Children’s acquisition of relative clauses

Holger Diessel
Structure of relative clauses

External syntax
(1) The *guy* we saw was Peter.
(2) I know the *guy* you are talking about.
(3) Peter gave the man we saw the keys.
(4) He lives in the same *house* where Peter lives.
(5) That’s the *picture* I made.

Internal syntax
(1) The man who slept.
(2) The man I met.
(3) The man I gave the picture to.
(4) The man I talked to.
(5) The man whose dog chased the cat.
Experimental studies

(1) The dog that jumps over the fence bumps into the lion.
(2) The dog bumps into the lion that jumps over the fence.

Tavakolian (1977)

(1) This is the sugar that goes in there.  
[Nina 3;0]
(2) That’s a picture I made.  
[Adam 3;0]
(3) The one I want  
[Abe 2;10]
(4) The one who laughed.  
[Abe 2;11]
## Children’s spontaneous REL-clauses

<table>
<thead>
<tr>
<th></th>
<th>Age range</th>
<th>Finite</th>
<th>Nonfinite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adam</td>
<td>2;3-4;10</td>
<td>178</td>
<td>120</td>
</tr>
<tr>
<td>Sarah</td>
<td>2;3-5;1</td>
<td>32</td>
<td>36</td>
</tr>
<tr>
<td>Nina</td>
<td>1;11-3;4</td>
<td>62</td>
<td>71</td>
</tr>
<tr>
<td>Peter</td>
<td>1;9-3;2</td>
<td>25</td>
<td>44</td>
</tr>
<tr>
<td>Naomi</td>
<td>1;8-3;3</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>1;9-5;1</td>
<td>305</td>
<td>287</td>
</tr>
</tbody>
</table>
Children’s spontaneous REL-clauses

(1) *CHI: And here's a rabbit that I'm patting. Nina 3;0
(2) *CHI: And there's the penguins that we saw. Nina 3;1
(3) *CHI: Is that house that's on fire? Peter 2;10

(4) *FAT: No what did you eat? Abe 3;6
   *CHI: Some apples that were sweet.
(5) *MOT: What are those? Nina 3;2
   *CHI: Animals that are chasing that.
(6) *FAT: What lion face? Abe 3;11
   *CHI: The lion face you were gonna draw.
### Children’s spontaneous REL-clauses

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>That’s doggy <em>turn around</em>.</td>
<td>Nina 1;11</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>This is my doggy <em>crys</em>.</td>
<td>Nina 2;0</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>That’s a turtle <em>swim</em>.</td>
<td>Nina 2;2</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Here’s a mouse <em>go sleep</em>.</td>
<td>Nina 2;3</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>That’s the roof <em>go on that home</em>.</td>
<td>Nina 2;4</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>That’s the rabbit <em>fall off</em>.</td>
<td>Nina 2;4</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>There’s a tape <em>go around right there</em>.</td>
<td>Peter 2;0</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>This is the fire engine <em>go ‘whoo whoo’</em>.</td>
<td>Peter 2;6</td>
</tr>
</tbody>
</table>
Children’s spontaneous REL-clauses

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>doggy turn around.</td>
<td>Nina 1;11</td>
</tr>
<tr>
<td>(2)</td>
<td>my doggy crys.</td>
<td>Nina 2;0</td>
</tr>
<tr>
<td>(3)</td>
<td>a turtle swim.</td>
<td>Nina 2;2</td>
</tr>
<tr>
<td>(4)</td>
<td>a mouse go sleep.</td>
<td>Nina 2;3</td>
</tr>
<tr>
<td>(5)</td>
<td>the roof go on that home.</td>
<td>Nina 2;4</td>
</tr>
<tr>
<td>(6)</td>
<td>the rabbit fall off.</td>
<td>Nina 2;4</td>
</tr>
<tr>
<td>(7)</td>
<td>a tape go around right there.</td>
<td>Peter 2;0</td>
</tr>
<tr>
<td>(8)</td>
<td>the fire engine go ‘whoo whoo’.</td>
<td>Peter 2;6</td>
</tr>
</tbody>
</table>
Children’s spontaneous REL-clauses

- Relative clauses with semantically empty main clauses
- Relative clauses with fully fledged main clauses
<table>
<thead>
<tr>
<th></th>
<th>German</th>
<th>English</th>
<th>Relative Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Der Mann, <em>der</em> mich gesehen hat.</td>
<td>The man who __ met the woman.</td>
<td>SUBJ-relative</td>
</tr>
<tr>
<td>2</td>
<td>Der Mann, <em>den</em> ich gesehen habe.</td>
<td>The woman who the man met __.</td>
<td>OBJ-relative</td>
</tr>
<tr>
<td>3</td>
<td>Der Mann, <em>dem</em> ich das Buch gegeben habe.</td>
<td>The boy who the girl gave the ball to __.</td>
<td>IO-relative</td>
</tr>
<tr>
<td>4</td>
<td>Der Mann, <em>zu dem</em> ich gegangen bin.</td>
<td>The girl who the boy played with __.</td>
<td>ADV-relative</td>
</tr>
<tr>
<td>5</td>
<td>Der Mann, <em>dessen</em> Hund mich gebissen hat.</td>
<td>The man whose cat caught a mouse.</td>
<td>GEN-relative</td>
</tr>
<tr>
<td>6</td>
<td>Diessel and Tomasello 2005</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Method

This is the farmer who fed the pig in the barn.

Subjects: 4-5 year-old English- and German-speaking children
Results

P vs. IO    p > 0.173
P vs. ADV   p > 0.169

P vs. IO    p > 0.061
P vs. ADV   p < 0.001
Error analysis

(1) Test item: This is the girl who the boy teased at school this morning.
   CHILD: This is the girl who teased ... the boy ... at school this morning.

(2) Test item: Da ist der Mann, den das Mädchen im Stall gesehen hat.
   CHILD: Da ist der Mann, der das Mädchen im Stall gesehen hat.

(3) This is the girl who bor/ Peter borrowed a football from.
(4) Da ist der Junge, der/ dem Paul ... die Mütze weggenommen hat.

The conversion errors do not arise from lack of grammatical knowledge.

Hypothesis: Subject relatives are easier to activate than other types of relative clauses.
Subject relatives

One factor that determines the ease of activation is frequency (Bybee 2006; Elman 2004).

Proportion of different structural types of relative clauses in the ambient language (Diessel 2004)
Subject relatives

Hypothesis: Subject relatives are easy to activate because they are similar to ordinary main clauses (Diessel & Tomasello 2005).

(1) The man [agent] who opened the door [patient].
(2) The cat [patient] the dog [agent] chased around the garden.
(3) The doctor [goal] the patient [agent] went to last night.
<table>
<thead>
<tr>
<th>Object- and adverbial REL</th>
</tr>
</thead>
<tbody>
<tr>
<td>the N [<strong>who</strong> saw NP]</td>
</tr>
<tr>
<td>the N [<strong>who NP</strong> saw]</td>
</tr>
<tr>
<td>the N [<strong>who NP</strong> gave NP to]</td>
</tr>
<tr>
<td>the N [<strong>who NP</strong> played with]</td>
</tr>
<tr>
<td>the N [[<strong>whose N</strong>] chased NP]</td>
</tr>
<tr>
<td>der Mann, <strong>der</strong> ...</td>
</tr>
<tr>
<td>der Mann, <strong>den</strong> ...</td>
</tr>
<tr>
<td>der Mann, <strong>dem</strong></td>
</tr>
<tr>
<td>der Mann, <strong>mit/von dem</strong> ....</td>
</tr>
<tr>
<td>der Mann, <strong>dessen</strong> N ...</td>
</tr>
</tbody>
</table>

- **subject**
- **direct object**
- **indirect object**
- **adverbial**
- **genitive**
Object- and adverbial REL

the N [who saw NP] subject
the N [who NP saw] direct object
the N [who NP gave NP to] indirect object
the N [who NP played with] adverbial
the N [[whose N] chased NP] genitive

der Mann, der ... subject
der Mann, den ... direct object
der Mann, dem indirect object
der Mann, mit/von dem .... adverbial
der Mann, dessen N ... genitive
(1) This is the man whose dog bit me.

Genitive relatives are rare (or even absent) in the ambient language.

Indirect object relatives are also rare.

Genitive relatives caused more problems than indirect object relatives because they are very different from all other types of relative clauses, whereas indirect object relatives can easily be formed in analogy to subject and direct object relatives.
Subject relatives caused few problems because they are frequent and similar to simple sentences.

English direct object, indirect object, and adverbial relatives caused basically the same amount of errors because they have the same word order.

Indirect object relatives caused relatively few problems because they are similar to direct object relatives.

Genitive relatives and German adverbial relatives caused great problems because they are dissimilar from other relative clauses.
Why is similarity so important?

Similarity is important because relative clauses are grammatical constructions (i.e. form-function pairings) that are related to each other in an associative network like lexical expressions.
Network of relative clauses

SVO sentences
Network of relative clauses

SVO sentences
Network of relative clauses
Network of relative clauses

Direct object relatives

SVO sentences

Subject relatives
Network of relative clauses

- Adverbial relatives
- Direct object relatives
- Subject relatives
- SVO sentences
Network of relative clauses

- Genitive relatives
- Adverbial relatives
- Indirect object relatives
- Direct object relatives
- Subject relatives
- SVO sentences
Conclusion

In traditional grammar, linguistic productivity is based on rules that are similar to mathematical equations.

But research on the acquisition of inflectional morphology suggests that linguistic productivity is based on associations that are shaped by frequency and similarity.

The current study has shown that the approach can be extended to syntax.

Grammar consists of a network of constructions that is shaped by the frequency and similarity of its components.
Merry Christmas