Illicit scope interpretations are not the cause of NPI illusions. They might be a consequence.
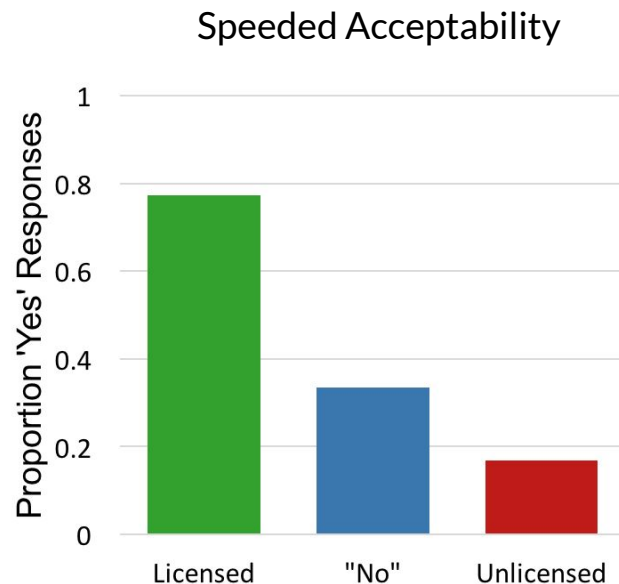
Hanna Muller, Iria de Dios Flores, Colin Phillips

NPI illusion basics

Online sentence comprehension does not perfectly align with the grammar of NPI licensing.

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

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

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Speeded Acceptability

NPI illusions - key questions

NPI illusions - key questions

- What causes the illusion of acceptability?

NPI illusions - key questions

- What causes the illusion of acceptability?
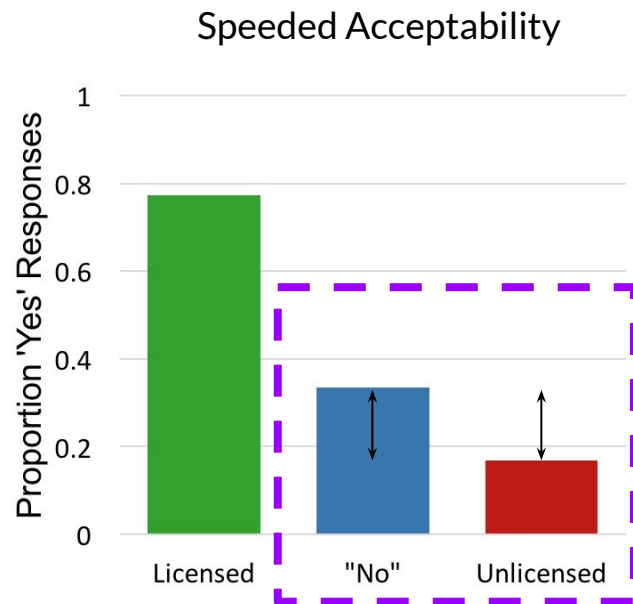- What do comprehenders think illusion sentences mean?

NPI illusions - key questions

- What causes the illusion of acceptability?
- What do comprehenders think illusion sentences mean?
- How do comprehenders recover from illusions?

NPI illusion basics

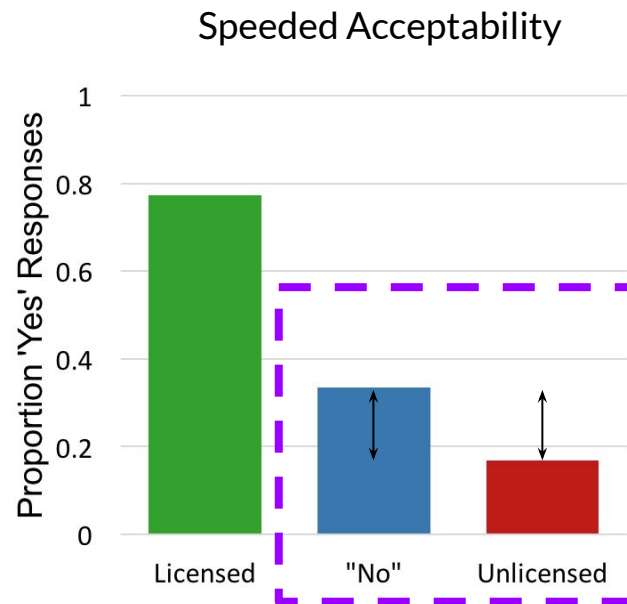Online sentence comprehension does not perfectly align with the grammar of NPI licensing.

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Speeded Acceptability

German: Drenhaus et al. 2005; *English*: de-Dios-Flores et al. 2017; Hildebrandt & Husband 2019; Muller et al. 2019; Orth et al. 2020a; Parker & Phillips 2016; Xiang et al. 2006; *Korean*: Yun et al. 2018
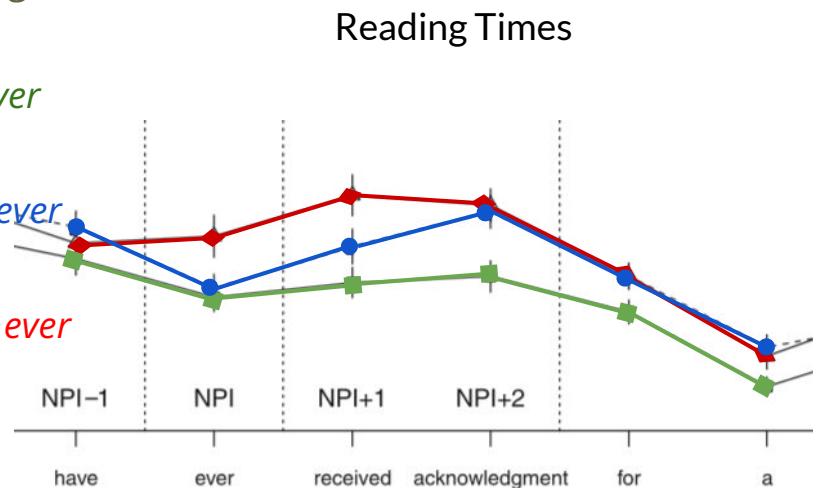
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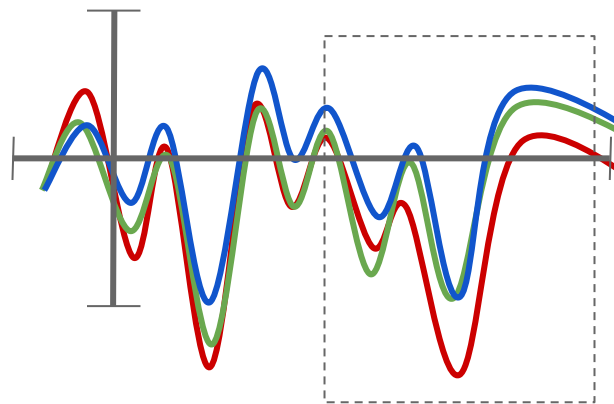
Reading Times

English: **Parker & Phillips 2011**, 2016; Ng & Husband 2017; Xiang et al. 2013; *Turkish*: Yanilmaz & Drury 2018a

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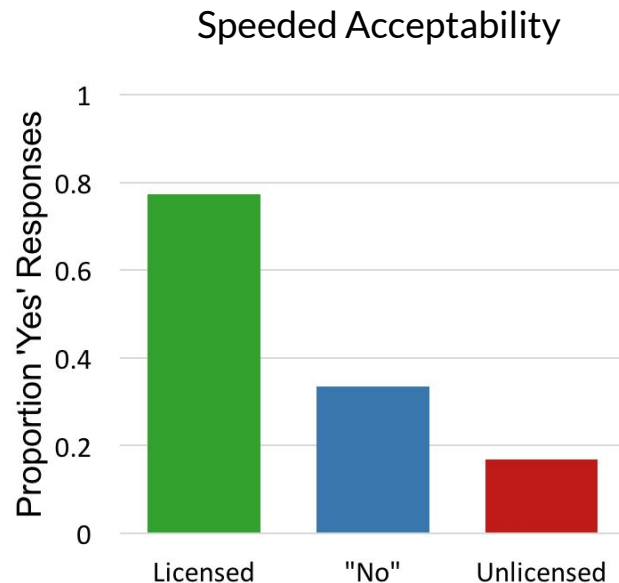(3) *The authors [that the critics recommended] have *ever* written a best-selling novel.

ERPs

German: Drenhaus et al. 2005; *English*: **Xiang et al. 2009**; *Turkish*: Yanilmaz & Drury 2018b; Lee et al. 2018; *Korean*: Lee et al. 2018
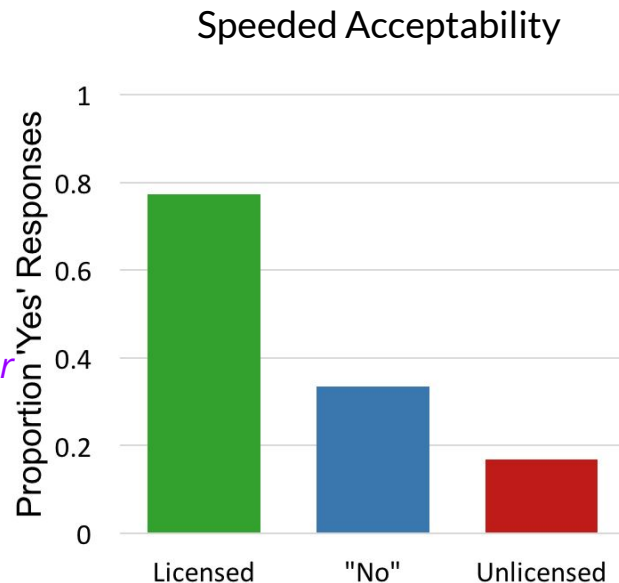
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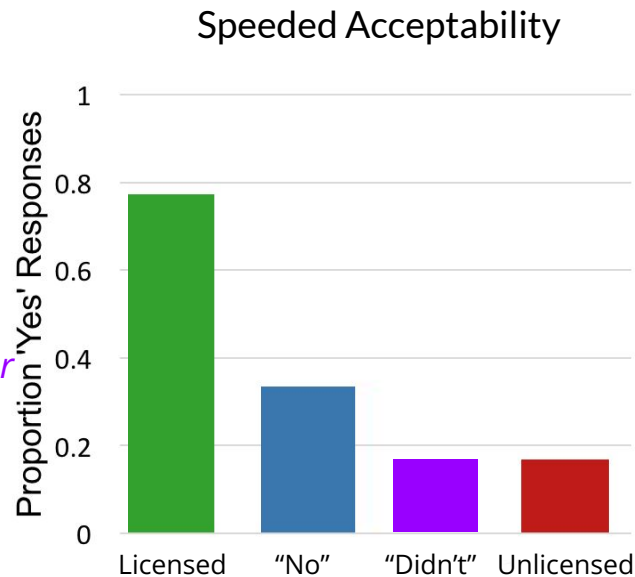
Speeded Acceptability

NPI illusion profile

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(2a) *The authors [that **no** critics recommended] have *ever* written a best-selling novel.

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Speeded Acceptability

NPI illusion profile

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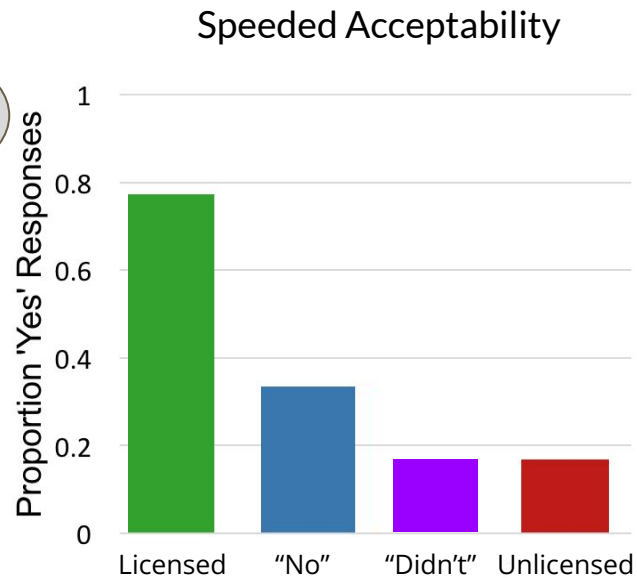(2b) *The authors [that the critics **didn't** recommend] have *ever* written a best-selling novel.

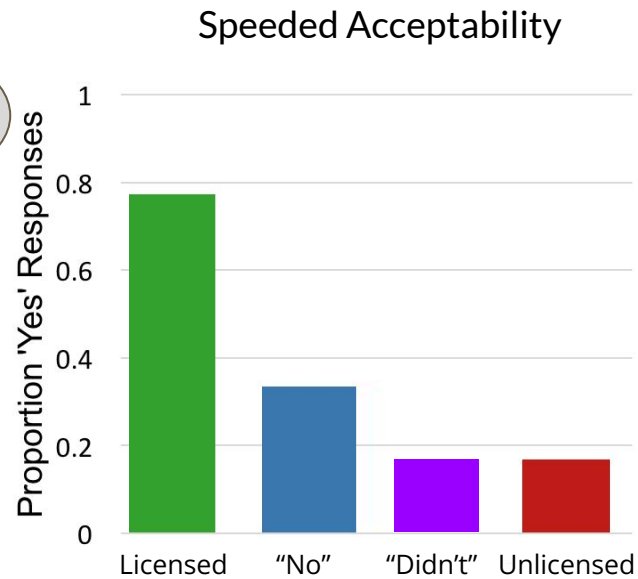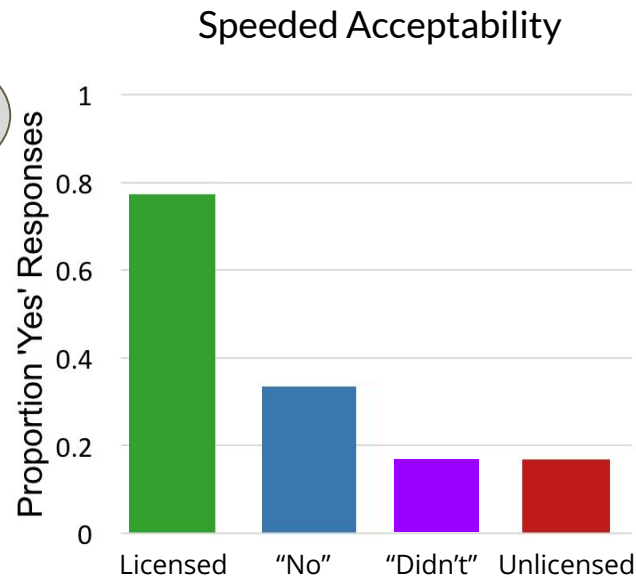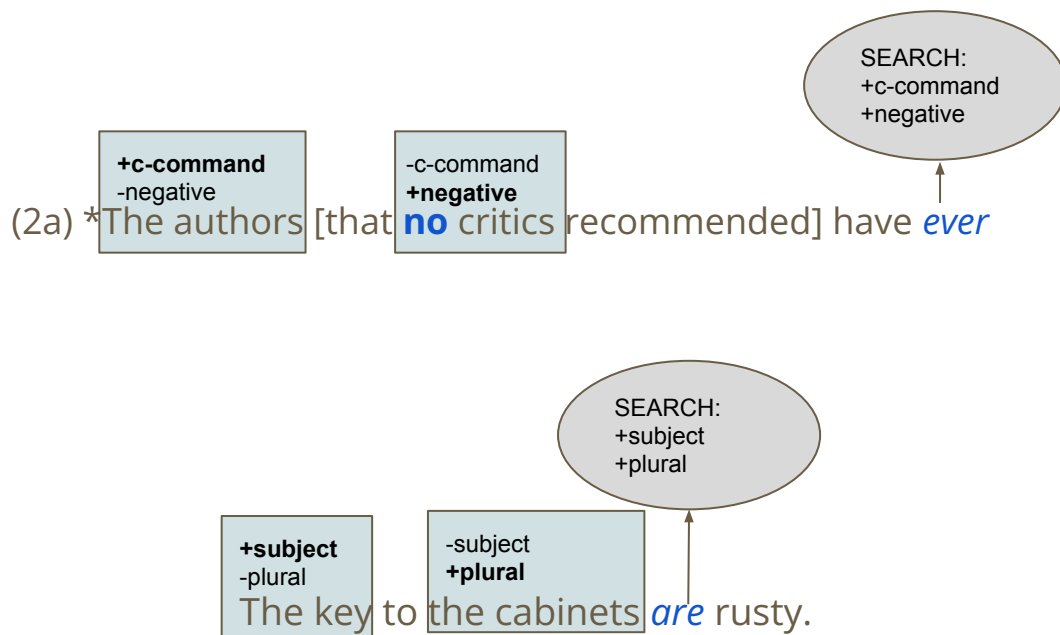(3) *The authors [that the critics recommended] have *ever* written a best-selling novel.

Speeded Acceptability

de-Dios-Flores et al. 2017; Orth et al. 2020a 13

NPI illusion profile

SEARCH:
+c-command
+negative

(2a) *The authors [that **no** critics recommended] have *ever*

Speeded Acceptability

Proportion 'Yes' Responses

Licensed   "No"   "Didn't"   Unlicensed

Vasishth et al. 2008 14

NPI illusion profile

SEARCH:
+c-command
+negative

+c-command
-negative

-c-command
+negative

(2a) *The authors [that **no** critics recommended] have *ever*

Speeded Acceptability

Vasishth et al. 2008 15

NPI illusion profile

+c-command
-negative

-c-command
+negative

(2a) *The authors [that **no** critics recommended] have *ever*

SEARCH:
+c-command
+negative

SEARCH:
+subject
+plural

+subject
-plural

-subject
+plural

The key to the cabinets *are* rusty.

Speeded Acceptability

Vasishth et al. 2008; Wagers et al., 2009

NPI illusion profile

SEARCH:
+c-command
+negative

+c-command
-negative

-c-command
+negative

(2a) *The authors [that **no** critics recommended] have *ever*

Speeded Acceptability

Proportion 'Yes' Responses

Licensed   "No"   "Didn't"   Unlicensed

NPI illusion profile

(2a) *The authors [that **no** critics recommended] have

+c-command
-negative

-c-command
+negative

(2b) *The authors [that the critics **didn't** recommend] have *ever*

+c-command
-negative

-c-command
+negative

SEARCH:
+c-command
+negative

SEARCH:
+c-command
+negative

Speeded Acceptability

Licensed, "No", "Didn't", Unlicensed

Proportion "Yes" responses

NPI illusion profile

(2a) *The authors [that **no** critics recommended] have...

(2b) *The authors [that the critics **didn't** recommend] have *ever* recommend] have *ever*

+c-command
-negative

-c-command
+negative

SEARCH:
+c-command
+negative

SEARCH:
+c-command
+negative

Speeded Acceptability

Proportion 'Yes' responses

Licensed "No" "Didn't" Unlicensed

Quantifier scope

(4) Three referees read every abstract. (from Szabolcsi 1997)

de-Dios-Flores et al. 2017; Orth et al. 2020a

Quantifier scope

(4) Three referees read every abstract. (from Szabolcsi 1997)

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Quantifier scope

(4) Three referees read every abstract. (from Szabolcsi 1997)

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Quantifier scope

(4) Three referees read every abstract. (from Szabolcsi 1997)

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de-Dios-Flores et al. 2017; Orth et al. 2020a

Quantifier scope

(4) Three referees read every abstract. (from Szabolcsi 1997)

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

(7) The authors [that the critics didn't recommend] have ever written a best-selling novel.

(8) Three referees read few abstracts. (from Szabolcsi 1997)
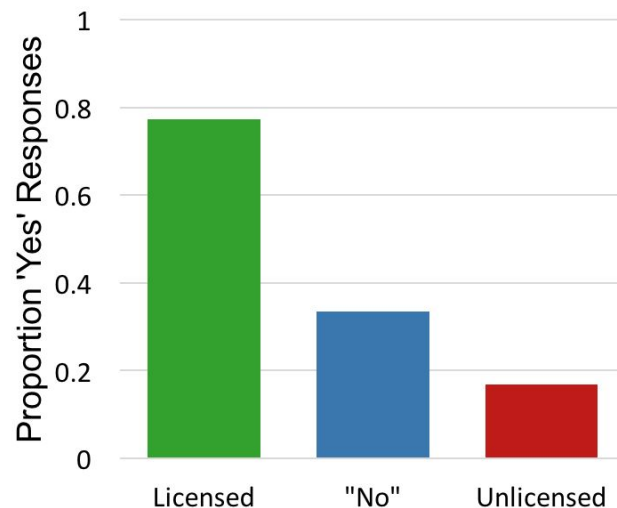
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A scope-based hypothesis

Online sentence comprehension does not perfectly align with the grammar of NPI licensing.

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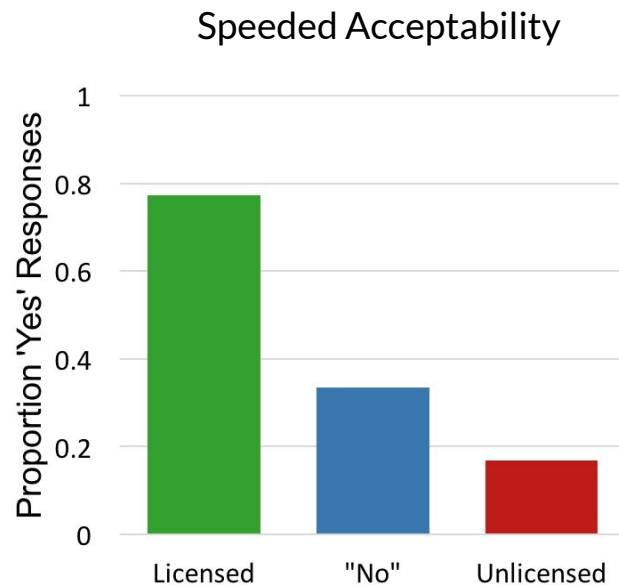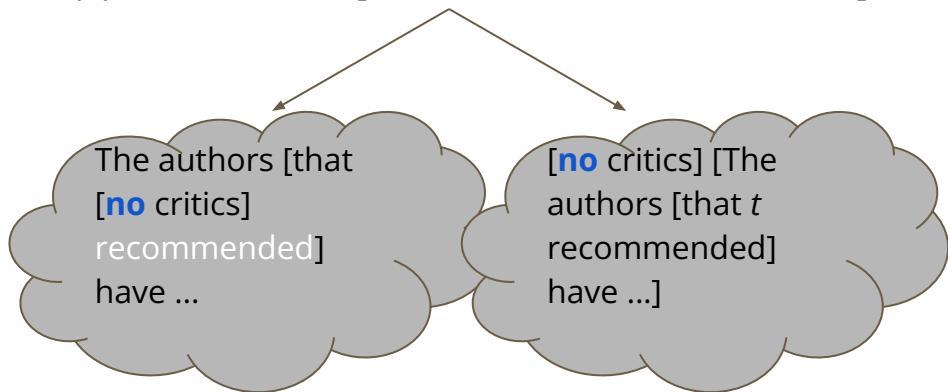
Speeded Acceptability

A scope-based hypothesis

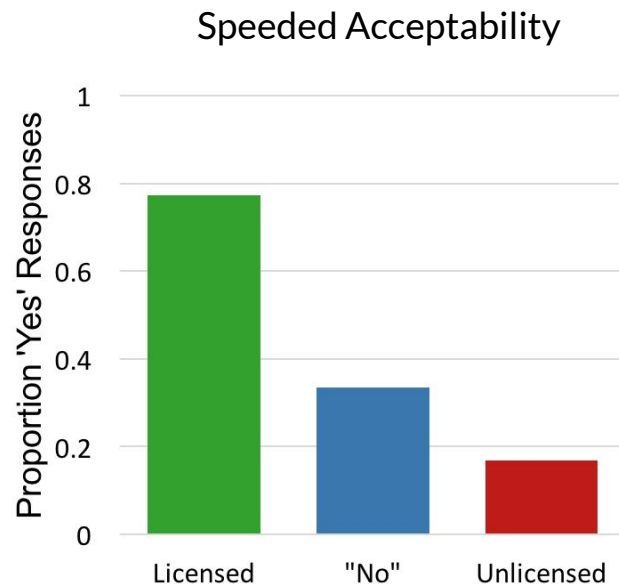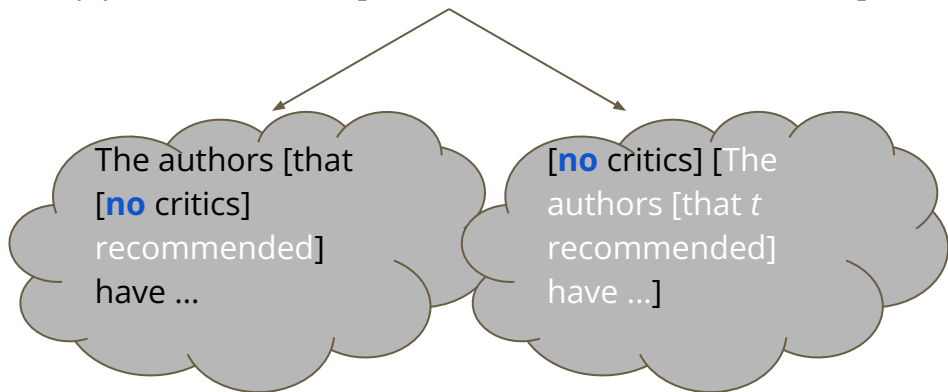Online sentence comprehension does not perfectly align with the grammar of ~~NPI licensing.~~ quantifier scope.

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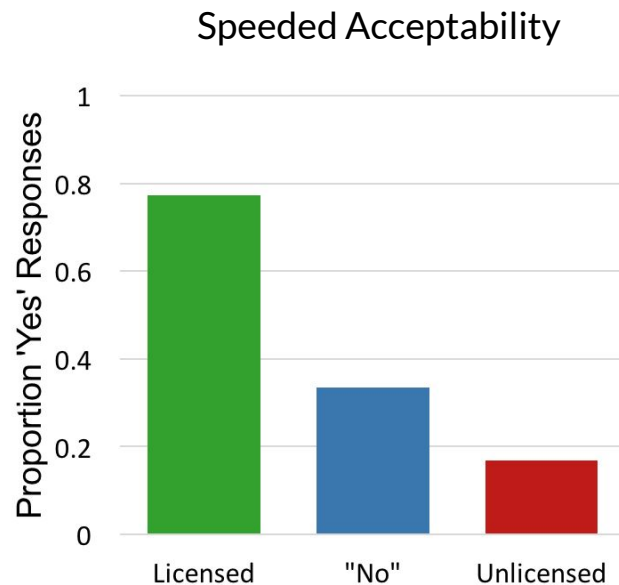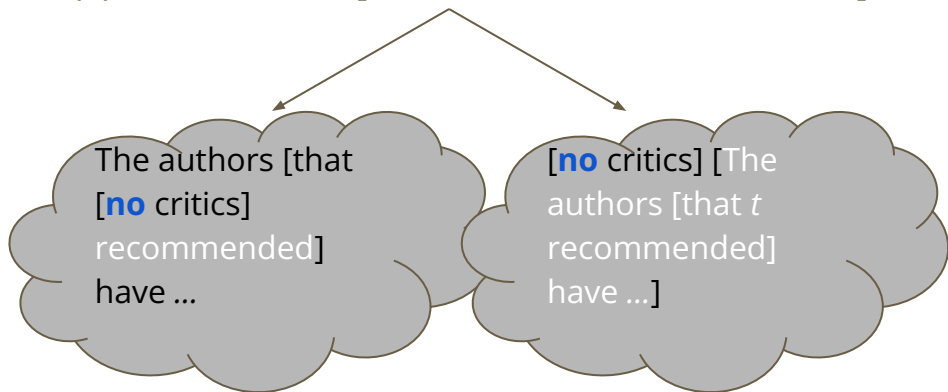(2) *The authors [that **no** critics recommended] have

Speeded Acceptability

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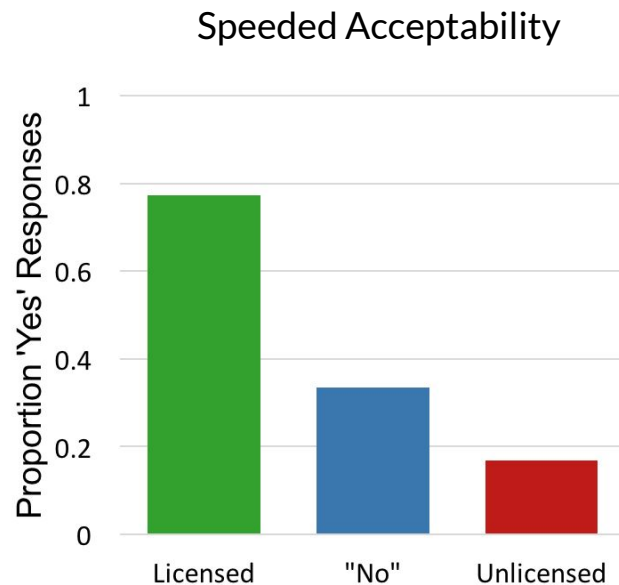Online sentence comprehension does not perfectly align with the grammar of ~~NPI licensing.~~ quantifier scope.

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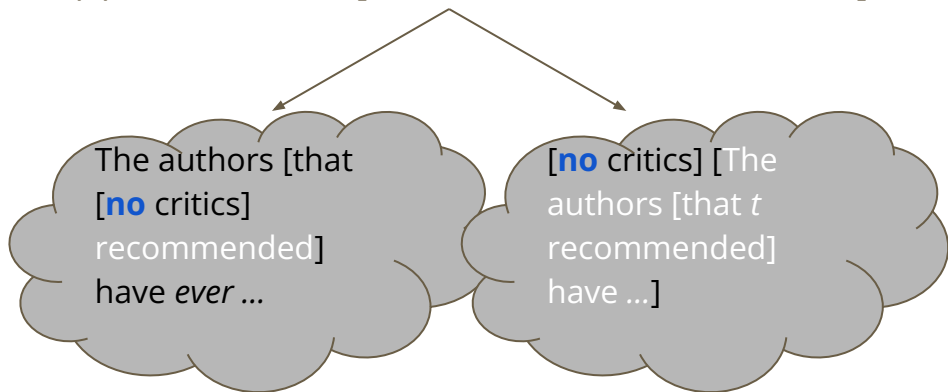Online sentence comprehension does not perfectly align with the grammar of ~~NPI licensing.~~ quantifier scope.

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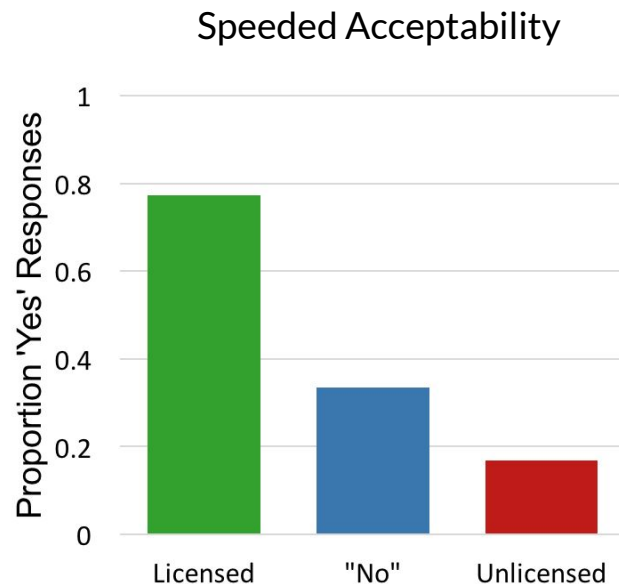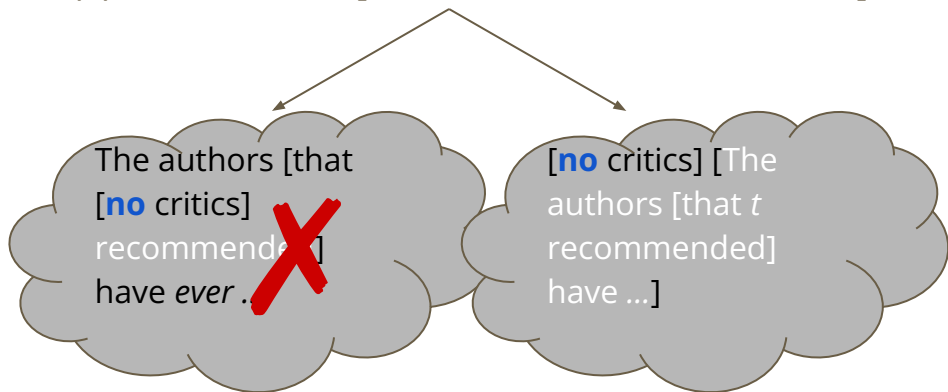Online sentence comprehension does not perfectly align with the grammar of ~~NPI licensing.~~ quantifier scope.

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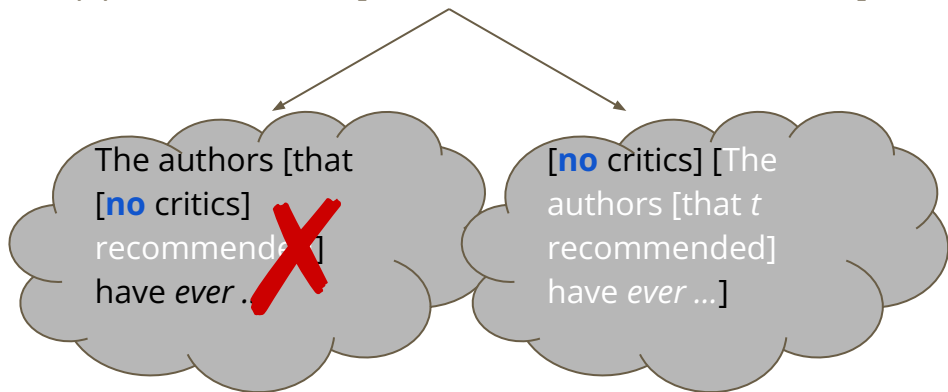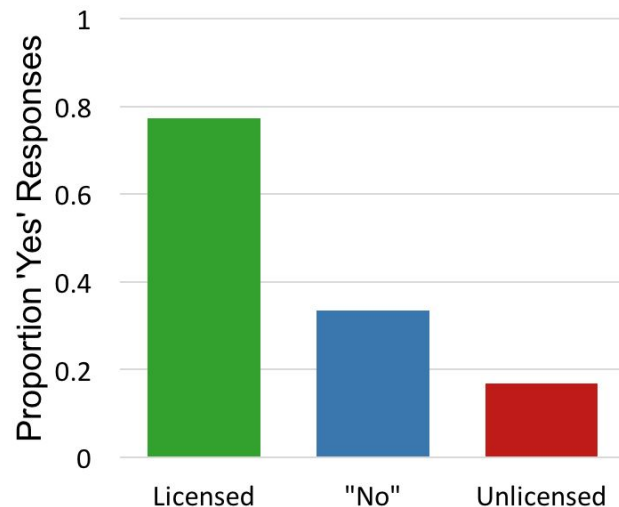(2) *The authors [that **no** critics recommended] have

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

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Speeded Acceptability

A bar chart titled "Speeded Acceptability" with y-axis "Proportion 'Yes' Responses" (0 to 1) and three bars: Licensed (green, ~0.77), "No" (blue, ~0.33), Unlicensed (red, ~0.17).

A scope-based hypothesis

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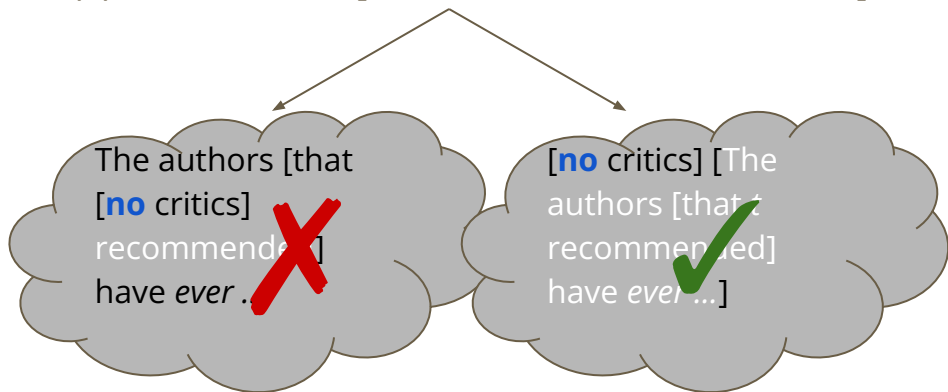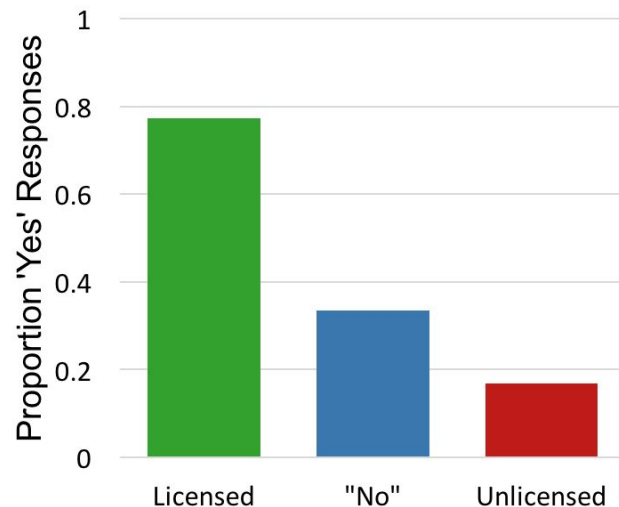(2) *The authors [that **no** critics recommended] have *ever*

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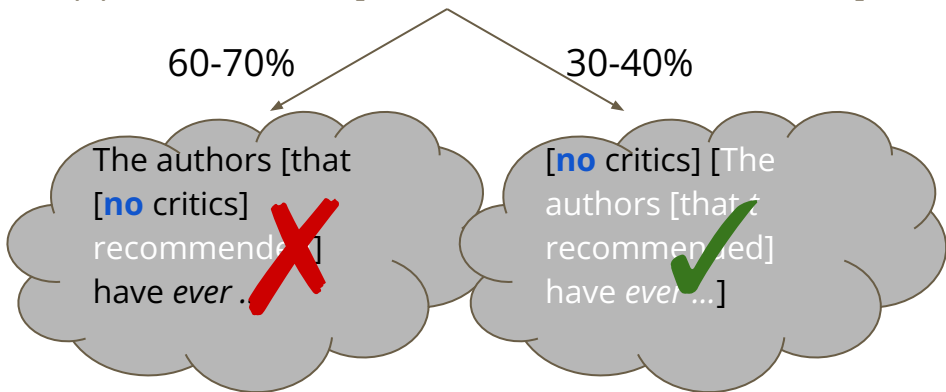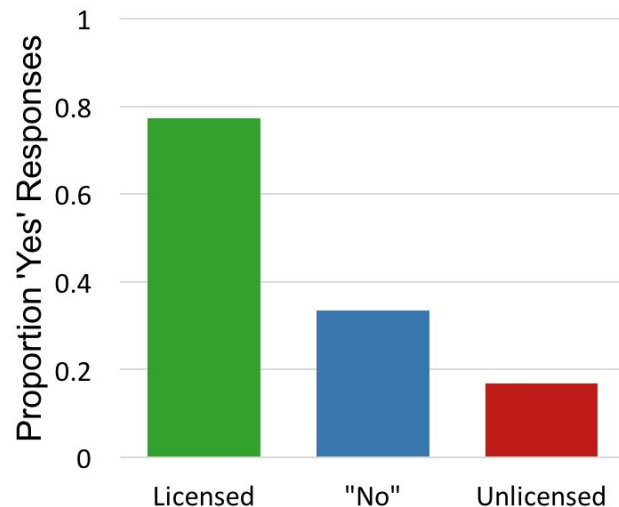(2) *The authors [that **no** critics recommended] have *ever*

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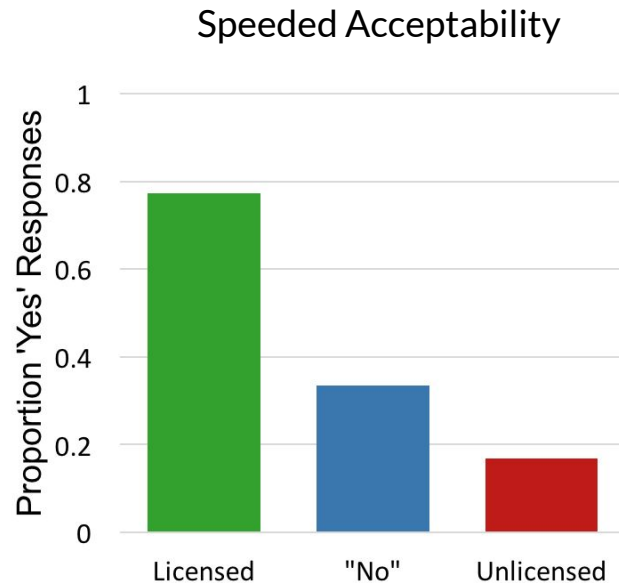
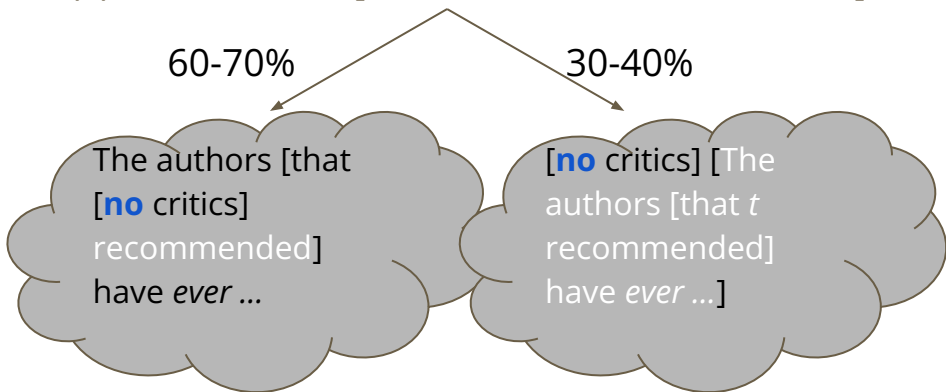(2) *The authors [that **no** critics recommended] have *ever*

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Speeded Acceptability

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(2) *The authors [that **no** critics recommended] have *ever*

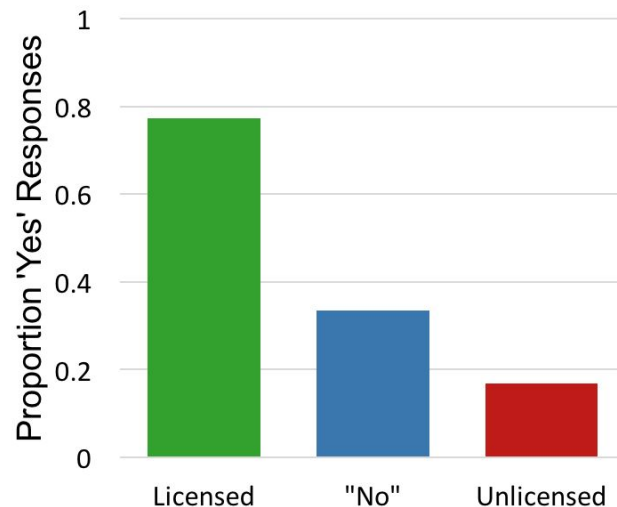The authors [that [**no** critics] recommended] have *ever* ...]

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

Speeded Acceptability

35

A scope-based hypothesis

Online sentence comprehension does not perfectly align with the grammar of ~~NPI licensing.~~ quantifier scope.

(2) *The authors [that **no** critics recommended] have *ever*

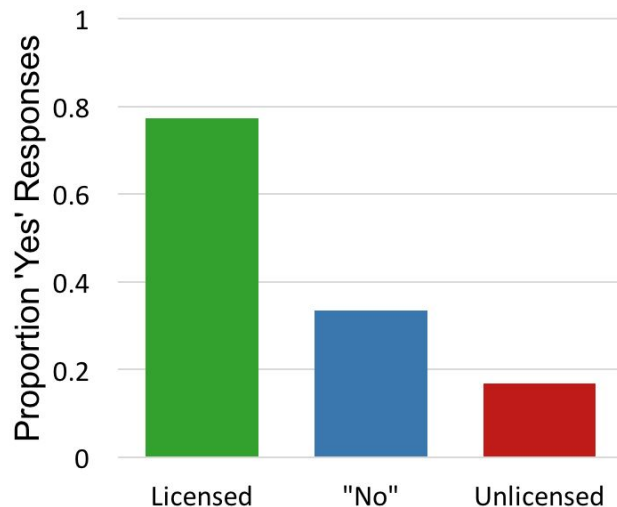The authors [that [**no** critics] recommended] have *ever* ... ❌

[**no** critics] [The authors [that *t* recommended] have *ever* ...] ✓

Speeded Acceptability

A scope-based hypothesis

Online sentence comprehension does not perfectly align with the grammar of ~~NPI licensing.~~ quantifier scope.

(2) *The authors [that **no** critics recommended] have *ever*

60-70%   30-40%
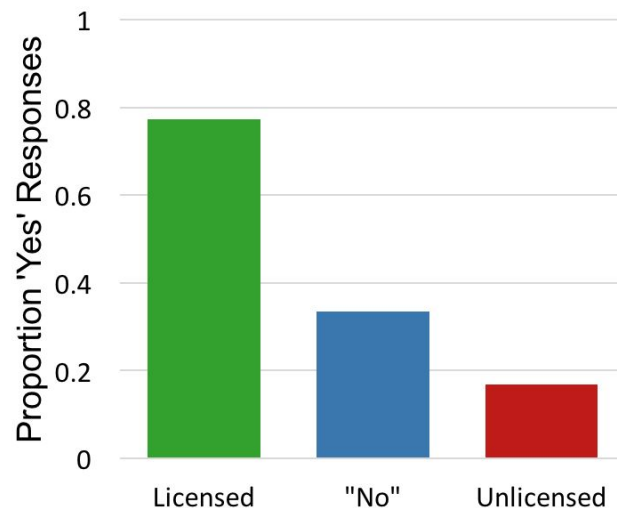
The authors [that [**no** critics] recommended] have *ever* ... ✗

[**no** critics] [The authors [that *t* recommended] have *ever* ...] ✓

Speeded Acceptability

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(2) *The authors [that **no** critics recommended] have *ever*

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

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

Speeded Acceptability

A scope-based hypothesis

Online sentence comprehension does not perfectly align with the grammar of ~~NPI licensing.~~ quantifier scope.

(2) *The authors [that **no** critics recommended] have *ever* written a best-selling novel.
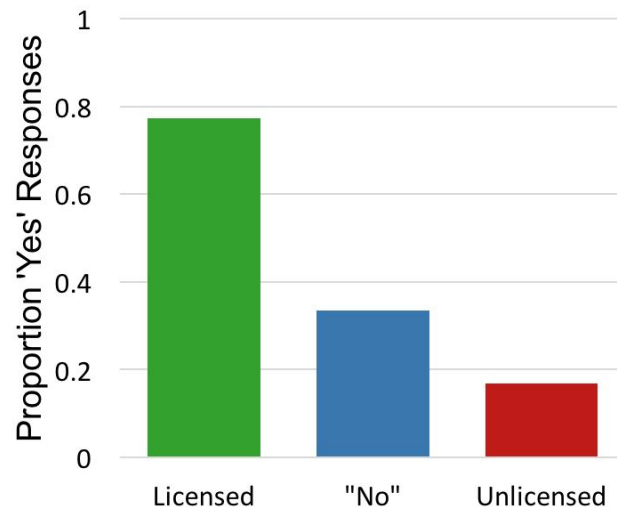
60-70%　　　　　30-40%

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

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

Speeded Acceptability

A scope-based hypothesis

Online sentence comprehension does not perfectly align with the grammar of ~~NPI licensing.~~ quantifier scope.

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

60-70%   30-40%

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

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

Speeded Acceptability

Did the authors write a best-selling novel?

A scope-based hypothesis

Online sentence comprehension does not perfectly align with the grammar of ~~NPI licensing.~~ quantifier scope.

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

60-70%   30-40%

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

Yes

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

No

Speeded Acceptability

Did the authors write a best-selling novel?

A scope-based hypothesis

Online sentence comprehension does not perfectly align with the grammar of ~~NPI licensing.~~ quantifier scope.

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

60-70%   30-40%

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

Yes

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

No

Speeded Acceptability

Did the authors write a best-selling novel?

Experiment design

36 items

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

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

(3)   *The authors [that the critics **didn't** recommend] have *ever* written a best-selling novel.

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

Experiment design

36 items

(1a) **No** authors [that the critics recommended] have *ever* written a best-selling novel.
(1b) **No** authors [that the critics recommended] have written a best-selling novel.

(2a) *The authors [that **no** critics recommended] have *ever* written a best-selling novel.
(2b)   The authors [that **no** critics recommended] have written a best-selling novel.
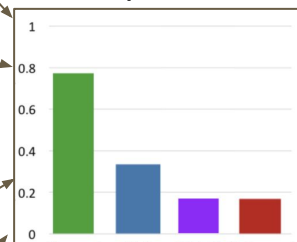
(3a) *The authors [that the critics **didn't** recommend] have *ever* written a best-selling novel.
(3b)   The authors [that the critics **didn't** recommend] have written a best-selling novel.

(4a) *The authors [that the critics recommended] have *ever* written a best-selling novel.
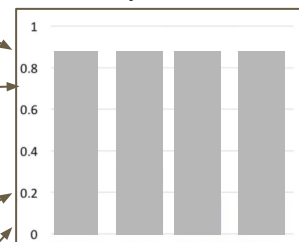(4b)   The authors [that the critics recommended] have written a best-selling novel.

Experiment design

36 items, RSVP

(1a) **No** authors [that the critics recommended] have *ever* written a best-selling novel.
(etc.)

Experiment design

36 items, RSVP

(1a) **No** authors [that the critics recommended] have *ever* written a best-selling novel.
(etc.)

(untimed) "Was the sentence acceptable?" Yes / No

(untimed) "Did the authors write a best-selling novel?" Yes / No / I can't answer

Experiment design

36 items, RSVP

(1a) **No** authors [that the critics recommended] have *ever* written a best-selling novel.
(etc.)

(untimed) "Was the sentence acceptable?" Yes / No

(untimed) "Did the authors write a best-selling novel?" Yes / No / I can't answer

Notes:
- Instructions clarified that definite descriptions in the question (e.g. "the authors") were intended to refer to the same set identified in the sentence
- The "I can't answer" option was for cases where the sentence was judged unacceptable and you can't figure out the intended meaning. This was used rarely.

Experiment design

(1a) **No** authors [that the critics recommended] have *ever* written a best-selling novel.
(1b) **No** authors [that the critics recommended] have written a best-selling novel.

(2a) *The authors [that **no** critics recommended] have *ever* written a best-selling novel.
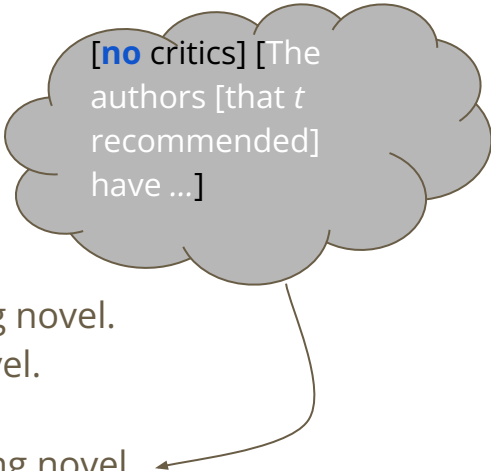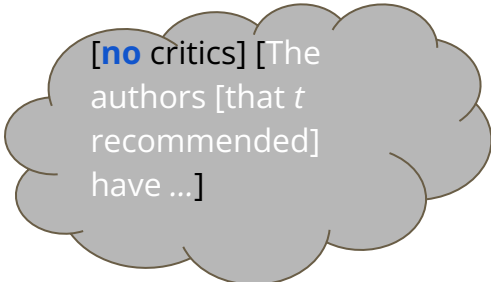(2b)   The authors [that **no** critics recommended] have written a best-selling novel.

(3a) *The authors [that the critics **didn't** recommend] have *ever* written a best-selling novel.
(3b)   The authors [that the critics **didn't** recommend] have written a best-selling novel.

(4a) *The authors [that the critics recommended] have *ever* written a best-selling novel.
(4b)   The authors [that the critics recommended] have written a best-selling novel.

Experiment design

(1a) **No** authors [that the critics recommended] have *ever* written a best-selling novel.
(1b) **No** authors [that the critics recommended] have written a best-selling novel.

(2a) *The authors [that **no** critics recommended] have *ever* written a best-selling novel.
(2b)   The authors [that **no** critics recommended] have written a best-selling novel.

(3a) *The authors [that the critics **didn't** recommend] have *ever* written a best-selling novel.
(3b)   The authors [that the critics **didn't** recommend] have written a best-selling novel.

(4a) *The authors [that the critics recommended] have *ever* written a best-selling novel.
(4b)   The authors [that the critics recommended] have written a best-selling novel.
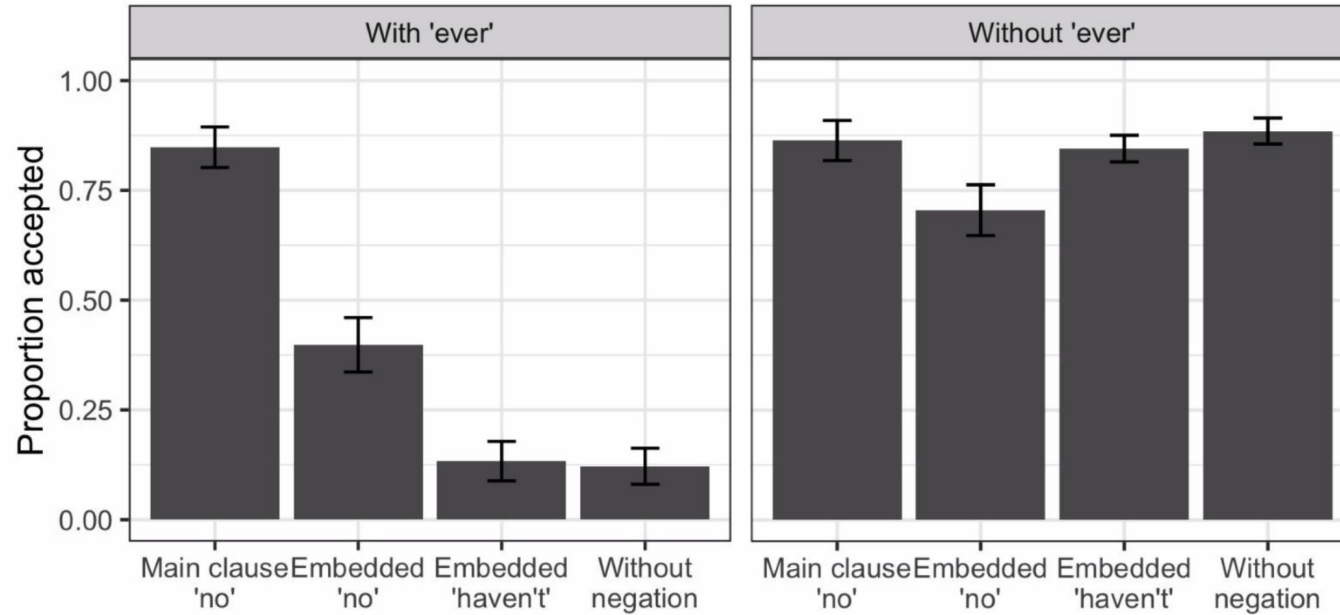
Acceptance

Experiment design

(1a) **No** authors [that the critics recommended] have *ever* written a best-selling novel.
(1b) **No** authors [that the critics recommended] have written a best-selling novel.

Acceptance

(2a) *The authors [that **no** critics recommended] have *ever* written a best-selling novel.
(2b)   The authors [that **no** critics recommended] have written a best-selling novel.

(3a) *The authors [that the critics **didn't** recommend] have *ever* written a best-selling novel.
(3b)   The authors [that the critics **didn't** recommend] have written a best-selling novel.

(4a) *The authors [that the critics recommended] have *ever* written a best-selling novel.
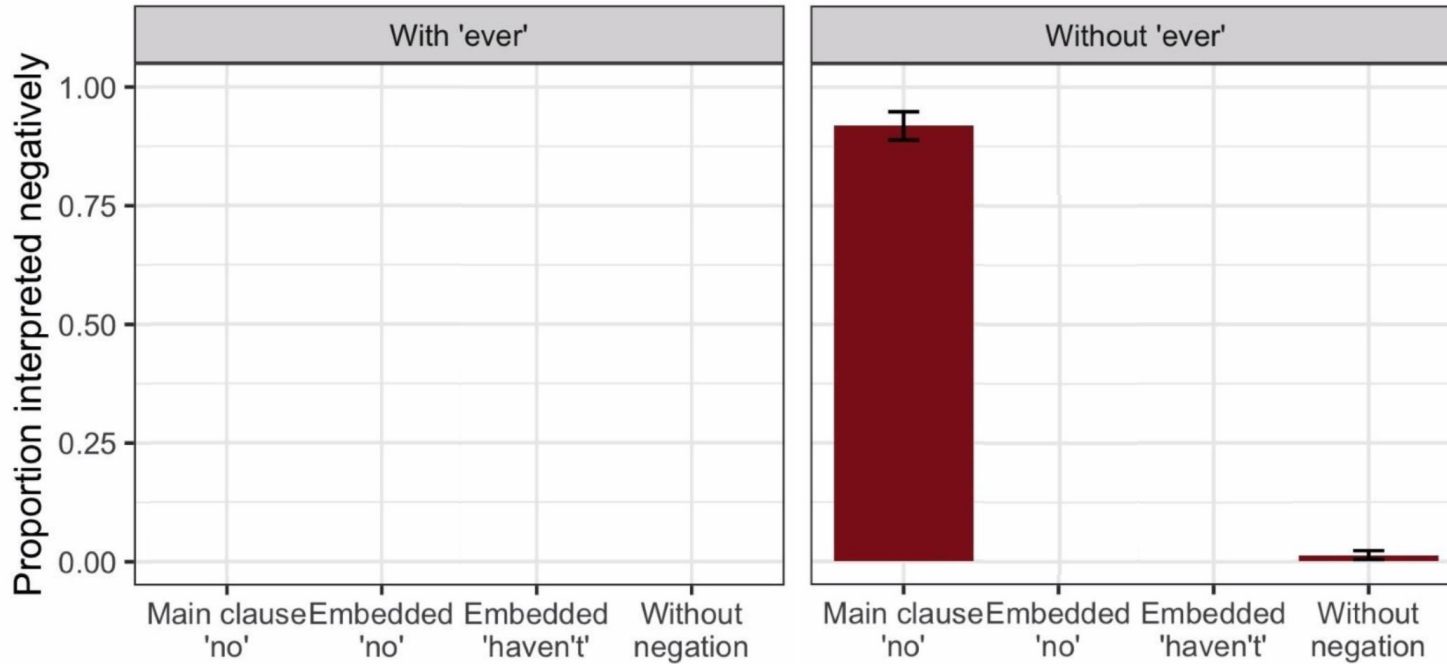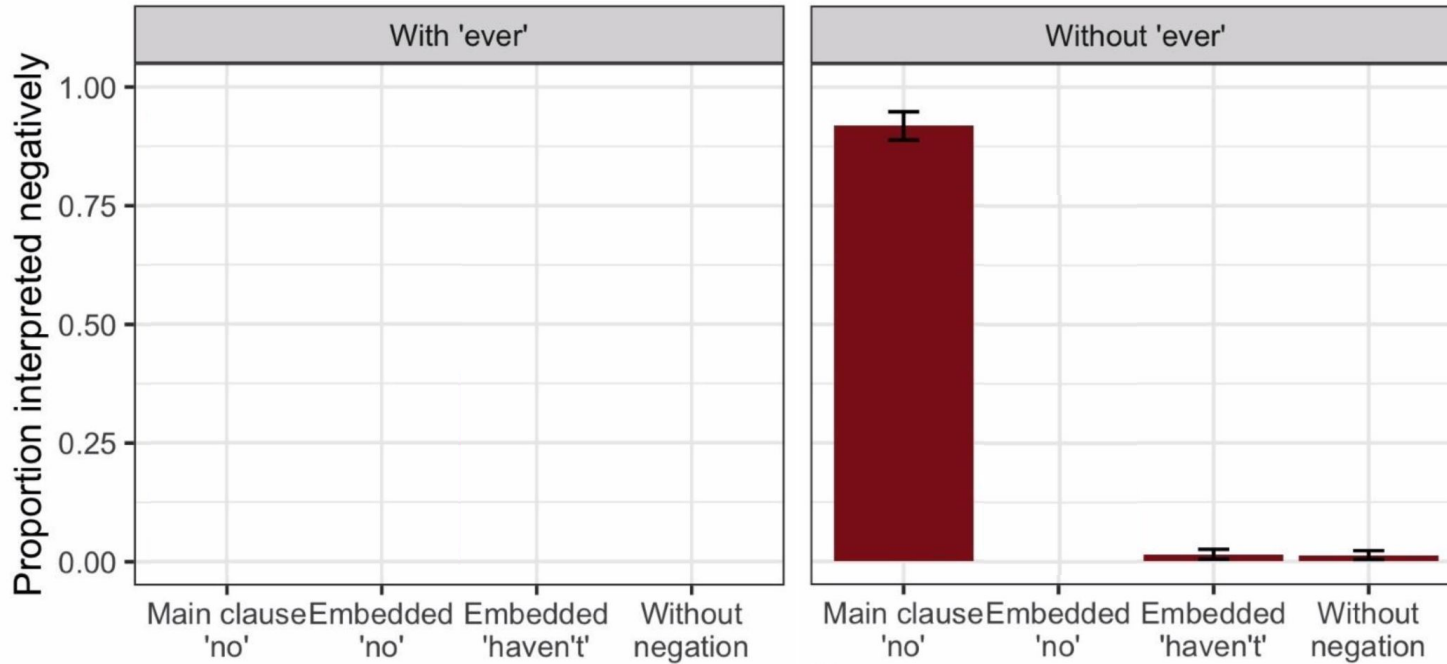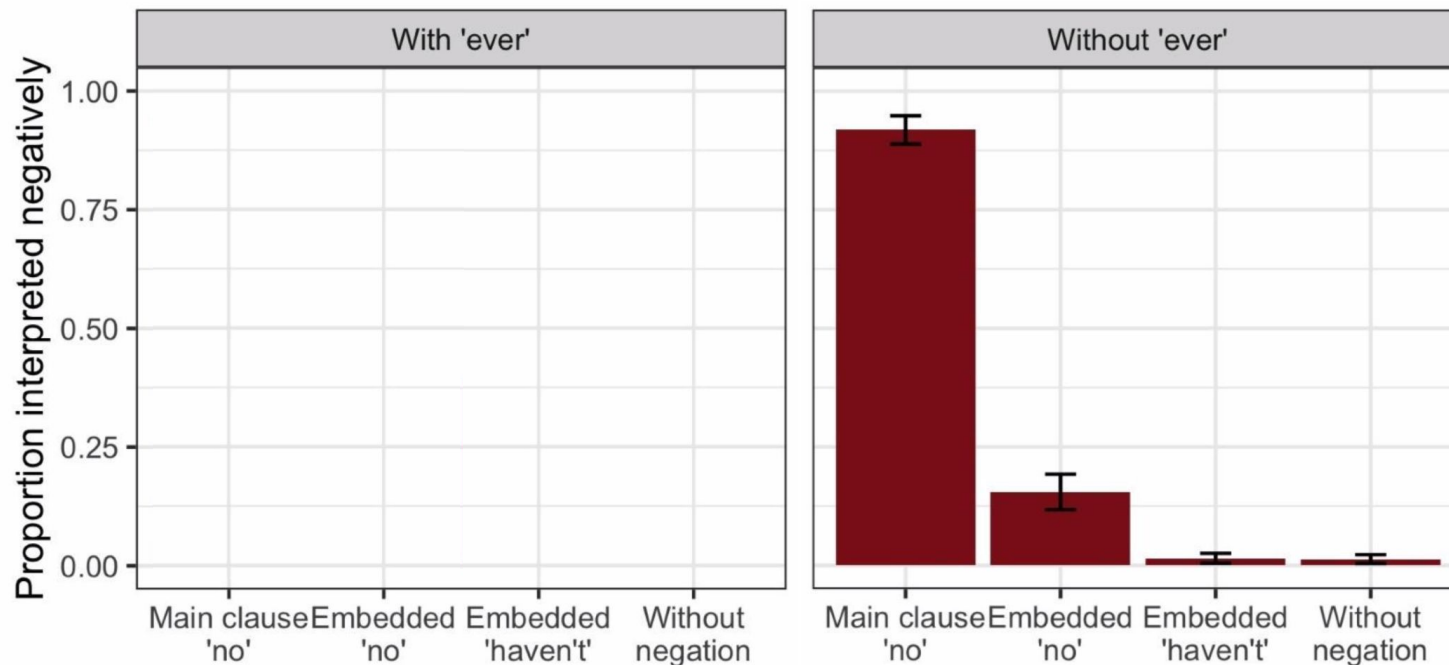(4b)   The authors [that the critics recommended] have written a best-selling novel.

Experiment design

[**no** critics] [The authors [that *t* recommended] have …]

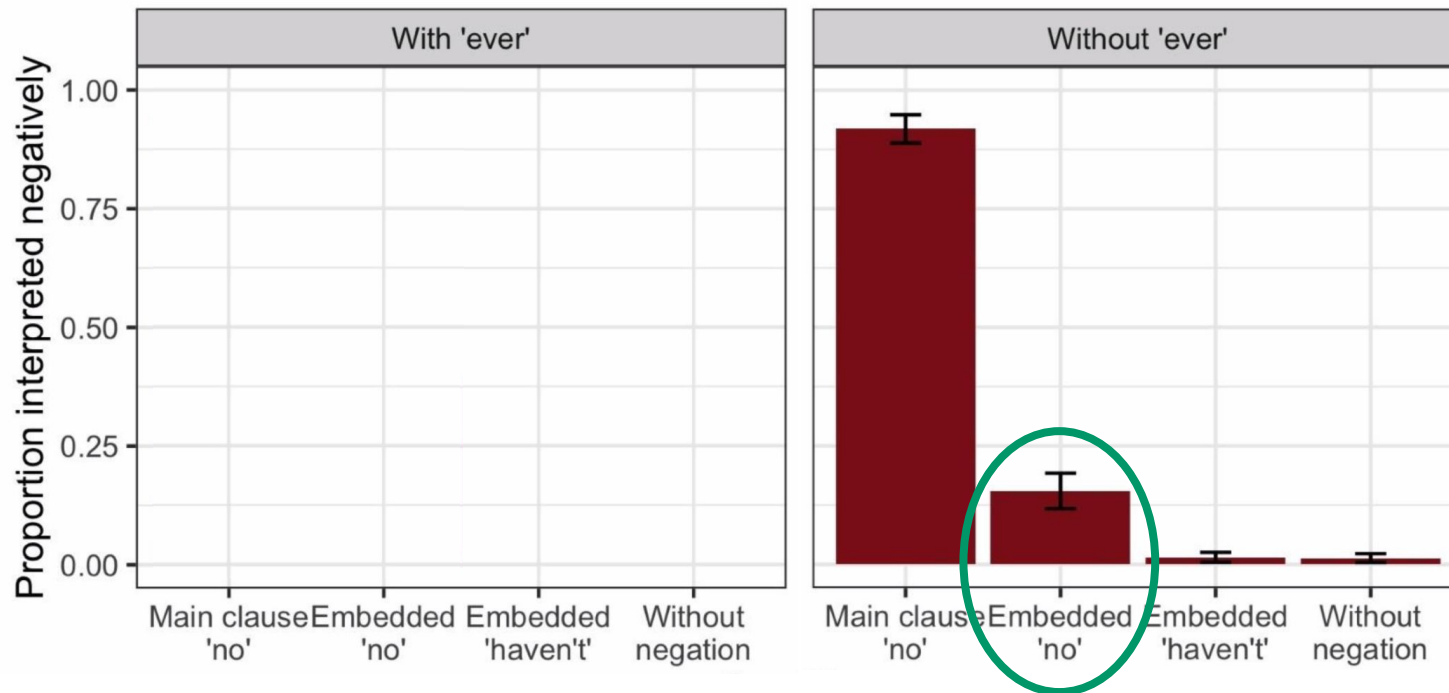(1a) **No** authors [that the critics recommended] have *ever* written a best-selling novel.
(1b) **No** authors [that the critics recommended] have written a best-selling novel.

(2a) *The authors [that **no** critics recommended] have *ever* written a best-selling novel.
(2b)   The authors [that **no** critics recommended] have written a best-selling novel.

(3a) *The authors [that the critics **didn't** recommend] have *ever* written a best-selling novel.
(3b)   The authors [that the critics **didn't** recommend] have written a best-selling novel.

(4a) *The authors [that the critics recommended] have *ever* written a best-selling novel.
(4b)   The authors [that the critics recommended] have written a best-selling novel.

Experiment design

[**no** critics] [The authors [that *t* recommended] have ...]

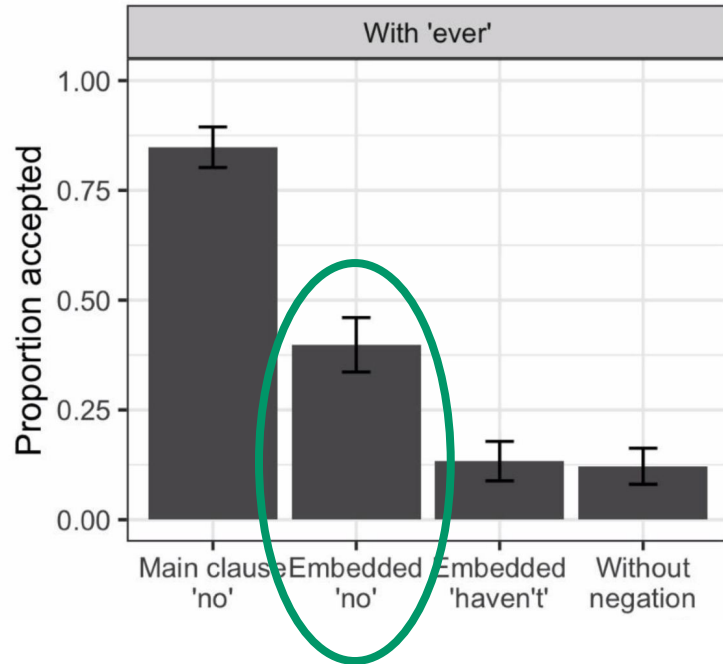(1a) **No** authors [that the critics recommended] have *ever* written a best-selling novel.
(1b) **No** authors [that the critics recommended] have written a best-selling novel.

(2a) *The authors [that **no** critics recommended] have *ever* written a best-selling novel.
(2b)   The authors [that **no** critics recommended] have written a best-selling novel.

(3a) *The authors [that the critics **didn't** recommend] have *ever* written a best-selling novel.
(3b)   The authors [that the critics **didn't** recommend] have written a best-selling novel.

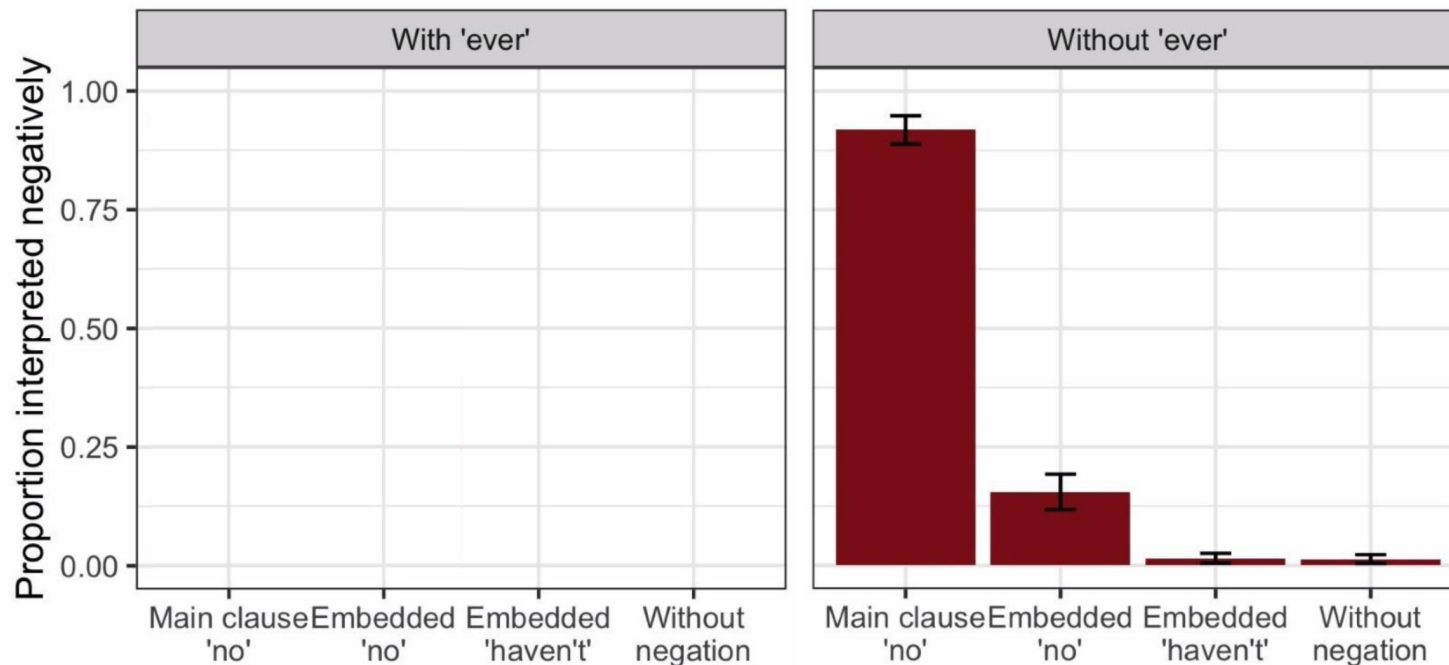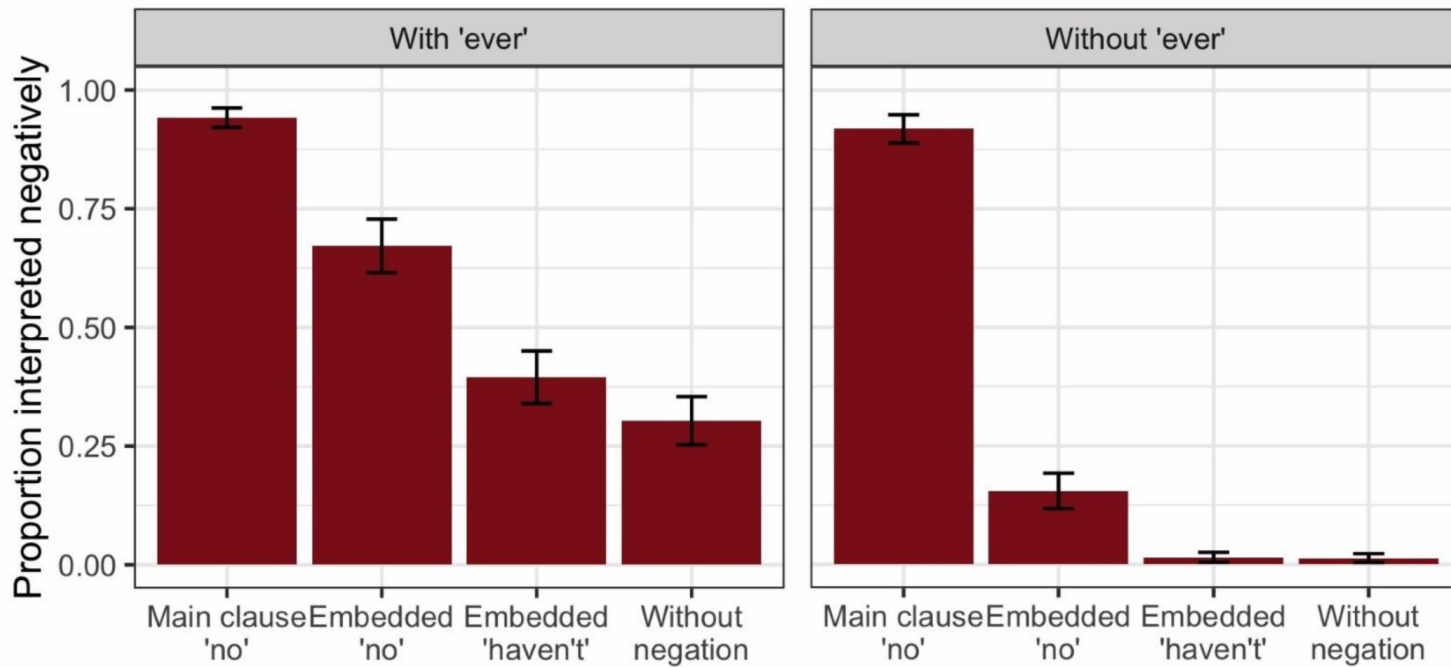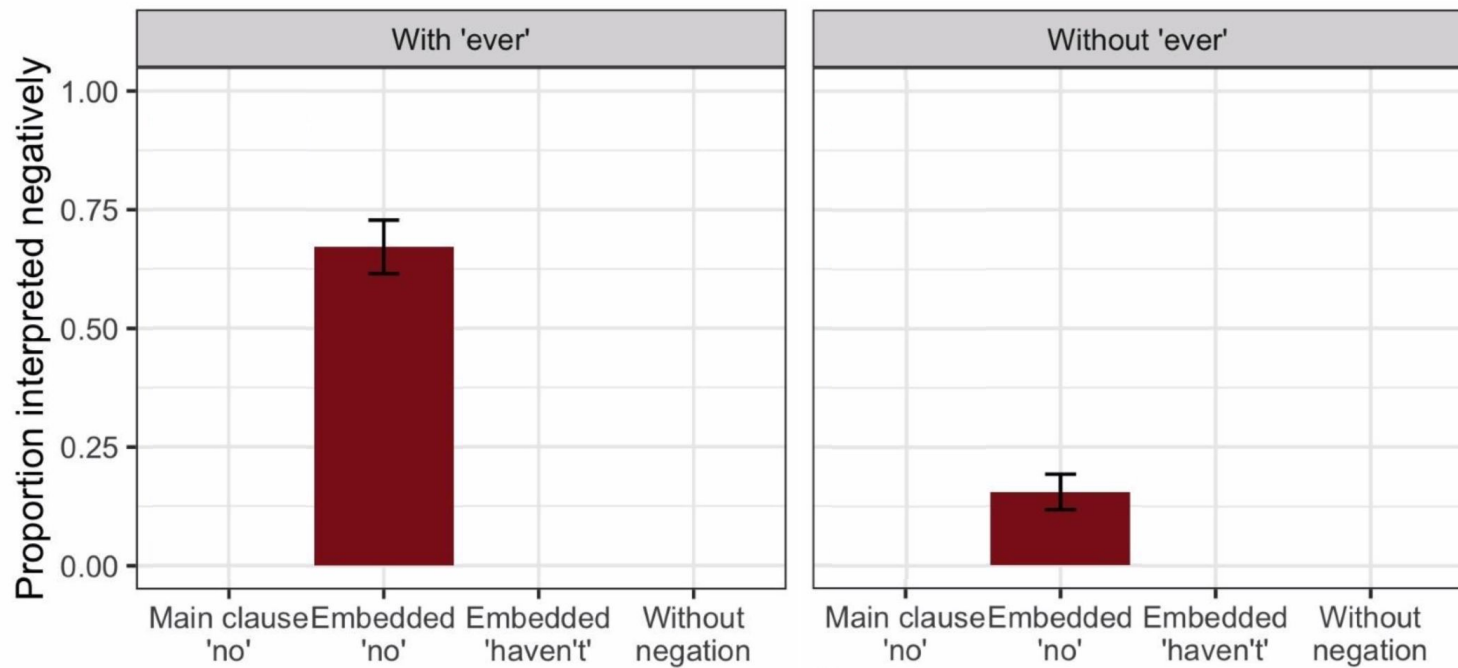(4a) *The authors [that the critics recommended] have *ever* written a best-selling novel.
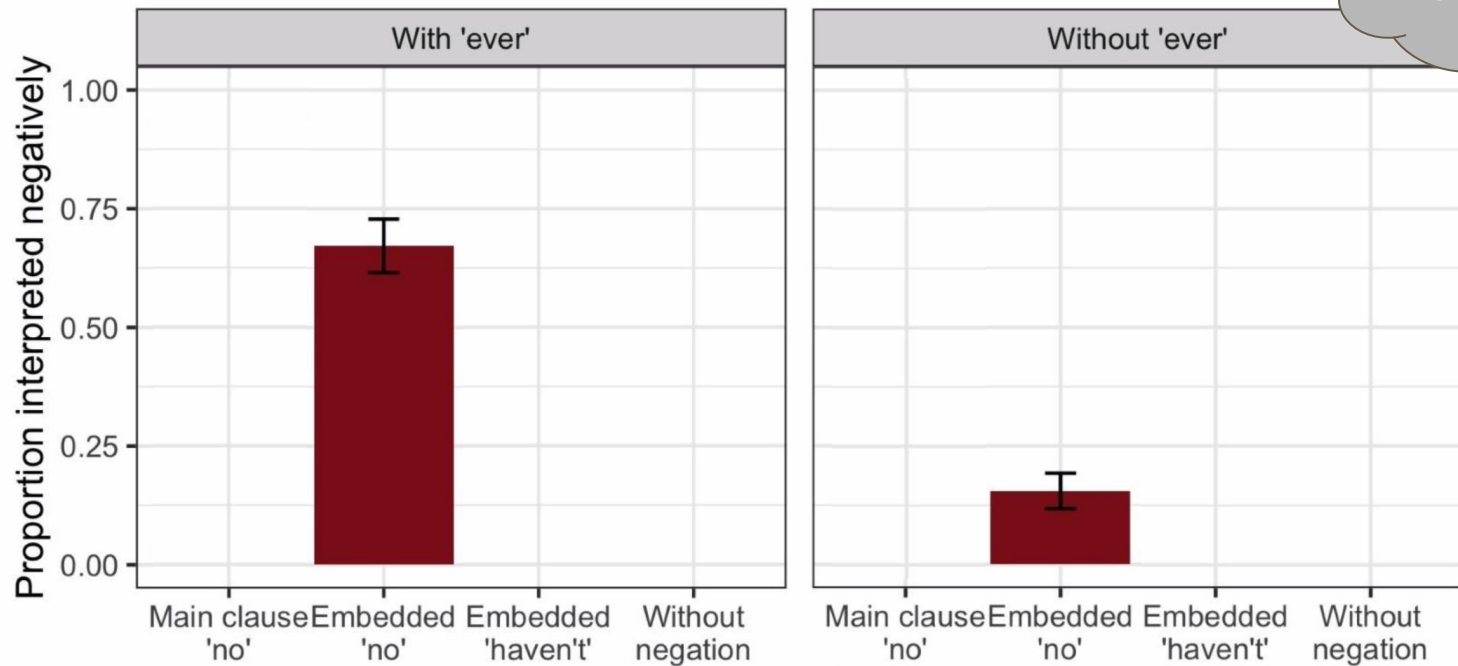(4b)   The authors [that the critics recommended] have written a best-selling novel.

Experiment design

Did the authors write a best-selling novel?

30-40%

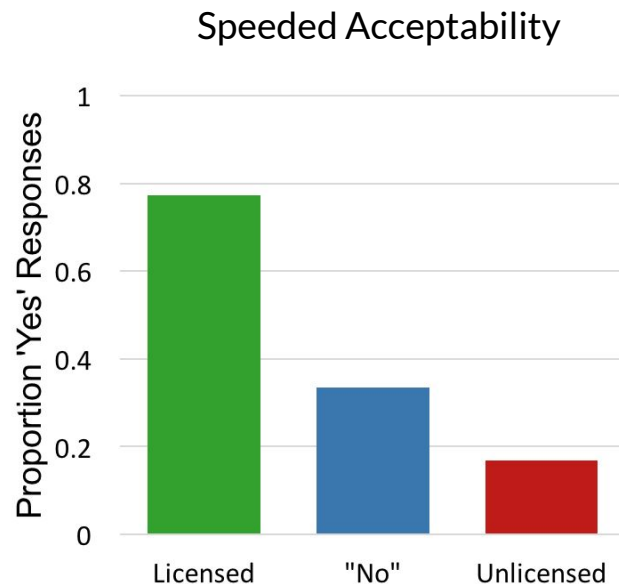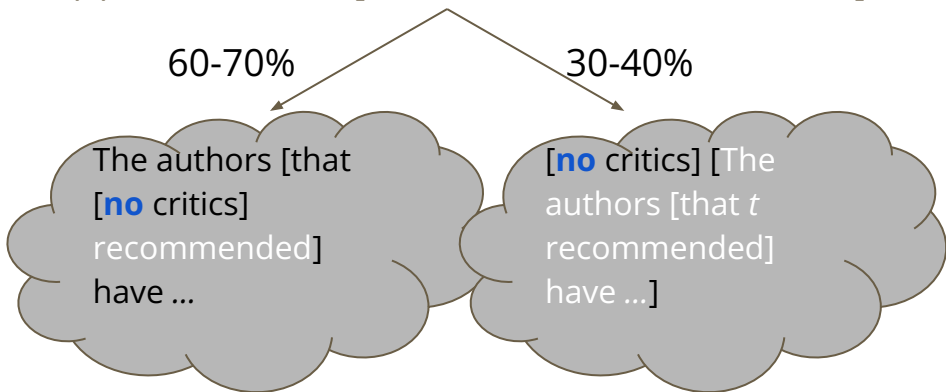[**no** critics] [The authors [that t recommended] have ...]

No

(1a) **No** authors [that the critics recommended] have *ever* written a best-selling novel.
(1b) **No** authors [that the critics recommended] have written a best-selling novel.

(2a) *The authors [that **no** critics recommended] have *ever* written a best-selling novel.
(2b)   The authors [that **no** critics recommended] have written a best-selling novel.

(3a) *The authors [that the critics **didn't** recommend] have *ever* written a best-selling novel.
(3b)   The authors [that the critics **didn't** recommend] have written a best-selling novel.

(4a) *The authors [that the critics recommended] have *ever* written a best-selling novel.
(4b)   The authors [that the critics recommended] have written a best-selling novel.

Findings

Findings

Findings

Findings

(1b) **No** authors [that the critics recommended] have written a best-selling novel.

Findings

(4b) The authors [that the critics recommended] have written a best-selling novel.

Findings

(1b) **No** authors [that the critics recommended] have written a best-selling novel.

(3b) The authors [that the critics **didn't** recommend] have written a best-selling novel.
(4b) The authors [that the critics recommended] have written a best-selling novel.

Findings

(1b) **No** authors [that the critics recommended] have written a best-selling novel.

(2b) The authors [that **no** critics recommended] have written a best-selling novel.

(3b) The authors [that the critics **didn't** recommend] have written a best-selling novel.

(4b) The authors [that the critics recommended] have written a best-selling novel.

Findings

(1b) **No** authors [that the critics recommended] have written a best-selling novel.
(2b) The authors [that **no** critics recommended] have written a best-selling novel.
(3b) The authors [that the critics **didn't** recommend] have written a best-selling novel.
(4b) The authors [that the critics recommended] have written a best-selling novel.

Findings

Findings

(1b) **No** authors [that the critics recommended] have written a best-selling novel.
(2b) The authors [that **no** critics recommended] have written a best-selling novel.
(3b) The authors [that the critics **didn't** recommend] have written a best-selling novel.
(4b) The authors [that the critics recommended] have written a best-selling novel.

Findings

Findings

Findings

Did the authors write a best-selling novel?

30-40%

[**no** critics] [The authors [that *t* recommended] have ...]

No

An additional prediction of the scope-based hypothesis

Online sentence comprehension does not perfectly align with the grammar of ~~NPI licensing.~~ quantifier scope.

(2) *The authors [that **no** critics recommended] have

60-70%   30-40%

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

[**no** critics] [The authors [that *t* recommended] have ...]

Speeded Acceptability

An additional prediction of the scope-based hypothesis

Online sentence comprehension does not perfectly align with the grammar of ~~NPI licensing.~~ quantifier scope.

(2) *The authors [that **no** critics recommended] have

60-70%   30-40%

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

[**no** critics] [The authors [that *t* recommended] have …]

- Globally positive
- NPI is unlicensed
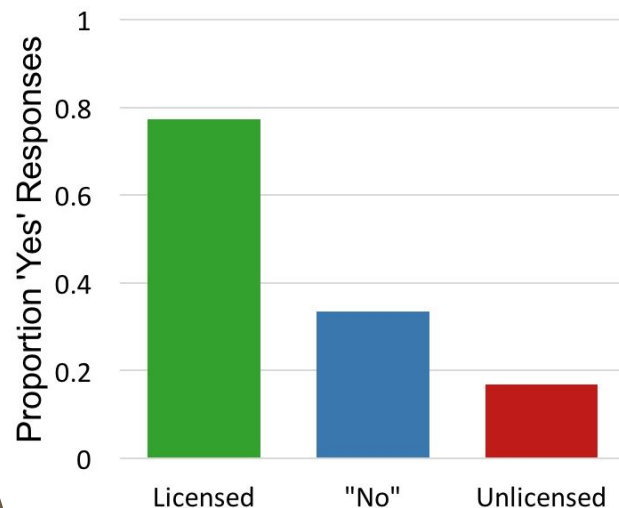
- Globally negative
- NPI is licensed
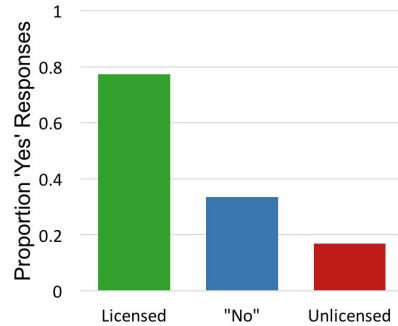
Speeded Acceptability

A prediction of the scope-based hypotheses

A prediction of the scope-based hypotheses
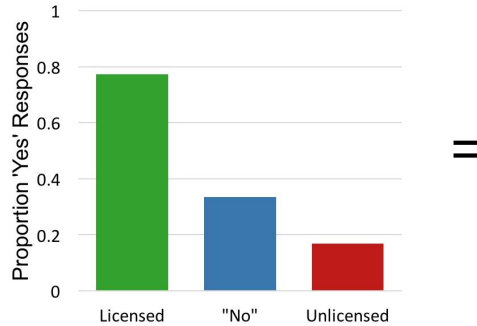
Trials interpreted negatively
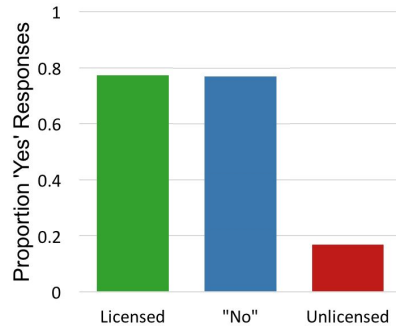
Trials interpreted positively

A prediction of the scope-based hypotheses

=
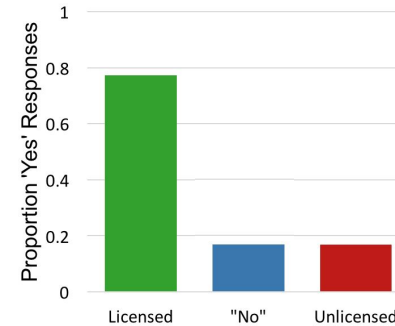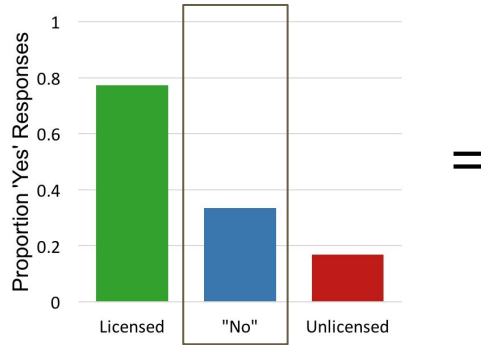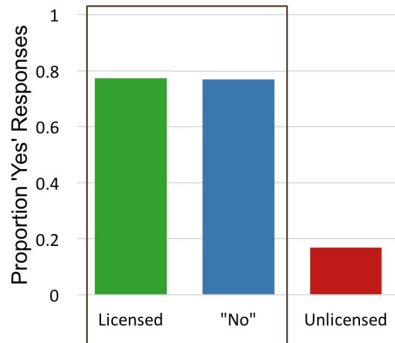
Trials interpreted negatively   Trials interpreted positively

+
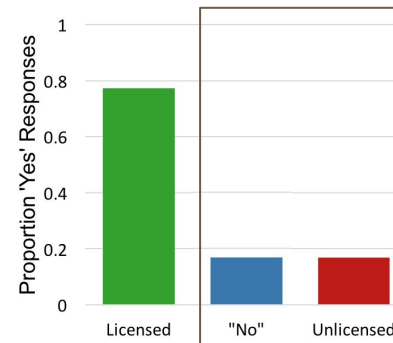
Findings
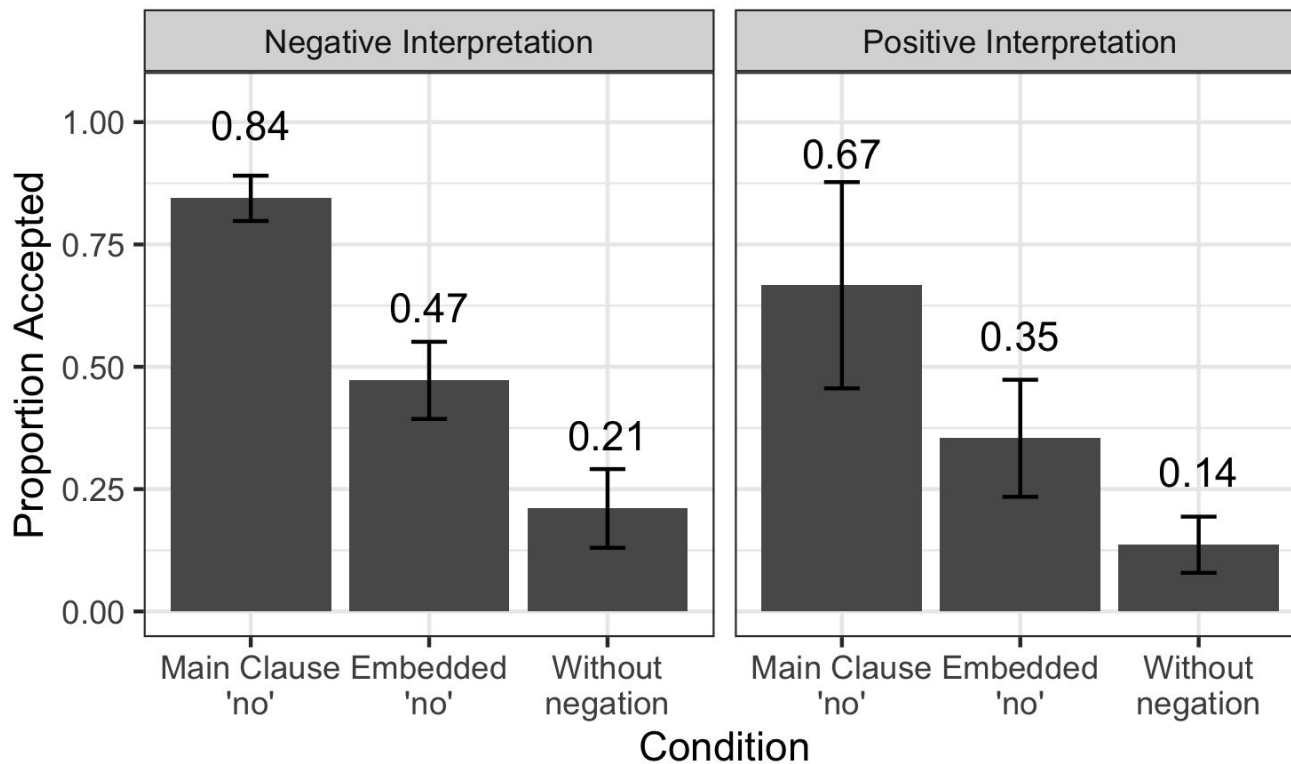
What we've learned so far

What we've learned so far

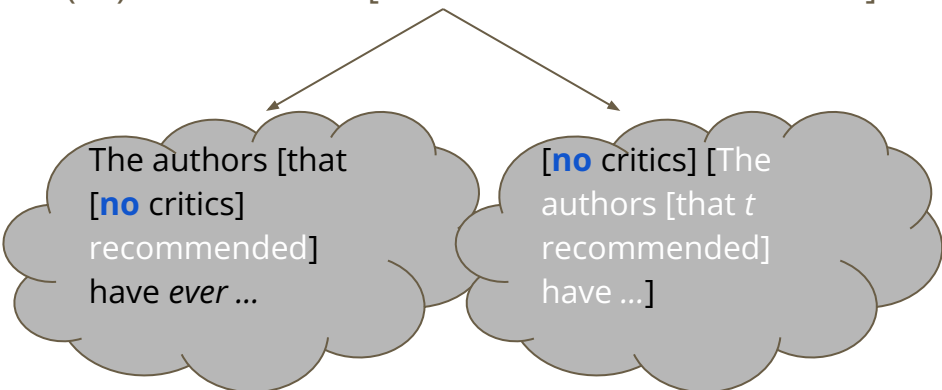**+c-command**
-negative

-c-command
+negative

SEARCH:
+c-command
+negative

(2a) *The authors [that **no** critics recommended] have *ever*

What we've learned so far
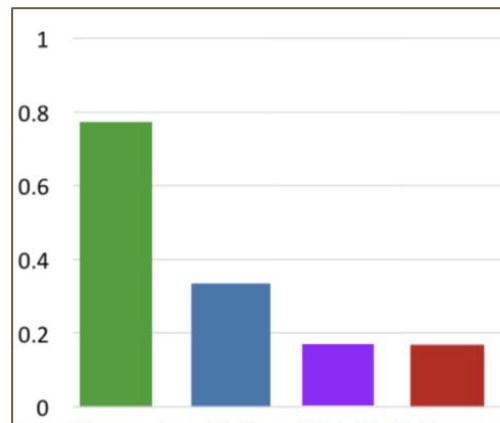
+c-command
-negative

-c-command
+negative

SEARCH:
+c-command
+negative

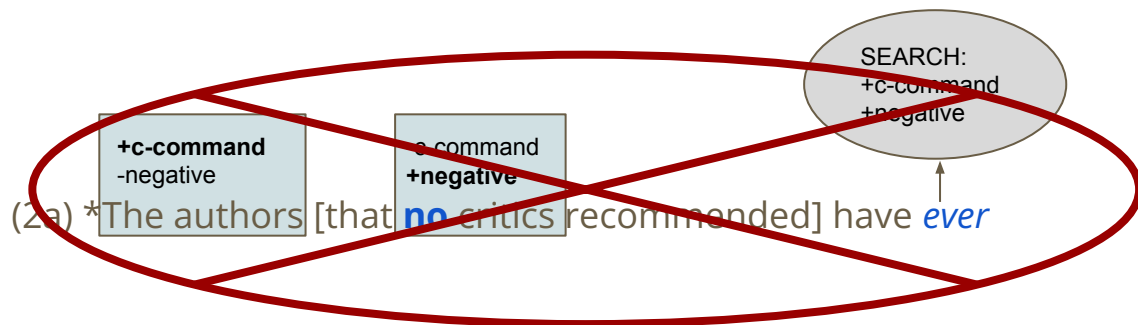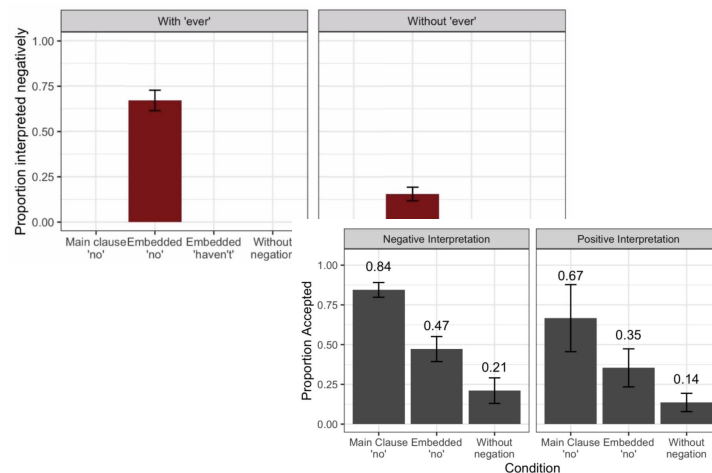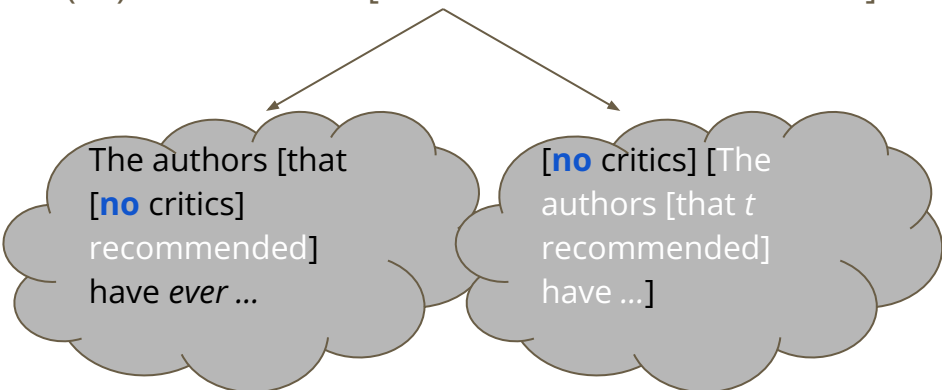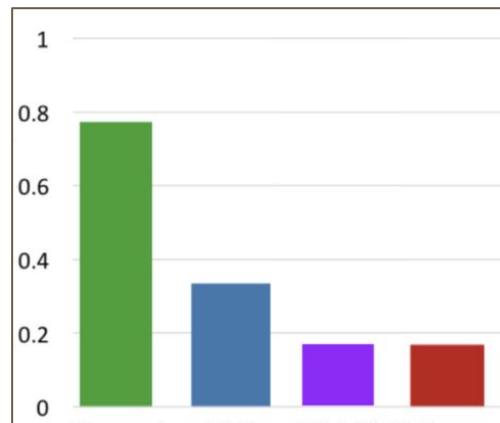(2a) *The authors [that **no** critics recommended] have *ever*

What we've learned so far

+c-command	-c-command	SEARCH:	
-negative	**+negative**	+c-command	
		+negative	

(2a) *The authors [that **no** critics recommended] have *ever*

What we've learned so far

+c-command
-negative

-c-command
+negative

SEARCH:
+c-command
+negative

(2a) *The authors [that **no** critics recommended] have *ever*

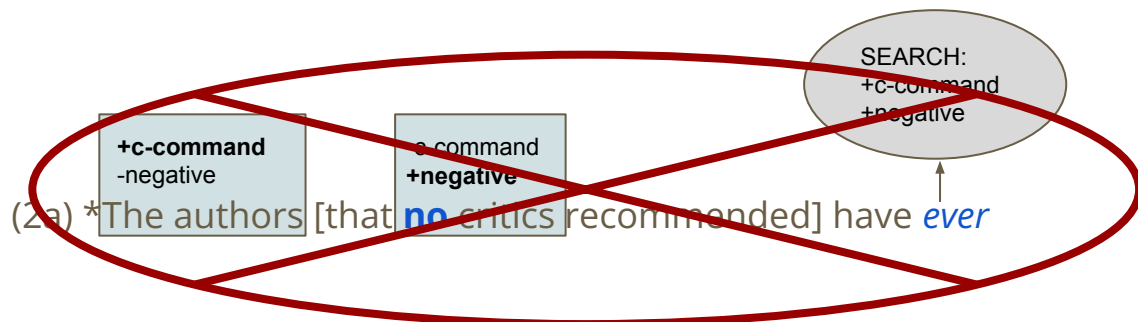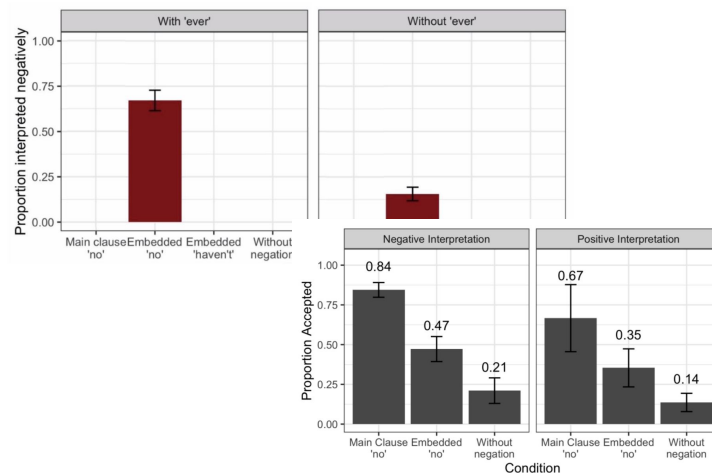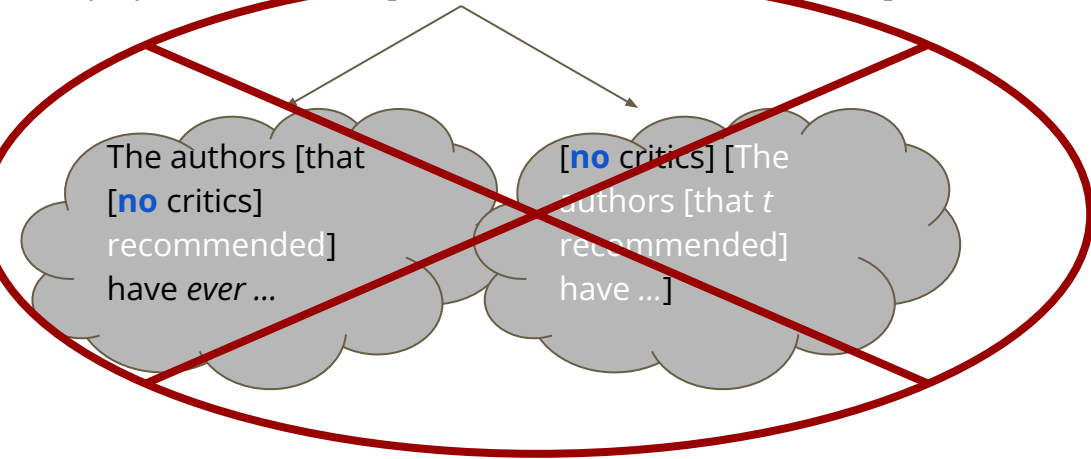(2a) *The authors [that **no** critics recommended] have *ever*

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

[**no** critics] [The authors [that *t* recommended] have ...]

What we've learned so far

+c-command
-negative

+c-command
+negative

SEARCH:
+c-command
+negative

(2a) *The authors [that **no** critics recommended] have *ever*

(2a) *The authors [that **no** critics recommended] have *ever*

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

[**no** critics] [The authors [that *t* recommended] have ...]

What we've learned so far

+c-command	c-command	SEARCH:
-negative	+negative	+c-command
		+negative

(2a) *The authors [that **no** critics recommended] have *ever*

(2a) *The authors [that **no** critics recommended] have *ever*

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

[**no** critics] [The authors [that *t* recommended] have ...]

With 'ever' / Without 'ever'

Proportion interpreted negatively

Main clause 'no' / Embedded 'no' / Embedded 'haven't' / Without negation

Negative Interpretation / Positive Interpretation

Proportion Accepted

0.84   0.47   0.21   0.67   0.35   0.14

Main Clause 'no' / Embedded 'no' / Without negation

Condition

What we've learned so far

SEARCH:
+c-command
+negative

| +c-command | -c-command |
| -negative | +negative |

(2a) *The authors [that **no** critics recommended] have *ever*

(2a) *The authors [that **no** critics recommended] have *ever*

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

[**no** critics] [The authors [that *t* recommended] have …]

What we've learned so far

(2a) *The authors [that **no** critics recommended] have *ever* written a best-selling novel.

What we've learned so far

(2a) *The authors [that **no** critics recommended] have *ever* written a best-selling novel.

What happened before the NPI?

What we've learned so far
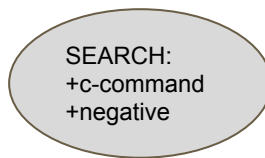
SEARCH:
+c-command
+negative

(2a) *The authors [that **no** critics recommended] have ever written a best-selling novel.

Is this how NPIs are licensed?

Prior to the NPI

(2a) *The authors [that **no** critics recommended] have *ever* written a best-selling novel.
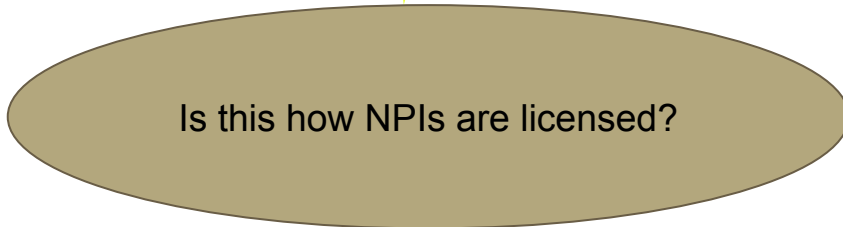
The authors [that
[**no** critics]
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[**no** critics] [The
authors [that *t*
recommended]
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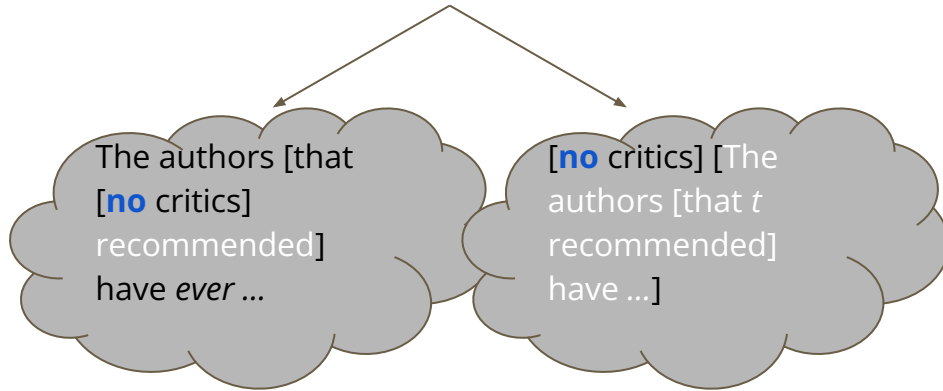
Prior to the NPI

(2a) *The authors [that **no** critics recommended] have *ever* written a best-selling novel.

negation!

Prior to the NPI - processing negation

(2a)   The authors [that **no** critics recommended] have…

negation!

Prior to the NPI - processing negation

The authors [that many critics recommended] have...
The authors [that some critics recommended] have...
The authors [that few critics recommended] have...

(2a)   The authors [that **no** critics recommended] have...

negation!

Prior to the NPI - processing negation

The authors [that many critics recommended] have…
The authors [that some critics recommended] have…
The authors [that few critics recommended] have…

(2a)   The authors [that **no** critics recommended] have…

negation!

Harper Lee   Stephenie Meyer   E.L. James

J.D. Salinger   J.K. Rowling

Ernest Hemingway   William Faulkner

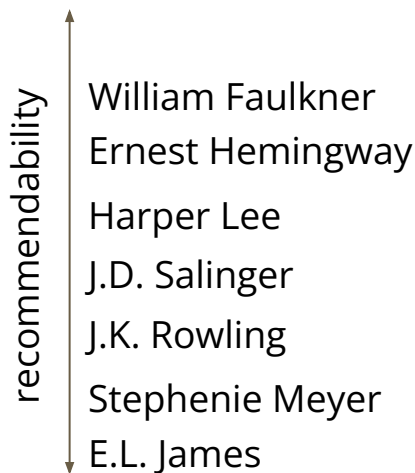# Prior to the NPI - processing negation

The authors [that many critics recommended] have...
The authors [that some critics recommended] have...
The authors [that few critics recommended] have...

(2a)   The authors [that **no** critics recommended] have...

negation!

recommendability

William Faulkner
Ernest Hemingway

Harper Lee

J.D. Salinger

J.K. Rowling

Stephenie Meyer

E.L. James

What happens at the NPI?

SEARCH:
+c-command
+negative

(1a)   **No** authors [that the critics recommended] have *ever* written a best-selling novel.

Is this how NPIs are licensed?

What happens at the NPI?

Integrate into context!

(1a)　**No** authors [that the critics recommended] have *ever* written a best-selling novel.

What licenses NPIs?

Fauconnier 1975: scalar alternatives

What licenses NPIs?

Fauconnier 1975: scalar alternatives

Mary hasn't ever been to Paris.

What licenses NPIs?

Fauconnier 1975: scalar alternatives

Mary hasn't been to Paris in the last month.

Mary hasn't been to Paris in the last year.

Mary hasn't been to Paris in the last 5 years.

Mary hasn't been to Paris in the last 10 years.

Mary hasn't ever been to Paris.

What licenses NPIs?

Fauconnier 1975: scalar alternatives

Mary has been to Paris in the last month.

Mary has been to Paris in the last year.

Mary has been to Paris in the last 5 years.

Mary has been to Paris in the last 10 years.

*Mary has ever been to Paris.

What drives NPI illusions?

SEARCH:
+c-command
+negative

| +c-command
-negative | -c-command
+negative |

(2a) *The authors [that **no** critics recommended] have *ever*

What drives NPI illusions?

The authors [that _{many} critics recommended...
The authors [that _{some} critics recommended]
The authors [that **few** critics recommended] have...

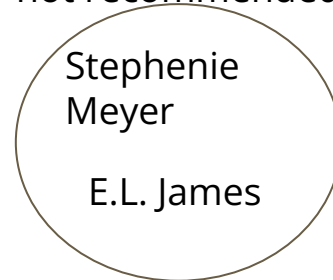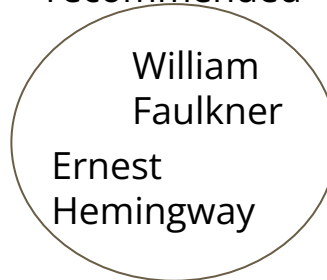(2a) *The authors [that **no** critics recommended] have *ever*

SEARCH:
+c-command
+negative

negation!

What drives NPI illusions?

The authors [that _{many} critics recommended
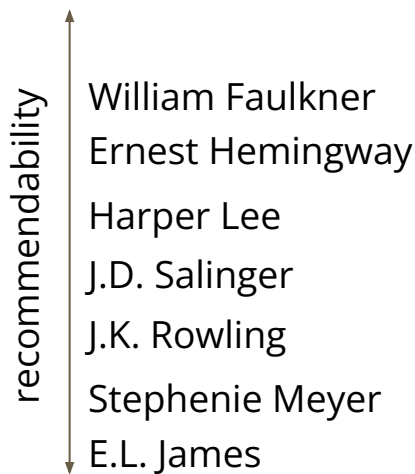The authors [that _{some} critics recommended]
The authors [that **few** critics recommended] have...

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Integrate into context!

negation!

What drives NPI illusions?

The authors [that _{many} critics recommended]...
The authors [that _{some} critics recommended]...
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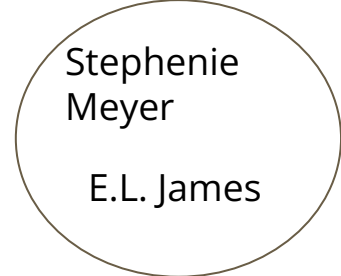
(2a) *The authors *[that no critics recommended]* have *ever*

Integrate into context!

negation!

What drives NPI illusions?

The authors [that many critics recommended] have…
The authors [that some critics recommended] have…
The authors [that few critics recommended] have…

(2a)   The authors [that **no** critics recommended] have…

negation!

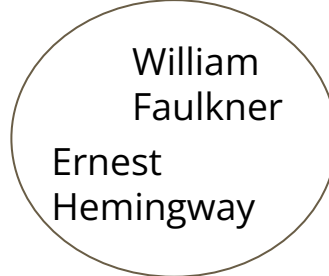(3a)   The authors [that the critics **didn't** recommend] have…

negation!

Prior to the NPI - processing negation

The authors [that _{many} critics recommended] have...
The authors [that _{some} critics recommended] have...
The authors [that **few** critics recommended] have...

(2a)   The authors [that **no** critics recommended] have...

negation!

(3a)   The authors [that the critics **didn't** recommend] have...

negation!

recommendability

William Faulkner
Ernest Hemingway

Harper Lee

J.D. Salinger

J.K. Rowling

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E.L. James

Prior to the NPI - processing negation

The authors [that many critics recommended] have...
The authors [that some critics recommended] have...
The authors [that few critics recommended] have...

(2a) The authors [that **no** critics recommended] have...

negation!

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negation!

recommendability

William Faulkner
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Prior to the NPI - processing negation

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negation!

The authors [that the critics recommended] have…

(3a) The authors [that the critics **didn't** recommend] have…

negation!

recommendability

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Ernest Hemingway

Harper Lee

J.D. Salinger

J.K. Rowling

Stephenie Meyer
E.L. James

recommended

William Faulkner

Ernest Hemingway

not recommended

Stephenie Meyer

E.L. James

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What licenses NPIs?

Fauconnier 1975: scalar alternatives

Mary hasn't been to Paris in the last month.

Mary hasn't been to Paris in the last year.

Mary hasn't been to Paris in the last 5 years.

Mary hasn't been to Paris in the last 10 years.

Mary hasn't ever been to Paris.

Prior to the NPI - processing negation

The authors [that _many_ critics recommended] have...
The authors [that _some_ critics recommended] have...
The authors [that **few** critics recommended] have...

(2a)   The authors [that **no** critics recommended] have...

negation!

The authors [that the critics   recommended] have...

(3a)   The authors [that the critics **didn't** recommend] have...

negation!

recommendability

William Faulkner
Ernest Hemingway

Harper Lee

J.D. Salinger

J.K. Rowling

Stephenie Meyer
E.L. James

recommended

William Faulkner

Ernest Hemingway

not recommended

Stephenie Meyer

E.L. James

What drives NPI illusions?

The authors [that **many** critics recommended]...
The authors [that **some** critics recommended]...
The authors [that **few** critics recommended] have...

Integrate into context!

(2a) *The authors **[that no critics recommended]** have *ever*

negation!
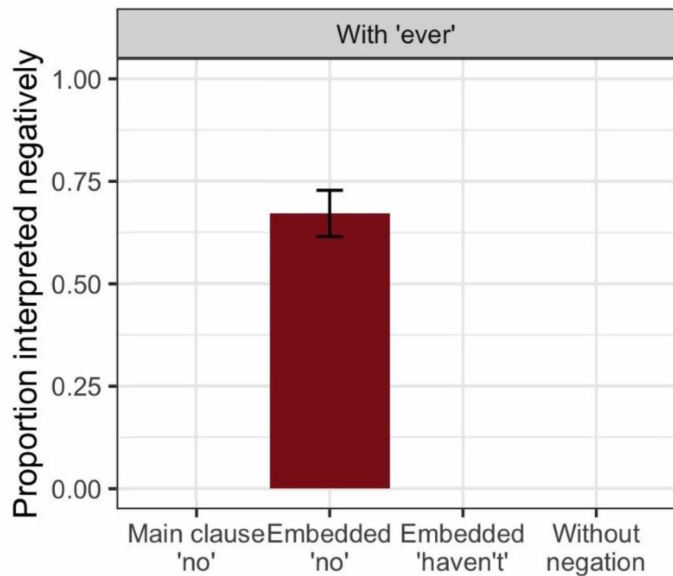
With 'ever'

Proportion interpreted negatively

1.00
0.75
0.50
0.25
0.00

Main clause 'no' Embedded 'no' Embedded 'haven't' Without negation

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After the NPI

(2a) *The authors [that **no** critics recommended] have *ever* <u>written a best-selling novel.</u>

After the NPI

licensed
NPI

(2a) *The authors [that **no** critics recommended] have *ever* written a best-selling novel.

After the NPI

licensed NPI

(2a) *The authors [that **no** critics recommended] have *ever* <u>written a best-selling novel.</u>

With 'ever'

Proportion interpreted negatively

1.00
0.75
0.50
0.25
0.00

Main clause 'no' Embedded 'no' Embedded 'haven't' Without negation

After the NPI

licensed NPI
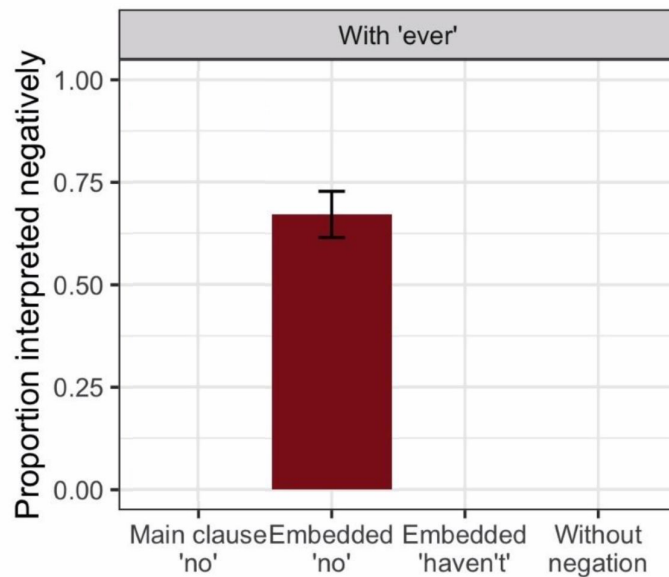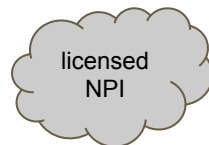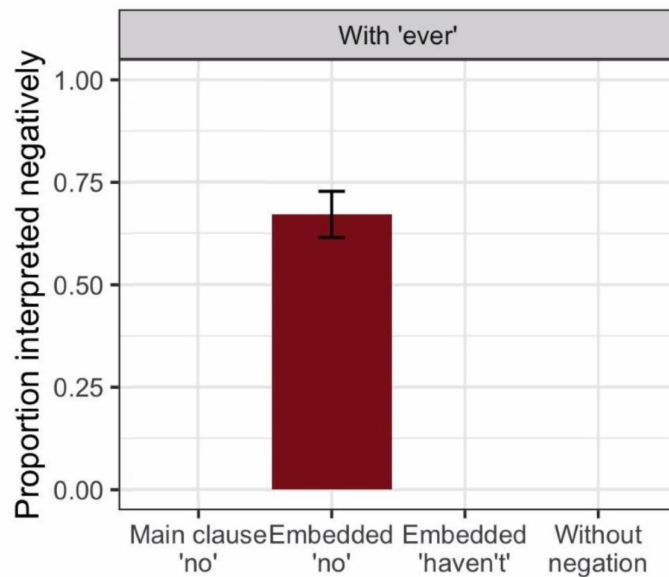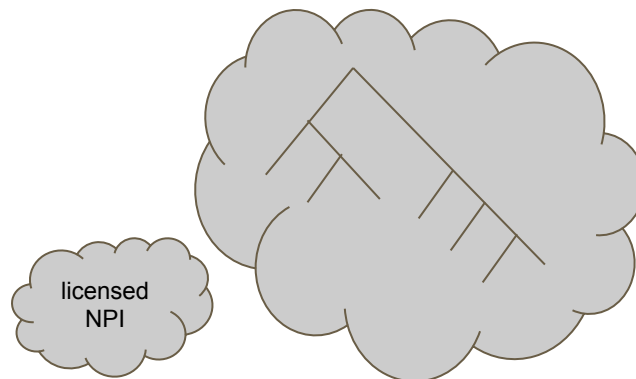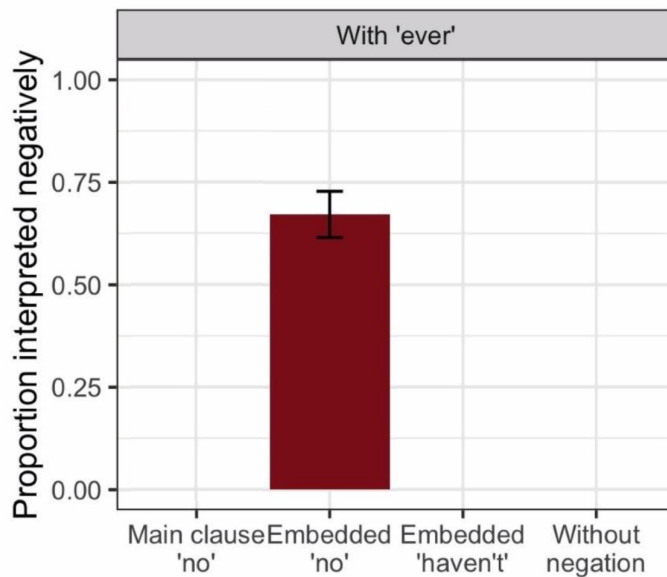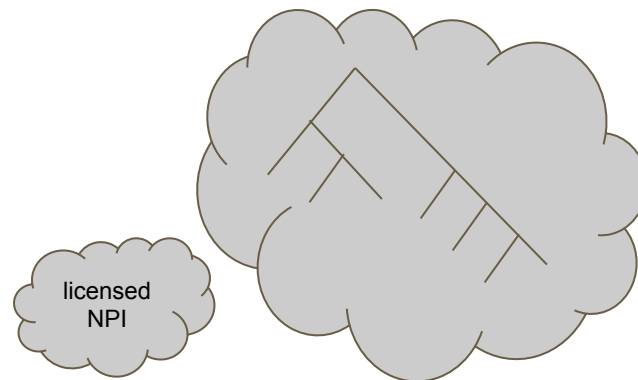
(2a) *The authors [that **no** critics recommended] have *ever* <u>written a best-selling novel.</u>
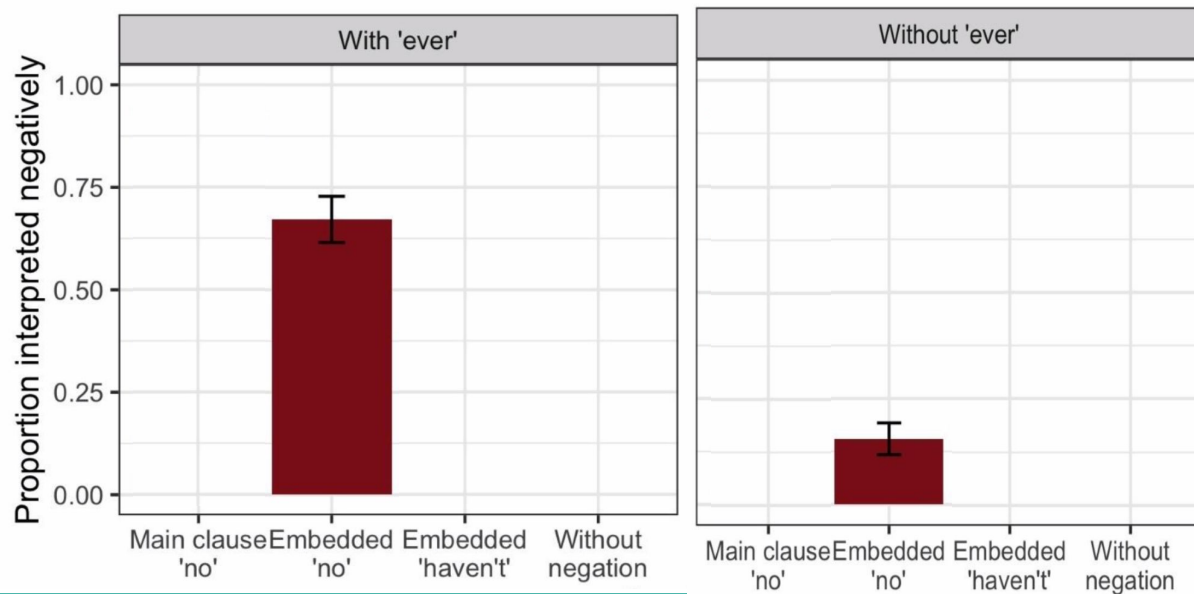
After the NPI - bonus findings

After the NPI - bonus findings

RSVP, timed judgment

After the NPI - bonus findings

RSVP, timed judgment

RSVP, untimed judgment

After the NPI - bonus findings

RSVP, timed judgment

RSVP, untimed judgment
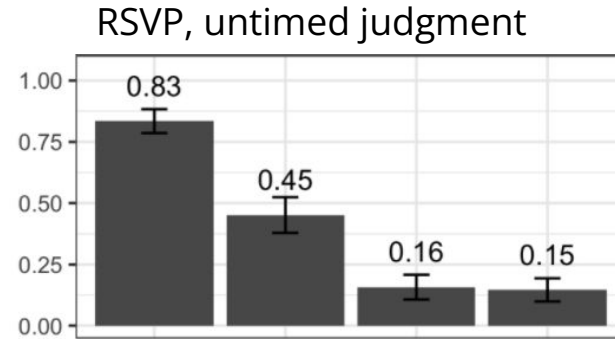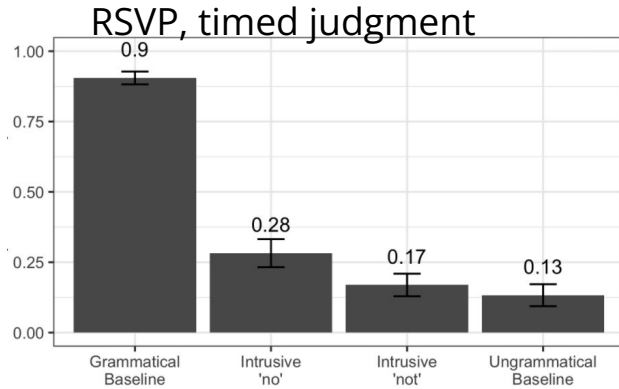
NPIs
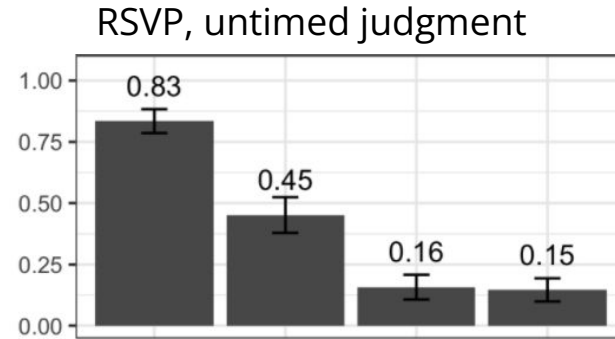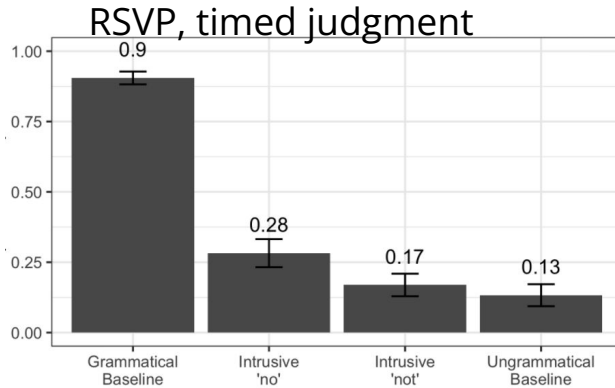
Agreement
attraction
(data from Parker
2019)
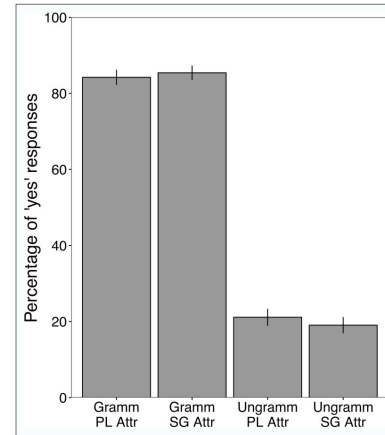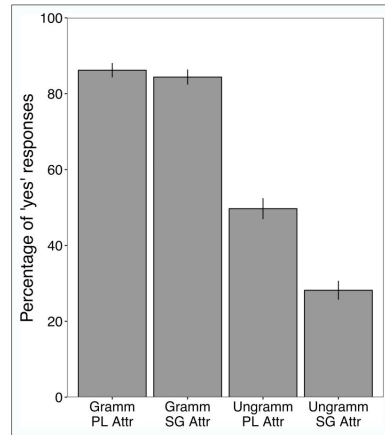
114

Key points

- NPI illusions do not appear to be driven by the erroneous retrieval of a non-c-commanding negative word

Key points

- NPI illusions do not appear to be driven by the erroneous retrieval of a non-c-commanding negative word
- The sentence final interpretation of NPI illusion sentences suggest that the illusion of acceptability is not purely a side effect of a prior error in scope assignment

Key points

- NPI illusions do not appear to be driven by the erroneous retrieval of a non-c-commanding negative word
- The sentence final interpretation of NPI illusion sentences suggest that the illusion of acceptability is not purely a side effect of a prior error in scope assignment
- Illusions may be driven by scalar alternatives introduced by the relative clause, but more work is needed to understand how globally negative interpretations arise

Thank you!

Thanks to audiences at CUNY2020 and the XPRAG.de workshop on The Processing of Negation and Polarity for helpful feedback and discussion.

Cue based retrieval

(1) **No** authors [that the critics recommended] have *ever* …

(2) *The authors [that **no** critics recommended] have *ever* …

(3) *The authors [that the critics recommended] have *ever* …

Cue based retrieval

```
+c-command
+negative
```
(1) **No** authors [that the critics recommended] have *ever* …

(2) *The authors [that **no** critics recommended] have *ever* …

(3) *The authors [that the critics recommended] have *ever* …

Cue based retrieval
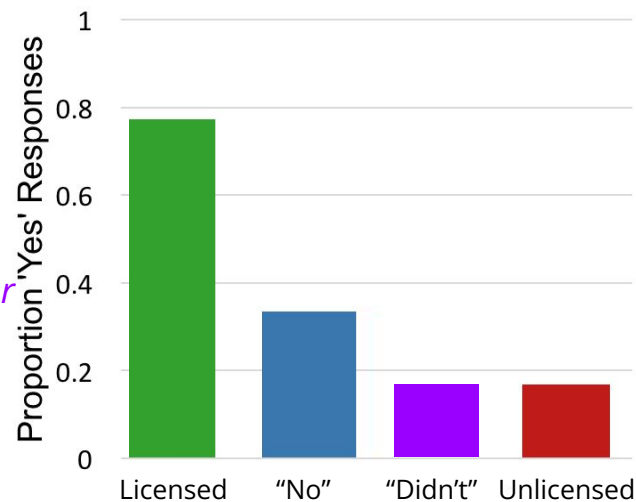
SEARCH:
+c-command
+negative
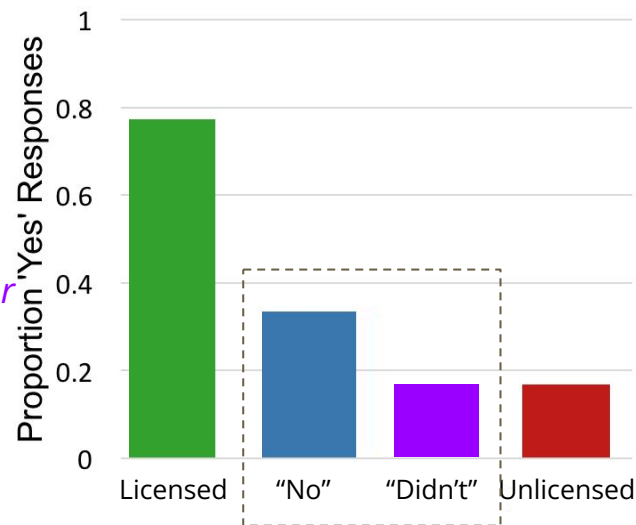
+c-command
+negative

(1) **No** authors [that the critics recommended] have *ever* …

(2) *The authors [that **no** critics recommended] have *ever* …

(3) *The authors [that the critics recommended] have *ever* …

Cue based retrieval

SEARCH:
+c-command
+negative

+c-command
+negative

(1) **No** authors [that the critics recommended] have *ever* …

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Cue based retrieval

(1) **No** authors [that the critics recommended] have *ever* …

(2) *The authors [that **no** critics recommended] have *ever* …

| +c-command | -c-command |
| -negative | +negative |

(3) *The authors [that the critics recommended] have *ever* …

Cue based retrieval

(1) **No** authors [that the critics recommended] h...

+c-command -negative		-c-command +negative

(2) *The authors [that **no** critics recommended] have *ever* ...

SEARCH:
+c-command
+negative

(3) *The authors [that the critics recommended] have *ever* ...

Cue based retrieval

(1) **No** authors [that the critics recommended] h

+c-command
-negative

-c-command
+negative

SEARCH:
+c-command
+negative

(2) *The authors [that **no** critics recommended] have *ever* …

(3) *The authors [that the critics recommended] have *ever* …

Cue based retrieval

(1) **No** authors [that the critics recommended] h...

| **+c-command** |
| -negative |

| -c-command |
| **+negative** |

SEARCH:
+c-command
+negative

(2) *_____ [that _____ recommended] have _ever_ ...

(3) *The authors [that the critics recommended] have _ever_ ...

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Cue based retrieval

(1) **No** authors [that the critics recommended] have *ever* …

(2) *The authors [that **no** critics recommended] have *ever* …

+c-command
-negative

-c-command
-negative

SEARCH:
+c-command
+negative

(3) *The authors [that the critics recommended] have *ever* …

NPI illusion profile

+c-command
-negative

-c-command
+negative

(2a) *The authors [that **no** critics recommended] have *ever*

(2b) *The authors [that the critics **didn't** recommend] have *ever*

Speeded Acceptability

de-Dios-Flores et al. 2017; Orth et al. 2020a 128

NPI illusion profile

(2a) *The authors [that **no** critics recommended] have *ever*

> **+c-command**
> -negative

> -c-command
> **+negative**

(2b) *The authors [that the critics **didn't** recommend] have *ever*

> **+c-command**
> -negative

> -c-command
> **+negative**

Speeded Acceptability

de-Dios-Flores et al. 2017; Orth et al. 2020a

NPI illusion profile

+c-command
-negative

-c-command
+negative

(2a) *The authors [that **no** critics recommended] have *ever*

+c-command
-negative

-c-command
+negative

(2b) *The authors [that the critics **didn't** recommend] have *ever*

Speeded Acceptability

de-Dios-Flores et al. 2017; Orth et al. 2020a

Tunstall 1998

Kelly showed **a** photo to **every** critic last month. The photo / photos …

Kelly showed **every** photo to **a** critic last month. The critics / critics …

Tunstall 1998
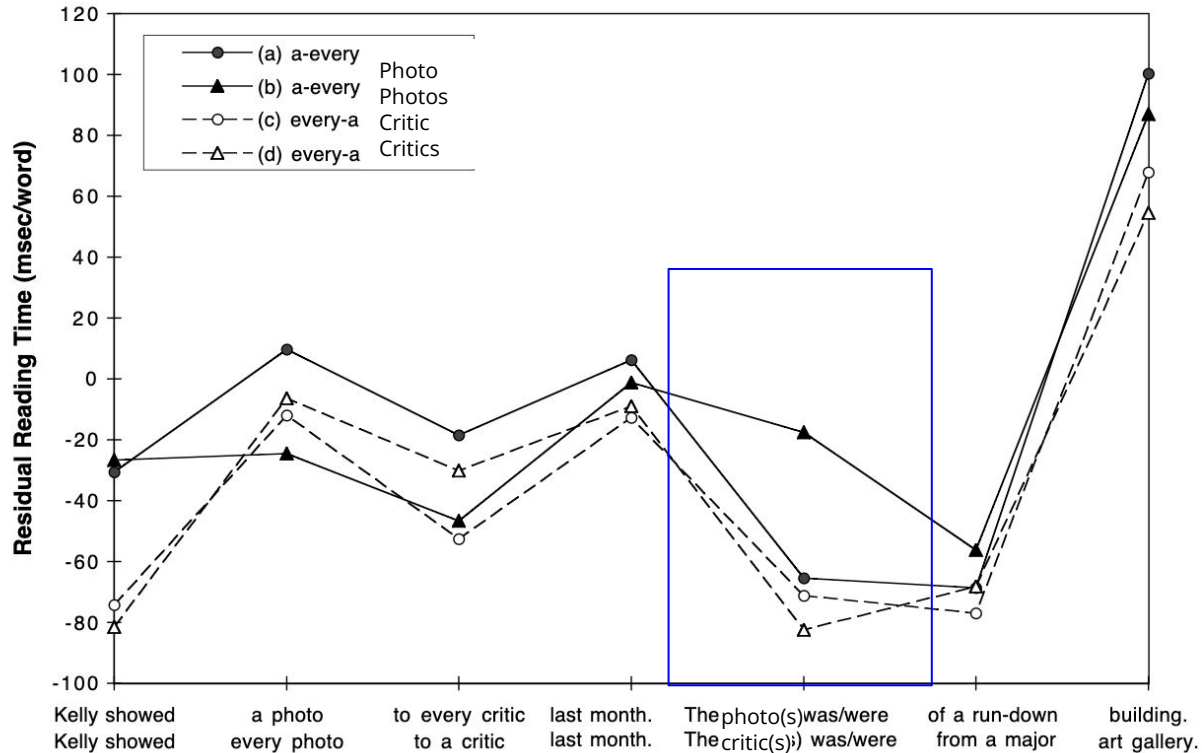
Tunstall 1998

Kelly showed **a** photo to **every** critic last month.

There exists some photo with this property: Kelly showed it to every critic l.m.

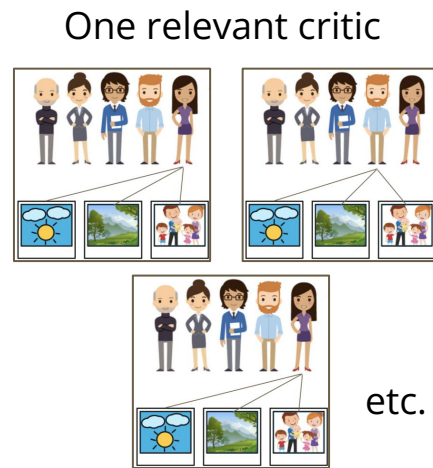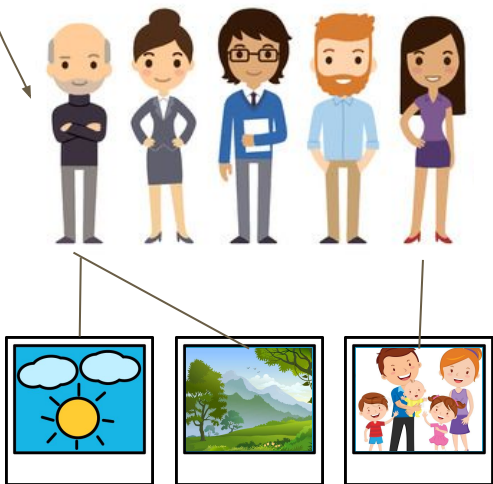*Every critic has this property: Kelly showed them a photo l.m.*

Kelly showed **every** photo to **a** critic last month.

Every photo has this property: Kelly showed it to a critic l.m.

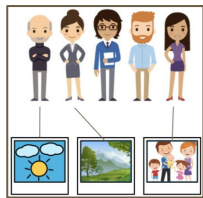*There exists some critic with this property: Kelly showed her every photo l.m.*
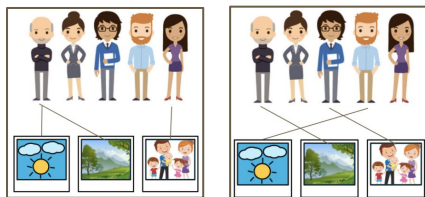
Tunstall 1998

Kelly showed **every** photo to **a** critic last month.

Every photo has this property: Kelly showed it to a critic l.m.

There exists some critic with this property: Kelly showed her every photo l.m.

Tunstall 1998

Kelly showed **every** photo to **a** critic last month.

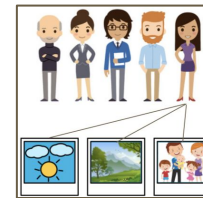*Every photo has this property: Kelly showed it to a critic l.m.*

There exists some critic with this property: Kelly showed her every photo l.m.

T

135

Tunstall 1998

Kelly showed **every** photo to **a** critic last month.

Every photo has this property: Kelly showed it to a critic l.m.

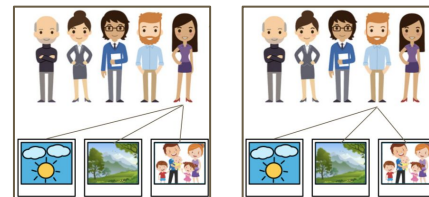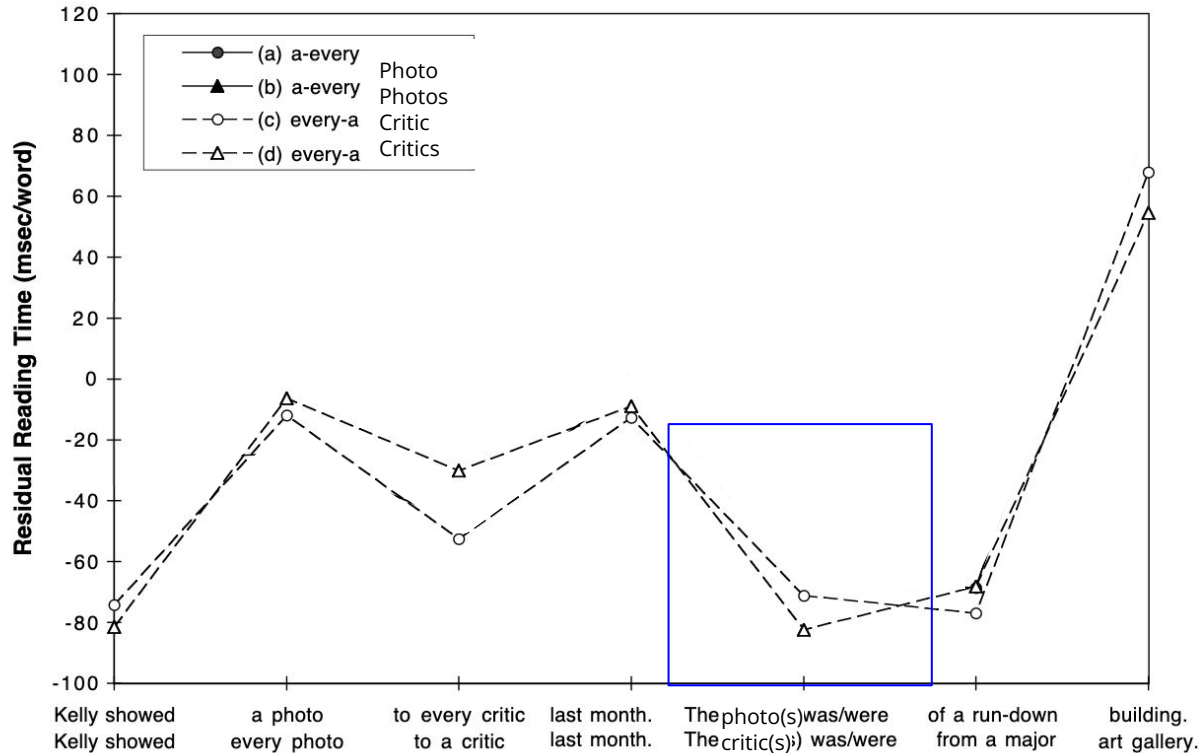*There exists some critic with this property: Kelly showed her every photo l.m.*
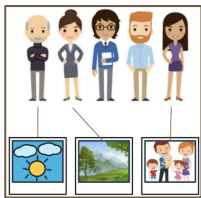
T

Tunstall 1998

Kelly showed **every** photo to **a** critic last month.

Every photo has this property: Kelly showed it to a critic l.m.

There exists some critic with this property: Kelly showed him every photo l.m.
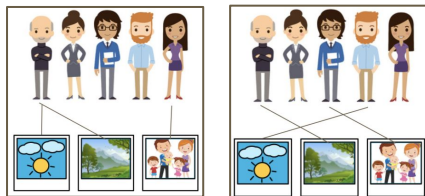
T

Tunstall 1998

Kelly showed **every** photo to **a** critic last month.

Every photo has this property: Kelly showed it to a critic l.m.

There exists some critic with this property: Kelly showed her every photo l.m.

T

One relevant critic

etc.

Tunstall 1998

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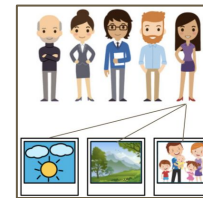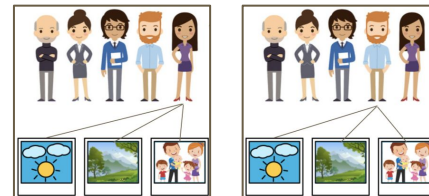*Every photo has this property: Kelly showed it to a critic l.m.*

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T

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There exists some critic with this property: Kelly showed her every photo l.m.

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etc.

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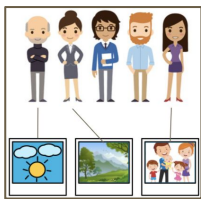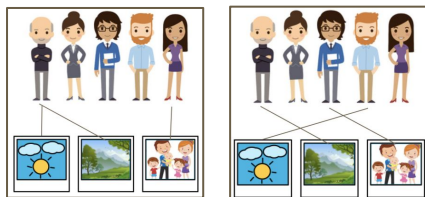*Every photo has this property: Kelly showed it to a critic l.m.*

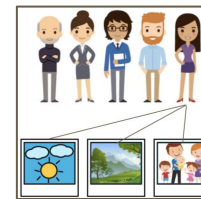*There exists some critic with this property: Kelly showed her every photo l.m.*

T

T

One relevant critic

etc.

Tunstall 1998

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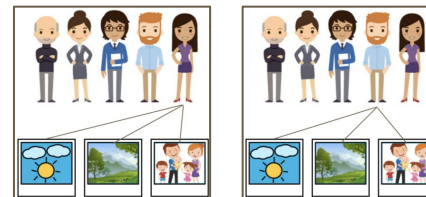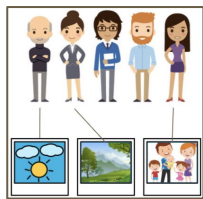*There exists some critic with this property: Kelly showed her every photo l.m.*

T

T

Multiple relevant critics

One relevant critic

etc.

etc.

Tunstall 1998

Tunstall 1998

Kelly showed **every** photo to **a** critic last month.

Every photo has this property: Kelly showed it to a critic l.m.

There exists some critic with this property: Kelly showed her every photo l.m.

T
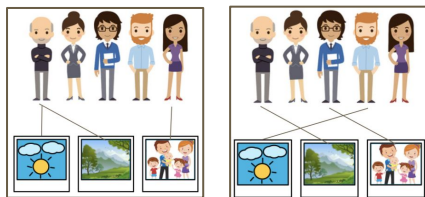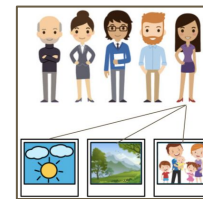
T

Multiple relevant critics

etc.

One relevant critic

etc.

Tunstall 1998
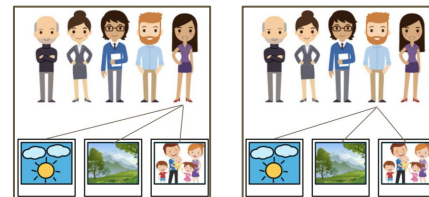
Kelly showed **every** photo to **a** critic last month.

Every photo has this property: Kelly showed it to a critic l.m.

T

There exists some critic with this property: Kelly showed her every photo l.m.

F

T

Multiple relevant critics

One relevant critic

etc.

etc.

Tunstall 1998

Kelly showed **every** photo to **a** critic last month.

Every photo has this property: Kelly showed it to a critic l.m.
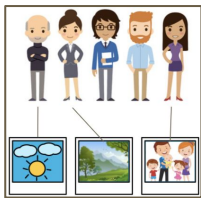
There exists some critic with this property: Kelly showed her every photo l.m.

T

T

F

T

Multiple relevant critics

One relevant critic

etc.

etc.

Tunstall 1998

Kelly showed **every** photo to **a** critic last month.

Every photo has this property: Kelly showed it to a critic l.m.

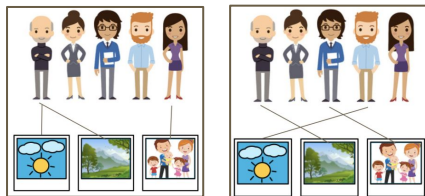*There exists some critic with this property: Kelly showed her every photo l.m.*
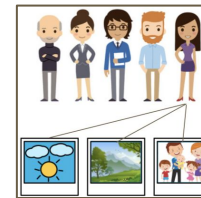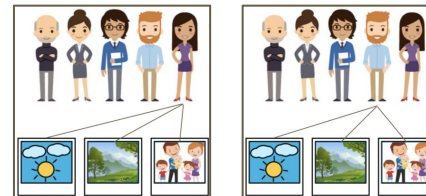
T

T

F

T

Multiple relevant critics

One relevant critic

etc.
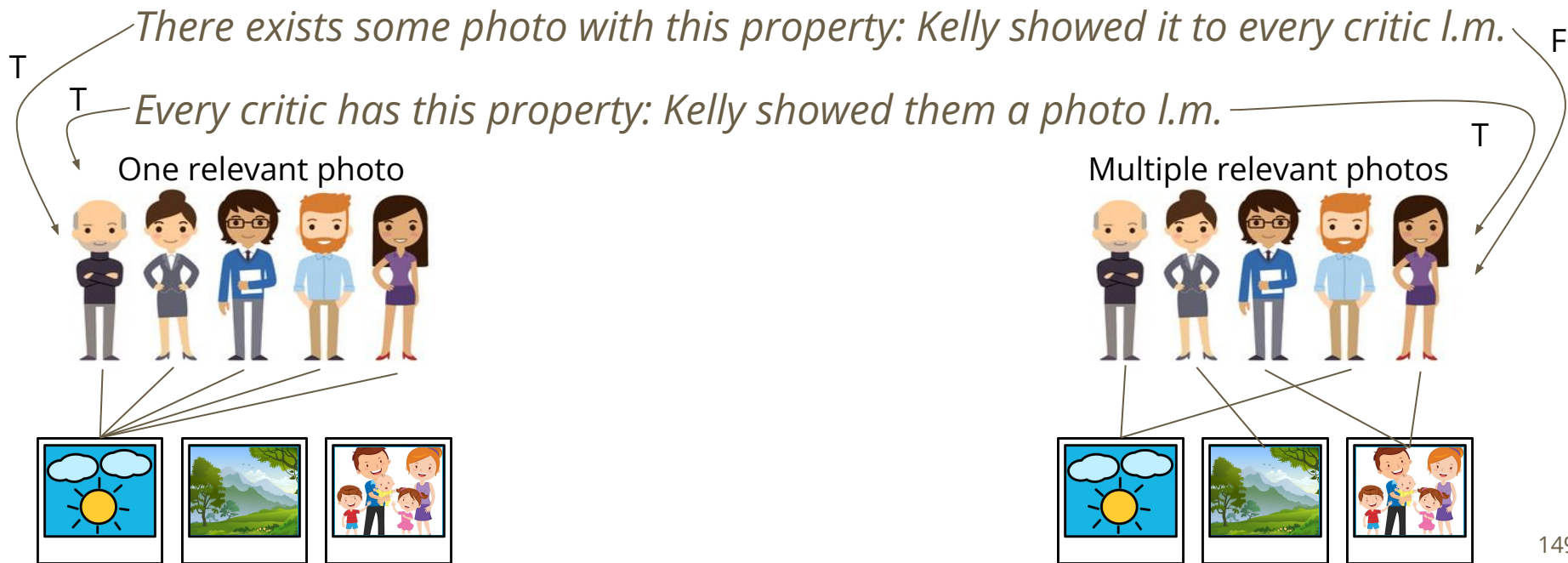
etc.

Tunstall 1998

Tunstall 1998

Kelly showed **a** photo to **every** critic last month.

There exists some photo with this property: Kelly showed it to every critic l.m.

T

T

F

Every critic has this property: Kelly showed them a photo l.m.

T

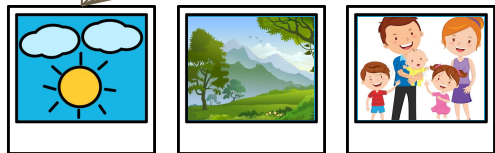One relevant photo

Multiple relevant photos

Tunstall 1998

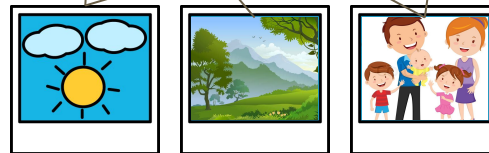Kelly showed **a** photo to **every** critic last month.

There exists some photo with this property: Kelly showed it to every critic l.m.

T

F

Every critic has this property: Kelly showed them a photo l.m.
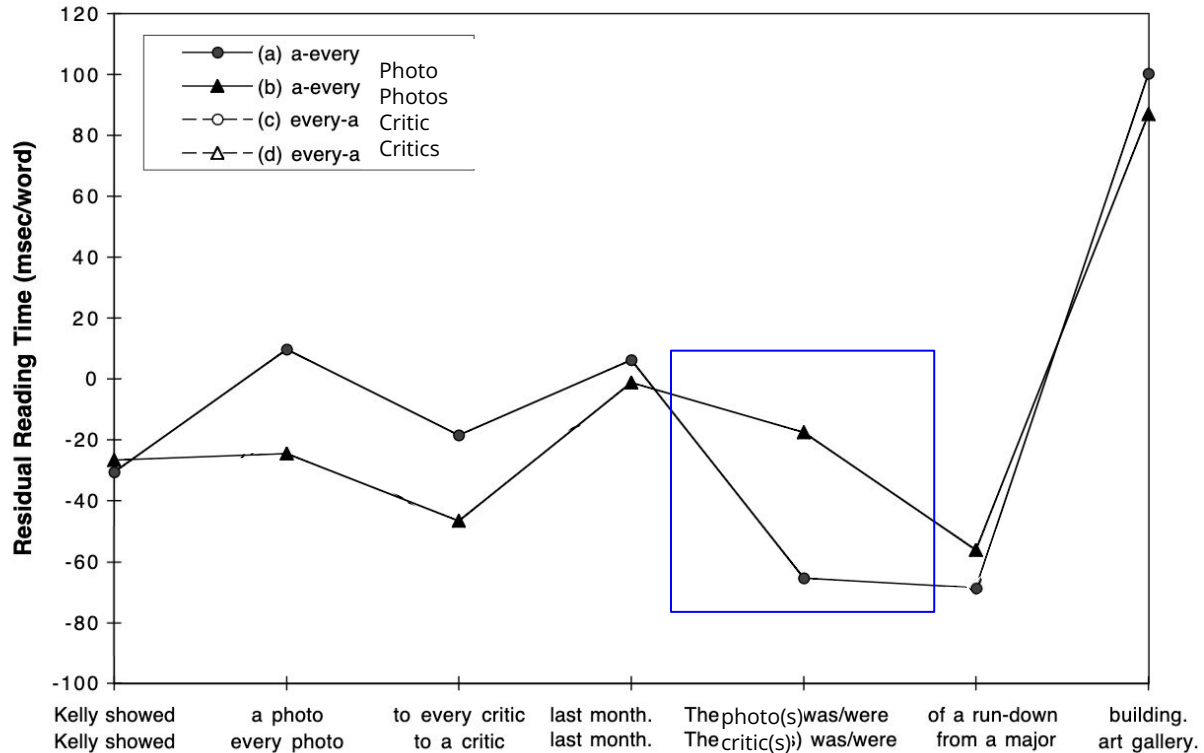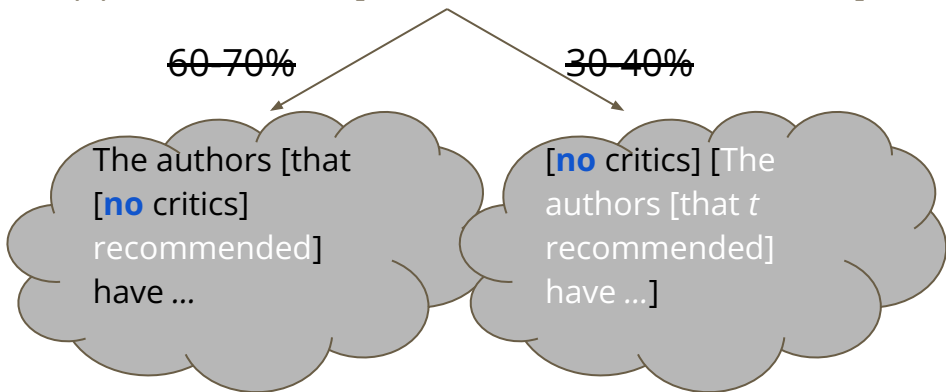
T

T

One relevant photo

Multiple relevant photos

Tunstall 1998

A refinement of the scope-based hypothesis

Online sentence comprehension does not perfectly align with the grammar of ~~NPI licensing.~~ quantifier scope.

(2) *The authors [that **no** critics recommended] have

~~60-70%~~   ~~30-40%~~

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

[**no** critics] [The authors [that *t* recommended] have …]
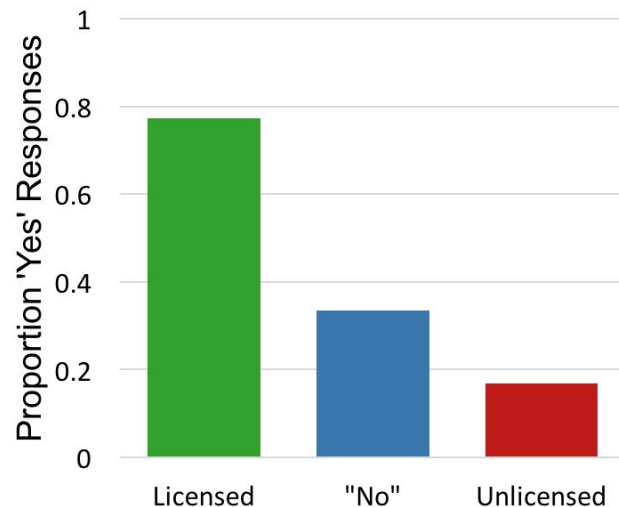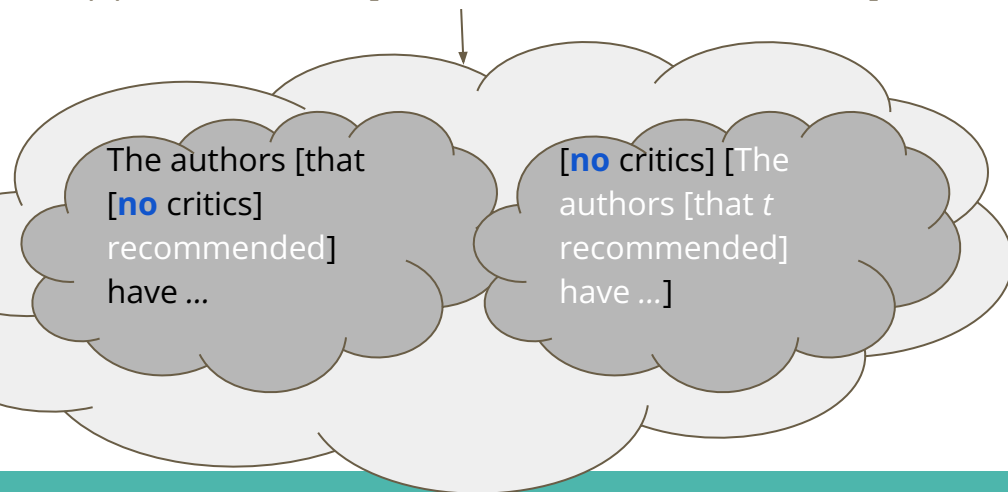
Speeded Acceptability

A refinement of the scope-based hypothesis

Online sentence comprehension does not perfectly align with the grammar of ~~NPI licensing.~~ quantifier scope.

(2) *The authors [that **no** critics recommended] have

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

[**no** critics] [The authors [that *t* recommended] have ...]

Speeded Acceptability

Proportion 'Yes' Responses

Licensed: ~0.77
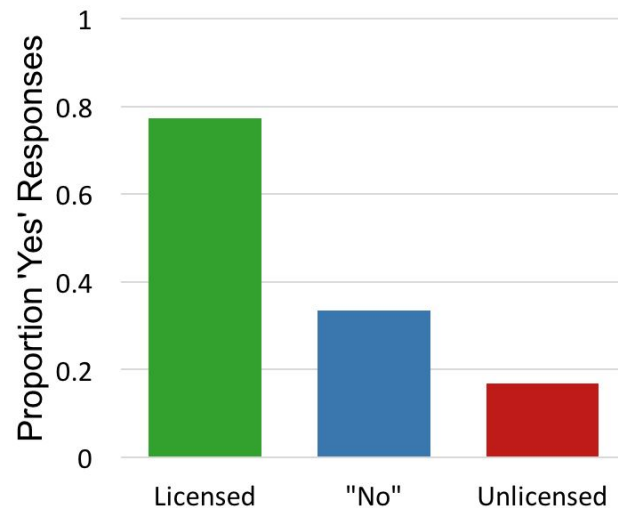"No": ~0.33
Unlicensed: ~0.17

A refinement of the scope-based hypothesis

Online sentence comprehension does not perfectly align with the grammar of ~~NPI licensing.~~ quantifier scope.

(2) *The authors [that **no** critics recommended] have

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

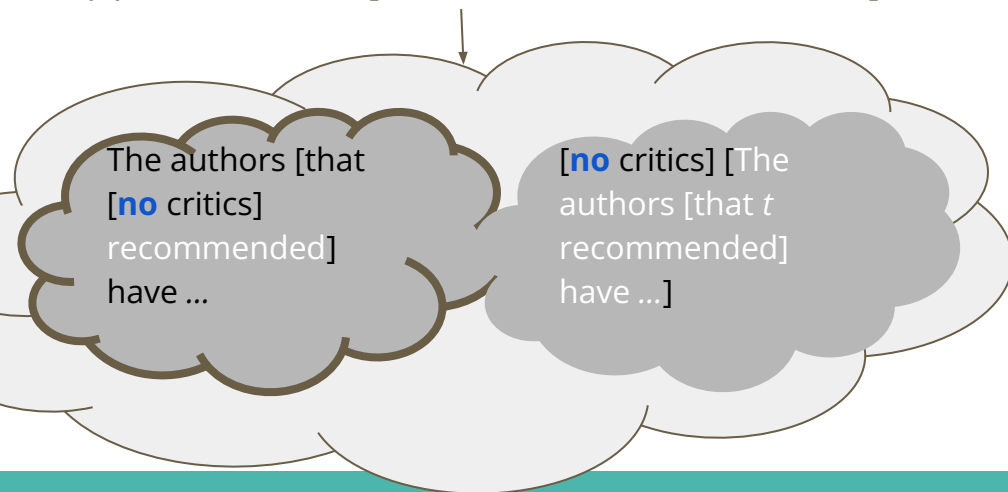[**no** critics] [The authors [that *t* recommended] have …]
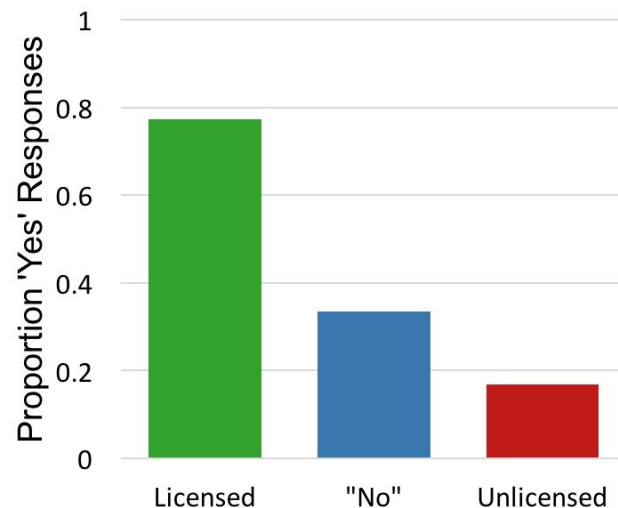
Speeded Acceptability

A refinement of the scope-based hypothesis

Online sentence comprehension does not perfectly align with the grammar of ~~NPI licensing.~~ quantifier scope.

(2) *The authors [that **no** critics recommended] have *ever*

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

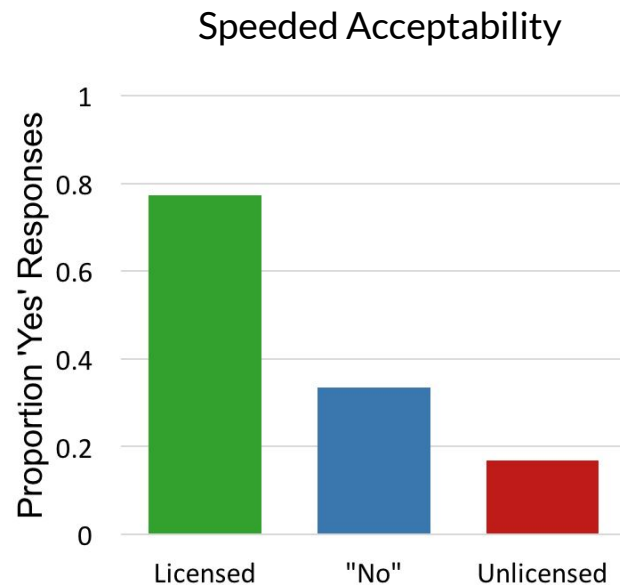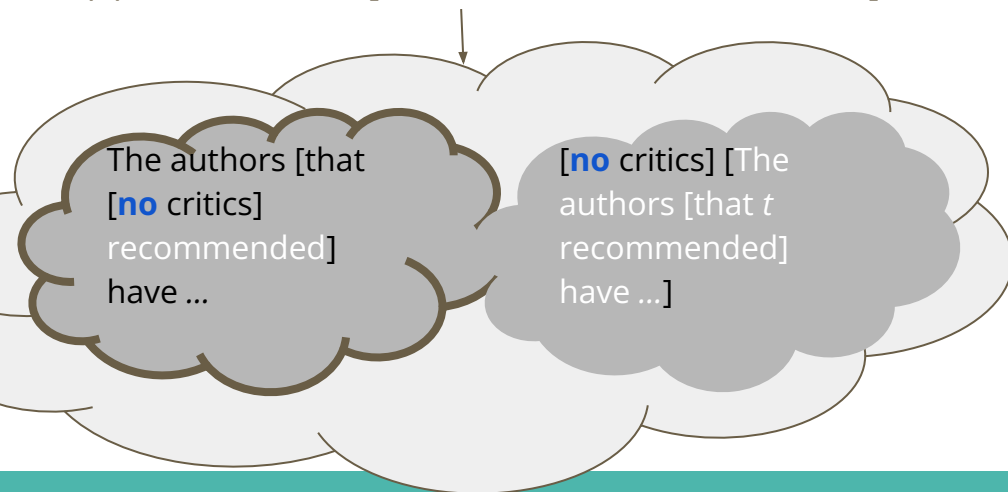[**no** critics] [The authors [that *t* recommended] have ...]

Speeded Acceptability

A refinement of the scope-based hypothesis

Online sentence comprehension does not perfectly align with the grammar of ~~NPI licensing.~~ quantifier scope.
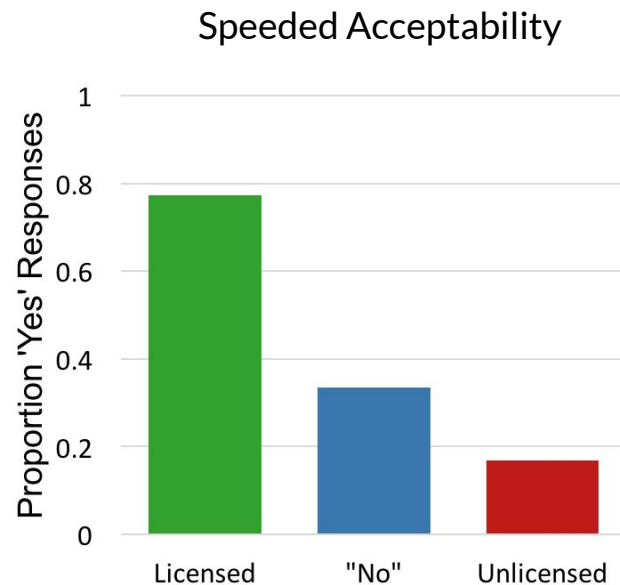
(2) *The authors [that **no** critics recommended] have *ever*

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

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

Speeded Acceptability

Findings

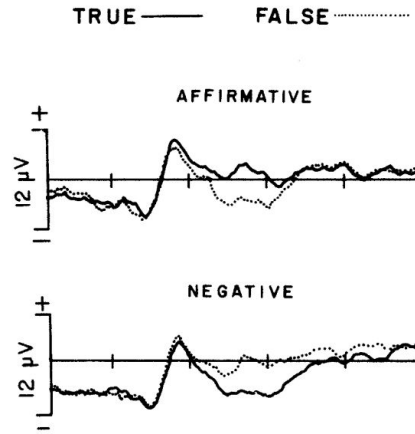# Prior to the NPI - processing negation

Prior to the NPI - processing negation

It can be difficult!

Prior to the NPI - processing negation

It can be difficult!

A robin is not a bird.

A robin is not a vehicle.

TRUE —— FALSE ·······

AFFIRMATIVE

NEGATIVE

Prior to the NPI - processing negation

It can be difficult!

A robin is not a bird.

A robin is not a vehicle.

Wason, 1961; Gough, 1965; Wales & Grieve, 1969; Cornish and Wason, 1970; Trabasso & Rollins, 1971; Clark & Chase, 1972; Carpenter & Just, 1975; **Fischler et al., 1983;** Oaksford & Stenning, 1992; Evans et al., 1996; Hasson & Glucksberg, 2006; Prado & Noveck, 2006; Kaup et al., 2007; Lüdtke et al., 2008; Mckinstry et al., 2008; Dale & Duran, 2011

Prior to the NPI - processing negation

It can be difficult to infer the question under discussion and/or the set of alternatives that would make an out-of-the-blue negative statement pragmatically appropriate.

A robin is not a bird.

A robin is not a vehicle.
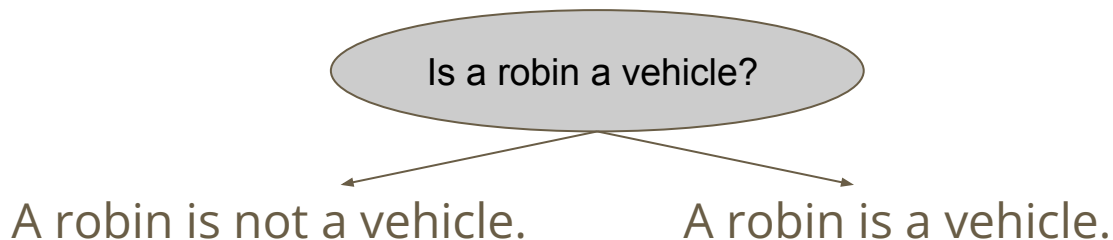
Prior to the NPI - processing negation

It can be difficult to infer the question under discussion and/or the set of alternatives that would make an out-of-the-blue negative statement pragmatically appropriate.

Is a robin a vehicle?

A robin is not a vehicle.   A robin is a vehicle.

Prior to the NPI - processing negation

When an out-of-the-blue statement contains negation, comprehenders must infer a context that would justify the use of negation (a question under discussion, or QUD).

A robin is not a vehicle.

Wason, 1961; Gough, 1965; Wales & Grieve, 1969; Cornish and Wason, 1970; Trabasso & Rollins, 1971; Clark & Chase, 1972; Carpenter & Just, 1975; **Fischler et al., 1983;** Oaksford & Stenning, 1992; Evans et al., 1996; Hasson & Glucksberg, 2006; Prado & Noveck, 2006; Kaup et al., 2007; Lüdtke et al., 2008; Mckinstry et al., 2008; Dale & Duran, 2011

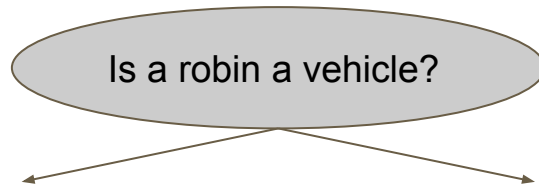# Prior to the NPI - processing negation

When an out-of-the-blue statement contains negation, comprehenders must infer a context that would justify the use of negation (a question under discussion, or QUD).

Is a robin a vehicle?

A robin is not a vehicle.   A robin is a vehicle.

Wason, 1961; Gough, 1965; Wales & Grieve, 1969; Cornish and Wason, 1970; Trabasso & Rollins, 1971; Clark & Chase, 1972; Carpenter & Just, 1975; **Fischler et al., 1983;** Oaksford & Stenning, 1992; Evans et al., 1996; Hasson & Glucksberg, 2006; Prado & Noveck, 2006; Kaup et al., 2007; Lüdtke et al., 2008; Mckinstry et al., 2008; Dale & Duran, 2011

What licenses NPIs?

Fauconnier 1975: scalar alternatives

51. A not do x to help
52.

x_2 is more help than x_1

x_2

x_1
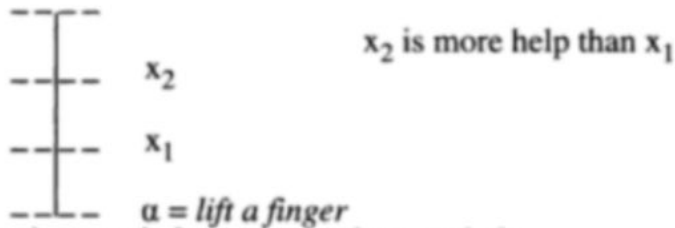
α = *lift a finger*

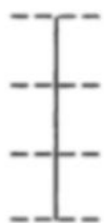A not do x_1 to help $\Rightarrow$ A not do x_2 to help
A not do α to help $\Rightarrow$ $\forall$x (A not do x to help).

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A not do x_1 to help $\Rightarrow$ A not do x_2 to help
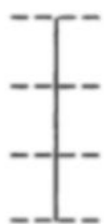A not do α to help $\Rightarrow$ $\forall x$ (A not do x to help).

Mary hasn't ever been to Paris.

What licenses NPIs?

Fauconnier 1975: scalar alternatives

51. A not do x to help

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x_2 is more help than x_1

$\alpha = $ *lift a finger*

A not do x_1 to help $\Rightarrow$ A not do x_2 to help

A not do α to help $\Rightarrow \forall x$ (A not do x to help).

Mary hasn't been to Paris in the last month.

Mary hasn't been to Paris in the last year.

Mary hasn't been to Paris in the last 5 years.

Mary hasn't been to Paris in the last 10 years.

Mary hasn't ever been to Paris.

What licenses NPIs?

Fauconnier 1975: scalar alternatives

51. A not do x to help

52.

x_2 is more help than x_1

$\alpha = $ *lift a finger*

A not do x_1 to help $\Rightarrow$ A not do x_2 to help

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Mary hasn't been to Paris in the last month.

Mary hasn't been to Paris in the last year.

Mary hasn't been to Paris in the last 5 years.

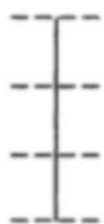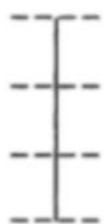Mary hasn't been to Paris in the last 10 years.

Mary hasn't ever been to Paris.

What licenses NPIs?

Fauconnier 1975: scalar alternatives

51. A not do x to help
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Mary has been to Paris in the last month.
Mary has been to Paris in the last year.
Mary has been to Paris in the last 5 years.
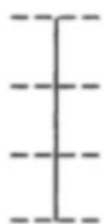Mary has been to Paris in the last 10 years.
Mary has ever been to Paris.

What licenses NPIs?

Fauconnier 1975: scalar alternatives

51. A not do x to help
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x_2 is more help than x_1

$\alpha = lift\ a\ finger$

A not do x_1 to help $\Rightarrow$ A not do x_2 to help
A not do α to help $\Rightarrow$ $\forall x$ (A not do x to help).

Mary has been to Paris in the last month.
Mary has been to Paris in the last year.
Mary has been to Paris in the last 5 years.
Mary has been to Paris in the last 10 years.
*Mary has ever been to Paris.