Presupposition projection in quantified sentences

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The University of Texas at Austin

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Presupposition Projection

Presuppositions...

(1) Bear won the race

\[ \sim \ \text{Bear ran the race} \]
Presupposition Projection

Presuppositions...

(1) Bear won 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

\[ \sim \Rightarrow \text{Bear ran the race} \]
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
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

How do presuppositions project in quantified sentences?
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*
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
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**.
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
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]
ONLY SOME 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** $\rightarrow$ **Covered** picture ($\times$ all bears ran)
- **Existential** $\rightarrow$ **Covered** picture ($\times$ at least 1 bear ran)
- **Presuppositionless** $\rightarrow$ **Visible** ($\checkmark$ no presupposition)
Experiment

General Predictions

None of the bears won the race

<table>
<thead>
<tr>
<th>Condition</th>
<th>Universal</th>
<th>Existential</th>
<th>Presuppositionless</th>
</tr>
</thead>
<tbody>
<tr>
<td>TrueControl</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>OnlySome</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>NoRunner</td>
<td>×</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>FalseControl</td>
<td>×</td>
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Presupposition projection in quantified sentences
Experiment

Universal-Specific Predictions

TrueControl

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OnlySome

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<tr>
<td>×</td>
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Experiment

Existential-Specific Predictions

ONLY SOME

Universal | Existential | Presuppositionless
---|---|---
✗ | ✓ | ✓

NORUNNER

Universal | Existential | Presuppositionless
---|---|---
✗ | ✗ | ✓


**Experiment**

*Presuppositionless-Specific Predictions*

---

**Universal**  |  **Existential**  |  **Presuppositionless**
--- | --- | ---

**NoRunner**

- False
- True

**FalseControl**

- False
- False

Presupposition projection in quantified sentences
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 \(\times\) Covered choices)

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<tr>
<td>Choice of Covered</td>
<td><strong>25%</strong></td>
<td><strong>25%</strong></td>
<td><strong>50%</strong></td>
<td><strong>75%</strong></td>
</tr>
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**Significant contrast**: only explained by **UNIVERSAL**
Results (N=42)

**ONLYSome vs. NoRunner**: evidence for existential

None of the bears won the race

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<tr>
<td>Choice of Covered (Rate of × Covered choices)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0%</td>
<td>25%</td>
<td>50%</td>
<td>75%</td>
<td>100%</td>
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**Presupposition projection in quantified sentences**

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Significant contrast: only explained by **EXISTENTIAL**
Results (N=42)

NoRunner: evidence for presuppositionless

None of the bears won the race

(TrueControl OnlySome Condition NoRunner FalseControl)

(Rate of \(\times\) Covered choices)

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Significant contrast: only explained by presuppositionless

Universal | Existential | Presuppositionless
--- | --- | ---
NoRunner | ✔ | ×
FalseControl | × | ×

Presupposition projection in quantified sentences

Bill, Zehr, Tieu, Romoli & Schwarz
Results (N=42)

Summary

![Bar chart showing choice of covered condition between TrueControl, OnlySome, NoRunner, and FalseControl]

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. **ONLY** Some vs. **No** Runner:
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
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 \(\times\) Covered choices)

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**TrueControl**

- Universal: ✓
- Existential: ✓
- Presuppositionless: ✓

**OnlySome**

- Universal: ✗
- Existential: ✓
- Presuppositionless: ✓

Only **Universal** could make participants reject **OnlySome**

Presupposition projection in quantified sentences
Experiment

Results (N=19)

None of the bears won the race

(Rate of × Covered choices)

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Universal Existential Presuppositionless

NoRunner ❌ ❌ ✓
FalseControl ❌ ❌ ❌

Only Presuppositionless makes NoRunner acceptable

Presupposition projection in quantified sentences
None of the bears won the race

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**Results (N=19)**

- **Universal**
  - OnlySome: ×
  - NoRunner: ×

- **Existential**
  - ✓

- **Presuppositionless**
  - ✓

*No difference between **OnlySome** and **NoRunner** in children: no evidence for **Existential**

Presupposition projection in quantified sentences
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*?
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 these three bears won the race*
  - Same results as for *None of the bears won the race*: evidence for all three readings (crucially, EXISTENTIAL)
Discussion

Domain Restriction in adults

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- Geurt and van Tiel (2015) also tested with an explicit domain
  - Test sentence: *Each of these 7 circles has the same color as the square to which it is connected*
  - Accepted even with only 2 circles connected to a square
Discussion

Domain Restriction in adults

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  - Test sentence: *Each of these 7 circles has the same color as the square to which it is connected*
  - Accepted even with only 2 circles connected to a square

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)*

*Our experiment*

"Bear didn’t win the race"  "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
Conclusions

- Evidence from adults that all three readings exist: universal, existential and presuppositionless.
- Theories have to predict each of these readings.
Evidence from adults that all three readings exist: **universal**, **existential** and **presuppositionless**

- Theories have to predict **each of these** readings

Children only provide evidence for **universal** inferences

- Probably the **basic reading** between the two
Evidence from adults that all three readings exist: universal, existential and presuppositionless

- Theories have to predict each of these readings

Children only provide evidence for universal inferences

- Probably the basic reading between the two

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
Conclusions

- Evidence from adults that all three readings exist: universal, existential and presuppositionless
  - Theories have to predict each of these readings
- Children only provide evidence for universal inferences
  - Probably the basic reading between the two
- 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
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, ...*)

Presupposition projection in quantified sentences
Thank you

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References