De Villiers and Roeper: Relative clauses are barriers to wh-movement for young children

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Background

Subjacency Principle:

- Movement may not cross more than one bounding node.
- Bounding nodes are IP(S), CP(S’), and NP
- Languages differ over whether S or S’ is a bounding node
Fig. 1. Schematic diagram of a well-formed chain.

(8) How did Sam say \([\mathcal{C} \mathcal{P} \tau_1 \text{ he would get Alice } \mathcal{C} \lambda \mathcal{P} \tau_1 \text{ to help him } \tau_1]\)?

answer e.g.: ‘by paying his bills while he was gone’.
(9) *When did you ask [how to help t_i?]

*I asked how to help next holiday season.

(10) *When did you ask t_i [how to help ?]

answer: I asked last night.

(11) Who did you ask how to help t_i?

I asked how to help my cousin.
These sentences show that there are constraints on movement that determine which interpretations are grammatical or not.

(12)  *How, did you meet the man who worked t₁?
Study 1

Does the grammar of children ages 3-4 treat relative clause barriers/islands as a proper constraint for movement and will the children try to answer the relative pronoun.
Otsu (1981) showed that 3 and 4 year olds answered questions in a manner that violated the barrierhood of the relative clause or prepositional phrase 25-30% of the time.

Jane is drawing a monkey with a crayon. The monkey is drinking milk with a straw.

(5) What is Jane drawing a monkey that is drinking milk with?  
(a) What is Jane drawing [a monkey that is drinking milk] with $t_1$?  
(b) What is Jane drawing [a monkey that is drinking milk with $t_1$]?
Hypothesis

Children ages 3 and 4 are obedient to the relative clause constraint on movement.
Method

- Subjects – 23 children ages 3-6 and an average of 4. English as a first language and no handicapping conditions.

- Stimuli – short pictured stories that set up appropriate conditions for the use of the relative clause and allowed for all possible construals of the question being asked at the end.

- Procedure – six relative clause stories and questions were presented in randomized order to the children as a larger battery of 20 questions, none of which had relative clauses as part of their structure.
Stimuli

These two brothers went to the circus. The clown came and tickled the little boy on the nose with a feather.

He sneezed very hard and blew the clown’s wig right off?

After the circus they were very thirsty and they went to buy some milk.

The little boy drank his milk with a straw but the big brother drank his milk straight from the carton.

How did the boy drink who sneezed?
Question types

- **Subject Relative:**
  How did the man who hurt his leg get home?

- **Object Relative:**
  How did the man rescue the cat who broke her leg?

- **Extraposed SR:**
  When did the man go home who hurt his leg?
# Results

## Table 1. Adjunct extraction from relative clauses

<table>
<thead>
<tr>
<th>Subject relatives</th>
<th>4 5 yr olds</th>
<th>3 4 yr olds</th>
<th>94%</th>
<th>58%</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) How did the boy who sneezed drink the milk?</td>
<td>o°o</td>
<td>o°o</td>
<td>91.5°o</td>
<td>61°o</td>
</tr>
<tr>
<td>Object relative</td>
<td>92°o</td>
<td>2°o</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) How did the woman help the man who won the race?</td>
<td>91.5°o</td>
<td>o°o</td>
<td>o°o</td>
<td></td>
</tr>
<tr>
<td>Subject relative extraposited</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) When did the woman sleep who painted the picture?</td>
<td>92°o</td>
<td>2°o</td>
<td>10.5°o</td>
<td></td>
</tr>
</tbody>
</table>

Percentages beneath the relative pronoun represent answers as if that were a question.
Findings

- Relative clauses are respected
- Errors do not violate RC island constraints
- Children answered the medial 0% of the time
- The younger children had more errors
Study 2

Attempts to investigate the changes in the grammars of 3 year olds over the course of a year with respect to the subject extraposed sentences.

Also included were questions with medial argument embedded questions to hopefully answer; do children who answer the medial question in embedded questions also answer the relative pronoun in the RC.
Method

- **Subjects** – 12 children ages 3-4
- **Stimuli** – Subject extraposed questions and embedded questions
- **Procedure** – same methodology as Study 1, except this was a longitudinal study which subjects were brought in 3 times over the course of 1 year.
### Results

**Table 3. Answers to adjacent question in Study 2 over the three time periods**

<table>
<thead>
<tr>
<th></th>
<th>October</th>
<th>January</th>
<th>October</th>
</tr>
</thead>
<tbody>
<tr>
<td>How did the dog climb up</td>
<td>5+5”</td>
<td>4+5”</td>
<td>4+5”</td>
</tr>
<tr>
<td>who barked</td>
<td>7+5”</td>
<td>6”</td>
<td>8+3”</td>
</tr>
<tr>
<td>How did the woman swim</td>
<td>4+7”</td>
<td>6”</td>
<td>8+3”</td>
</tr>
<tr>
<td>who knitted</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How did the dog climb up</td>
<td>7+8”</td>
<td>4+5”</td>
<td>8+3”</td>
</tr>
</tbody>
</table>


**Results**

<table>
<thead>
<tr>
<th></th>
<th><strong>October</strong></th>
<th><strong>January</strong></th>
<th><strong>Infinitival</strong></th>
<th><strong>Infinitival</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensed</td>
<td>How did the boy say what he caught?</td>
<td>October</td>
<td>4°3′0″</td>
<td>69°1′0″</td>
</tr>
<tr>
<td></td>
<td>How did Rover learn what to catch?</td>
<td>January</td>
<td>31°8′0″</td>
<td>45°4′0″</td>
</tr>
<tr>
<td></td>
<td>How did the boy say what he ate?</td>
<td>Infinitival</td>
<td>12°0′0″</td>
<td>60°0′0″</td>
</tr>
<tr>
<td></td>
<td>How did Big Bird ask who to help?</td>
<td>Infinitival</td>
<td>16°6′0″</td>
<td>54°1′0″</td>
</tr>
<tr>
<td>Tensed</td>
<td>How did the boy say what he caught what he caught?</td>
<td>October</td>
<td>29°2′0″</td>
<td>50°0″</td>
</tr>
<tr>
<td></td>
<td>How did Rover learn what to catch?</td>
<td>Infinitival</td>
<td>29°2′0″</td>
<td>58°3′0″</td>
</tr>
</tbody>
</table>
Findings

- Wh-island constraints are also not violated
- Children are able to distinguish wh- and relative clauses
- Seems children are learning to interpret the main clause better as their grammar develops over time
Children as young as 3 years do have the structures available to them to recognize, make sense of, and correctly respond to RC questions.

The never violate constraints by associating the wh- with the verb of the RC.

Understanding of constructions with embedded questions increases over time as grammars adapt.

Children 3-4 don’t have the same grammars as adults yet still don’t violate islands.