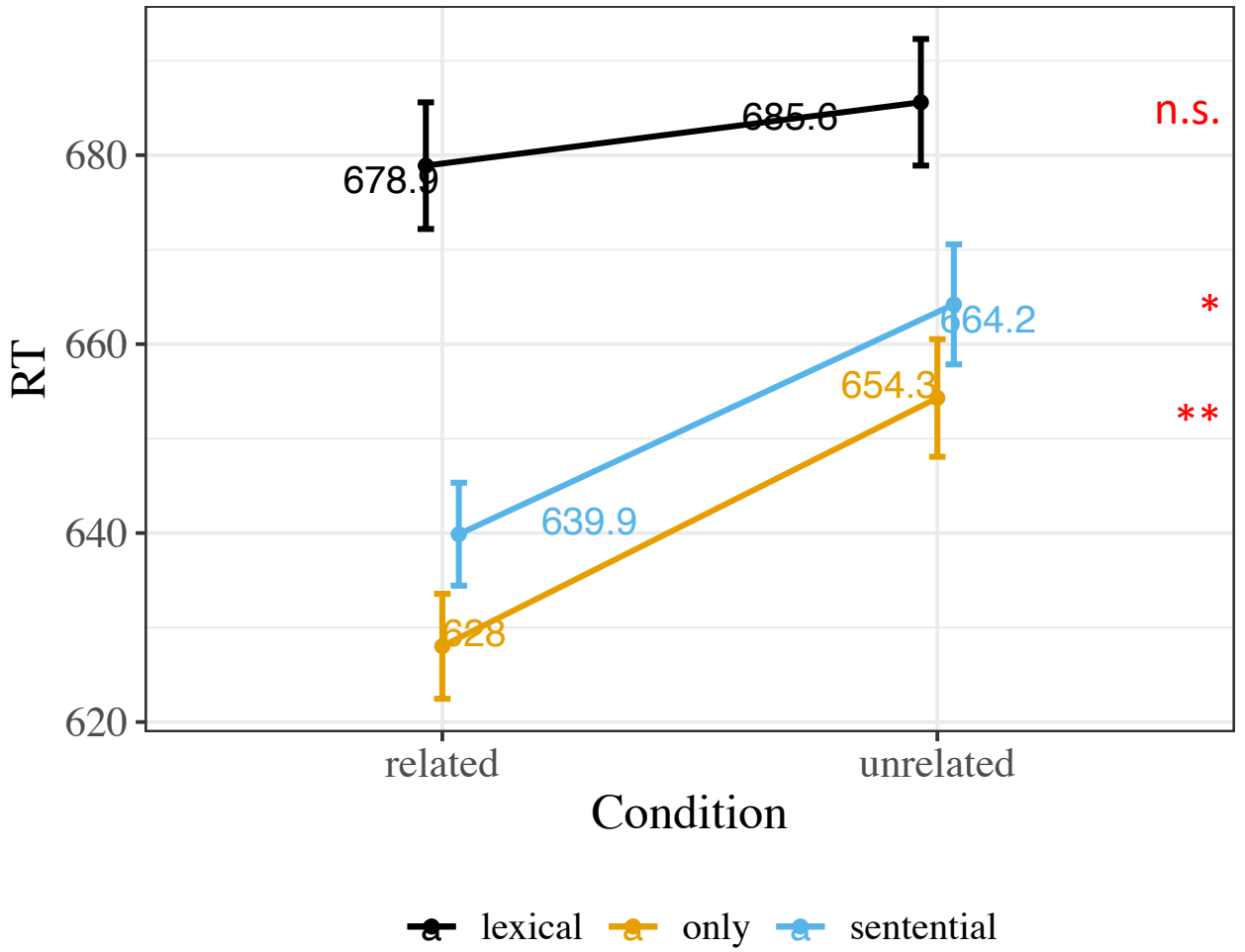


Results

SI and *only*: no difference

Linear mixed effects regression model:

Estimate=9.51
SE= 22.53
t=0.422
p=0.67



Upshot of findings

Alternatives **are retrieved and activated in real-time processing** of scalar implicature-triggering sentences

A puzzle

Alternatives like *excellent*:

similar activation with *The movie is good* or *The movie is only good*

does **not track the rate of inference** from the corresponding sentences

Thank you!

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List of scales

Adjective	<allowed, obligatory>; <attractive, stunning>; <big, enormous>; <cool, cold>; <dark, black>; <difficult, impossible>; <dirty, filthy>; <funny, hilarious>; <good, excellent>; <happy, ecstatic>; <hard, unsolvable>; <harmful, deadly>; <hungry, starving>; <intelligent, brilliant>; <intimidating, terrifying>; <old, ancient>; <overweight, obese>; <palatable, delicious>; <polished, impeccable>; <possible, certain>; <pretty, beautiful>; <scared, petrified>; <serious, life-threatening>; <similar, identical>; <small, tiny>; <snug, tight>; <tired, exhausted>; <ugly, hideous>; <understandable, articulate>; <unpleasant, disgusting>; <warm, hot>; <willing, eager>
Verb	<begin, complete>; <believe, know>; <damage, destroy>; <dislike, loathe>; <double, triple>; <like, love>; <match, exceed>; <permit, require>; <reduce, eliminate>; <slow, stop>; <start, finish>; <survive, thrive>; <tolerate, encourage>; <try, succeed>; <want, need>
Adverb	<equally, more>; <here, everywhere>; <largely, totally>; <mostly, entirely>; <once, twice>; <overwhelmingly, unanimously>; <partially, completely>; <primarily, exclusively>; <probably, necessarily>; <usually, always>; <well, superbly>
Quantifier	<or, and>
Connective	<some, all>

Experimental details

Before each sentence, a fixation cross was displayed for **350ms**, followed by **400ms** of an empty screen.

Each word in the sentence was displayed for **350ms** (Experiments 1-2). Prime sentences were presented word-by-word.

In Experiment 3, the prime word was displayed for **150ms**.

The time (SOA) between the offset of the final prime word (*good*/*foreign*) and the onset of the target word (*excellent*) was **650ms**.

Another puzzle

No by-item correlation between SI rates and priming effect

allowed ⟶ *not obligatory* more robust SI than *dirty* ⟶ *not filthy*

this doesn't correspond to a difference in priming

Possible reason: we measure priming effect by **comparing to the unrelated condition**
(*The movie is foreign.*)