English Comparatives:

Children See More Than Adults

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Study Motivation

• Why are we interested in comparatives?
  – a crucial component of human cognition
  – a basic linguistic category all languages have

• In terms of acquisition there are two aspects to it:
  – the ability to process the very concept of comparison
  – figure out language specific lexical, morphological and syntactic categories

• Acquisition of comparatives has been a widely researched topic
  – but we still know very little about their abstract linguistic representation
Developmental Background

• Focus on cognitive development
  – language is an instrument to assess the development stage
  – no linguistic analysis

• Focus on spontaneous production
  – observe what children’s performance
  – work backwards from that point

• Focus on semantics and syntax
  – Hohaus et al (in press)

• What is missing:
  – a theoretically driven study based on a proposal about semantics and/or syntax
Theoretical Background: Bhatt & Takahashi (2011)

2-place ‘-er’
- two arguments
- requires a reduction operation
- takes clausal arguments

3-place ‘er’
- three arguments
- no reduction required
- takes phrasal arguments

- English only has a two-place degree head
- Hindi-Urdu and Japanese have both degree heads
Bhatt & Takahashi (2011): Binding

- *More people talked to \textit{him} than about Sally than about \textit{Peter’s} sister.

- More people talked to Sally about \textit{him} than to \textit{Peter’s} sister.
Binding Theory and Language Acquisition

• By the ages of 4-5 years children have adult-like understanding of Principle C
  – Kiguchi and Thornton (2004): ACD & Principle C at LF
  – Craine & Thornton (2000): acquisition of Principle C
  – and many others

• Theoretical premises:
  – assume that children have adult understanding of Principle C
  – knowing that, what can we learn about the underlying structure of their comparatives?
Experiment Design

- **Participants:**
  - 29 children
  - range 4;6 – 6;5, mean 5;2
  - adult control group: 12 undergraduate students

- **Method**
  - truth value judgment task
  - act-out task

- **Procedure**
  - stories acted out with toys
  - Baby Bunny puppet presenting the target sentence
  - ambiguous scenarios: two possible contextual interpretations
  - only one interpretation compatible with adult grammar
  - each session was 30-40 minutes and required two experimenters
Target Sentences

• Training session
  – Ariel swam from Ursula to her sister for help. (TVJ)
  – Hello Kitty bought more pebbles than shells. (act-out)

• Control sentences
  – Sherriff Woody fed more bear cubs than Jessie. (TVJ)
  – More cars drove into town than into the woods. (act-out, TVJ)
  – He ate the cake, when the Smurf was dancing. (TVJ)
  – Sebastian found a present from her to Ariel’s sister. (TVJ)
  – She gave more cones to Winnie-the-Pooh than to Sleeping Beauty’s godmother. (act-out)

• Test sentences (act-out)
  – More lambs walked from Belle to him than from Harris’s brother.
  – More blocks connected him to Minnie than to Flynn’s horse.
  – King Triton gave more lizards to her than Olivia’s mother.
  – Nemo delivered more presents from him to Flounder than to Eric’s dog.
Perfect Kid 😊

- She gave more cones to Winnie-the-Pooh than to Sleeping Beauty’s godmother.
And the children surprised us when they did this:

• She gave more cones to Winnie-the-Pooh than to Sleeping Beauty’s godmother.
It’s lucky we didn’t go for all TVJ tasks!

- She gave more cones to Winnie-the-Pooh than to Sleeping Beauty’s godmother.
Unexpected Interpretation

• “She gave more cones to Winnie-the-Pooh than to Sleeping Beauty’s godmother”

• \# cones [she_{who?} gave to x & x is Winnie-the-Pooh] >
  > \# cones [she_{who?} gave to x & x is Sl. Beauty’s Godmother]

• Who is she?
  – Both are Hello Kitty
  – Both are Sleeping Beauty
  – Hello Kitty and Sleeping Beauty
  – Sleeping Beauty and Hello Kitty

• The last two were not accidental:
  – observed in all the 5 act-out tasks
  – on multiple occasions
  – with different children
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Reduction Analysis

• Adult underlying structure: Bhatt and Takahashi (2011):
  – She$_i$ gave more cones to Winnie-the-Pooh
    [than λd. she$_i$ gave d-many cones to SB’s Godmother]
  – obligatory coindexation
  – strict reading

• Child underlying structure:
  – She$_i$ gave more cones to Winnie-the-Pooh
    [than λd. she$_j$ gave d-many cones to SB’s Godmother]
  – some children allowed for indices to mismatch
  – sloppy identity readings

• But, we are used to seeing sloppy identities with anaphors and possessives, not personal pronouns
E-type Pronoun: Heim (1990), Heim & Kratzer (1998)

• Not a bound variable
• Not a referential pronoun
• Recall donkey anaphora:
  – Every man who owns a donkey beats it.
• It is a functional pronoun that allows the denotation to vary with the assignment
• In this way E-type pronouns are definite descriptions
• $f(x)$ is a contextually salient function from individuals to individuals
  – domain of $f \rightarrow \{x: x$ is a recipient of cones$\}$
  – value of $f(x) \rightarrow$ the individual giving cones to $x$
E-type Pronoun ctd.

- She gave more cones to Winnie-the-Pooh than to Sleeping Beauty’s godmother

- $\lambda d (\lambda x (f(x) \text{ gave } d\text{-many cones to } x)) (\text{Winnie-the-Pooh })$
- $\lambda d (\lambda x (f(x) \text{ gave } d\text{-many cones to } x)) (\text{Sl. Beauty’s Godmother })$
  - $f(x)$ assigns the value of the person’s giver to the person
  - children seem to treat it as a bound functional pronoun

- E-type pronouns are a part of adult grammars
  - And (!) adults did marginally try out interpretations similar to children’s
  - Maybe they were not using their processing skills efficiently enough then
E-type Pronoun and Reduction Analysis

• 2-place ‘-er’ and reconstruction of ellipsis (B&T 2011)

• She gave more cones to Winnie-the-Pooh than to Sleeping Beauty’s godmother

• LF: $f(x)$ gave more cones to Winnie-the-Pooh [than $\lambda d. f(x)$ gave $d$-many cones to Sleeping Beauty’s Godmother]
E-type Pronoun and Direct Analysis

- 3-place ‘-er’ combines with two individual arguments and a predicate of individuals and degrees (B&T 2011)
  - \(-er(x)(P)(y) \leftrightarrow \exists d[P (y, d) \land \neg P (x, d)]\)
- LF: [Winnie-the-Pooh [[-er [than Sleeping Beauty’s Godmother]]
  \(\lambda d \lambda x f(x) \text{ gave } d\text{-many cones to } x]]\]

- the predicate of individuals and a degrees is created by movement of the associate and the degree phrase
- thus, 3-place ‘-er’ allows f(x) to assign two givers to two recipients
Binding Effects

• This “sloppy” interpretation is compatible with both Reduction and Direct Analysis

• What about Binding?
  – More lambs walked from Belle to him than [d-many lambs walked from Harris$_1$’s brother to him$_1$].
  – *More blocks connected him to Minnie than [d-many blocks connected him$_1$ to Flynn$_1$’s horse].

• Children did not reveal this contrast in judgments
  – For all the 5 act-out tasks children allowed for interchangeable assignment in terms of the value of the e-type pronoun
  – Maybe have a 3-place ‘-er’ and do not do reduction? ☺
  – Pilot study: adults are inconsistent either ☹
Discussion

• Children’s grammars allow them to interpret rather complex comparative constructions
  – they definitely are dealing with abstract representation
  – unlike what has been claimed by developmentalists
  – the mechanisms are different from those of adults

• Our findings so far do not show a definitive contrast between the Reduction and Direct Analysis for English

• It could be the case that looking at binding effects is not the key to the underlying structure
  – Questionably, it could be linear precedence effects

• Designing a study which assesses children and adults in parallel proves very efficient if we want to make a theoretical claim
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References


References


Hohaus et al (in press)


Appendix I: Test Sentences

- More lambs walked from Belle to him than [d-many lambs walked from Harrisi’s brother to himi].

- *More blocks connected him to Minnie than [d-many blocks connected himi to Flynni’s horse].

- King Triton gave more lizards to her than [Oliviapi’s mother gave d-many cones to heri].

- *Nemo delivered more presents from him to Flounder than [Nemo delivered d-many presents from himi to Erici’s dog].