Presupposition projection in quantified sentences

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Presupposition Projection

Presuppositions...

(1) Bear won the race $\rightsquigarrow$ *Bear ran the race*

Presupposition Projection

Presuppositions...

(1) Bear won the race $\rightsquigarrow$ *Bear ran the race*

... tend to project:

(2) Bear did **not** win the race

(3) **Did** Bear win the race**?**

(4) **It's possible that** Bear won the race

$\rightsquigarrow$ *Bear ran the race*

Quantified sentences

Presupposition projection in **quantified sentences** is still very controversial

(5) None of the bears won the race

a. ?→ **At least one** of the bears ran

b. ?→ **All** of the bears ran

Quantified sentences

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(5) None of the bears won the race

a. ?→ **At least one** of the bears ran

b. ?→ **All** of the bears ran

How do presuppositions project in **quantified sentences**?

Suspendability

Presupposition projection is not always visible: it is possible to **suspend it**

(6) Bear did **not** win the race... he didn't even run!

a. ≈ *It's not the case that Bear ran and won*

Suspendability

Presupposition projection is not always visible: it is possible to **suspend it**

(6) Bear did **not** win the race... he didn't even run!

a. ≈ *It's not the case that Bear ran and won*

(7) **None** of the bears won the race... none of them even ran!

a. ≈ *There is no bear that both ran and won*

Projection from *None*

Three candidate readings for (8):

(8) None of the bears won the race

a. EXISTENTIAL: *At least one of the bears ran and none of them won.*

b. UNIVERSAL: *All of the bears ran and none of them won.*

c. PRESUPPOSITIONLESS: *None of the bears both ran and won.*

Our goals:

- test whether we observe each of these readings
- shed light on their status (are they basic? derived?)

2 experiments:

- with adults: suggests **all three readings do exist**
- with children: suggests UNIVERSAL is **basic**

Previous Studies

Chemla 2009, Evidence for universal reading

Inference task, testing the UNIVERSAL reading:

Know

"None of these 10 students knows that he is lucky."
suggests that:
Each of these 10 students is lucky.
No? *Yes?*

All

"None of these 10 students missed all of their exams."
suggests that:
Each of these 10 students missed some of their exams.
No? *Yes?*

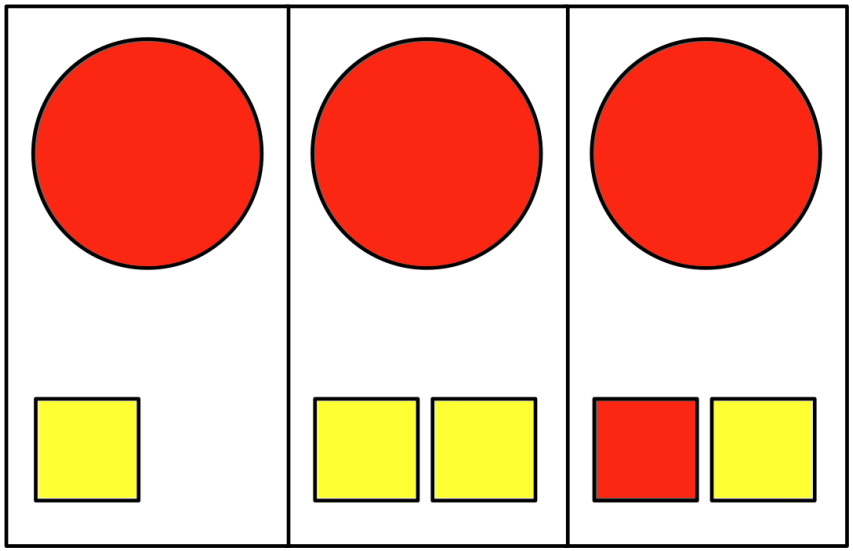
More than 80% 'yes' for *know*, **significantly higher** than *all*.

Evidence that a universal reading exists

Previous Studies

Sudo, Romoli, Fox and Hackl, 2011, Evidence for non-universal reading

TVJT (assumption: universal presupposition→rejection):



None of these three circles have the same color as both of the squares in their own cell.

Half of the speakers accepted the description, *even though the left circle has only one square in its cell*.

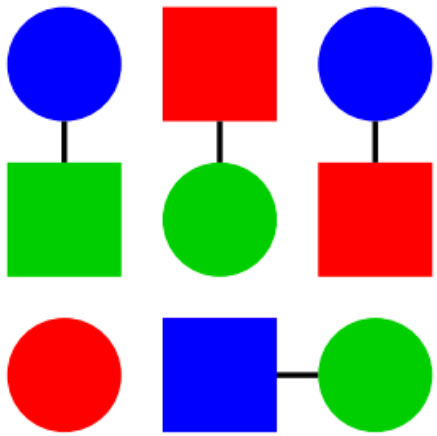
Evidence that non-universal reading exists

Previous Studies

Geurts and van Tiel, 2015, Evidence for non-universal reading

TVJT (assumption: universal presupposition→rejection):

No circle has the same color
as the square to which it is connected.



☐ True ☐ False ☐ Don't know

Acceptance $> 92\%$, *despite there being a circle with no square*

Evidence that non-universal reading exists

Previous Studies

Summary

Summary of the previous results

- Chemla, 2009: Existence of **universal reading**
- Sudo et al., 2011; Geurts and van Tiel, 2015: Existence of **non-universal readings**

Interim Conclusions

- **No** clear experimental evidence for EXISTENTIAL readings:
  - Sudo et al., 2011 and Geurts and van Tiel, 2015 do not distinguish between EXISTENTIAL and PRESUPPOSITIONLESS readings.

Experiment

Goals and Procedure

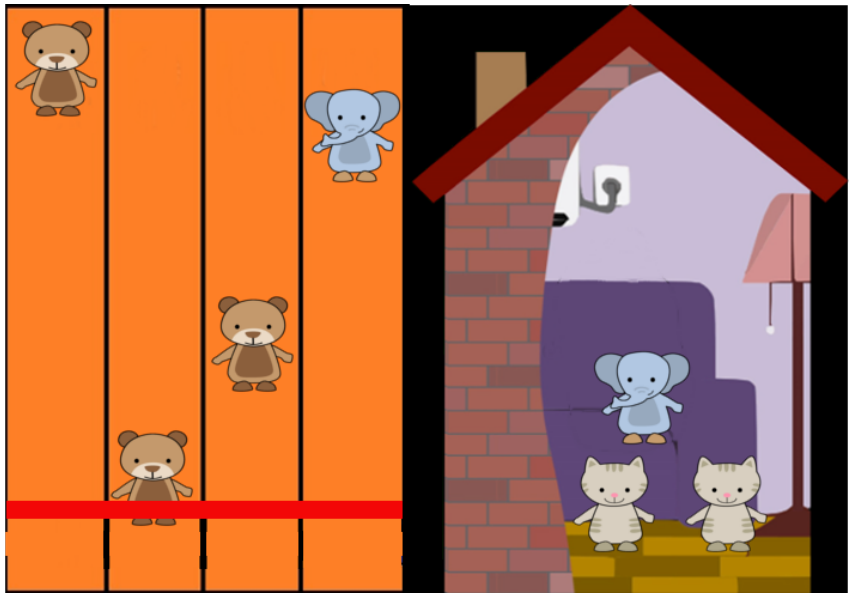
We tested for the existence of:

- the UNIVERSAL reading
- the EXISTENTIAL reading
- the PRESUPPOSITIONLESS reading

Covered-Box paradigm (Huang, Spelke and Snedeker, 2013),
$\approx$ **rejection** task, successfully used to investigate presuppositions

Experiment

Context

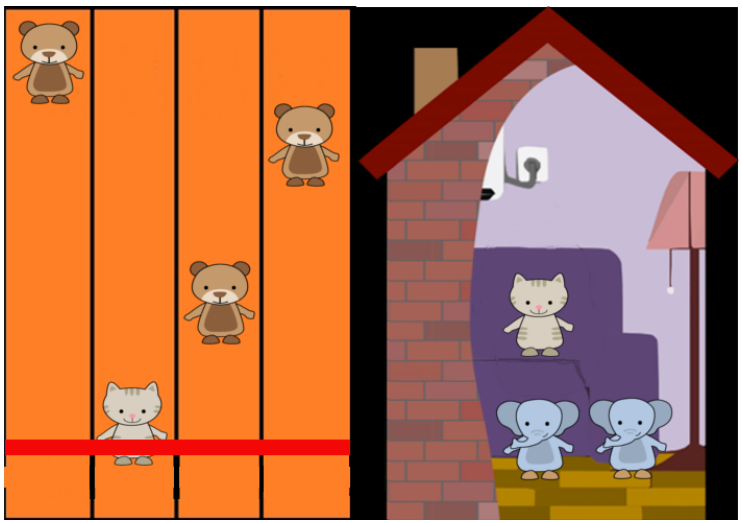


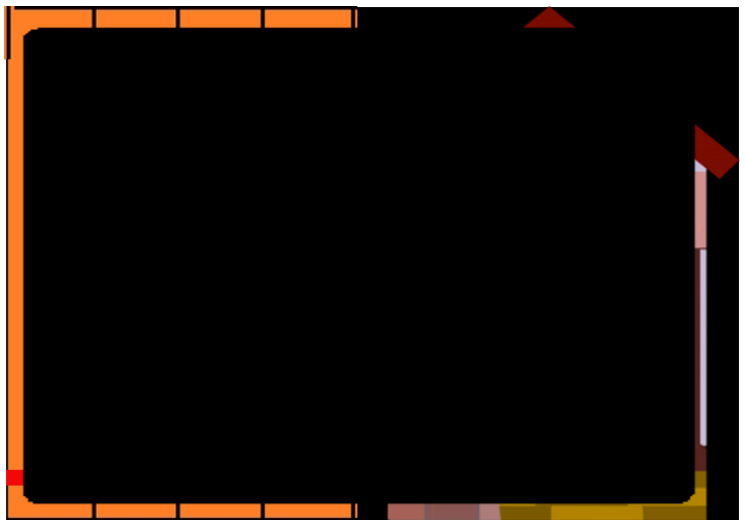
In the morning race, **these three bears** *did really well, and in the end one of them won. I thought they would do well later in the day as well, but...* [Audio]

Experiment

TrueControl

TrueControl condition (2 repetitions)
(All bears ran but **none won**)



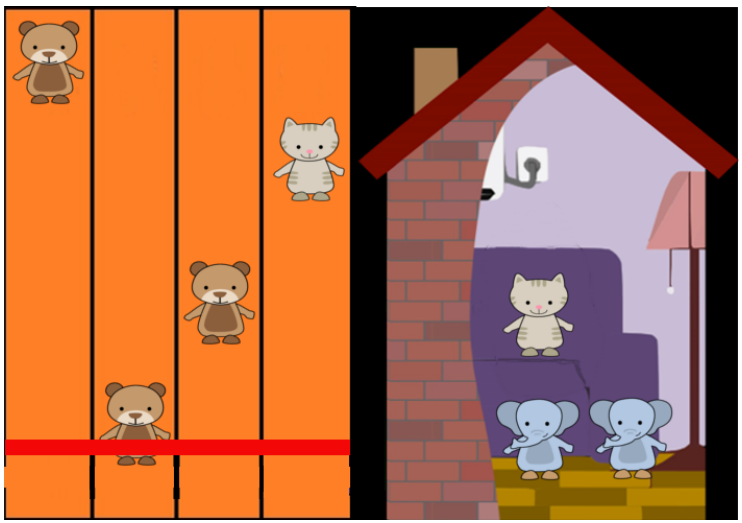


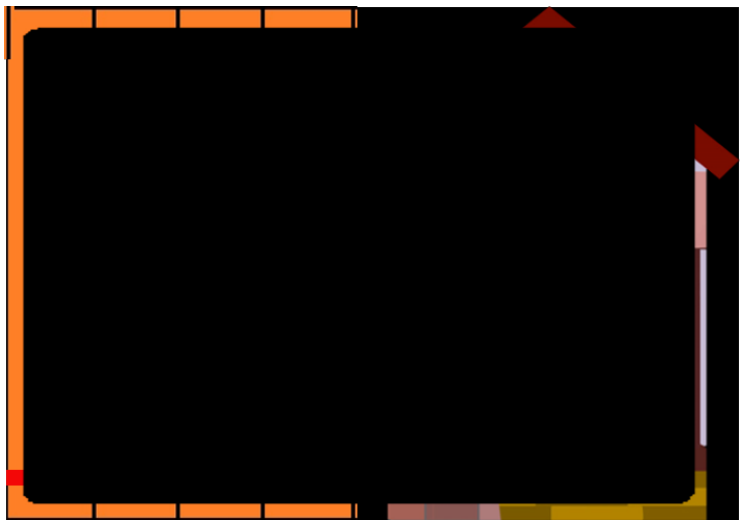
None of the bears won the afternoon race [Audio]

Experiment

FalseControl

FalseControl condition (2 repetitions)
(All bears ran and **one of them won**)



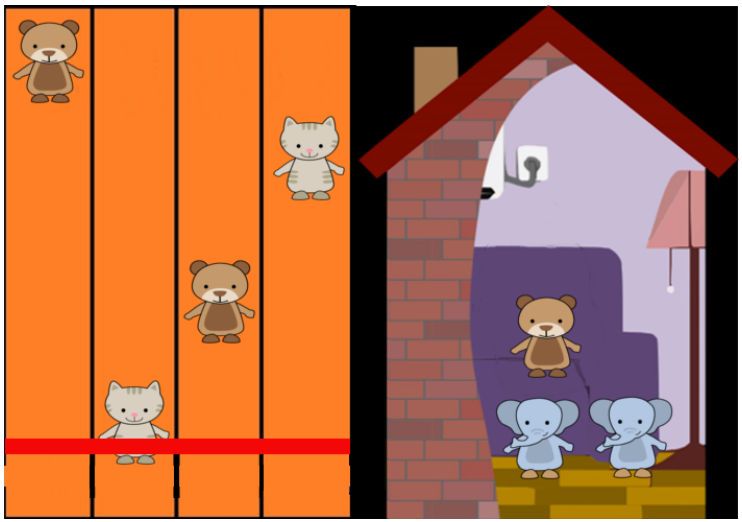


None of the bears won the afternoon race [Audio]

Experiment

OnlySome

OnlySome condition (4 repetitions)
(2 out of 3 bears ran and lost)



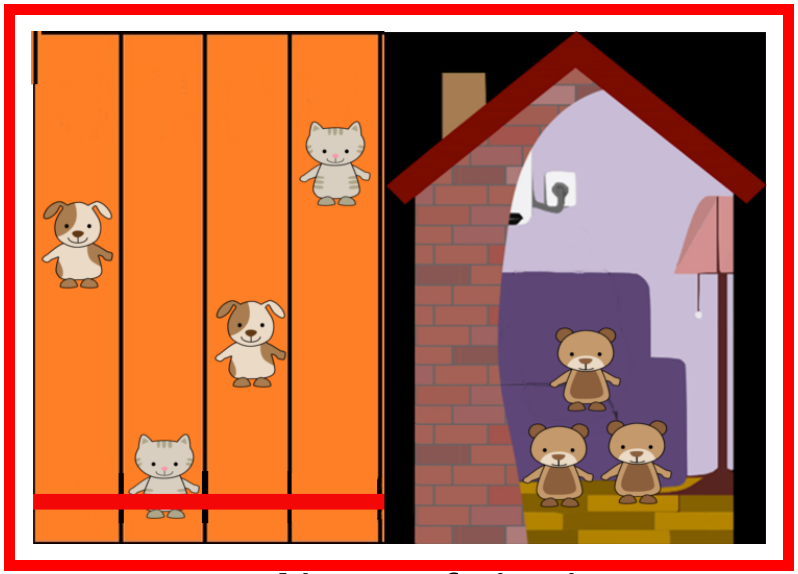
None of the bears won the afternoon race [Audio]

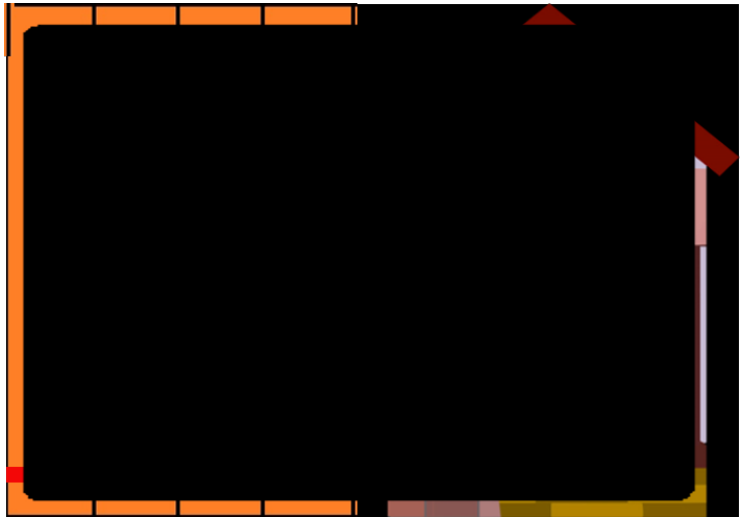
- Universal → **Covered** picture (× *all bears ran*)
- Existential → **Visible** picture (✓ *at least 1 bear ran*)
- Presuppositionless → **Visible** (✓ *no presupposition*)

Experiment

NoRunner

NoRunner condition (4 repetitions):
(No bear ran the race)





None of the bears won the afternoon race [Audio]

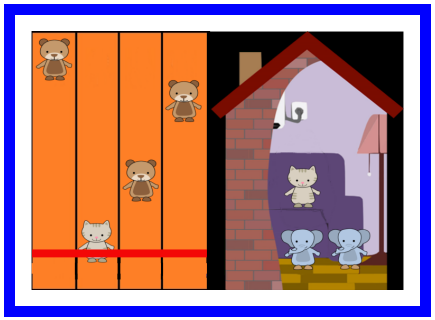
- Universal → **Covered** picture (× *all bears ran*)
- Existential → **Covered** picture (× *at least 1 bear ran*)
- Presuppositionless → **Visible** (✓ *no presupposition*)

Experiment

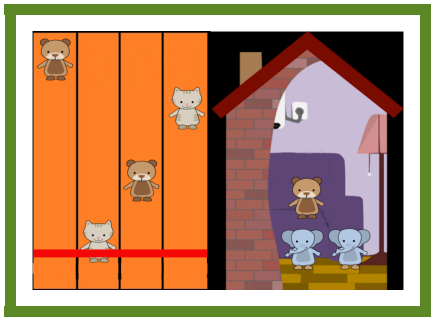
General Predictions

None of the bears won the race

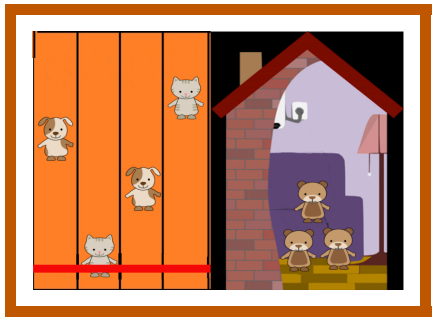
TrueControl



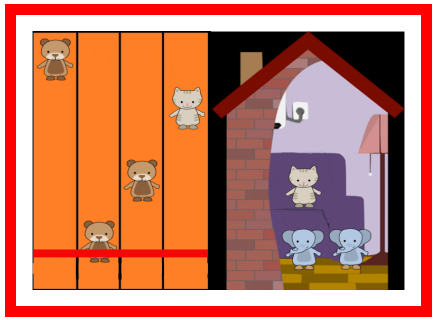
OnlySome



NoRunner



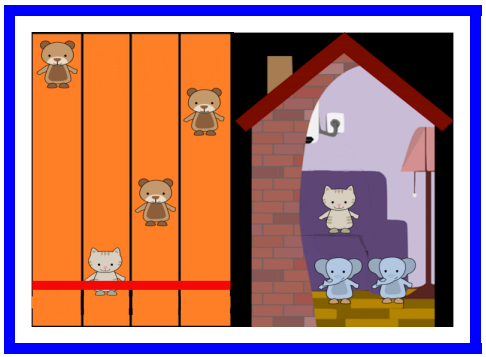
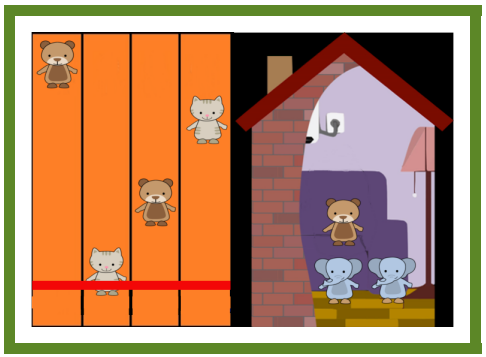
FalseControl



	Universal	Existential	Presuppositionless
TrueControl	✓	✓	✓
OnlySome	✗	✓	✓
NoRunner	✗	✗	✓
FalseControl	✗	✗	✗

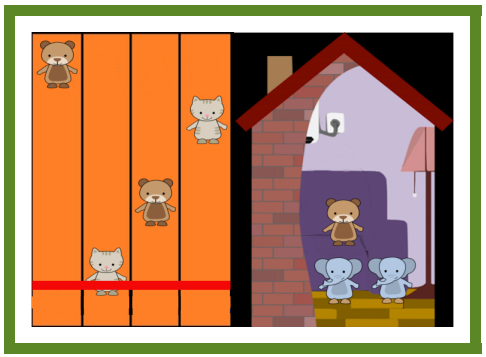
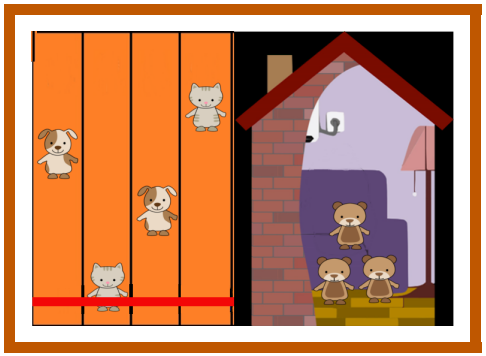
Experiment

Universal-Specific Predictions

	Universal	Existential	Presuppositionless
TrueControl 	✓	✓	✓
OnlySome 	✗	✓	✓

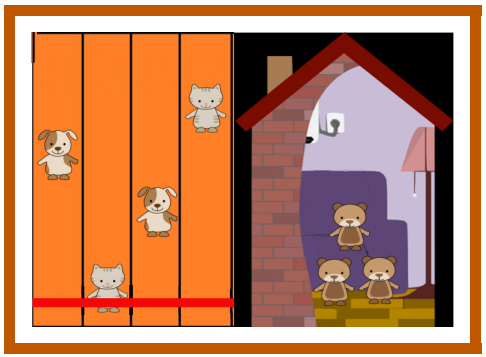
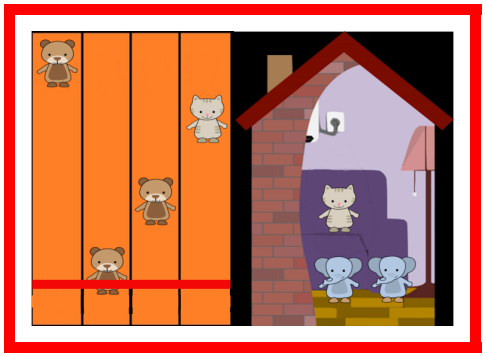
Experiment

Existential-Specific Predictions

	Universal	Existential	Presuppositionless
OnlySome 	✗	✓	✓
NoRunner 	✗	✗	✓

Experiment

Presuppositionless-Specific Predictions

	Universal	Existential	Presuppositionless
NoRunner 	×	×	✓
FalseControl 	×	×	×

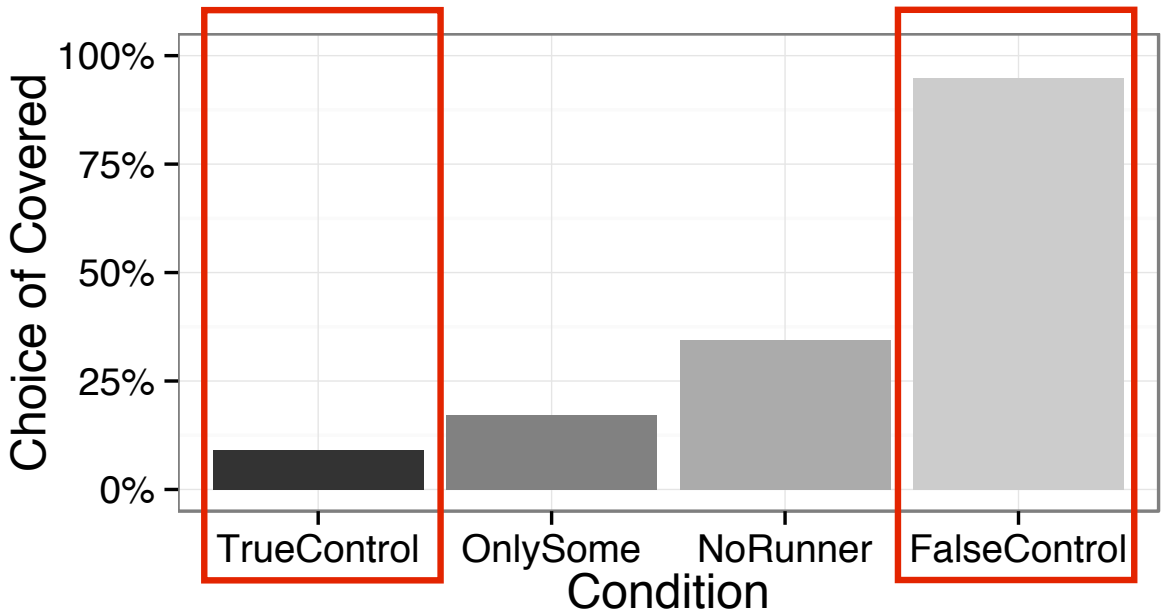
Experiment

Details

- 4 true and 4 false additional control conditions
  - *None of the bears were on the couch during the afternoon race*
  - *None of the bears ran in the afternoon race* (final trials)
- Exclusion criterion: $< 75\%$ accuracy on all the controls
  42 out of 48 subjects
- Mixed-effect logistic regression models on *visible* vs *covered* choice (participants and items as random effects)

Results (N=42)

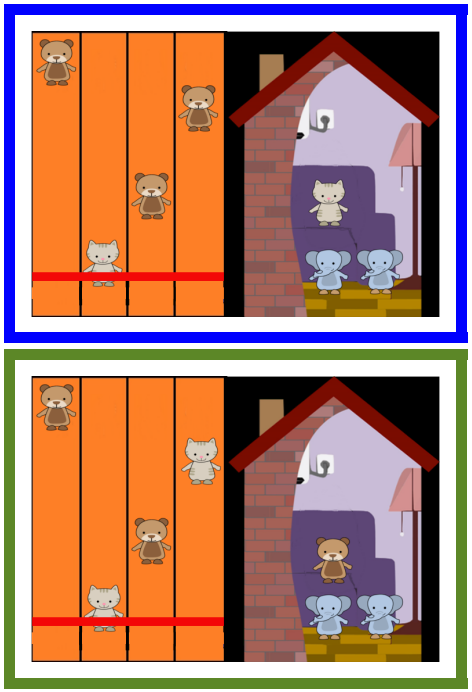
Controls



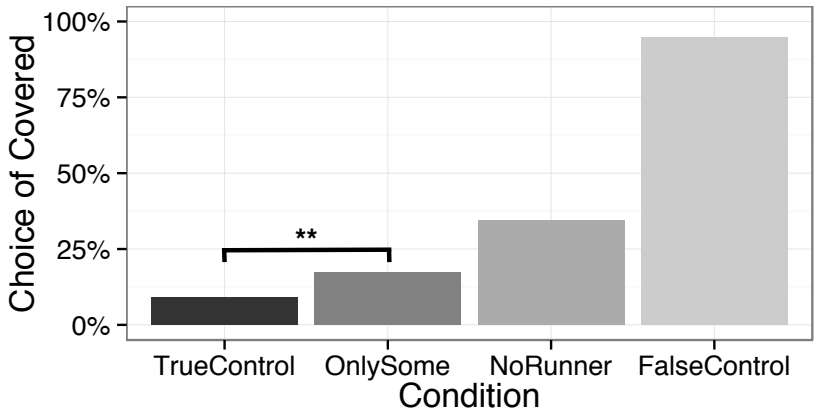
- Good accuracy on controls: **covered** in FALSE, not in TRUE
- Participants understood the task and the descriptions

Results (N=42)

OnlySome: evidence for universal



None of the bears won the race



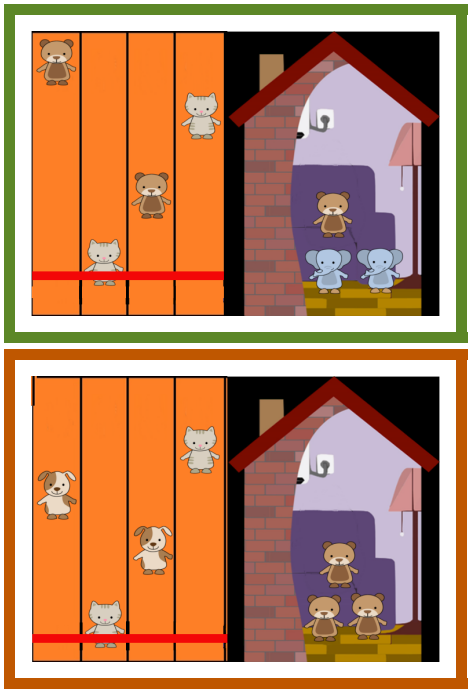
(Rate of ✗ *Covered* choices)

	Universal	Existential	Presuppositionless
TrueControl	✓	✓	✓
OnlySome	✗	✓	✓

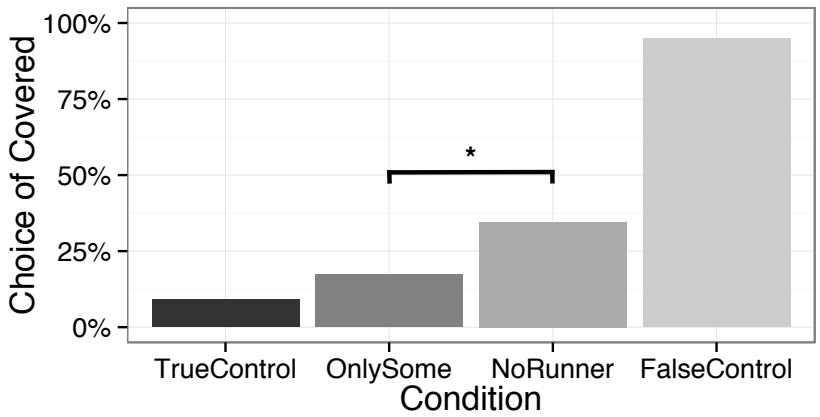
Significant contrast: only explained by universal

Results (N=42)

OnlySome vs. NoRunner: evidence for existential



None of the bears won the race



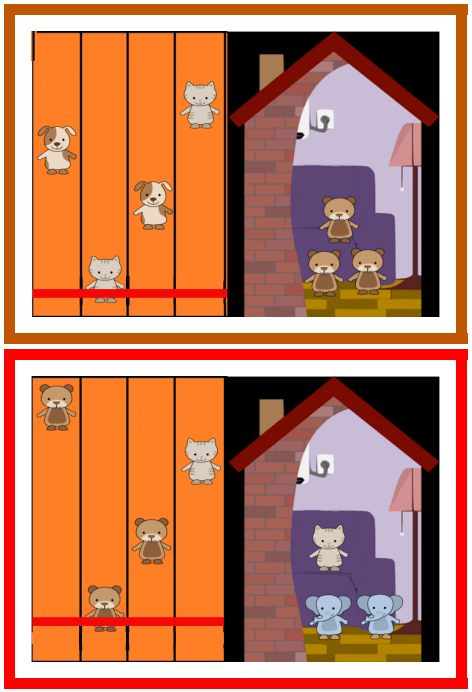
(Rate of ✗ *Covered* choices)

	Universal	Existential	Presuppositionless
OnlySome	✗	✓	✓
NoRunner	✗	✗	✓

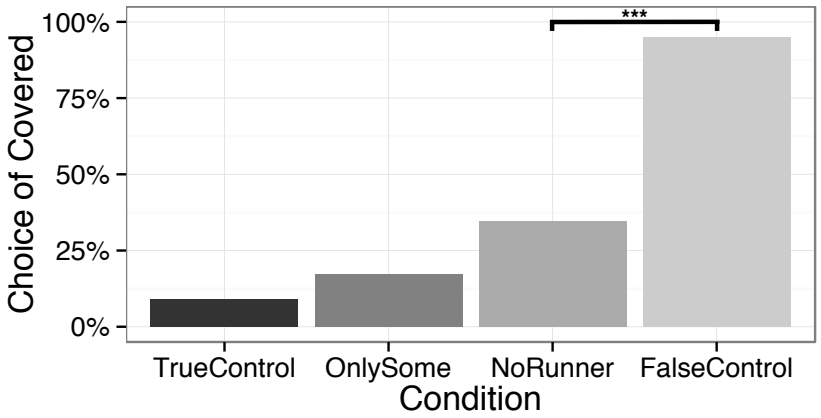
Significant contrast: only explained by existential

Results (N=42)

NoRunner: evidence for presuppositionless



None of the bears won the race



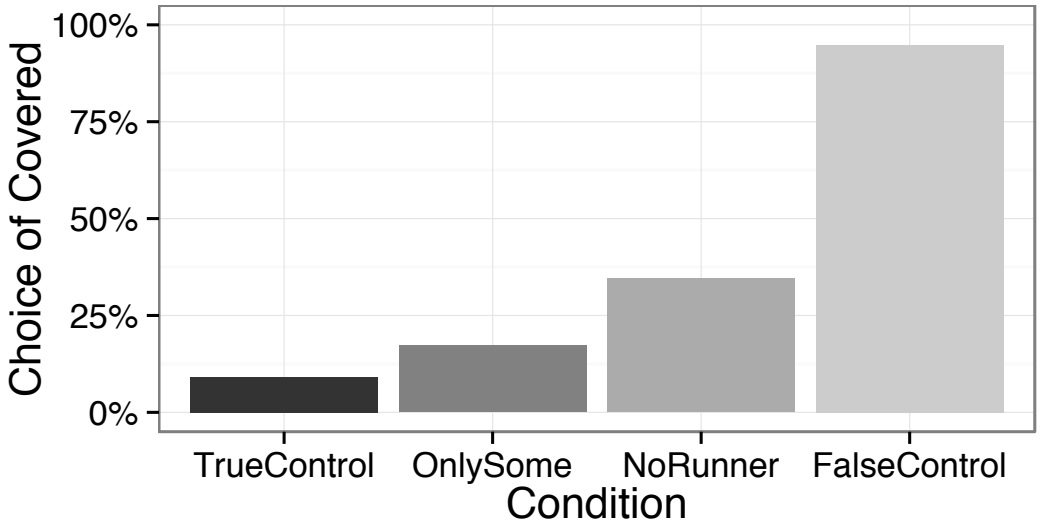
(Rate of ✗ *Covered* choices)

	Universal	Existential	Presuppositionless
NoRunner	✗	✗	✓
FalseControl	✗	✗	✗

Significant contrast: only explained by presuppositionless

Results (N=42)

Summary



Evidence for

- Universal: contrast TrueControl vs OnlySome
- Existential: contrast OnlySome vs NoRunner
- Presuppositionless: contrast NoRunner vs FalseControl

Discussion

Two types of theories

There are two broad types of projection theories

1. Those that predict **universal projection** (Heim 1983, Schlenker 2008, a.o.)
2. Those that predict **existential projection** (Beaver 1994, van der Sandt 1992, a.o.)

How to account for the three readings?

Discussion

1) Universal projection + Weakening

1) **Universal-projection-only**

- UNIVERSAL = directly from **universal** projection
- EXISTENTIAL = reanalyzed as a **weakened** reading, e.g. through **domain restriction** ($\approx$ *none [who ran] won*)
- PRESUPPOSITIONLESS = local accommodation or other option (e.g. ignore the presupposition)

Required assumption: weakening option (e.g. domain restriction)

Discussion

2) Existential projection + Strengthening

2) **Existential-projection-only**

- EXISTENTIAL = directly from **existential** projection
- UNIVERSAL = reanalyzed as a **strengthened** meaning, e.g. through a preference for homogeneity (Mandelkern, Ms.)
- PRESUPPOSITIONLESS = local accommodation or other mechanism (e.g. ignore the presupposition)

Required assumption: strengthening option (e.g. homogeneity)

Discussion

3) Existential + Universal projection

3) **Existential + universal projection**

- EXISTENTIAL = directly from **existential** projection
- UNIVERSAL = directly from **universal** projection
- PRESUPPOSITIONLESS = local accommodation or other mechanism (e.g. ignore the presupposition)

Required assumption re. ONLYSOME vs. NORUNNER:

the more *true* readings a description has, the more it tends to be accepted (cf. Spector & Chemla 2011)

Extending to children

Motivations

- All 3 accounts have possible extensions to account for the data
- Children can potentially help us discriminate between the approaches
  - If **one reading is basic** in adults and the other is complex
  - Children might **lack the non-basic**, more complex one
- Same covered box design, previously used to investigate presuppositions in children by Bill et al. (2015)

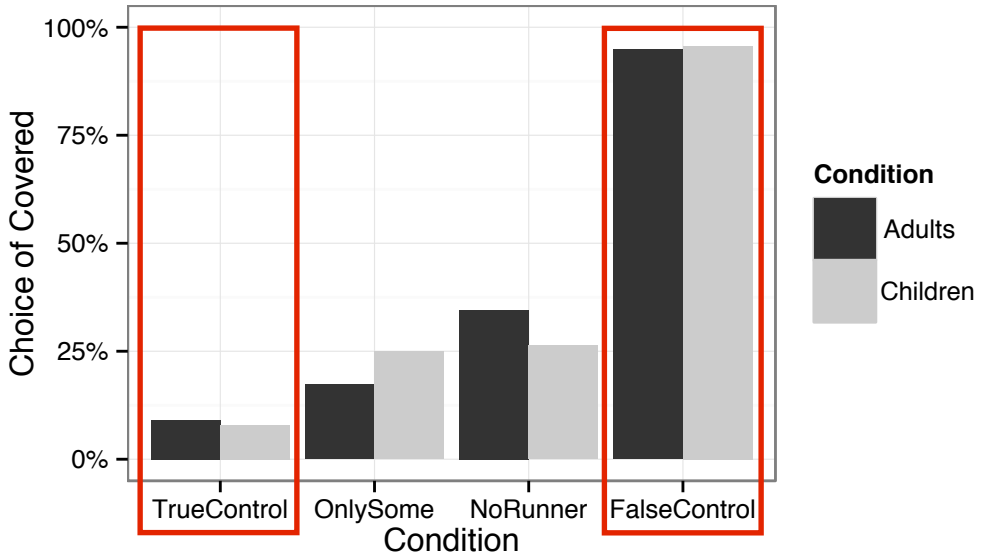
Experiment

Goal and Participants

- **Goal:** Test whether children **lack a non-basic reading**, and whether they do **project presuppositions** in quantified sentences
- Same design as the adult experiment
- 22 children ranging from 4;00 to 5;10 (mean age: 5;04)
  Same exclusion criteria as for adults (19 out of 22)
- Macquarie University

Experiment

Results (N=19)

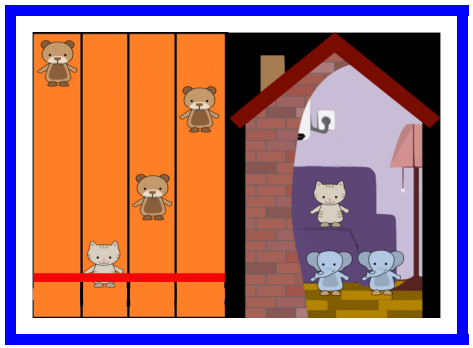


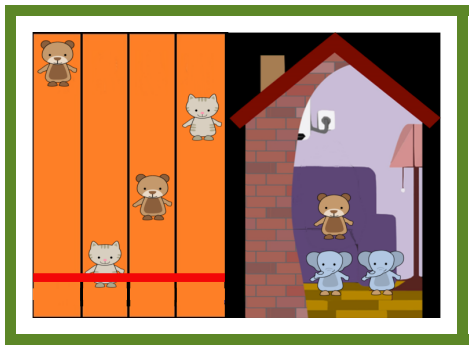
Children behave the same as adults on controls:

they understand the task

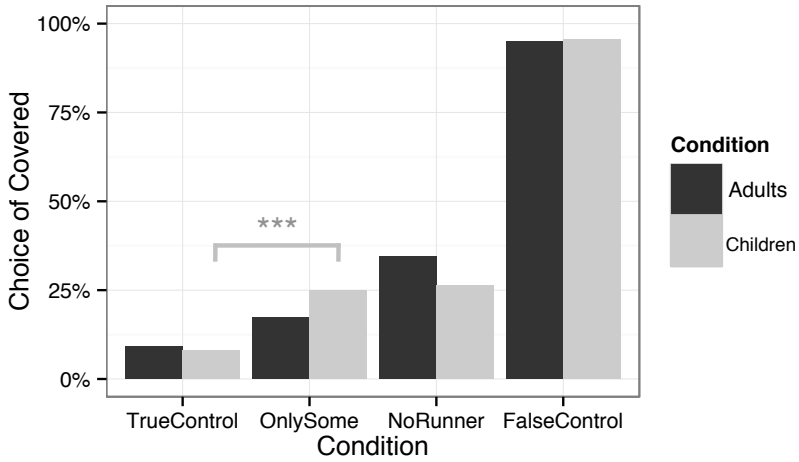
Experiment

Results (N=19)





None of the bears won the race



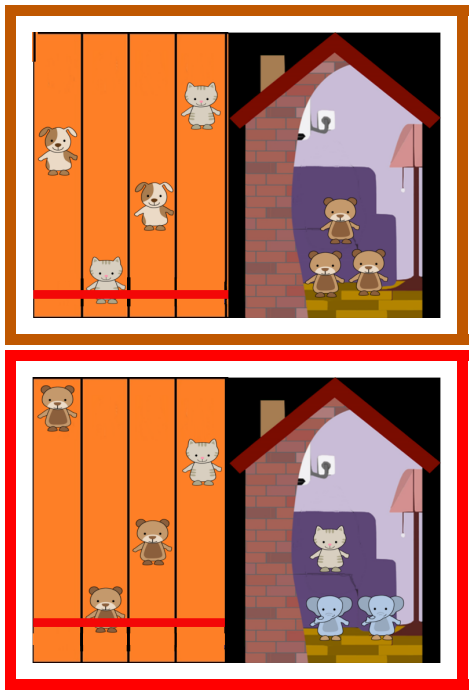
(Rate of ✗ *Covered* choices)

	Universal	Existential	Presuppositionless
TrueControl	✓	✓	✓
OnlySome	✗	✓	✓

Only Universal could make participants reject OnlySome

Experiment

Results (N=19)



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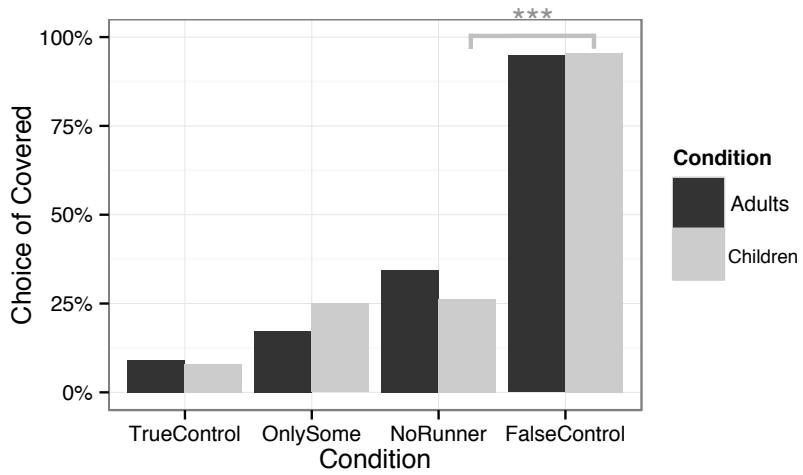


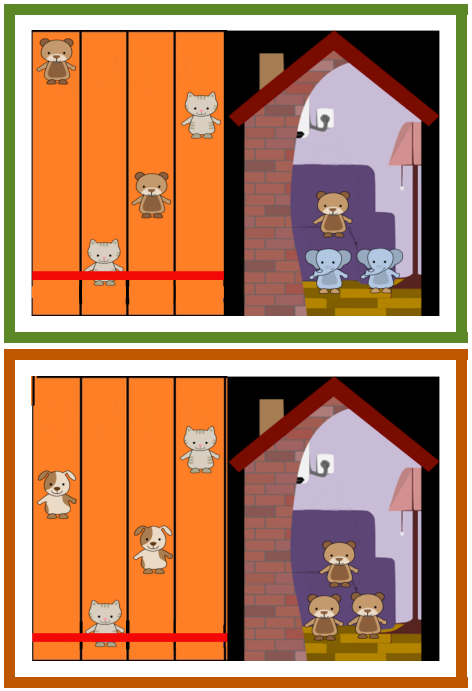
(Rate of ✗ *Covered* choices)

	Universal	Existential	Presuppositionless
NoRunner	✗	✗	✓
FalseControl	✗	✗	✗

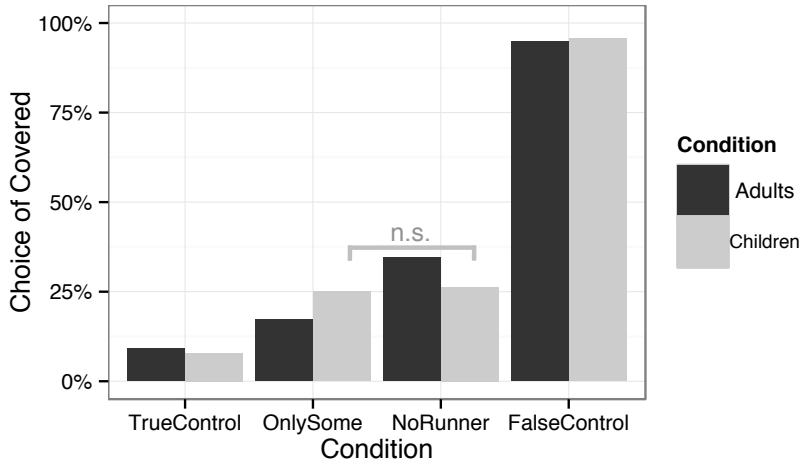
Only Presuppositionless makes NoRunner acceptable

Experiment

Results (N=19)



None of the bears won the race



(Rate of ✗ *Covered* choices)

	UNIVERSAL	EXISTENTIAL	PRESUPPOSITIONLESS
ONLYSOME	✗	✓	✓
NORUNNER	✗	✗	✓

No difference between ONLYSOME and NORUNNER in children:
no evidence for EXISTENTIAL

Discussion

Universal projection + Weakening

- **Lack of evidence** for EXISTENTIAL in children
  - Most directly consistent with basic universal projection and EXISTENTIAL as a weakened, derived reading (in adults)
  - Late adult-like weakening (e.g. domain restriction)
- The alternative hypotheses face unresolved issues
  - Existential projection + UNIVERSAL by strengthening:
    Unlike adults, children always go with strengthening: why?
  - Parallel existential and universal projections:
    Children systematically go with universal projection: why?

Discussion

Domain Restriction in children

- Children have been reported to differ from adults when it comes to domain restriction (e.g. Rakhlin 2007, see literature on acquisition of plural definites for related considerations)
- The three bears in the picture form a natural, salient group (hence UNIVERSAL as a basic presuppositional reading)
- Defining a subset to restrict to involves the complex interaction of several factors (quantifier, presupposition, ...)
- Children are known to be non-adult like in other multi-factorial phenomena (see e.g. Gualmini et al. 2008 on QUD)

Discussion

Domain Restriction in adults

- Follow-up on adults with explicit domain of quantification
  - Test sentence: *None of <u>these three</u> bears won the race*
  - Same results as for *None of <u>the bears</u> won the race*: evidence for all three readings (crucially, EXISTENTIAL)

Discussion

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  - Test sentence: *Each of these 7 circles has the same color as the square to which it is connected*
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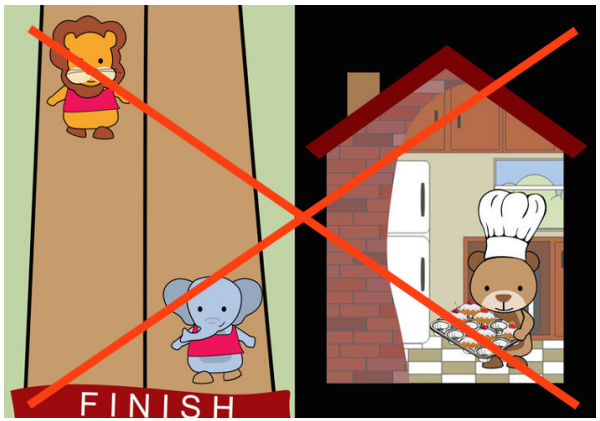
Seems like adults can override an explicit domain

Discussion

Children and Presupposition Suspendability

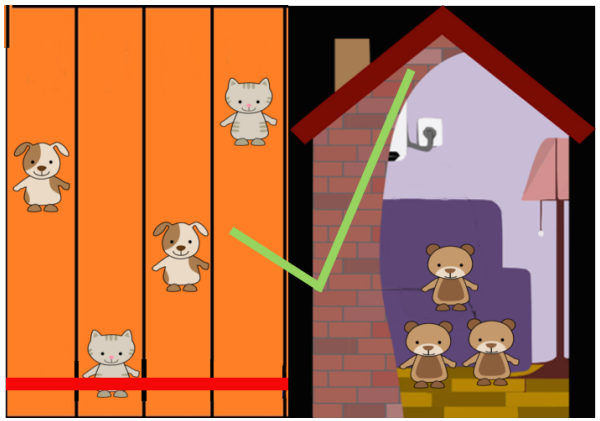
Unlike Bill et al. (2015), we often observed suspension

Bill et al. (2015)



"Bear did**n't** win the race"

Our experiment



"**None** of the bears won the race"

- Why are children less prone to project in our case?
- Quantificational sentences are more complex than non-quantificational negative sentences
- Children sometimes ignore the presupposition
- When they **do not ignore** it, they show a UNIVERSAL reading

Conclusion

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- Evidence from adults that **all three readings** exist: **universal**, **existential** and **presuppositionless**
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- Under this view, presupposition-driven **domain restriction**
  - Would be treated **differently by children and adults**
  - Adults can even override domain information that is explicitly expressed, e.g. by numerals
- PRESUPPOSITIONLESS readings + Bill et al. (2015) suggest that children **can ignore the presupposition**

Conclusion

Future Directions

- Manipulate various factors to test for domain restriction in children
  - Explicit domain of quantification (like the adult follow-up)
  - Visual stimuli (running bears in different colors)
- Look at triggers with different projection strengths (*stop*, *again*, ...)

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