On the acquisition of object A’ dependencies.

The comprehension of Relative clauses (and wh-questions), CLLD and intervention-locality

HO2
Subject and Object relatives

Subject Relative:

(...) [il bambino [che ___ pettina la mamma] ] (...)  
the kid that combs the mother

Object Relative:

(...) [il bambino [che la mamma pettina ___ ]] (...)  
the kid that the mother combs
Background: Summary of results from comprehension

Friedmann, Belletti, Rizzi (2009)

Children’s age: 3;7–5;0 – Hebrew (22 children)
Materials:

Pictures

Show me the lion that the elephant wets
>> OR
Show me the lion that wets the elephant
>>SR
Experiment 1: The comprehension of Headed Subject and Object relative clauses

SR:
Tare li et ha-para she-menasheket et ha-tarnegolet.
Show to-me acc the-cow that-kisses acc the-chicken

*Show me the cow that is kissing the chicken.*

OR:
Tare li et ha-pil she-ha-arie martiv.
Show to-me acc the-elephant that-the-lion wets

*Show me the elephant that the lion is wetting.*
## Results of Experiment 1

<table>
<thead>
<tr>
<th></th>
<th>Headed Subject relative</th>
<th>Headed Object relative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined pictures and scenarios</td>
<td>90%</td>
<td>55%</td>
</tr>
<tr>
<td>No. of participants of 22 who performed above chance</td>
<td>22</td>
<td>7</td>
</tr>
<tr>
<td>Group-level chance above chance</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Table 1. Percentage of correct responses and number of participants who performed above chance.
Results of Experiment 2: Comprehension of headed object relatives with a resumptive pronoun

<table>
<thead>
<tr>
<th></th>
<th>Headed subject relative</th>
<th>Headed object relative</th>
<th>Resumptive object relative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined</td>
<td>90%</td>
<td>55%</td>
<td>56%</td>
</tr>
<tr>
<td>No. of participants of 22 who performed above chance</td>
<td>22</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Group-level chance?</td>
<td>above</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
Results of Experiment 3: The comprehension of free relatives

<table>
<thead>
<tr>
<th></th>
<th>Headed subject relative</th>
<th>Headed object relative</th>
<th>resumptive pronoun object relative</th>
<th>Free Subject relative</th>
<th>Free object relative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined</td>
<td>90%</td>
<td>55%</td>
<td>56%</td>
<td>84%</td>
<td>79%</td>
</tr>
<tr>
<td>No. of participants of 22 above chance</td>
<td>22</td>
<td>7</td>
<td>6</td>
<td>18</td>
<td>17</td>
</tr>
<tr>
<td>Group-level Above chance(?)</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Examples of Free Relatives tested

FreeSR

Tare li et mi she-martiv et ha-yeled
Show to-me Acc who that wets Acc the-boy

FreeOR

Tare li et mi she- ha-yeled menadned
Show to-me Acc who that the boy swings _
Results of Experiment 4: The comprehension of headed object relatives with an impersonal arbitrary *pro* subject

<table>
<thead>
<tr>
<th></th>
<th>Headed subject relative</th>
<th>Headed object relative</th>
<th>Resumptive pronoun object relative</th>
<th>Free Subject relative</th>
<th>Free object relative</th>
<th>Impersonal pro object relative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined</td>
<td>90%</td>
<td>55%</td>
<td>56%</td>
<td>84%</td>
<td>79%</td>
<td>83%</td>
</tr>
<tr>
<td>No. of participants</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>of 22 above chance</td>
<td>22</td>
<td>7</td>
<td>6</td>
<td>18</td>
<td>17</td>
<td>19</td>
</tr>
<tr>
<td>Group-level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Above chance ..</td>
<td>Yes</td>
<td><strong>No</strong></td>
<td><strong>No</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Results of Experiment 5: The comprehension of which and who questions (different group of children)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3;7-4;5</td>
<td>80%</td>
<td>75%</td>
<td>72%</td>
<td>57%</td>
</tr>
<tr>
<td>4;6-4;10</td>
<td>84%</td>
<td>84%</td>
<td>81%</td>
<td>58%</td>
</tr>
<tr>
<td>Total</td>
<td>81%</td>
<td>78%</td>
<td>75%</td>
<td>58%</td>
</tr>
<tr>
<td>Children above chance</td>
<td>15</td>
<td>14</td>
<td>14</td>
<td>4</td>
</tr>
</tbody>
</table>

Group-level above chance: Yes, Yes, Yes, No
Examples of *who* and *which* questions

**S**

Who - bites - the cat
Which dog ___ bites - the cat

**O**

Whom - the cat - bites ___
Which dog - the cat - bites ___
## Summary from FBR 2009

<table>
<thead>
<tr>
<th></th>
<th>headed subject relative:</th>
<th>D NP R .....</th>
<th>&lt;D NP&gt;</th>
<th>D NP</th>
<th>ok</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>headed object relative:</td>
<td>D NP R .....</td>
<td>D NP</td>
<td>...</td>
<td>&lt;D NP&gt;</td>
</tr>
<tr>
<td></td>
<td>resumptive object relative:</td>
<td>D NP R .....</td>
<td>D NP</td>
<td>...</td>
<td>pronoun</td>
</tr>
<tr>
<td>IV</td>
<td>free subject relative:</td>
<td>Wh R .....</td>
<td>&lt;Wh&gt;</td>
<td>...</td>
<td>D NP</td>
</tr>
<tr>
<td>V</td>
<td>free object relative:</td>
<td>Wh R .....</td>
<td>D NP</td>
<td>...</td>
<td>&lt;Wh&gt;</td>
</tr>
<tr>
<td>VI</td>
<td>(impersonal) pro object rel:</td>
<td>D NP R .....</td>
<td>pro arb</td>
<td>...</td>
<td>pronoun</td>
</tr>
<tr>
<td>VII</td>
<td>subject who question:</td>
<td>Wh Q .....</td>
<td>&lt;Wh&gt;</td>
<td>...</td>
<td>D NP</td>
</tr>
<tr>
<td>VIII</td>
<td>object who question:</td>
<td>Wh Q .....</td>
<td>D NP</td>
<td>...</td>
<td>&lt;Wh&gt;</td>
</tr>
<tr>
<td>IX</td>
<td>subject which question:</td>
<td>Wh NP Q .....</td>
<td>&lt;Wh NP&gt;...</td>
<td>D NP</td>
<td>ok</td>
</tr>
<tr>
<td>X</td>
<td>object which question:</td>
<td>Wh NP Q .....</td>
<td>D NP</td>
<td>...</td>
<td>&lt;Wh NP&gt;</td>
</tr>
</tbody>
</table>
Summary from FBR 2009 in a graph (Comprehension in Hebrew ORs)
Why: Locality and Intervention

Building on a long lasting tradition of theoretical work in formal syntax

Proposal in Friedmann, Belletti, Rizzi 2009: The same principle accounting for the locality of syntactic computations accounts for the difficulty with Ors, and, more generally, of object A’-dependencies.

Featural Relativized Minimality

(Rizzi, 1990, 2004, Starke 2001; Minimal search Chomsky 2001 and related work)
Locality and Intervention: Relativized Minimality

The dependency between X (target) and Y (origin) cannot be established if Z structurally intervenes, and Z and X are positions that share relevant features (Rizzi 1990, 2004, Starke 2001...; Minimal search, Chomsky 2001).

A nominal feature, [+NP]:
Lexical restriction among the features relevant for the locality principle
The inclusion relation and the relevance of the +NP feature

? Which problem do [you wonder [how [to solve __]]]?  
*What do you wonder how to solve <what>

**inclusion**

Which problem ..... how ..... <which problem>  
+Q, +NP  
+Q  

X  

Z  

Y

**identity**

*What do you wonder how to solve <what>  
+Q  
+Q
The inclusion relation and the relevance of the +NP feature

+NP: In some Italian dialects *which*-type questions target a different position compared to *who* questions in the left periphery (Munaro 1998)

Crucial relevance of (enriching) the target X:

i. *How do [you wonder [which problem [to solve <how>]]]?* vs (cfr. previous slide)

ii. Which problem do [you wonder [how [to solve <which problem>]]]?
Headed OR.
Moving into the relative CP: attracting a +NP lexical head of the relative clause
Intervention in headed ORs with a lexical subject in the relative clause: Inclusion of the nominal feature [+NP]

SR: (...) [the elephant [that <___> wets the lion]] (...)
+R, +NP

OR: (...) [the lion [that the elephant wets <___>]] (...) +R, +NP +NP <___>

Children have difficulty in computing the feature-inclusion relation, both in comprehension and in production (on which see later ho), whence their difficulty with ORs. >> FBR’s conjecture to interpret development.
END OF WEEK 1
FBR (2009): set theoretic approach to interpret development

<table>
<thead>
<tr>
<th></th>
<th>X</th>
<th>Z</th>
<th>Y</th>
<th>Children</th>
<th>Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>identity:</td>
<td>+A ...</td>
<td>+A ...</td>
<td>&lt;+A&gt;</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>inclusion:</td>
<td>+A,+B ...+B ....</td>
<td>&lt;+A,+B&gt;</td>
<td>*</td>
<td>ok</td>
<td></td>
</tr>
<tr>
<td>disjunction:</td>
<td>+A ...</td>
<td>+B ...</td>
<td>&lt;+A&gt;</td>
<td>ok</td>
<td>ok</td>
</tr>
</tbody>
</table>
Features to consider/review

Gender

Number

Case

Animacy

Mismatch condition for [+NP] lexically restricted

Relative head (/which wh) ___ Preverbal lexical subject
**Gender of X-Target and Z-Intervener.**
Belletti, Friedmann, Brunato, Rizzi (2012)

**Hebrew**

**SR same gender:**

Tare       li       et       ha-isha     she-mecayeret       et ha-yalda.

Show to-me acc the-woman(fem) that-draws-fem acc the-girl(fem)

'Show me the woman that draws the girl.'

**SR different gender:**

Tare li   et     ha-rofe     she-mecayer   et ha-yalda.

Show to-me acc the-doctor(masc) that-draws-masc acc the-girl(fem)

'Show me the (male)doctor that draws the girl.'
Gender of X-Target and Z-Intervener.

Belletti, Friedmann, Brunato, Rizzi (2012)

**OR same gender:**

Tare li et ha-yalda she-ha-isha mecayeret.

Show to-me acc the-girl(fem) that-the-woman(fem) draws-fem

'Show me the girl that the woman draws.'

**OR different gender:**

Tare li et ha-yalda she-ha-rofe mecayer.

Show to-me acc the-girl(fem) that-the-doctor(masc) draws-masc

'Show me the girl that the (male)doctor draws.'

31 children aged 3;9-5;5 (M = 4;7, SD = 0;5)
Gender of X-Target and Z-Intervener.
Belletti, Friedmann, Brunato, Rizzi (2012)

**Italian**

**SR same gender**
Mostrami la bambina che disegna la donna
Show-to-me the girl (fem) that draws the woman (fem)
'Show me the girl that draws the mother.'

**SR different gender:**
Mostrami la bambina che disegna il dottore
Show-to-me the girl (fem) that draws the doctor (masc)
'Show me the girl that draws the doctor.'
Gender of X-Target and Z-Intervener.
Belletti, Friedmann, Brunato, Rizzi (2012)

OR same gender:

Mostrami la bambina che la mamma disegna
Show-to-me the girl(fem) that the woman (fem) draws
'Show me the girl that the mother draws.'

OR different gender:

Mostrami il dottore che la bambina disegna
Show-to-me the doctor(masc) that the girl (fem) draws
'Show me the (male)doctor that the girl draws.'

31 children aged 3;9-5;3 (M = 4;7, SD = 0;5)
Material used in the same gender/different gender conditions
### Hebrew: Percentage of correct responses

<table>
<thead>
<tr>
<th></th>
<th>Subject relative</th>
<th>Subject relative</th>
<th>Object relative</th>
<th>Object relative</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>same gender</td>
<td>different gender</td>
<td>same gender</td>
<td>different gender</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td>85%</td>
<td>89%</td>
<td>67%</td>
<td>81%</td>
</tr>
<tr>
<td><strong>SD</strong></td>
<td>12%</td>
<td>13%</td>
<td>15%</td>
<td>13%</td>
</tr>
</tbody>
</table>

### Italian: Percentage of correct responses

<table>
<thead>
<tr>
<th></th>
<th>Subject relative</th>
<th>Subject relative</th>
<th>Object relative</th>
<th>Object relative</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>same gender</td>
<td>different gender</td>
<td>same gender</td>
<td>different gender</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td>82%</td>
<td>86%</td>
<td>52%</td>
<td>57%</td>
</tr>
<tr>
<td><strong>SD</strong></td>
<td>15%</td>
<td>12%</td>
<td>21%</td>
<td>20%</td>
</tr>
</tbody>
</table>
The different status of gender for fRM

Proposal in BFBR 2012:

Only in Hebrew Gender is a *syntactically active* feature in the sense *relevant for the fRM/locality*. I.e.: It has the status of being an *feature attracting movement*, as witnessed by verbal gender agreement.

Hence, only in Hebrew intervention is overcome in the Gender mismatch condition.

This condition yields an intersection feature relation between Target and Intervener.
Tari li  et ha-ylada  she- ha-isha mecayeret ___

Show to-me acc  the-girl(fem)   that-the-woman(fem)  draws-fem
    [+R, +NP, +fem]  [+NP, +fem]

Tari li  et ha-yalda  she-ha-rofe mecayer  ___

Show to-me acc  the-girl(fem)   that-the-doctor(masc)  draws-masc
    [+R, +NP, +fem]  [+NP, +masc]
Relations w.r.t. relevant features between target and intervener expressed in set theoretic terms

<table>
<thead>
<tr>
<th></th>
<th>X</th>
<th>Z</th>
<th>Y</th>
<th>Children</th>
<th>Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Identity</strong></td>
<td>+A ...</td>
<td>+A ...</td>
<td>&lt;+A&gt;</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td><strong>Inclusion</strong></td>
<td>+A,+B ... +B ....</td>
<td>&lt;+A,+B&gt;</td>
<td>*</td>
<td>ok</td>
<td></td>
</tr>
<tr>
<td><strong>Intersection</strong></td>
<td>+A,+B+C... +B,+D ...</td>
<td>&lt;+A,+B,+C&gt;</td>
<td>ok</td>
<td>ok</td>
<td></td>
</tr>
<tr>
<td><strong>Disjunction</strong></td>
<td>+A ...</td>
<td>+B ...</td>
<td>&lt;+A&gt;</td>
<td>ok</td>
<td>ok</td>
</tr>
</tbody>
</table>
No role of gender in French

Durrleman & Bentea 2017 – 35 Typically developing children 4;4-5;6. Exactly the same test as in Hebrew and Italian

No effect of gender mismatch (p>.05)
No role of gender in Greek

As recently shown by Angelopoulos and Terzi (Gala 2017), manipulating Gender in Greek does not enhance the comprehension of ORs (18 typically developing children tested, 4;1 to 5;2):

a. Edo ine i vasilisa pu akoluthi i kiria. OBJ RC-match
   here is the.NOM. queen.NOM. that follows the.NOM. lady.NOM.
   ‘Here is the queen that the lady follows.’

b. Edo ine i jaja pu fotografizi o gabros. OBJ RC-mismatch
   here is the.NOM. grandma.NOM. that photographs the.NOM. groom.NOM.
   ‘Here is the grandma that the groom photographs.’

<table>
<thead>
<tr>
<th>Table 1: Version 1 - Errors</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUBJ RCS</td>
</tr>
<tr>
<td>17/360</td>
</tr>
<tr>
<td>4.72%</td>
</tr>
</tbody>
</table>

⇒ SUBJ RCS vs. OBJ RCS: difference is significant (χ²=33.693, p=.000)
⇒ OBJ RCS-match vs. OBJ RCS-mismatch: difference is not significant (χ²=.458, p=.498)