



Adults behaving like children: the effect of time in resolving quantifier ambiguity

Scott Fults¹, Anastasia Conroy¹, Jeffrey Lidz¹ and Julien Musolino²



¹University of Maryland, ²Rutgers University

We measure the time-course of adult scope interpretation in order to understand two things:

1 why inverse scope is difficult for children

2 the process by which adults resolve semantic ambiguities

We suggest that adult processing can shed light on why children make mistakes in ambiguity resolution

Background

Scope Ambiguity: A sentence with a quantifier and negation has two interpretations determined by the scope of the quantifier.

(1) Every dwarf didn't spray paint the barn.

Surface scope interpretation:

(2) *every* > *not*: None of the dwarves spray painted the barn.

Inverse scope interpretation:

(3) *not* > *every*: It is not the case that every dwarf spray painted the barn, but some did.

An asymmetry

(Lidz & Musolino 2006; Musolino, Crain & Thornton 2000)

- Adults prefer inverse interpretation of (1)
- Children adhere to the surface interpretation of (1)

Where does this asymmetry come from?

Hypotheses

Preference Hypothesis:

Idiosyncratic scope assignments are learned for every construction; the adult preference for (1) is inverse scope. *There is no distinction between initial and preferred scope.*

Children initially have trouble with (1) because they have already learned that the general preference for most other constructions is surface scope.

Adults

— Surface Scope

— Inverse Scope

Children

→ Surface Scope

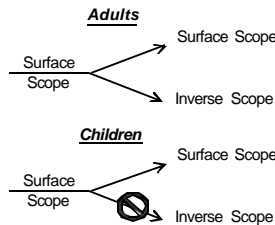
⊘ Inverse Scope

Hypotheses, cont.

Surface-Default Hypothesis:

surface scope is always the default, initial interpretation for both adults and children.

Apparent deviations from the default are learned as special cases: adults have learned to revise their initial interpretations of (1) and assign inverse scope, but children have not. (Conroy & Lidz 2007; Lidz & Musolino 2006)



The Experiment

Speeded vs. Non-speeded Sentence Completion Task

In order to improve upon previous on-line scope parsing studies:

- we provided a context with each sentence, so that participants did not have to imagine their own, and,
- each context supported both interpretations

Participants sat in front of a computer screen, viewed pictures like these, and heard a story about the pictures:



"Here we have a red dwarf, a blue dwarf and a green dwarf, and they all have their own colors of spray paint. And, there's the farmer and he has his own can of spray paint. First, there's the barn that the cow lives in. It looks like the red dwarf and the blue dwarf spray painted the cow's barn but not the green dwarf. And, then we have the barn that the pig lives in. It doesn't look like any of the dwarves painted the pig's barn but it looks like the farmer did."

Not all of the dwarves spray painted the cow's barn!

None of the dwarves spray painted the cow's barn!

After the story, participants heard an incomplete sentence and were asked to choose the best completion.

(4) Every dwarf didn't spray paint the barn that belonged to the...

This answer is consistent with inverse scope



This answer is consistent with surface scope

We could tell which scope was assigned while interpreting the incomplete sentence by which answer was given.

Controls included:

- Every dwarf spray painted the barn that belonged to the...
- The dwarf didn't spray paint the barn that belonged to the...
- The dwarf spray painted the barn that belonged to the...

Predictions (for adults)

non-speeded condition

there was no beep and participants were told to take as much time as they wanted.

speeded condition

a beep signaled participants to finish the sentence as quickly as they could.

Preference Hypothesis:

Inverse scope

Preference Hypothesis:

Inverse scope

Surface Hypothesis:

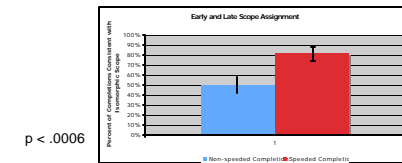
Inverse scope

Surface Hypothesis:

Surface scope

Results

- 40 adults: 20 speeded, 20 non-speeded
- Speeded: 10 test trials; 10 controls
- Non-speeded: 6 test trials; 3 controls



Conclusions

1. Evidence for **Surface-Default hypothesis**: adults *always* first assign surface scope, and only later change to inverse scope if necessary.
2. Adults' offline preference for inverse scope can be unified with children's offline preference for surface scope: both initially arrive at surface scope.
3. The scope ambiguity illustrated in (1) falls in line with previous studies implicating surface scope as the initial interpretation. (Anderson 2004; Frazier 1999; Kurtzman & McDonald 1993)
4. We must maintain a distinction between initial and preferred interpretations in the processing of ambiguous sentences.
5. Preferred scope interpretations, which are measured off-line reflect the parser *and* contextual factors that lead to reanalysis.

References

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- Conroy, A. M. and J. Lidz. (2007) poster presented at CUNY 2007, San Diego, CA.
- Frazier, L. (1999) Dordrecht: Kluwer Academic Publishing.
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