Presupposition projection from *none*: An experimental investigation

J. Zehr[1], C. Bill[2], L. Tieu[3], J. Romoli[4], F. Schwarz[1]

[1]University of Pennsylvania, [2]Macquarie University, [3]LSCP-ENS-CNRS, [4]Ulster University

Friday, 18 December, 2015

Presupposition Projection

Projection is a hallmark of presupposition:

(1)   Bear <u>won</u> the race ⤳ *Bear participated in the race*

(2)   Bear did **not** <u>win</u> the race ⤳ *Bear participated*

(3)   **If** Bear <u>won</u> the race, Frog is glad ⤳ *Bear participated*

(4)   **Did** Bear <u>win</u> the race**?** ⤳ *Bear participated*

When **the inference is preserved**, we say the presupposition **projects**

But it is possible to **not derive the inference**:

(5)   Bear did not win the race... he never participated!

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

In such a case, we have a **presuppositionless** reading.

Projection from *None*

When embedded under the universal quantifier *none* as in (6), what the result of projection is is not clear.

(6)   None of the bears won the race

Three candidate readings:

(7)   a.   EXISTENTIAL: *At least one of the bears participated and none of them won.*
      b.   UNIVERSAL: *All of the bears participated and none of them won.*
      c.   PRESUPPOSITIONLESS: *None of the bears both participated and won.*

Our goal: test to what extent these readings are accessible

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:
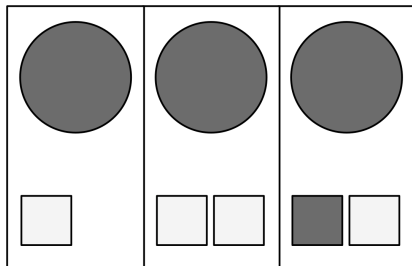Each of these 10 students missed some of their exams.
No?   *Yes?*

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

Evidence that a universal reading exists

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.*
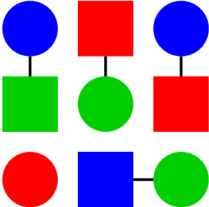
Evidence that non-universal reading exists

TVJT (assumption: universal presupposition→rejection):

Acceptance > 92%, *despite there being a circle with no square*
Evidence that non-universal reading exists

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
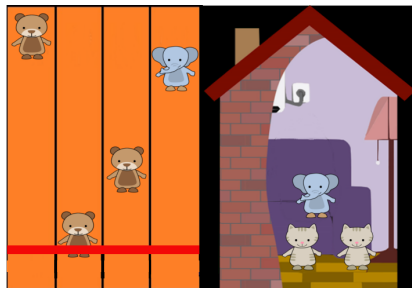   distinguish between EXISTENTIAL and PRESUPPOSITIONLESS
    readings.

We **separately** 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
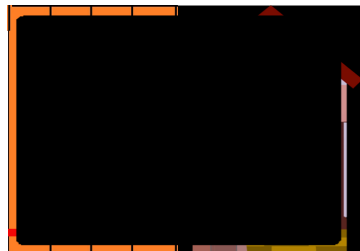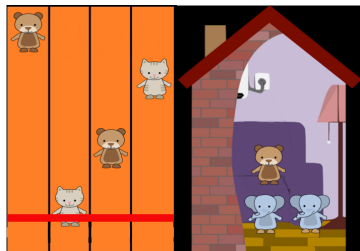
*In the morning race, **these three bears** did really well, and in the end one of them won. I thought they would do well later in the day as well, but...* [Audio]
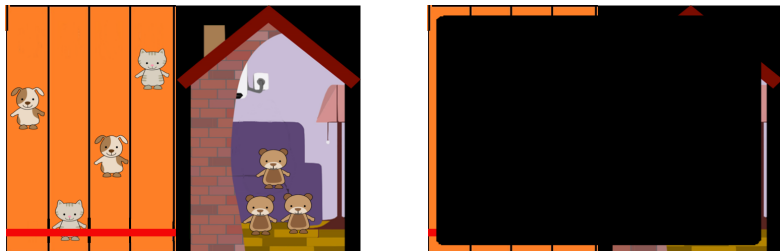
ONLYSOME condition (4 repetitions):
2 out of 3 bears ran and lost

None of the bears won the afternoon race [Audio]

- UNIVERSAL → **Covered** picture (not all bears ran)

- EXISTENTIAL → **Visible** picture (at least 1 bear ran but none won)

- PRESUPPOSITIONLESS → **Visible** (The winner is not a bear)

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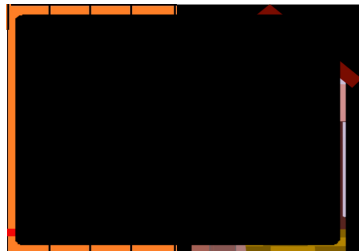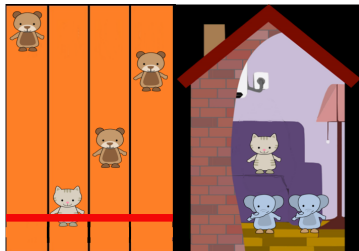No bear ran the race

None of the bears won the afternoon race [Audio]

- Universal → **Covered** picture (not all bears ran)

- Existential → **Covered** picture (not even 1 bear ran)

- Presuppositionless → **Visible** (The winner is not a bear)

TRUECONTROL condition (2 repetitions):
All bears participated but **none won**

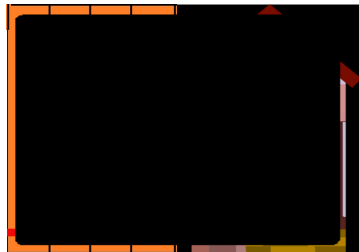*None of the bears won the afternoon race* [Audio]

FALSECONTROL condition (2 repetitions):
All bears participated and **one of them won**

None of the bears won the afternoon race [Audio]

UNIVERSAL-specific predictions

	UNIVERSAL	EXISTENTIAL	PRESUPPOSITIONLESS
TRUECONTROL	✓	✓	✓
ONLYSOME	✗	✓	✓

EXISTENTIAL-specific predictions

	UNIVERSAL	EXISTENTIAL	PRESUPPOSITIONLESS
ONLYSOME	✗	✓	✓
NORUNNER	✗	✗	✓

PRESUPPOSITIONLESS-specific predictions

	UNIVERSAL	EXISTENTIAL	PRESUPPOSITIONLESS
NORUNNER			
	✗	✗	✓
FALSECONTROL			
	✗	✗	✗

- Also 4 true and 4 false fillers
  - *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 fillers (**not** $\leq$): total of 42 subjects analyzed

- Also collected Reaction Times
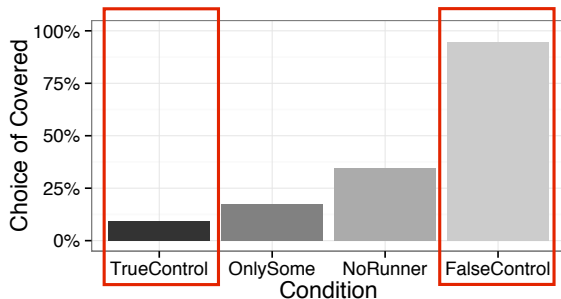
- Good accuracy on controls
- Participants understood the task and the descriptions
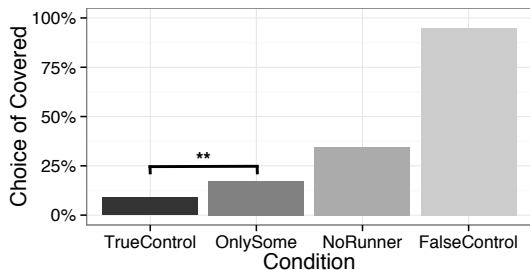
	UNIVERSAL	EXISTENTIAL	PRESUPPOSITIONLESS
TRUECONTROL	✓	✓	✓
ONLYSOME	✗	✓	✓

Significant rejection: only UNIVERSAL can yield it

	UNIVERSAL	EXISTENTIAL	PRESUPPOSITIONLESS
ONLYSOME	✗	✓	✓
NORUNNER	✗	✗	✓

Significant contrast: only EXISTENTIAL can yield it

	Universal	Existential	Presuppositionless
NoRunner	✗	✗	✓
FalseControl	✗	✗	✗

Significant acceptance: only Presuppositionless can yield it

- Evidence for UNIVERSAL: rejection in ONLYSOME
- Evidence for EXISTENTIAL: contrast ONLYSOME vs NORUNNER
- Evidence for PRESUPPOSITIONLESS: acceptance in NORUNNER

Acceptance reaction times:

- NoRunner > (OnlySome = TrueControl)

  - Presuppositionless = local accommodation = costly process (cf. Chemla & Bott, 2013)
  - Existential = faster than presuppositionless

There are two broad types of projection theories

1. Those that predict a **universal projection** (Heim 1983, Schlenker 2008, a.o.)

2. Those that predict an **existential projection** (Beaver 1994, van der Sandt 1992, a.o.)

How to account for the three readings?

1) **Universal-projection-only**

- UNIVERSAL = directly from **universal** projection
- EXISTENTIAL = reanalyzed as a **weakened** reading, from **domain restriction** ($\approx$ *none of the bears [who ran] won*)
- PRESUPPOSITIONLESS = local accommodation

Needs an extra mechanism: domain restriction (faster than local accommodation, cf. RTs)

2) **Existential-projection-only**

- EXISTENTIAL = directly from **existential** projection
- UNIVERSAL = reanalyzed as a **strengthened** meaning
- PRESUPPOSITIONLESS = local accommodation

Needs an extra mechanism: strengthening (optional)

3) **Existential + universal projections**

- EXISTENTIAL = directly from **existential** projection
- UNIVERSAL = directly from **universal** projection
- PRESUPPOSITIONLESS = local accommodation

Needs an extra assumption re. ONLYSOME vs. NORUNNER:

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

Conclusion

Conclusions

- Evidence for **all three readings** from *none*:
  universal, **existential** and **presuppositionless**

- Evidence for **local accommodation**, associated with **delay**
  (easily available: $> 50\%$ acceptance in NoRunner)

- None of existential- and universal-only projection theories can
  directly account for all three readings

  1. Either there is a strengthening/weakening mechanism
  2. or both existential and universal projections exist in parallel

Conclusion

Future Directions

- Test children: Bill et al., 2015 suggest they resist accommodation

- Variant with "*None of* **the three** *bears*" to test domain restriction (cf. Geurts and van Tiel, 2015)

- Vary triggers (*win*, *stop*, ...) and tasks (covered box, inference)

Acknowledgments

Thank you

And thanks to...

- our funders
  - NSF grant BCS-1349009 to Florian Schwarz
  - European Research Council under the European Unions Seventh Framework Programme (FP/2007-2013) / ERC Grant Agreement n.313610
  - ANR-10-IDEX- 0001-02 PSL* and ANR-10-LABX-0087 IEC
- Emmanuel Chemla, Stephen Crain, and Danny Fox (discussion)
- Dorothy Ahn (illustrations)

References

- **Beaver, D. 1994.** "When variables dont vary enough." In M. Harvey and L. Santelmann, editors, *Proceedings of SALT 4*, pp 35–60. Cornell University.

- **Chemla, E. 2009.** "Presuppositions of quantified sentences: Experimental data." *Natural Language Semantics, 17(4)*:299–340.

- **Chemla, E. and Spector, B. 2011.** "Experimental Evidence for Embedded Scalar Implicatures." *Journal of Semantics*.

- **Chemla, E. and Bott, L. 2013.** "Processing presuppositions: Dynamic semantics vs pragmatic enrichment." *Language and Cognitive Processes, 38(3)*:241–260.

- **Geurts, B. and van Tiel, B. 2015.** "When all the five circles are four: new exercises in domain restriction." *Topoi*, pp 1–14.

- **Heim, I. 1983.** "On the projection problem for presuppositions." In Daniel P. Flickinger, editor, *Proceedings of WCCFL 2*, pp 114–125, Stanford University, Stanford, California, 1983. CSLI Publications.

- **Huang Y., Spelke E. and Snedeker, J. 2013.** "What exactly do number words mean?" *Language Learning and Development, 9(2)*:105–129.

- **Sudo Y., Romoli J., Fox D. and Hackl M. 2011.** "Variation of presupposition projection in quantified sentences." In *Proceedings of the Amsterdam Colloquium 2011*, Amsterdam, The Netherlands, to appear.