Children's Knowledge of Scope Ambiguity and Scope Freezing in Argument Structure Alternations

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Testing Between Theories

- As a language acquisition researcher working in the generative framework, I try to study phenomena that will test between theories of linguistics and acquisition

- Argument structure alternations where scope is 'frozen' in certain sentences is one area where theories make different predictions

Negative Facts

Ambiguous Alternant

Sentence 1:   Meaning 1

                     Meaning 2

Alternant with Scope Freezing

Sentence 2:   *Meaning 1

                     Meaning 2

Problem for Usage-based Accounts:

If a child is exposed to Sentence 1 and its two meanings, and is learning the grammar using mechanisms such as analogy, they are likely to assume that Sentence 2 is also ambiguous, contrary to fact.

Today's Plan

- Introduce 2 experiments with preschool children, one investigating scope freezing in the dative alternation and a second one looking at similar facts in the spray/load alternation

- In each case, one sentence in the alternation is ambiguous, and in the other alternant, one potential scope assignment is 'frozen' or prohibited

- In each case, we will have 2 quantifiers in the sentence, 'a' and 'every'

Dative Alternation

Prepositional Dative

1. Snow White gave every cupcake to a lady

    ✓every > a   (surface scope)

    > SW gave every cupcake to a different lady

    ✓ a > every   (inverse scope)

    > SW gave every cupcake to a particular lady

Double Object Structure

2. Snow White gave a lady every cupcake

    ✓ a > every   (surface scope)

    > SW gave a particular lady every cupcake

    * every > a   (inverse scope)

    > SW gave each of the cupcakes to a different lady

Inverse Scope

DO Structure

1. A lady gave Snow White every cupcake

✓ a > every   (surface scope)

A particular lady gave SW every cupcake

✓ every > a   (inverse scope)

A different lady gave SW each cupcake

'Put' Locative Structure

2. Snow White put a cake in front of every lady

✓ a > every   (surface scope)

Snow White put a particular (big) cake in front of every lady

✓ every > a   (inverse scope)

Snow White put a (small) cake in front of each lady

Spray/Load Alternation

Ambiguous

1. Snow White stuffed a tiara into every drawer

   ✓ a > every (surface scope)

   > SW stuffed a particular tiara into every drawer

   ✓ every > a (inverse scope)

   > SW stuffed a (different) tiara into every drawer

'With Variant': Scope Freezing

2. Snow White stuffed a drawer with every tiara

   ✓ a > every (surface scope)

   > SW stuffed a particular drawer with every tiara

   * every > a (inverse scope)

   > SW stuffed a (different) tiara into each drawer

Scope Freezing

We assume Bruening's (2001) theoretical proposal of scope freezing in these 2 alternations:

- QR has to obey Superiority

- When the quantifiers raise at LF, they have to keep their original order

- This is just like wh-words in multiple wh-questions in Bulgarian

*Bruening, B. (2001) QR obeys Superiority: Frozen Scope and ACD. *Linguistic*

Inquiry 32, 233-273.

Bulgarian (Rudin 1988)

cited in Bruening (2001)

a. Koj kogo vižda?
    who whom sees
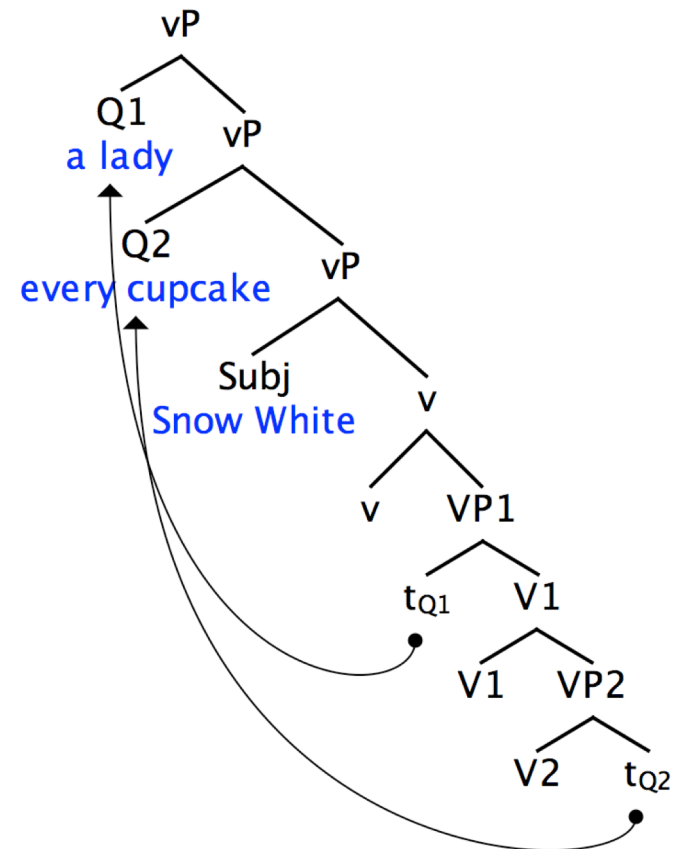   'Who sees whom?'

b. *Kogo koj vižda?

C. Koj kogo t_{subj} vižda t_{obj}

Wh-words keep their original order when moved

# Double Object Sentences

Snow White sold a lady every cupcake

- Bruening proposes that QR is not to TP, but to vP

- v has a feature that attracts Q1 first, then Q2

- The subject is generated vP-internally, but raises

- Scope Freezing results

Prepositional Datives

Snow White sold every cupcake to a lady

- Bruening proposes the QNPs *every cupcake* and *a lady* are originally sisters.

- Since these are 'equi-distant' from the higher projection Superiority doesn't apply

- Either element can move first
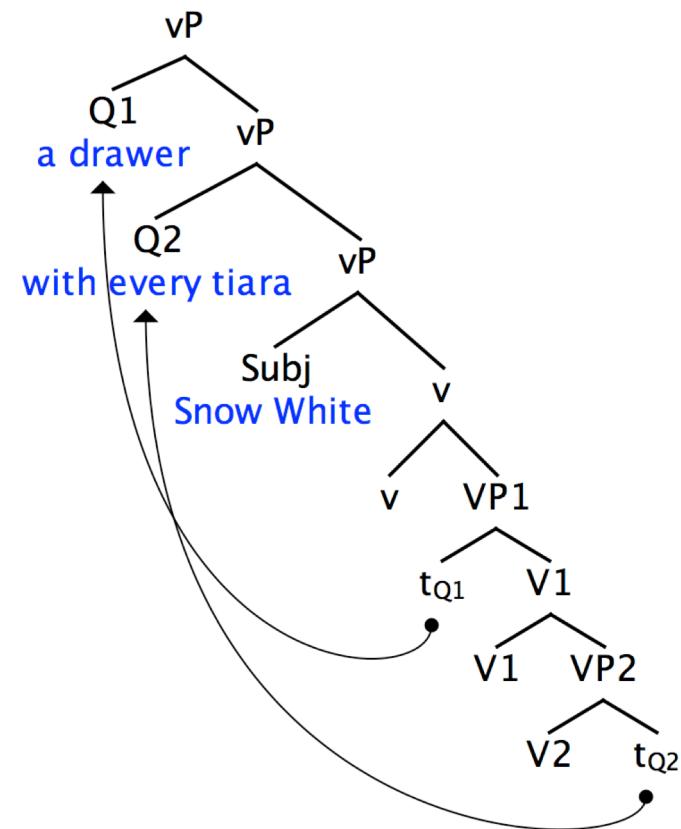
- This gives rise to the ambiguity
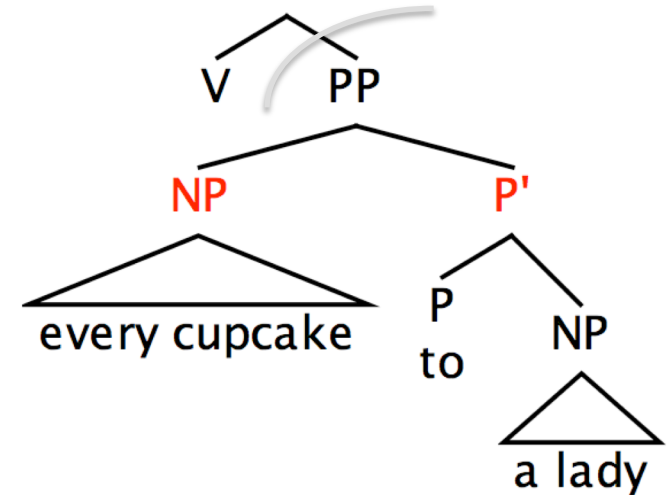
Spray/Load Sentences

Snow White stuffed a drawer with every tiara

Bruening explains the scope freezing in the same way as the DO sentences

Bruening's Puzzle
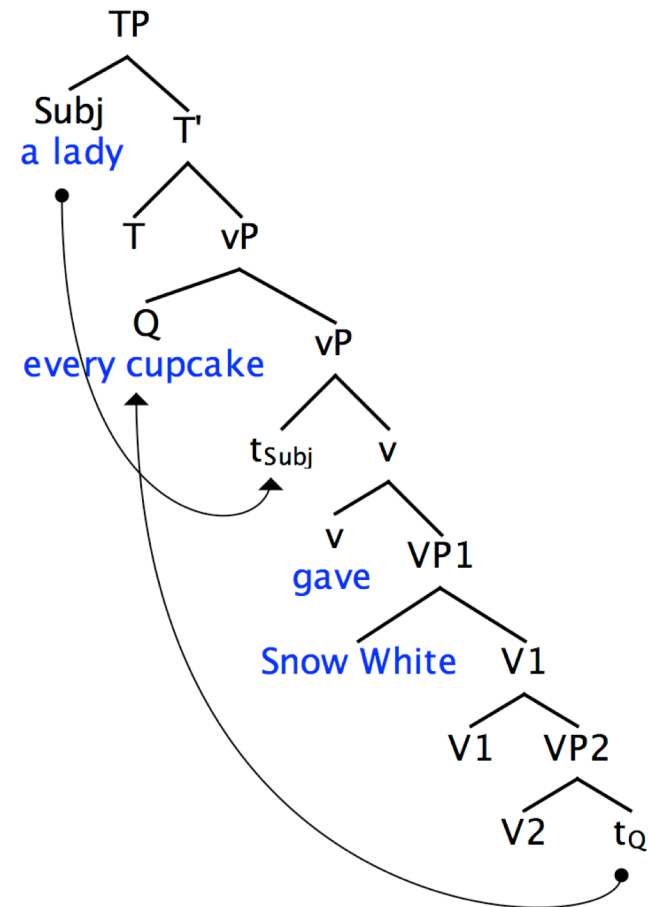
1. Snow White gave a lady every cupcake. (*every>a)

2. A lady gave Snow White every cupcake. (every>a)

- In 1., the second object couldn't take scope over the higher object; this accounted for Scope Freezing

- But in 2., the second object (*every cupcake*) <u>can</u> take scope over the *subject*

- Question: If quantifiers have to raise in their original order, how does the second object raise over the subject NP to give the inverse scope reading?

Bruening's Proposal

A lady gave Snow White every cupcake

- There is only one Quantifier to move (*every cupcake*) since the subject is already in vP.
- The subject moves to TP for EPP reasons (a>every)
- The subject can optionally reconstruct to vP internal position
- Reconstruction gives the inverse scope interpretation, because then *every cupcake* c-commands the reconstructed subject (every>a)

Inverse Scope

DO Structure

1. A lady gave Snow White every cupcake

     ✓ a > every   (surface scope)

          A particular lady gave SW every cupcake

     ✓ every > a   (inverse scope)

          A different lady gave SW each cupcake

If we can show that children allow inverse scope in these sentences, this would be additional support that children have access to reconstruction

Predictions

- Children who have innate knowledge of these facts should behave like adults with respect to scope freezing

- If children do not have innate knowledge and have to learn these facts, the sentences with scope freezing should be ambiguous
  - That is, children will accept the illicit reading

Previous Literature Su (2001)

- Yi-Ching Su (2001) tested both Prepositional Dative and Scope Freezing in DO sentences using a Truth Value Judgment Task

- Mandarin and English-speaking children aged 4 to 6 years

- Relevant Finding:

  The English-speaking children did not obey Scope Freezing, accepting the illicit reading 72% of the time

Su's Interpretation

English:

Roughly, children treat the indefinite NP as a bare plural

Snow White gave a lady every cupcake

Interpreted as:

Snow White gave ladies every cupcake

This would allow a pairing between ladies and cupcakes

Question:

How do children eliminate this non-adult interpretation?

Better if we could demonstrate that children obey Scope Freezing…

Experiment 1:

Scope Freezing

1. Snow White gave a lady every cupcake

Prepositional Datives

2. Snow White gave every cupcake to a lady

Inverse Scope and Reconstruction

3. A lady gave Snow White every cupcake

Inverse Scope in Locatives

4. Snow White put a cake in front of every lady

Experimental Hypotheses

Scope Freezing

1. Snow White gave a lady every cupcake
   Children should reject the interpretation on which each lady gets a cupcake (*every>a)

Prepositional Datives

2. Snow White gave every cupcake to a lady

   Children should accept the reading on which each lady gets a cupcake (every>a)

Experimental Hypotheses

Inverse Scope and Reconstruction

3. A lady gave Snow White every cupcake

   Children should accept the reading on which each lady gives SW a cupcake (every>a)

'Put' Locative Structure

4. Snow White put a cake in front of every lady

   Children should accept the surface scope reading on which Snow White put a giant cake in front of all the ladies, given that this is true (a>every)?

   Or, will children prefer the inverse scope interpretation? (every>a)

Participants and Method

- 16 children ranging in age from 4;0 to 5;10 (mean 4;4 years)

- 14 adults (undergraduates)

- Truth Value Judgement Task delivered as short video clips of 'stories' (video-recorded due to so many tiny toys and props…)

- Puppet delivered sentences for judgement at the end (live)

- 2 sessions (each alternant in separate session)

- Exclusion Criterion: Acceptance of 2 ACD sentences that were false in the context; 2 children excluded
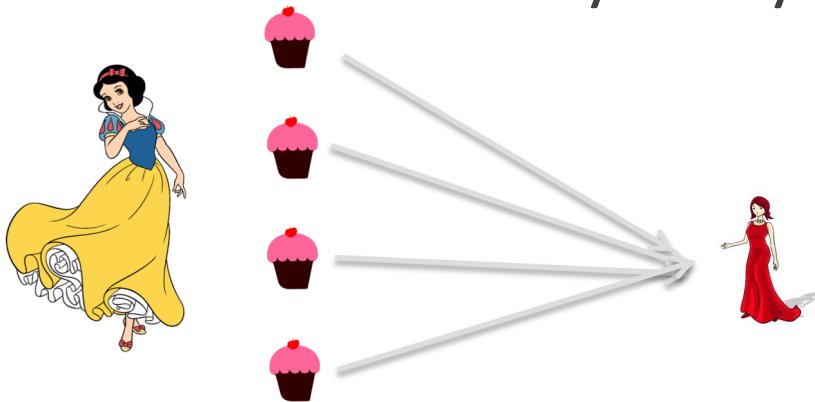
Design of Scope Freezing Items

Snow White gave a lady every cupcake
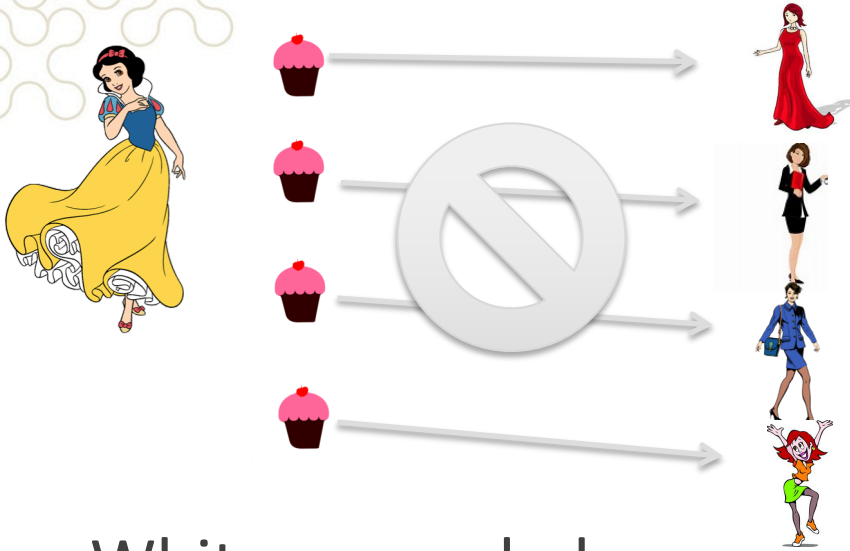
every > a
will be
TRUE

Snow White gave a lady every cupcake

a > every
will be
FALSE

Scope Freezing Story

- SW has done some baking and made some lemonade and wants to give everything away

- There happen to be ladies and sportsmen at the park

- A (particular) lady who is on roller skates asks for all the cupcakes but SW says the tray will be hard to carry, so suggests the lady take all the donuts in the basket instead. The lady accepts

  <False that SW gives a particular lady every cupcake>

- SW gives the sportsmen a drink to take with them

- SW gives out all the cupcakes, one to each lady

  <True that SW gives each lady a cupcake>

Puppet's Judgement

Puppet: That was a story about Snow White who was giving away cakes and drinks at the park, and these sportsmen and these ladies. And I know what happened.

Snow White gave every sportsman a drink   **T**

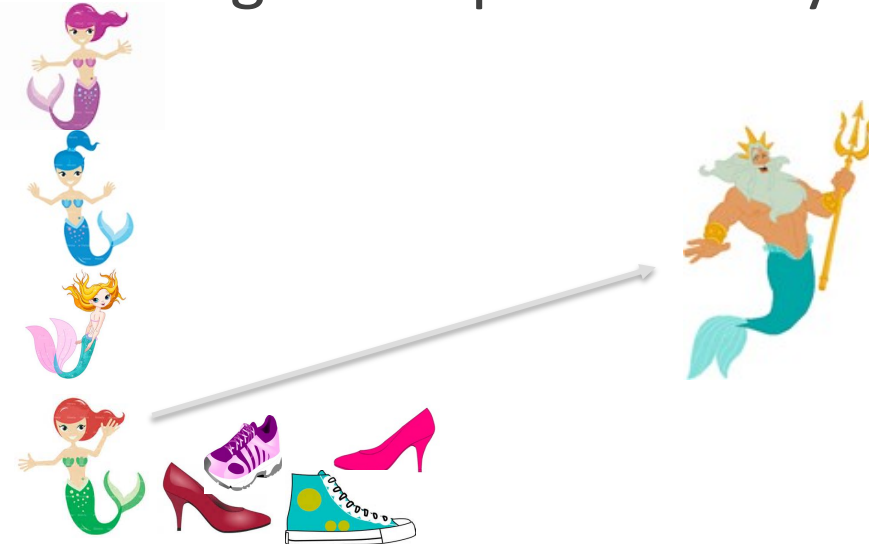And I know something else that happened in that story.

Snow White gave a lady every cupcake   **F**

Inverse Scope Items

A mermaid gave Neptune every shoe

every>a
will
be TRUE

A mermaid gave Neptune every shoe

a>every
will be
FALSE

Neptune Story

(A mermaid gave Neptune every shoe)

- Neptune wants all the trash cleaned up from the ocean

- One mermaid offers to get all the shoes but in the end decides to take Neptune every bottle instead

  <False that a particular mermaid gave every shoe>

- The fish think about tidying up shoes but can't manage to carry them so they take Neptune every rubber band

- Finally, each mermaid takes Neptune a shoe

  <True that each mermaid gave Neptune a shoe>

Puppet's Judgement

Puppet: That was a story about Neptune who wanted the ocean cleaned up, and some mermaids and some fish. And I know one thing that happened.

The fish gave Neptune every shoe   **F**

And I know something else that happened

A mermaid gave Neptune every shoe   **T**

Reminder: Hypotheses

Reject every>a: Scope Freezing

1. Snow White gave a lady every cupcake

Accept every>a in Prepositional Datives

2. Snow White gave every cupcake to a lady

Inverse Scope in DO sentences?

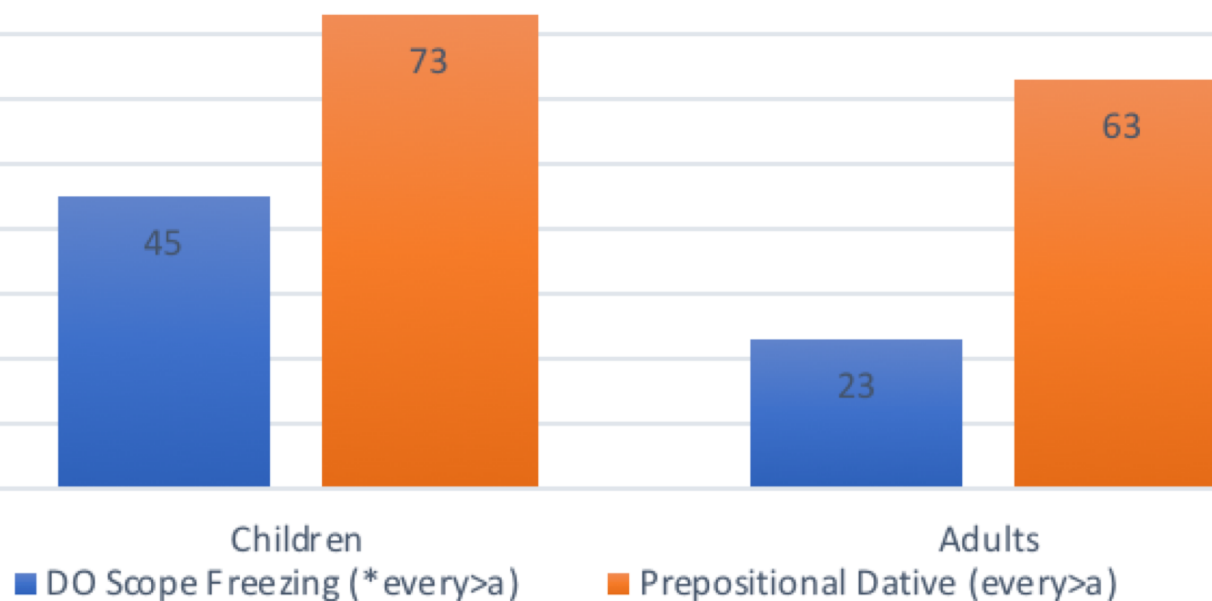3. A lady gave Snow White every cupcake

Surface or Inverse Scope in Locatives?

4. Snow White put a cake in front of every lady

Scope Freezing

Dative Alternation with 'Give'

Percentage Acceptance

Children: DO Scope Freezing (*every>a) = 45, Prepositional Dative (every>a) = 73

Adults: DO Scope Freezing (*every>a) = 23, Prepositional Dative (every>a) = 63

■ DO Scope Freezing (*every>a)   ■ Prepositional Dative (every>a)

Interpretation

Scope Freezing results could have been cleaner….

Possibilities:

1. Judgements (adults and kids) are not very sharp for these sentences with 'give'

2. Pragmatics of experimental stories need 'tweaking' to make indefinite natural in context?

   > SW gave a lady every cupcake

3. Noise introduced by videos rather than live stories

4. SF judgement preceded by 'yes' judgement of illicit reading (SW gave every sportsman a drink)

Inverse Scope (every>a)
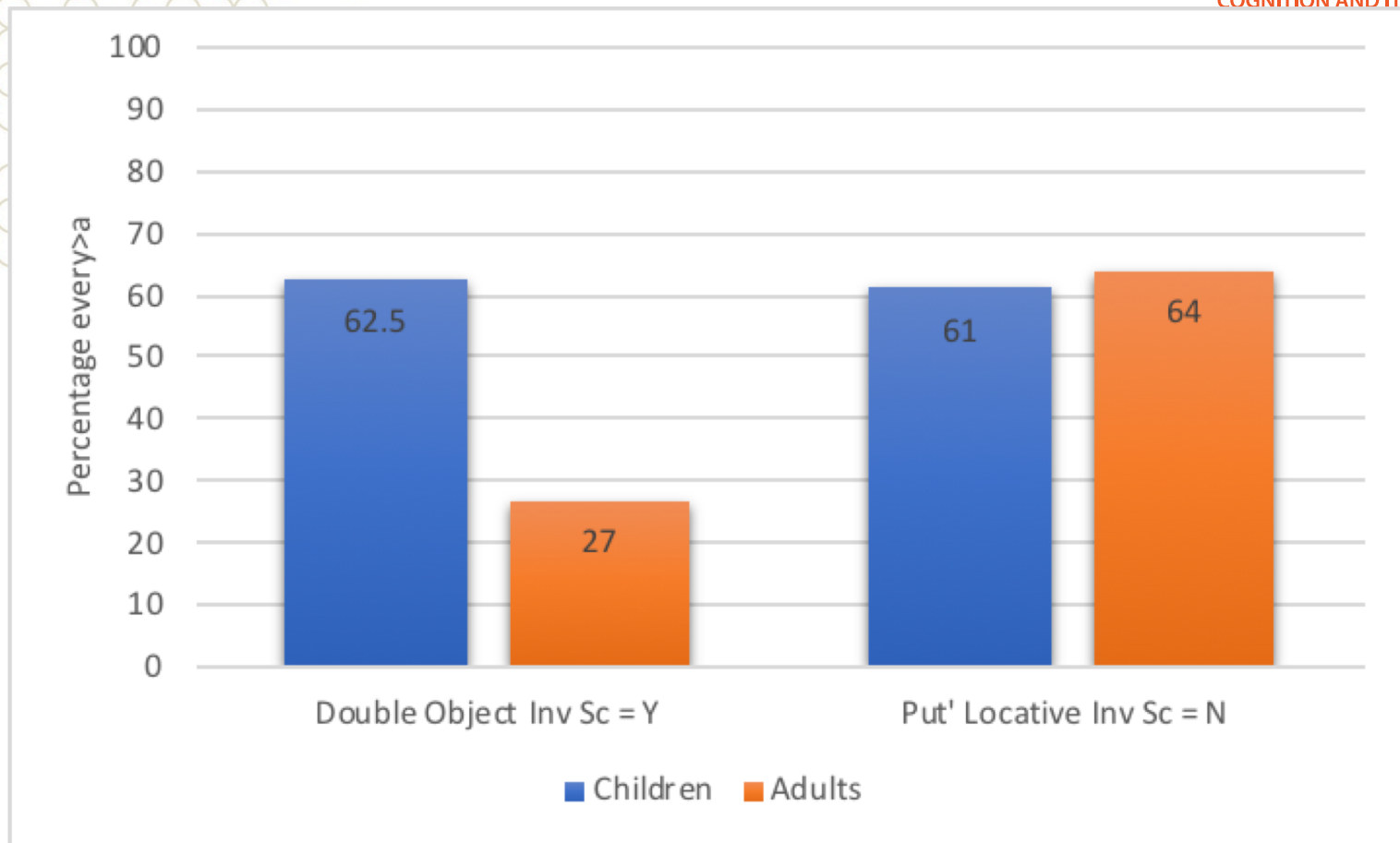
Double Object Inv Sc (every>a is TRUE): A mermaid gave Neptune every shoe
'Put' Locative (every>a is FALSE):   Donald Duck put a pizza in front of every boy

Interpretation

Inverse Scope and Reconstruction

- The finding that adults are more rigid than children in their scope assignment has been found in previous experimental studies (Lee 1991, 2003; Zhou & Crain 2009)

- Individual children seem to prefer inverse scope. The same 4 children who accepted inverse scope and violated Scope Freezing also accepted all 4 items with indefinite in subject position

Experiment 2

- The DO sentences with 'give' were all about a character giving objects to people for various reasons

- The second experiment is with the 'spray/load' verbs. These stories were all about someone trying to fit various objects in different containers or places…. We used the 'load' verbs *pack*, *stuff* and *load*

- Theoretically, the alternation works the same way, but are people's judgements the same?

- Could we 'improve' on the Scope Freezing results in Experiment 1?

Experiment 2

Scope Freezing ('With' variant)

1. The rabbit stuffed a drawer with every tiara

   * every > a   (inverse scope)

   The rabbit stuffed a (different) tiara into each drawer

Ambiguous Alternant

2. The rabbit stuffed a tiara into every drawer

   ✓every > a   (inverse scope)

   The rabbit stuffed a (different) tiara into every drawer

Participants and Method

Experiment in Progress

- 14 children, ranging in age from 4;1 to 5;8 (mean 4;5 years)

- Scope Freezing Session: 14 kids

- Session with Ambiguous Controls: 9 kids

- No adults yet

- Method was TVJT, delivered as live stories

- Puppet watched along with the child and produced sentences for judgement at the end (live)

Scope Freezing – 'With' Variant

The rabbit stuffed a drawer with every tiara
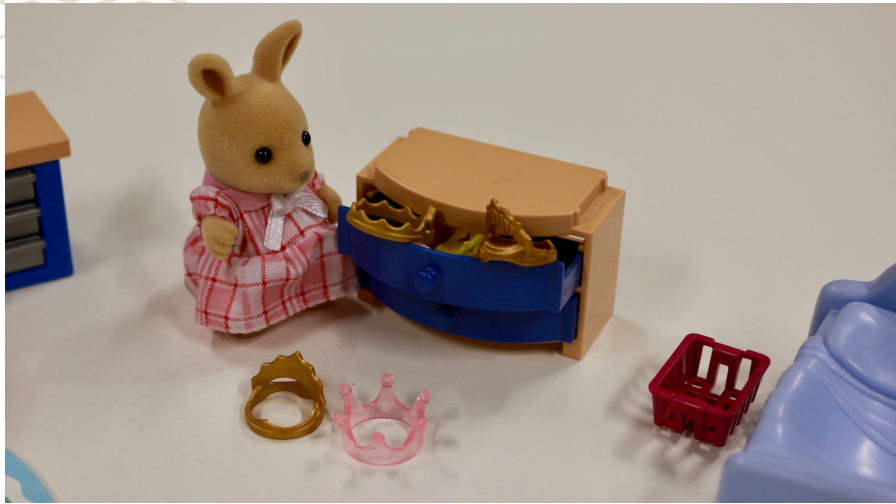
a>every

is FALSE

*every>a
is TRUE

Dress-Up Story

This rabbit has been playing dress-up with all these shoes and tiaras. Her mother tells her to tidy everything up.
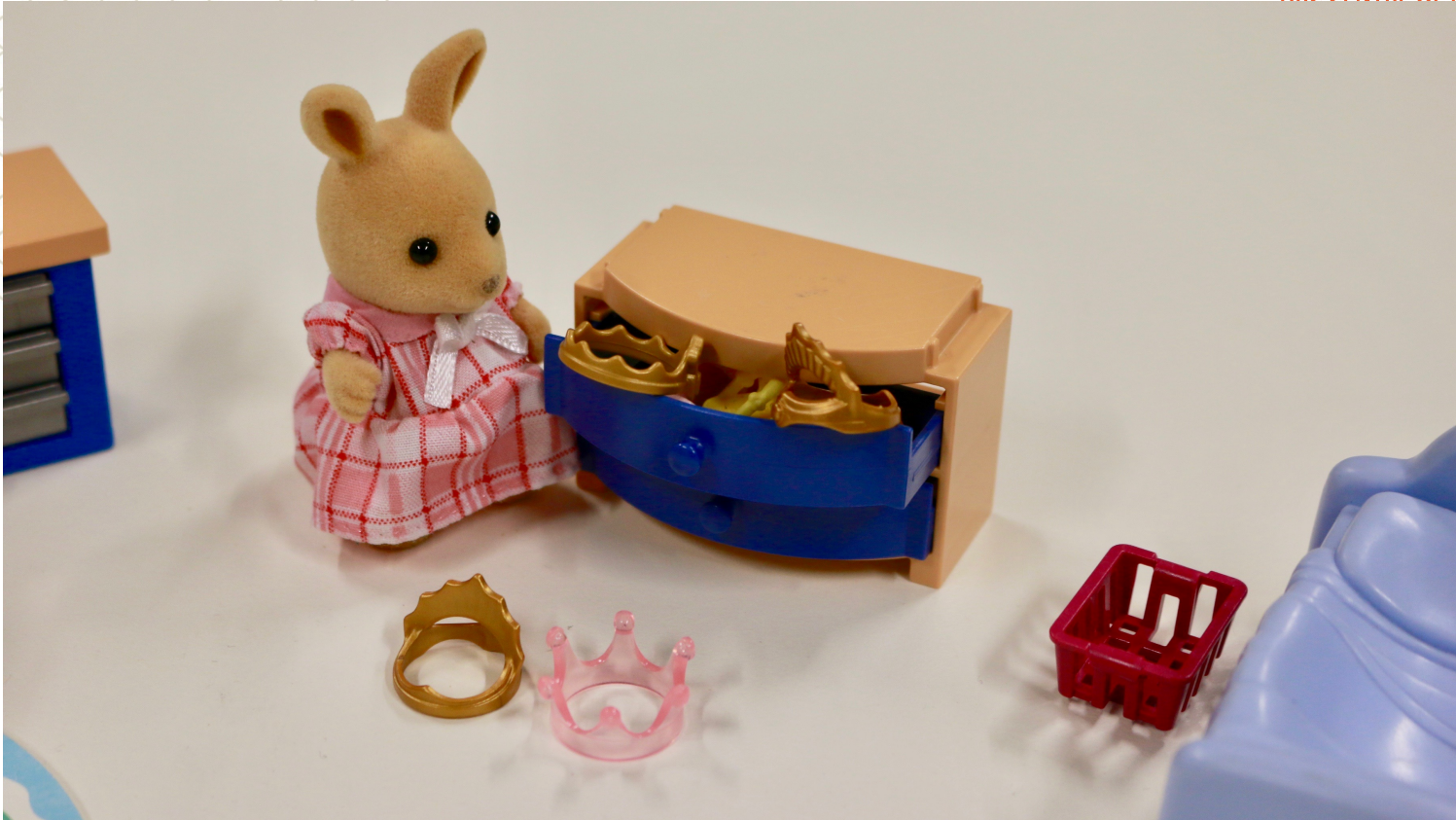
Where to Put Everything?

The rabbit decides to get all the shoes and all the tiaras into the drawer by her bed

Shoes...

She gets all the shoes in, and then decides to get the tiaras into the drawer

The drawer is full

She tries to get all the tiaras in, but fails, so decides to just put one tiara in the drawer

Actual Outcome

She decides to try and find room for the other tiaras in her other drawers.

She manages to stuff a tiara into other drawers

Tidying Up is Done!

Puppet's Judgment

"Cool story. That was a story about a Rabbit who had to tidy up her dress up shoes and tiaras before dinner. And I know one thing that happened. The rabbit stuffed a drawer with every tiara. Was I right or a bit mixed up?"

Ambiguous Alternant
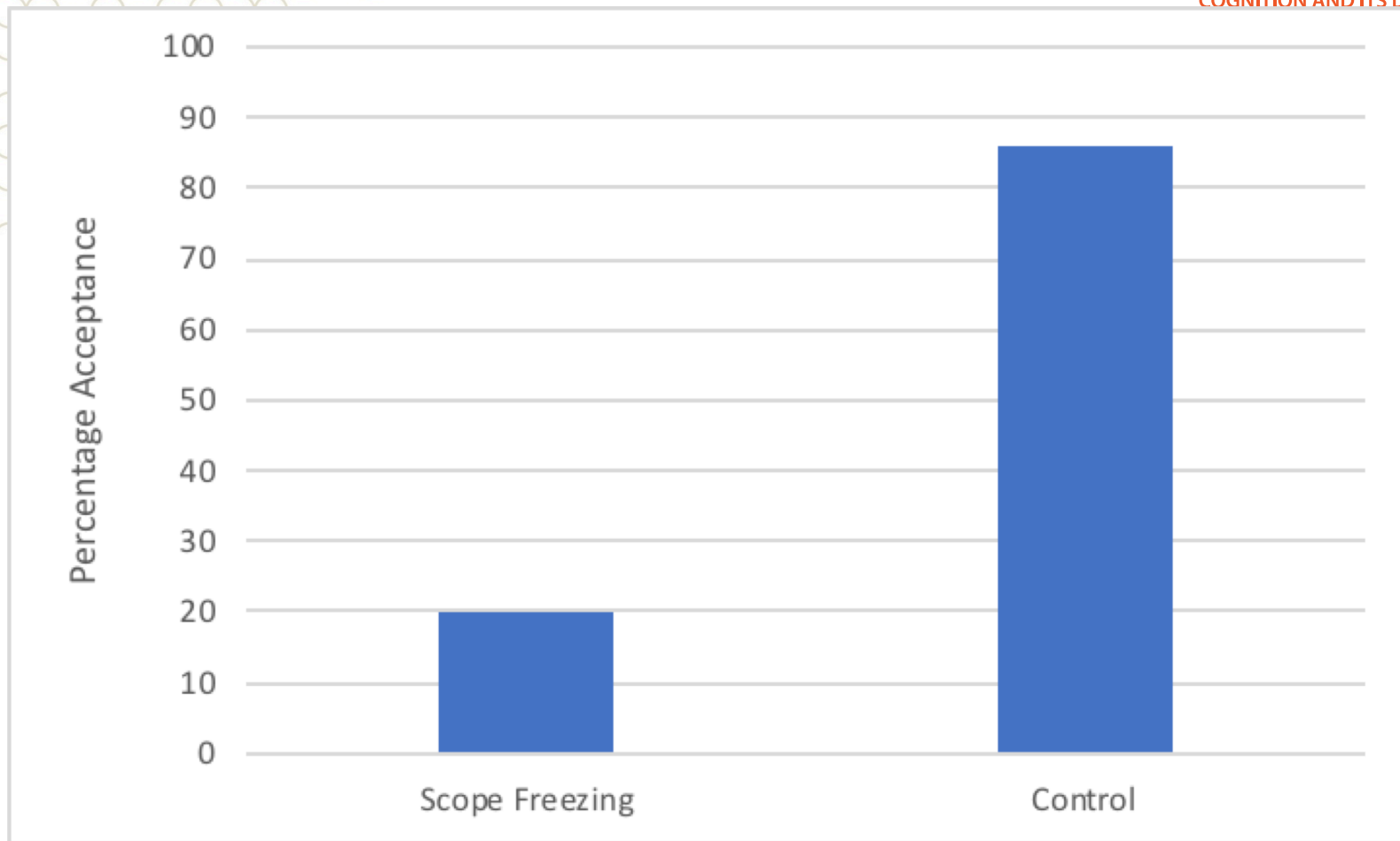
Mrs. Mouse stuffed a present in every cupboard

a>every is FALSE

every>a is TRUE

Spray/Load Alternation

The rabbit stuffed a drawer with every tiara

Mrs. Mouse stuffed a present in every cupboard

Interpretation

- The theory is the same for the Dative Alternation and Spray/Load Scope Freezing cases but children clearly found the Spray/Load judgements easier

- What was different?
  - Scope bearing QPs are both inanimate in Spray/Load sentences. (drawers/tiaras)
  - In Dative Alternation, one is animate (ladies/cupcakes)

- Probably decreased 'noise' by acting-out the stories live

Conclusion

- The experimental findings from Expt. 2 support the proposal that whatever linguistic knowledge is required for scope freezing is in place in child grammars

- These findings will challenge usage-based approaches to language acquisition. Any usage-based account will have difficulty explaining how children learn negative facts, such as when an interpretation is not possible

End

One Child's Justifications of 'No'

1. Puppet: Mrs. Mouse stuffed a present in every cupboard

- Child: Stuffed every present in every cupboards

2. Puppet: The zookeeper packed a pumpkin in every rubbish bin

- Child: Packed pumpkins with a 's' into every rubbish bin

3. Puppet: The scientist packed a baby dinosaur into every box

- Child: Packed every dinosaur into every boxes

4. Puppet: The man loaded a wall onto every boat

- Child: The man loaded a wall, walls onto each boat

Experiment 1 Sessions

- Session 1:

  4 scope freezing DO sentences

  4 ACD; 2T, 2F

- Session 2:

  4 DO Inverse Scope

  4 'Put' Locatives

  4 Prepositional Datives

Experiment 2 Sessions Spray/Load

- Session 1:

  4 scope freezing 'With' Spray/Load sentences

  2 ACD; F

  Fillers

- Session 2:

  4 Ambiguous Spray/Load sentences

  Fillers