An environment-based account of negative polarity illusions

Hanna Muller, Iria de Dios Flores, Celeste Joly, Colin Phillips, & Philip Resnik

Overview

Overview

- Negative polarity illusions can provide a window into the online processing of polarity dependencies

Overview

- Negative polarity illusions can provide a window into the online processing of polarity dependencies
- Previous work on NPI illusions highlights critical computations occurring *at the NPI*

Overview

- Negative polarity illusions can provide a window into the online processing of polarity dependencies
- Previous work on NPI illusions highlights critical computations occurring *at the NPI*
- By shifting focus to the computations that occur *before the NPI*, leading to vulnerability, we see new connections:

Overview

- Negative polarity illusions can provide a window into the online processing of polarity dependencies
- Previous work on NPI illusions highlights critical computations occurring *at the NPI*
- By shifting focus to the computations that occur *before the NPI*, leading to vulnerability, we see new connections:
  a. Negative sentences have interpretive consequences as soon as the negative word is encountered

Overview

- Negative polarity illusions can provide a window into the online processing of polarity dependencies
- Previous work on NPI illusions highlights critical computations occurring *at the NPI*
- By shifting focus to the computations that occur *before the NPI*, leading to vulnerability, we see new connections:
    a. Negative sentences have interpretive consequences as soon as the negative word is encountered
    b. Quantifiers are interpreted with respect to their scalar alternatives

Overview

- Negative polarity illusions can provide a window into the online processing of polarity dependencies
- Previous work on NPI illusions highlights critical computations occurring *at the NPI*
- By shifting focus to the computations that occur *before the NPI*, leading to vulnerability, we see new connections:
  a. Negative sentences have interpretive consequences as soon as the negative word is encountered
  b. Quantifiers are interpreted with respect to their scalar alternatives
- Two new generalizations, and a first look at interpretations

Basic Phenomenon

NPI = Negative Polarity Item, e.g. *ever, any, lift a finger, give a damn, in years*

NPIs' defining characteristic is their **limited distribution**:

(1)   We **haven't** left the house *in months*.
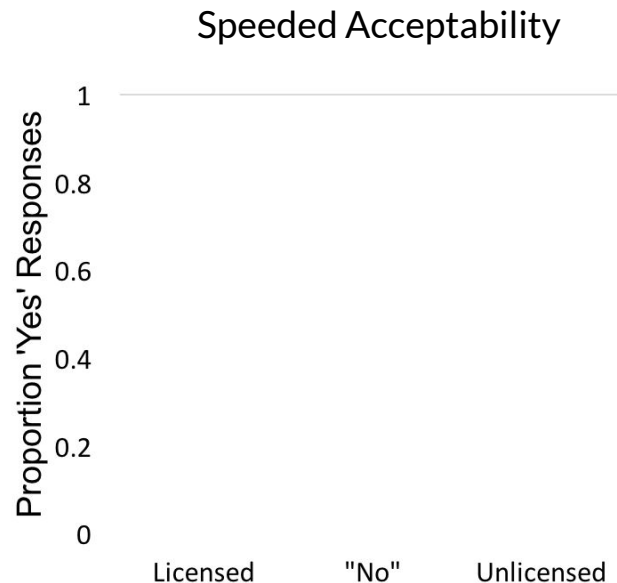(2)   * We have left the house *in months*.

Basic Phenomenon

NPIs must occur in the scope of the licensor

(3) I **don't** think the students [that read the paper] have thought about it *in years*.

(4) * I think the students [that **didn't** read the paper] have thought about it *in years*.
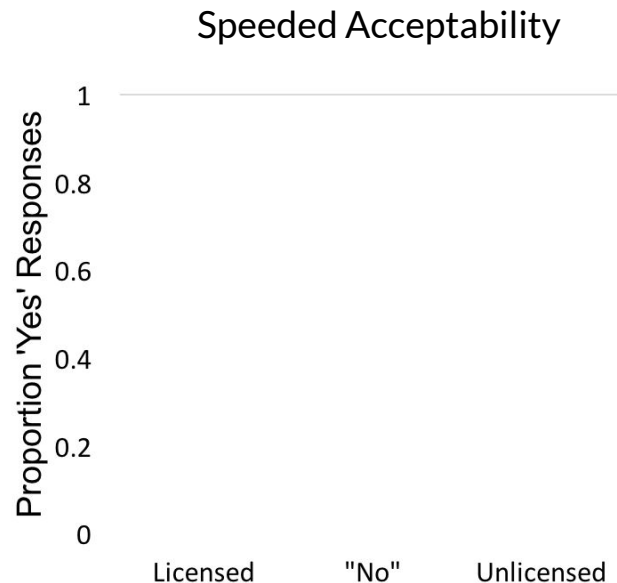
Basic Phenomenon

Online sentence comprehension does not perfectly align with these licensing facts.

Speeded Acceptability

Proportion 'Yes' Responses

1
0.8
0.6
0.4
0.2
0

Licensed   "No"   Unlicensed

Basic Phenomenon

Online sentence comprehension does not perfectly align with these licensing facts.

(5) **No** authors [that the critics recommended] have *ever* written a best-selling novel.
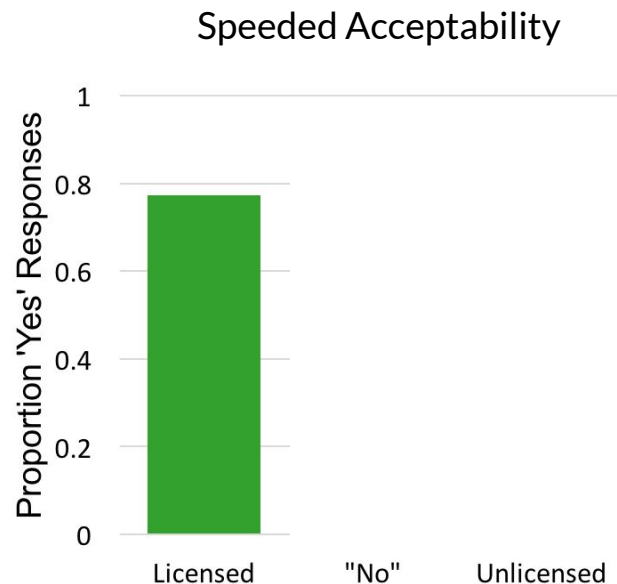
Speeded Acceptability

Basic Phenomenon

Online sentence comprehension does not perfectly align with these licensing facts.

(5) **No** authors [that the critics recommended] have *ever* written a best-selling novel.

Speeded Acceptability

The chart shows "Proportion 'Yes' Responses" on the y-axis (ranging from 0 to 1) with three categories on the x-axis: Licensed, "No", and Unlicensed. The "Licensed" bar reaches approximately 0.77.
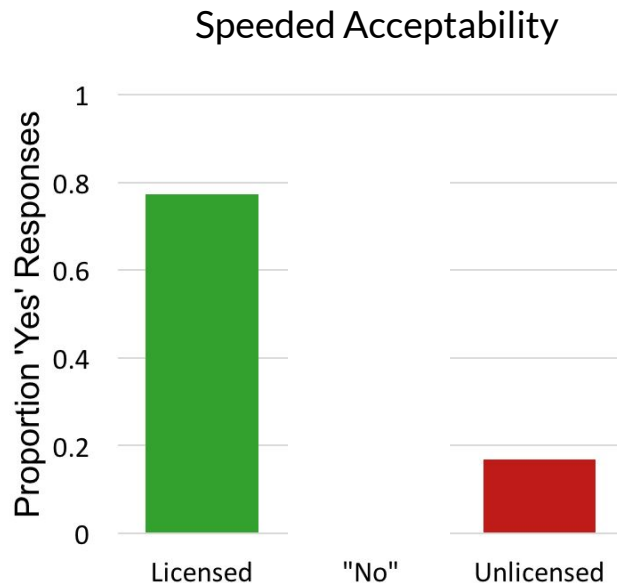
Basic Phenomenon

Online sentence comprehension does not perfectly align with these licensing facts.

(5) **No** authors [that the critics recommended] have *ever* written a best-selling novel.

(7) *The authors [that the critics recommended] have *ever* written a best-selling novel.
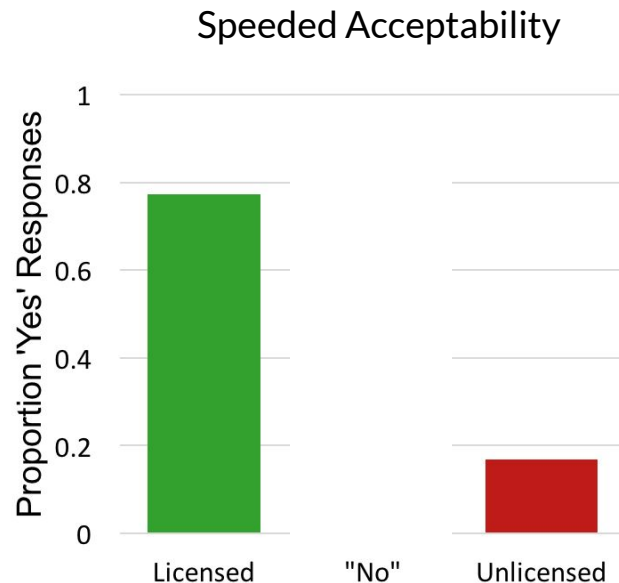
Speeded Acceptability

Basic Phenomenon

Online sentence comprehension does not perfectly align with these licensing facts.

(5) **No** authors [that the critics recommended] have *ever* written a best-selling novel.

(7) *The authors [that the critics recommended] have *ever* written a best-selling novel.
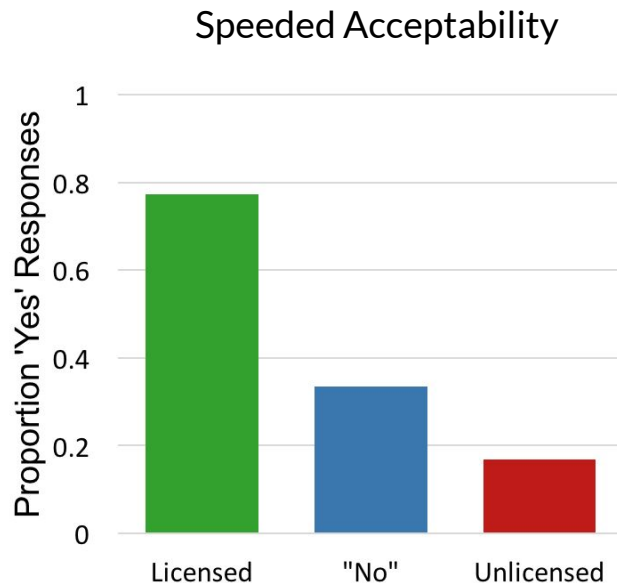
Speeded Acceptability

Basic Phenomenon

Online sentence comprehension does not perfectly align with these licensing facts.

(5) **No** authors [that the critics recommended] have *ever* written a best-selling novel.

(6) *The authors [that **no** critics recommended] have *ever* written a best-selling novel.

(7) *The authors [that the critics recommended] have *ever* written a best-selling novel.
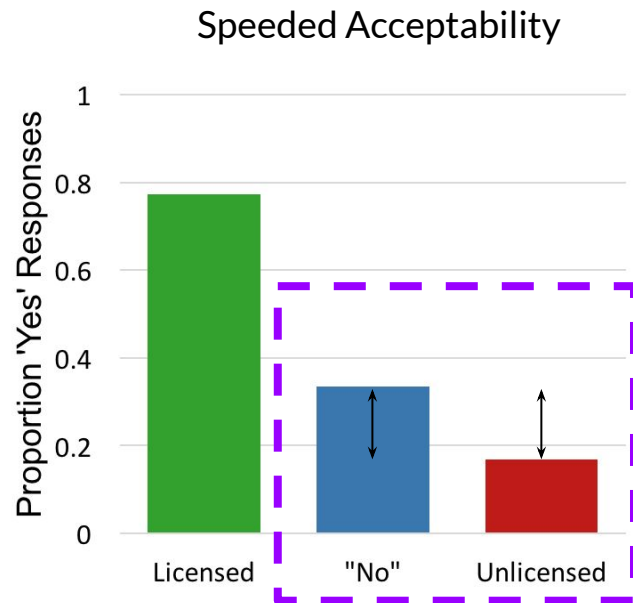
Speeded Acceptability

Basic Phenomenon

Online sentence comprehension does not perfectly align with these licensing facts.

(5) **No** authors [that the critics recommended] have *ever* written a best-selling novel.

(6) *The authors [that **no** critics recommended] have *ever* written a best-selling novel.

(7) *The authors [that the critics recommended] have *ever* written a best-selling novel.

Speeded Acceptability

[Bar chart — Proportion 'Yes' Responses: Licensed ≈ 0.77, "No" ≈ 0.34, Unlicensed ≈ 0.17]
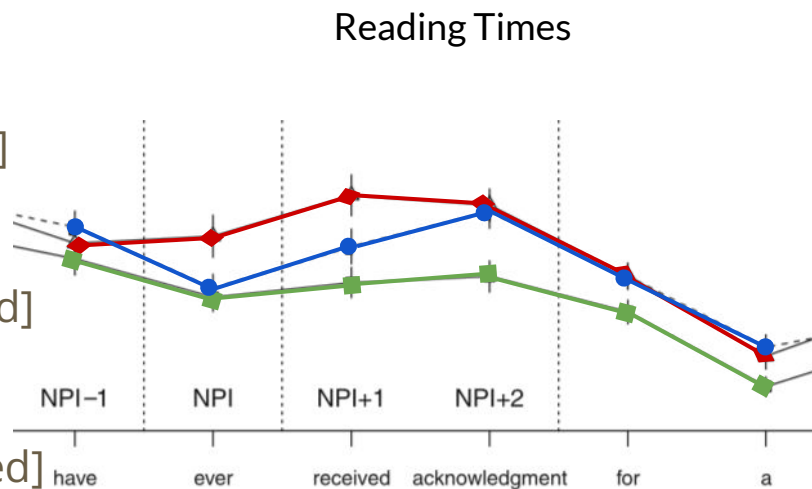
Basic Phenomenon

Online sentence comprehension does not perfectly align with these licensing facts.

(5) **No** authors [that the critics recommended] have *ever* written a best-selling novel.

(6) *The authors [that **no** critics recommended] have *ever* written a best-selling novel.

(7) *The authors [that the critics recommended] have *ever* written a best-selling novel.

Speeded Acceptability

Proportion 'Yes' Responses (y-axis: 0, 0.2, 0.4, 0.6, 0.8, 1)

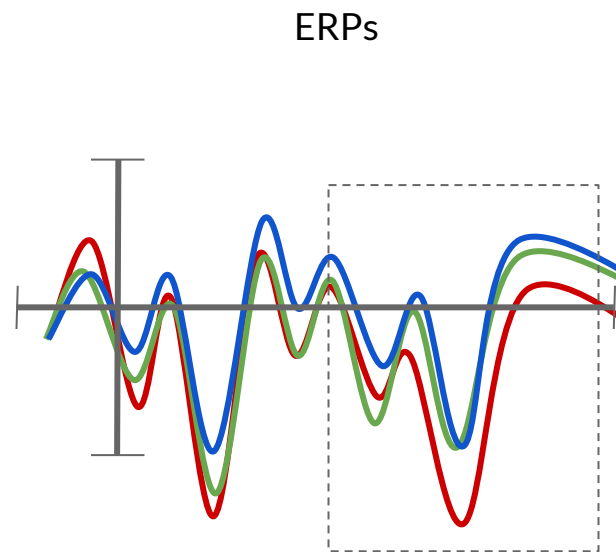Categories: Licensed, "No", Unlicensed

Basic Phenomenon

Online sentence comprehension does not perfectly align with these licensing facts.

(5) **No** authors [that the critics recommended] have *ever* written a best-selling novel.

(6) *The authors [that **no** critics recommended] have *ever* written a best-selling novel.

(7) *The authors [that the critics recommended] have *ever* written a best-selling novel.

Reading Times

Basic Phenomenon

Online sentence comprehension does not
perfectly align with these licensing facts.

(5) **No** authors [that the critics recommended]
have *ever* written a best-selling novel.

(6) *The authors [that **no** critics recommended]
have *ever* written a best-selling novel.

(7) *The authors [that the critics recommended]
have *ever* written a best-selling novel.

ERPs

Xiang, Dillon, & Phillips 2009

NPI licensing online

The authors [that **no** critics recommended] have *ever*

Is that how negation is processed?

The authors [that **no critics recommended**] have *ever*

Is that how NPIs are licensed?

I haven't ever been to Paris.

Is that how NPIs are licensed?

I have**n't** *ever* been to Paris.

Is that how NPIs are licensed?

I haven't   been to Paris.

↑
ever

Is that how NPIs are licensed?

strong

I haven't ever been to Paris.

I haven't been to Paris in the last five years.

I haven't been to Paris today.

weak

Intrusive licensors or intrusive contexts?

The authors [that no critics recommended] have *ever* written a best-selling novel.

Intrusive licensors or intrusive contexts?

The authors [that **no** critics recommended] have *ever* written a best-selling novel.

Intrusive licensors or intrusive contexts?

The authors [that **no critics recommended]** have *ever* written a best-selling novel.

The distance effect

8) *The journalists [that **no** editors recommended for the assignment] *ever* thought that the readers would understand the complicated situation. **(illusion)**
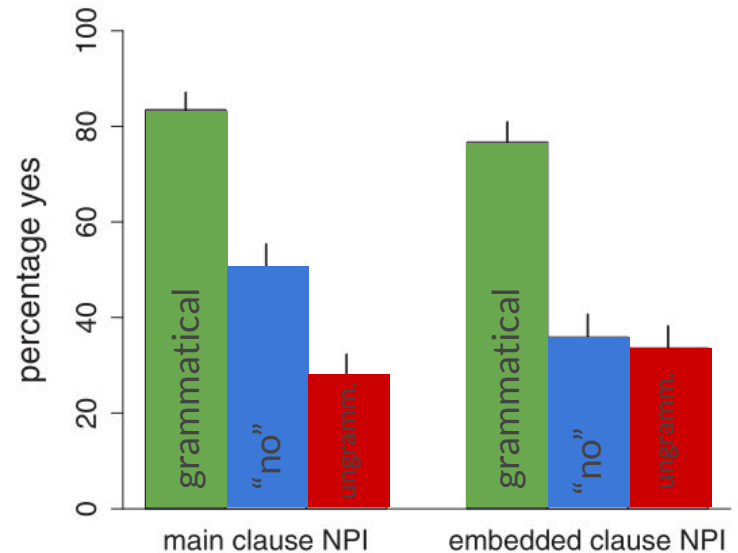
9) *The journalists [that **no** editors recommended for the assignment] thought that the readers would *ever* understand the complicated situation. **(no illusion)**

The distance effect

(17) **No** journalists [that the editors recommended for the assignment] (*ever*) thought that the readers would (*ever*) understand the complicated situation.

(18) *The journalists [that **no** editors recommended for the assignment] (*ever*) thought that the readers would (*ever*) understand the complicated situation.

(19) *The journalists [that the editors recommended for the assignment] (*ever*) thought that the readers would (*ever*) understand the complicated situation.

Which distance?

(A) *The journalists [that **no** editors recommended for the assignment] (*ever*) thought that the readers would (*ever*) understand the complicated situation.

Which distance?

(A) *The journalists [that **no** editors recommended for the assignment] (*ever*) thought that the readers would (*ever*) understand the complicated situation.

The distance effect - Experiment 1

(a-c) No/The surgeons [that no/the patients trusted] have *ever* prescribed new experimental medications.

The distance effect - Experiment 1

(a-c) No/The surgeons [that no/the patients trusted] have *ever* prescribed new experimental medications.

(g-i) No/The surgeons [that no/the patients have trusted] have **healed** *any* injuries with experimental medications.
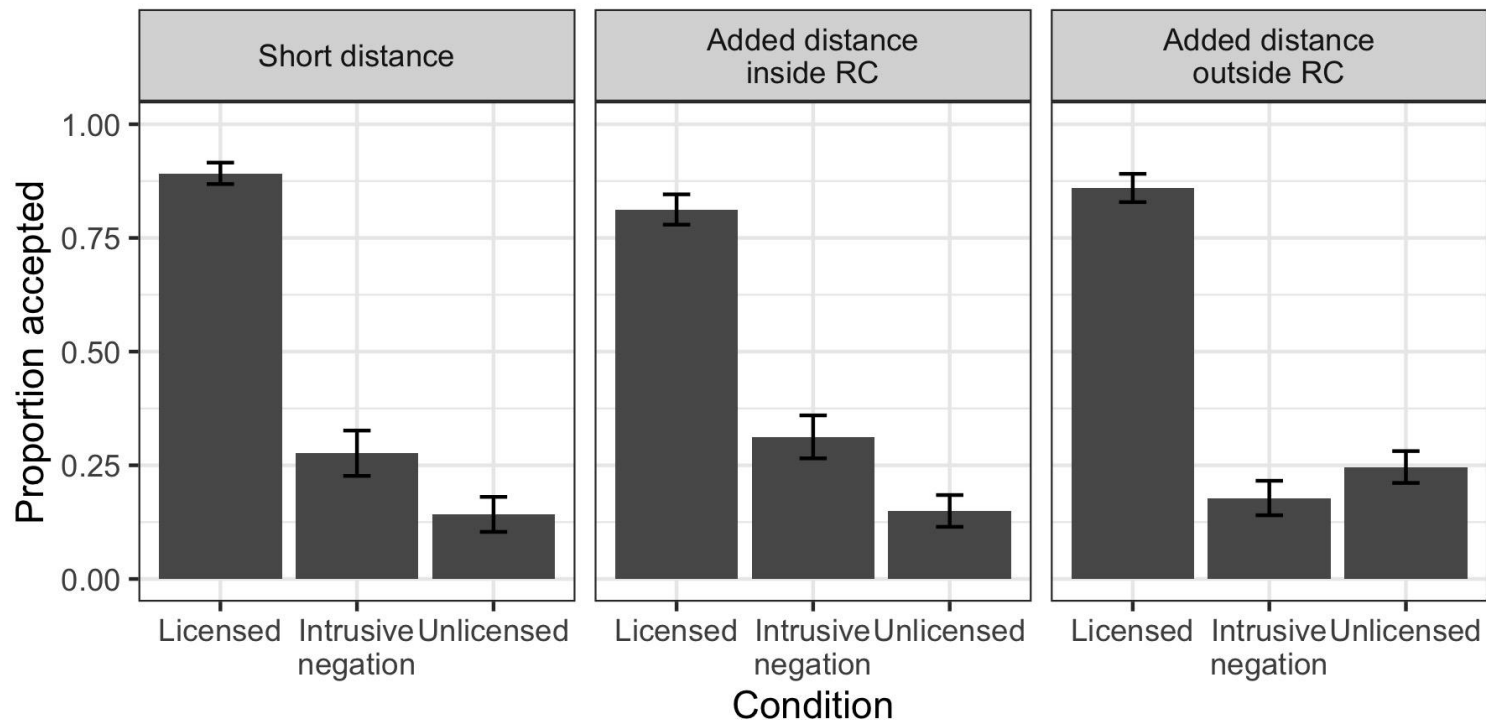
The distance effect - Experiment 1

(a-c) No/The surgeons [that no/the patients trusted] have *ever* prescribed new experimental medications.

(d-f) No/The surgeons [that no/the patients trusted **to heal their injuries**] have *ever* prescribed new experimental medications.

(g-i) No/The surgeons [that no/the patients have trusted] have **healed** *any* injuries with experimental medications.

The distance effect - Experiment 1

short

(a-c) No/The surgeons [that no/the patients trusted] have *ever* prescribed new experimental medications.

long

(d-f) No/The surgeons [that no/the patients trusted **to heal their injuries**] have *ever* prescribed new experimental medications.

long

(g-i) No/The surgeons [that no/the patients have trusted] have **healed** *any* injuries with experimental medications.

The distance effect - Experiment 1

short

(a-c) No/The surgeons [that no/the patients trusted] have *ever* prescribed new experimental medications.

short

(d-f) No/The surgeons [that no/the patients trusted **to heal their injuries**] have *ever* prescribed new experimental medications.

long

(g-i) No/The surgeons [that no/the patients have trusted] have **healed** *any* injuries with experimental medications.

The distance effect - Experiment 1

The distance effect

- Short distances from the *licensing environment* to the NPI are critical for illusions to occur
- NPI illusions are insensitive to the distance between the intrusive licensor and the NPI

Intrusive contexts

The authors **[that no critics recommended]** have *ever* written a best-selling novel.
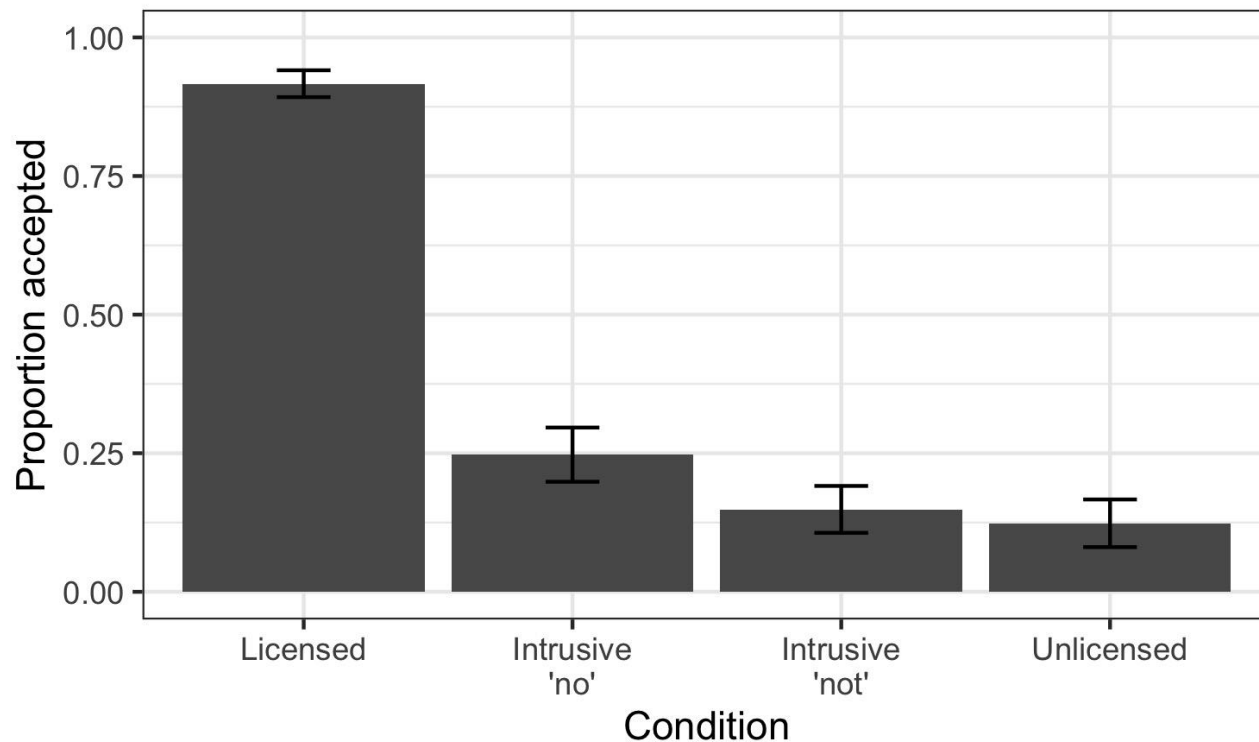
The licensor effect

The authors [that **no** critics have recommended for the award] have ever received acknowledgement for a best-selling novel.

The authors [that the critics **haven't** recommended for the award] have ever received acknowledgement for a best-selling novel.
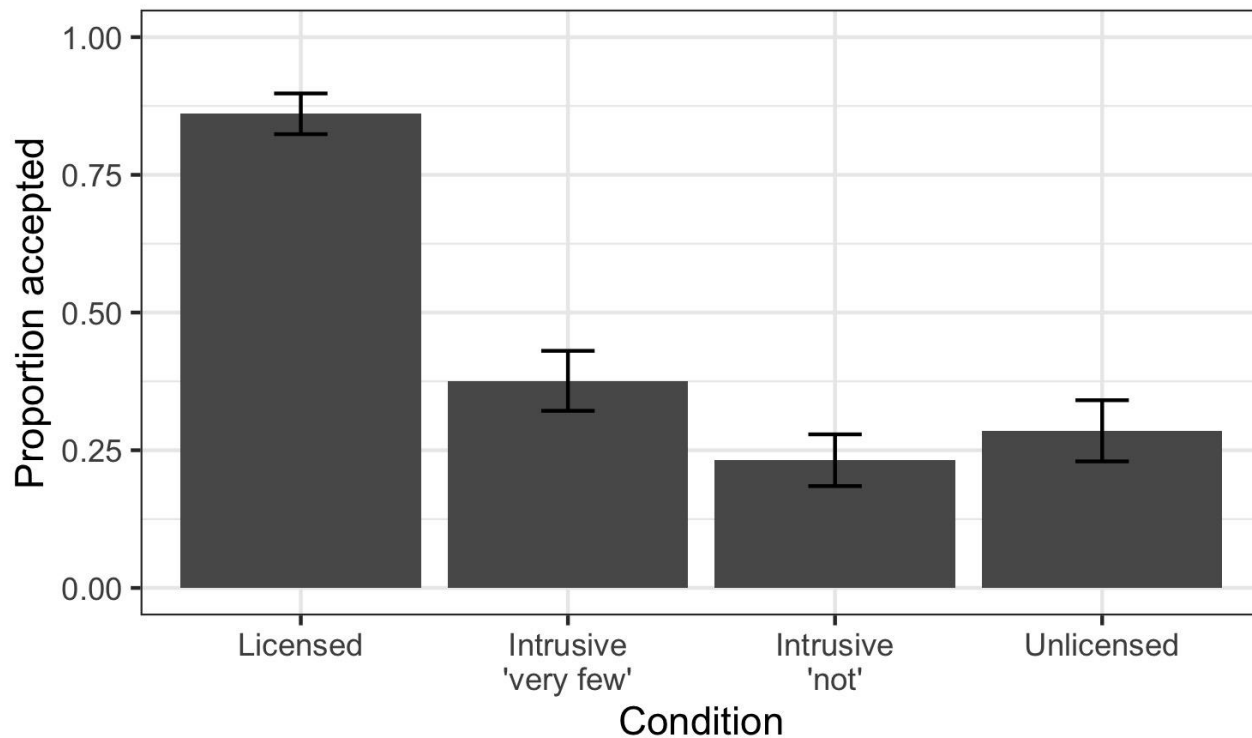
The licensor effect - Experiment 2
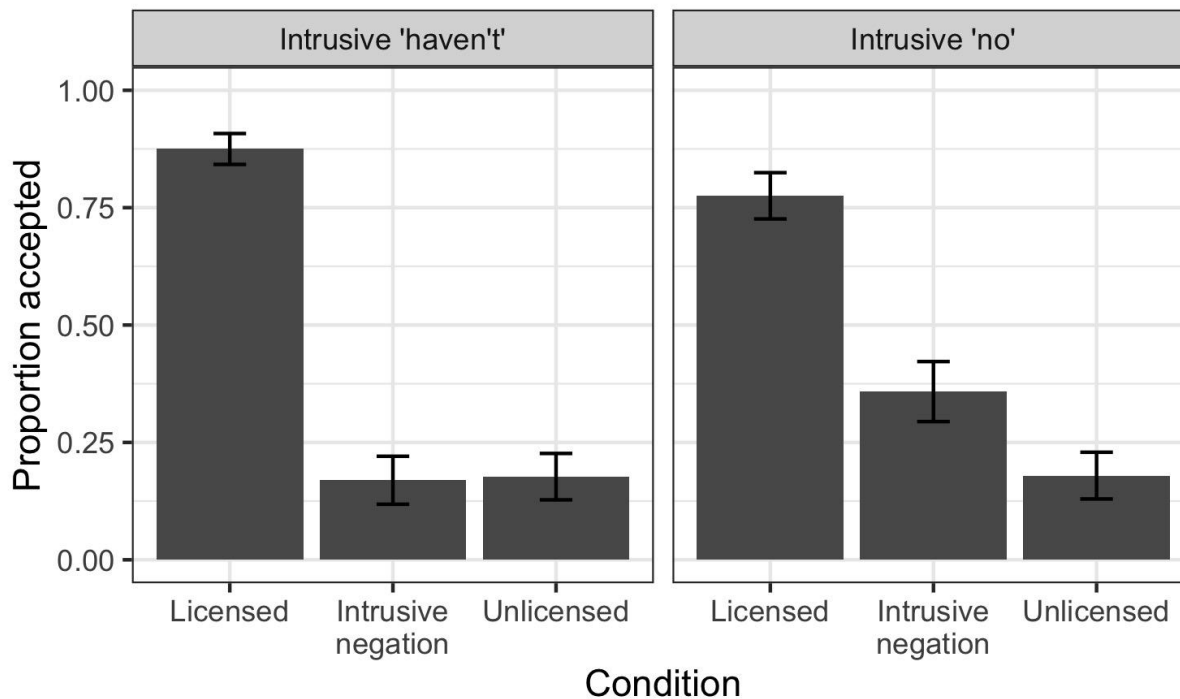
The licensor effect - Experiment 3

The licensor effect - Experiment 4

Processing negation

Processing negation

- Negation triggers consideration of the affirmative alternative
  - "Mary hasn't been to Paris" suggests "Has Mary been to Paris?" as the QUD, and "Mary has been to Paris" as an alternative

Processing negation

- Negation triggers consideration of the affirmative alternative
  - "Mary hasn't been to Paris" suggests "Has Mary been to Paris?" as the QUD, and "Mary has been to Paris" as an alternative
- Negative quantifiers may trigger consider consideration of a scale of alternatives
  - "No authors have been to Paris" suggests "How many authors have been to Paris?" as the QUD, and "Few authors have been to Paris", "Many authors have been to Paris", etc. as alternatives

Negative quantifiers

weak

Some people have been to Paris.

Few people have been to Paris.

No one has been to Paris.

strong

NPIs are strong endpoints of negative scales

weak

I haven't been to Paris today.

I haven't been to Paris in the last five years.

I haven't ever been to Paris.

strong

Quantifier scope

Someone from every city despises it.

May 1985

Quantifier scope

The journalists [that **no** editors recommended] *ever* thought that the readers would understand the complicated situation.

No editors x [the journalists [that x recommended] *ever* thought that the readers would understand the complicated situation]

Quantifier scope

- Predicts that illusion sentences are interpreted as if they are globally negative
- Claims that all fallibility is located in quantifier processing - NPI processing can be perfectly accurate

Probing interpretations - Experiment 5

The authors that no critics recommended have ever received acknowledgment for a best-selling novel.

Was that sentence acceptable? Yes / No

Did the authors receive acknowledgment? Yes / No / I don't know

Probing interpretations - Experiment 5

The authors that no critics recommended have **ever** received acknowledgment for a best-selling novel.

Was that sentence acceptable? Yes / No

Did the authors receive acknowledgment? Yes / No / I don't know

Probing interpretations - Experiment 5

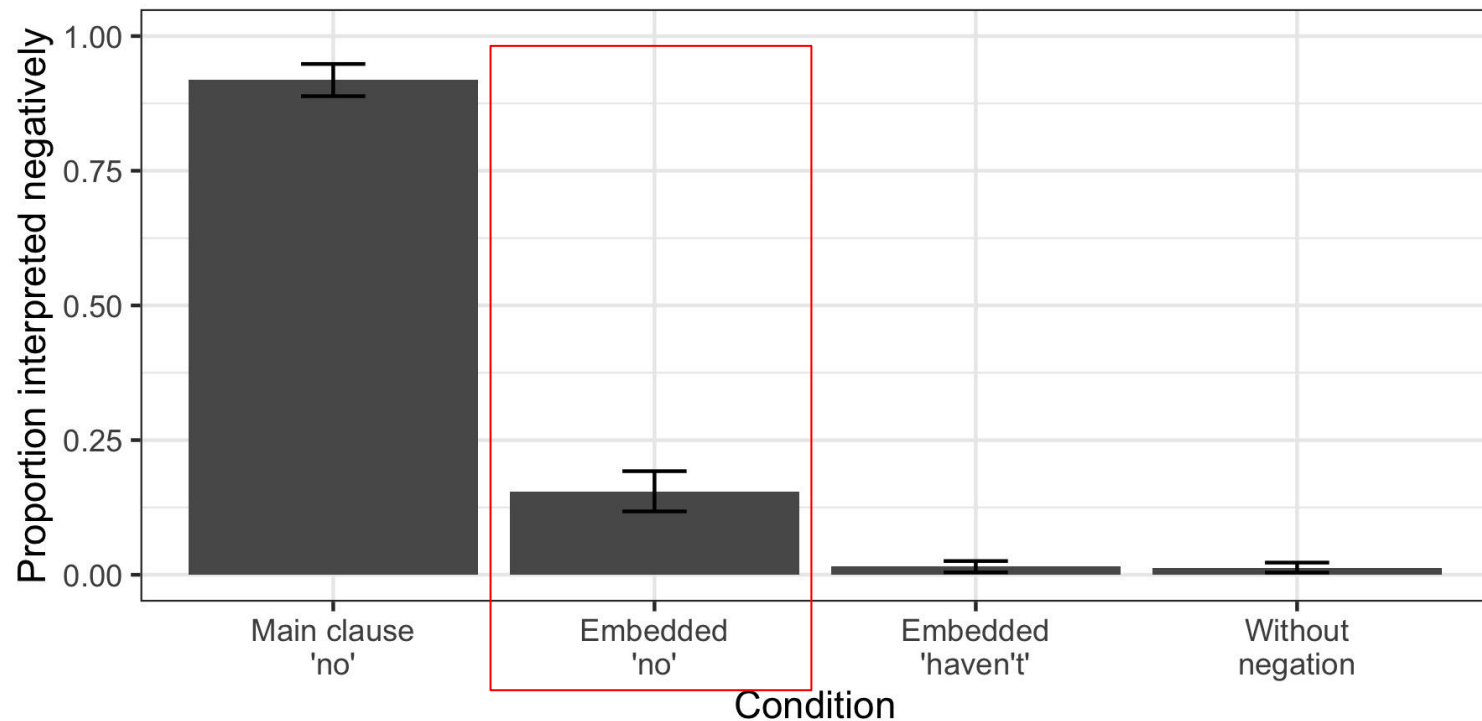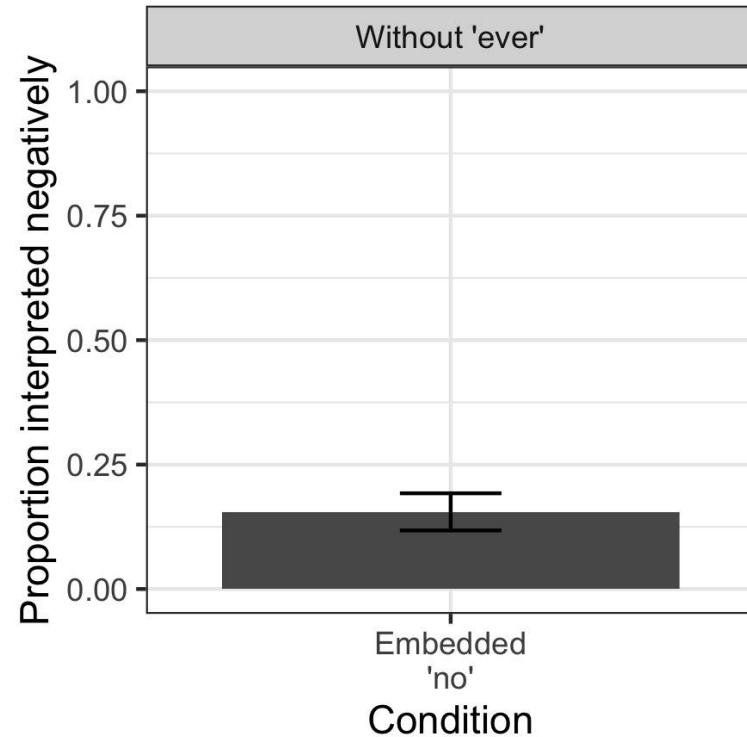The authors that no critics recommended have received acknowledgment for a best-selling novel.

Was that sentence acceptable? Yes / No

Did the authors receive acknowledgment? Yes / No / I don't know
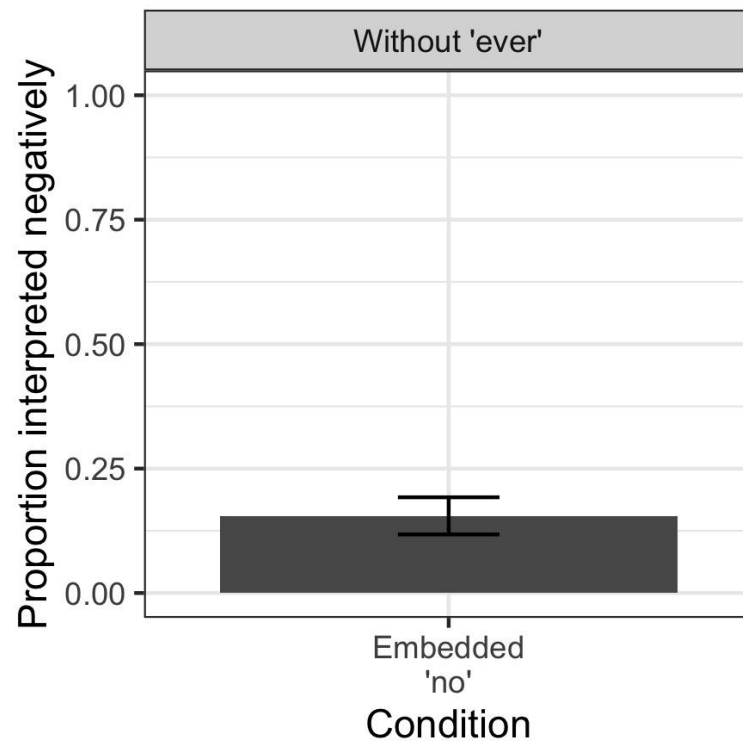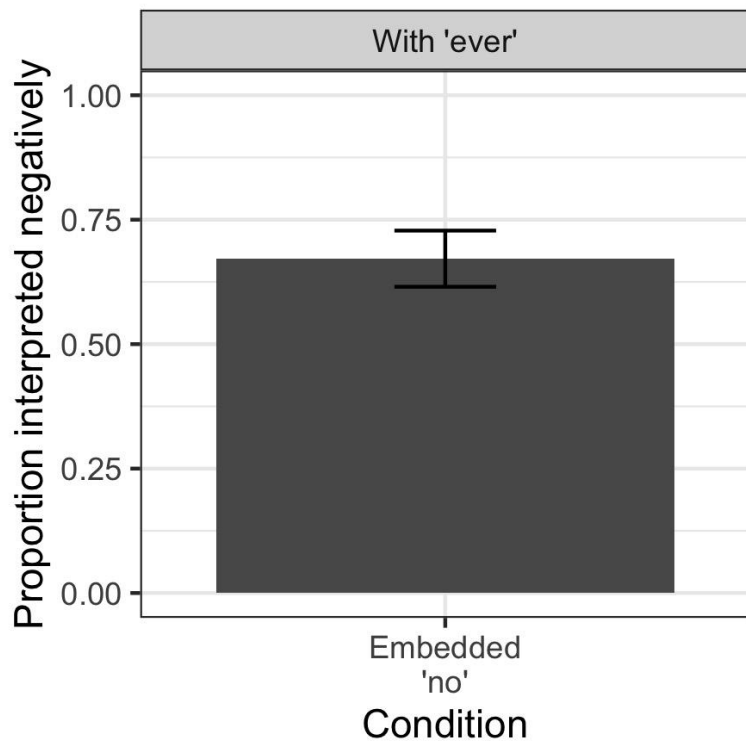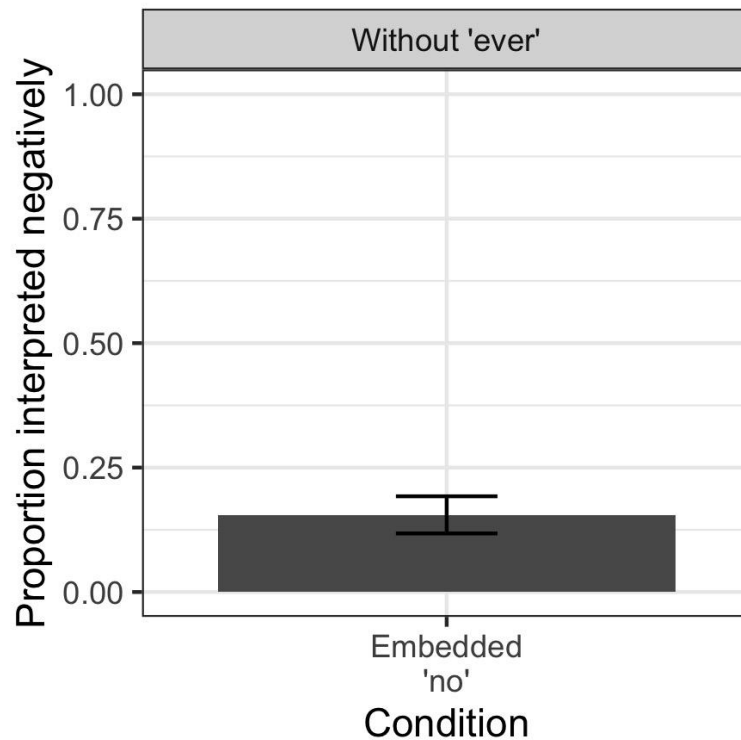
Experiment 5 (without 'ever')
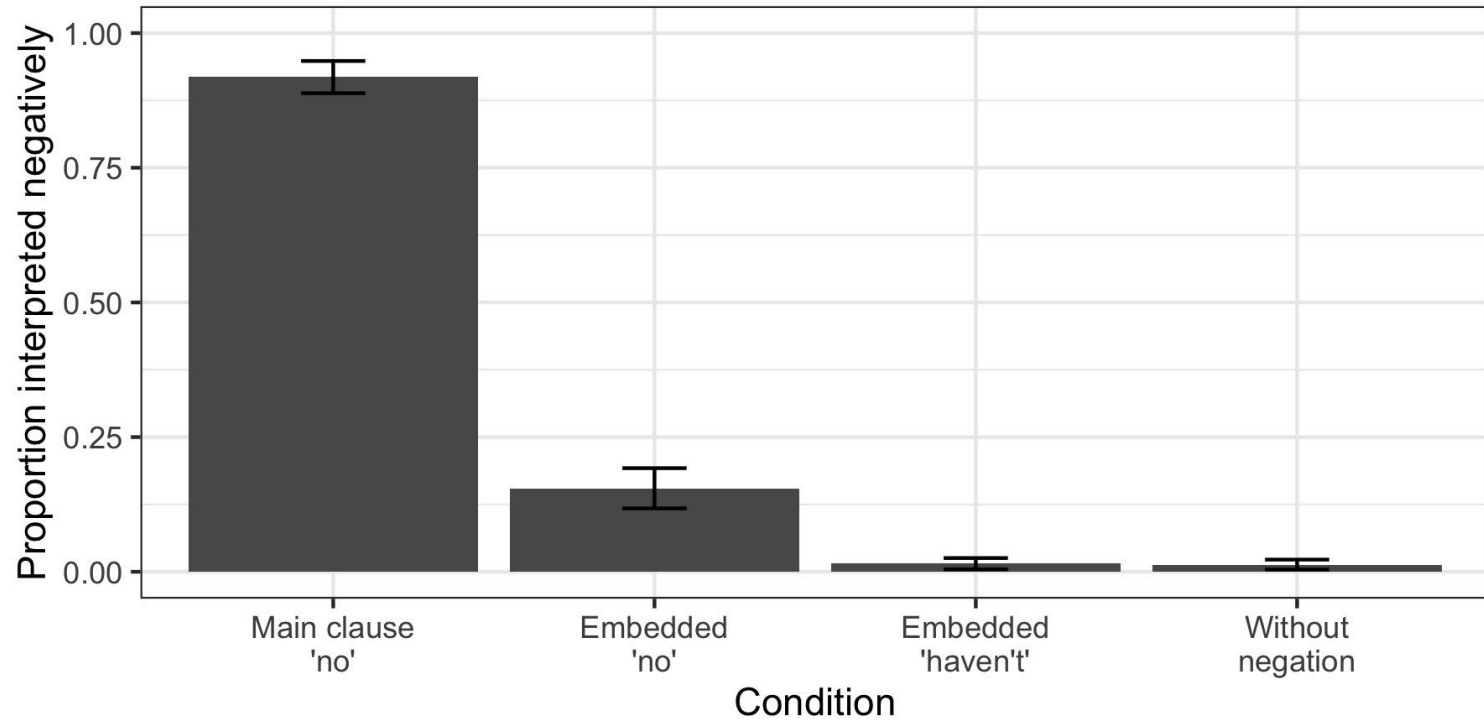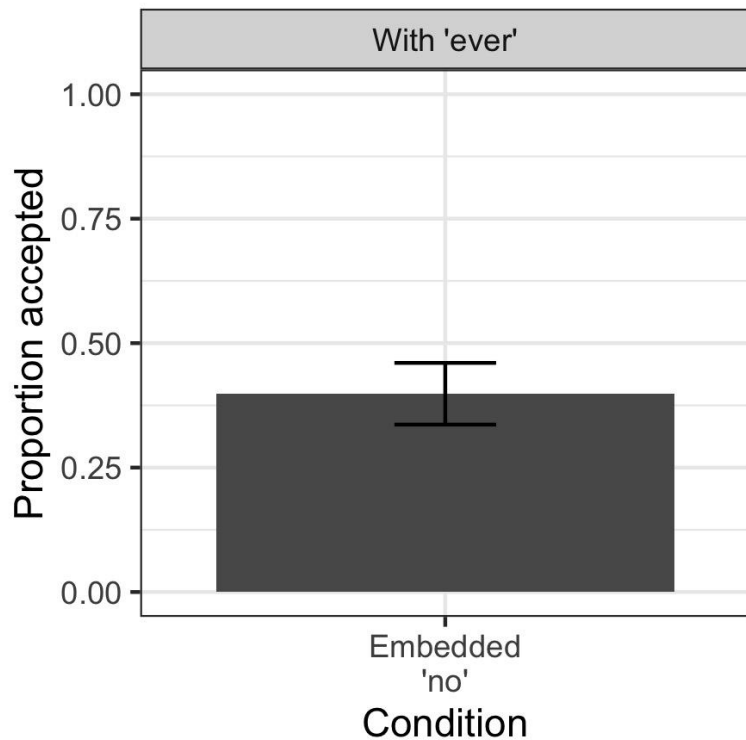
Experiment 5 (without 'ever')

Experiment 5 (without 'ever')

Experiment 5

Experiment 5

NPI illusions

❖ Added distance outside the RC can "turn off" the illusion, but added distance inside the RC has no impact

➢ Online NPI licensing operates on representations that are maintained throughout the licensing context, not purely retrieval of prior encoded information

NPI illusions

❖ Added distance outside the RC can "turn off" the illusion, but added distance inside the RC has no impact

➤ Online NPI licensing operates on representations that are maintained throughout the licensing context, not purely retrieval of prior encoded information

❖ Negative quantifiers cause illusions, but other forms of negation don't

➤ The context-level property that NPI illusions are sensitive is *not* just being a licensor

NPI illusions

❖ Added distance outside the RC can "turn off" the illusion, but added distance inside the RC has no impact

➤ Online NPI licensing operates on representations that are maintained throughout the licensing context, not purely retrieval of prior encoded information

❖ Negative quantifiers cause illusions, but other forms of negation don't

➤ The context-level property that NPI illusions are sensitive is *not* just being a licensor

❖ Interpretations are inconsistent with quantifier scope hypothesis

➤ But not straightforwardly predicted by the scalar meanings hypothesis either!

Thank you!

Lab members for useful discussion: Phoebe Gaston, Chia-Hsuan Liao, Masato Nakamura, Rosa Lee, Cassidy Wyatt

Audiences at CUNY 2017, CUNY 2019, CUNY 2020, PIPP workshop

Funding sources: NRT, MURI, Flagship Fellowship

And to you!