

## 2<sup>nd</sup> graduate student workshop in memory of Tanya Reinhart

### Extraposition and Scope: evidence for embedded Late Merge

#### 1. Two Puzzles from Extraposition

##### 1.1. Non-intersective adjectives and extraposition<sup>1</sup>

**Culicover and Rochemont's (1990) Observation:** Extraposition of an adjunct out of an NP that contains a non-intersective adjective appears to eliminate a reading.

- (1) a. John saw an alleged mouse from Mars (yesterday).  
 $\exists x \text{ alleged}[\lambda w. \text{mouse}(w,x) \& \text{from-Mars}(w,x)] \& J. \text{ saw } x$  (allege > from Mars)  
 $\exists x \text{ alleged}[\lambda w. \text{mouse}(w,x)] \& \text{from-Mars}(x) \& J. \text{ saw } x$  (allege & from Mars)
- b. John saw an alleged mouse yesterday from Mars.  
 ~~$\exists x \text{ alleged}[\lambda w. \text{mouse}(w,x) \& \text{from-Mars}(w,x)] \& J. \text{ saw } x$~~  (allege > from Mars)  
 $\exists x \text{ alleged}[\lambda w. \text{mouse}(w,x)] \& \text{from-Mars}(x) \& J. \text{ saw } x$  (allege & from Mars)

Paraphrase of only available meaning: *There is this thing John saw which is alleged to be a mouse and in reality is from Mars.*

**Puzzle:** If this is the right description of the restriction imposed by extraposition, we would make wrong predictions for (2) and (3).

- (2) John saw an alleged alien yesterday from Mars.

Predicted meaning:

$\exists x \text{ alleged}[\lambda w. \text{alien}(w,x)] \& \text{from-Mars}(x) \& J. \text{ saw } x$  (allege & from Mars)  
*#There is this thing John saw which is alleged to be an alien and in reality is from Mars.*

- (3) a. John saw an alleged New Yorker yesterday from the Upper East Side.  
b. John saw an alleged antique yesterday from the 15<sup>th</sup> century.

**Claim:** C&R are indeed right that extraposition has an effect on meaning in cases such as (1), but this effect has not been characterized correctly.

**Puzzle:** What is the correct characterization of the effect of extraposition on meaning in such contexts, and what can account for it?

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<sup>1</sup> This puzzle was formulated in a class I taught at MIT in 1999. Thanks to David Pesetsky that insisted on the key intuition that led to this formulation, and to Kyle Johnson for helpful discussions.

## 1.2. Exceptionally non-local extraposition

### 1.2.1. Extraposition appears to violate certain islands

...in particular the complex NP constraint

- (4)    a. I bought a car owned by Fred.  
      b. \*By whom did you buy a car owned?
- (5) ? We [[[looked at [a house owned by someone]] yesterday] who teaches at UCLA].

### 1.2.2. The local environment of the “source NP” matters.

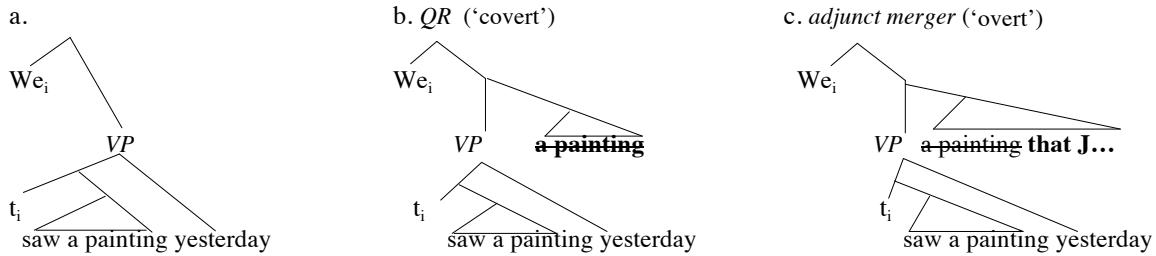
- (6)    a. I'll [[read [a paper that was recommended by a linguist] tomorrow] who teaches at UCLA].  
      b. \*I'll [[read [a paper that wasn't recommended by any linguist] tomorrow] who teaches at UCLA].
- (7)    a. I'll [[read [every paper that was recommended by any linguist] next year] who teaches at UCLA].  
      b. ??/\* I'll [[read [a paper that was recommended by every linguist] next year] who teaches at UCLA].  
      c. ??/\* I'll [[read [every paper that was recommended by every linguist] next year] who teaches at UCLA].
- (8)    a. ? You can [[do [nothing prohibited by anyone] without being expelled] who teaches in this school].  
      b. \* You can [[do [something that isn't allowed by anyone] without being expelled] who teaches in this school].
- (9)    a. ? You can [[do [everything demanded by anyone] without being rewarded] who teaches in this school].  
      b. \* You can [[do [everything demanded by everyone] without being rewarded] who teaches in this school].

**Puzzle:** What explains the insensitivity of extraposition to the CNPC? When CNPC is violated what explains sensitivity to the local domain of the source NP?

## 2. Background on Extraposition

### 2.1. Derivation and Structural Representation (Fox and Nissenbaum 1999)

- (10) We saw a painting yesterday that John talked about.



### 2.2. Interpretation (by Trace Conversion, Fox 2002, 2003)

$\llbracket \text{A painting that John talked about} \rrbracket \llbracket (\lambda x \llbracket \text{We saw the painting } x_1 \rrbracket^{1 \rightarrow x}) \rrbracket$

Equivalently

$\llbracket \text{A painting that John talked about} \rrbracket \llbracket (\lambda x \llbracket \text{we saw [the thing identical to } x_1 \text{ which is a painting]} \rrbracket^{1 \rightarrow x}) \rrbracket$

Equivalently

$\llbracket \text{A painting that John talked about} \rrbracket \llbracket (\lambda x: x \text{ is a painting. we saw } x) \rrbracket$

This is equivalent to the traditional representation because the presupposition ends up being tautological (by well established observations about presupposition projection):

*that (certain) paintings that John talked about are paintings.*

### 2.3. One of the Arguments for QR

- (11) **Williams's generalization (WG):** When an adjunct  $\beta$  is “extraposed” from a “source QP”  $\alpha$ , the scope of  $\alpha$  is at least as high as the attachment site of  $\beta$  (the extraposition site).<sup>2</sup>

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<sup>2</sup> By the source QP, we mean the minimal QP that dominates the item that  $\beta$  modifies. (11) is a slight modification (due to Fox and Nissenbaum 1999) of the original statement of the generalization (Williams 1974, chapter 4). Williams (in contrast to F&N) did not restrict himself to adjuncts, perhaps because he

- (12) a. I read a/every book before you did.  
 b. I read a/every book that John had recommended before you did.  
 c. I read a/every book before you did that John had recommended.

(12a,b) show an ambiguity that is explained in terms of the relative scope of the object quantifier and the *before*-clause (see Sag 1976 and Williams 1977). (12c) has only the interpretation in which the object quantifier has wide scope.

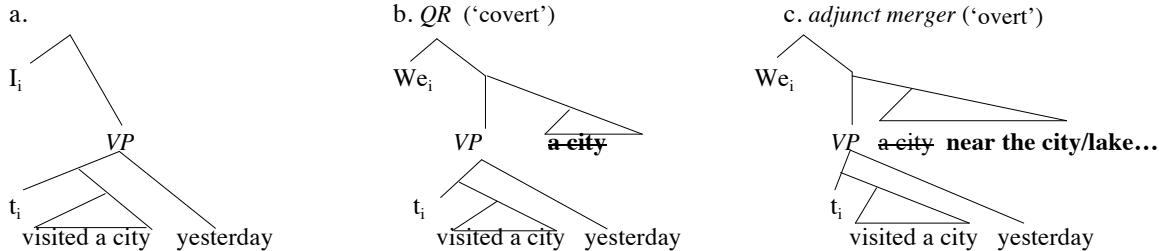
#### 2.4. One of the argument for Trace Conversion

Derivation of Antecedent Contained Deleteion (proposed in Fox 2002)

- (13) **Run-of-the-mill ACD: *John likes every boy Mary does <likes t>***  
 [VP John likes every boy]. -QR-->  
 [[VP John likes every boy] ~~every boy~~]. –Late Merge of RC-->  
 [[VP John likes every boy] ~~every boy~~ that Mary does <likes boy>].  
 [every boy  $\lambda x$  Mary does <likes the boy x>]  
 $\lambda y$  John likes the boy y]

Extraposition/late merge is necessary for ACD because, without it, the VP and its antecedent don't satisfy the conditions on ellipsis.

- (14) **Sauerland (1998, 2004):**  
 a. \*I visited a city (yesterday) near the lakej John did <visited  $t_j$ >.  
 b. (??)I visited a city (yesterday) near the cityj John did <visited  $t_j$ >.  
 c. I visited a city (yesterday) near the onej John did <visited  $t_j$ >.



#### (15) Good Sauerland Cases (14b,c)

- [VP I visited a city]. -QR-->  
 [[VP I visited a city] ~~a-city~~]. –Late merge of adjunct (nearP)-->  
 [[VP I visited a city] ~~a-city~~ near the city that John did <visited city>].  
 [a city near the city  $\lambda x$  John did <visited the city x>]  
 $\lambda y$  I visited the city y]

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focused on comparative- and result-extrapolation, where, as Bhatt and Pancheva argue, complements pattern with NP adjuncts (for reasons having to do with the nature of Trace Conversion).

(16) **Bad Sauerland Cases (14b,c)**

[VP I visited a city]. -QR-->

[[VP I visited a city] a-city]. – Late merge of adjunct (nearP)-->

[[VP I visited a city] a-city near the lake that John did <visited lake>].

\*[a city near the lake  $\lambda x$  John did <visited the lake x>  
 $\lambda y$  I visited the city y]

### 3. Non-intersective Adjectives and Extraposition

#### 3.1.The puzzle repeated

- (1) a. John saw an alleged mouse from Mars (yesterday).

$\exists x \text{ alleged}[\lambda w. \text{mouse}(w,x) \& \text{from-Mars}(w,x)] \& J. \text{ saw } x$  (allege > from Mars)  
 $\exists x \text{ alleged}[\lambda w. \text{mouse}(w,x)] \& \text{from-Mars}(x) \& J. \text{ saw } x$  (allege & from Mars)

- b. John saw an alleged mouse yesterday from Mars.

~~$\exists x \text{ alleged}[\lambda w. \text{mouse}(w,x) \& \text{from-Mars}(w,x)] \& J. \text{ saw } x$  (allege > from Mars)~~  
 $\exists x \text{ alleged}[\lambda w. \text{mouse}(w,x)] \& \text{from-Mars}(x) \& J. \text{ saw } x$  (allege & from Mars)

Paraphrase of only available meaning: *There is this thing John saw which is alleged to be a mouse and in reality is from Mars.*

**Puzzle:** If this is the right description of the restriction imposed by extraposition, we would make wrong predictions for (2) and (3).

- (2) John saw an alleged alien yesterday from Mars.

Predicted meaning:

$\exists x \text{ alleged}[\lambda w. \text{alien}(w,x)] \& \text{from-Mars}(x) \& J. \text{ saw } x$  (allege & from Mars)  
*#There is this thing John saw which is alleged to be an alien and in reality is from Mars.*

- (3) a. John saw an alleged New Yorker yesterday from the Upper East Side.

b. John saw an alleged antique yesterday from the 15<sup>th</sup> century.

**Claim:** C&R are indeed right that extraposition has an effect on meaning in cases such as (1), but this effect has not been characterized correctly.

**Puzzle:** What is the correct characterization of the effect of extraposition on meaning in such contexts, and what can account for it?

### 3.2. We need two occurrences of the NP in order to resolve the puzzle

- (17) Let  $B$  be a modifier “extraposited” from the DP *an alleged N*. And let  $x$  be an individual quantified over by the DP.<sup>3</sup>

Property 1 – inferred from (1)b:

**$\llbracket \text{alleged} \rrbracket^w(\llbracket N \rrbracket)$  must hold of  $x$ . Hence  $B$  cannot be in the scope of *alleged*.**

Property 2 – inferred from (2) and (3)

**$\llbracket B \rrbracket$  need not hold of  $x$ . Hence,  $B$  can be in the scope of *alleged*.**

Property 1 and 2 cannot both be satisfied, unless there is more than one occurrence of *alleged*.

**Resolution:** There are indeed two occurrences of *alleged*, one which has  $B$  in its scope and one which doesn’t.

- (3)b' [An alleged [antique from the 15<sup>th</sup> century]]  
 $\lambda x I \text{ saw } [\text{the alleged antique (identical to) } x]$

true just in case:

$\exists x (\text{alleged}(\lambda w. \text{antique}(w, x)) \wedge \text{alleged}(\lambda w. \text{from-the-15}^{\text{th}}\text{-century}(w, x)) \wedge \text{saw}(I, x))$

We get the same effects in cases of anaphora in which the definite description postulated by trace conversion appears overtly:

- (18) a. John saw an alleged mouse yesterday from Mars.  
b. Right after John saw an alleged mouse from Mars, he talked about the alleged mouse to various reporters.
- (19) a. John saw an alleged antique yesterday from the 15<sup>th</sup> century.  
b. Right after John saw an alleged antique from the 15<sup>th</sup> century, he talked about the alleged antique with an art dealer.

### 3.3. Complement Adjunct distinction

**As argued by Fox and Nissenbaum:** Complement extraposition is associated with different structures (plain movement to the right). We thus don’t predict the same effect.

- (20) a. John read an alleged book yesterday about Irene Heim.  
b. #John read an alleged book yesterday by Ronald Reagan.

Context (that might help with A, thanks to Tamina Stephenson): Irene’s sister wrote a book the protagonist of which is a semanticist who left Germany at a young age to study at a university on the east coast of the United States. Someone makes the allegation that the story is based on the life of Irene Heim.

A similar Context doesn’t help with b: there’s this book about indefinites and everybody believes the author is Irene Heim. Someone makes the allegation that the author is actually Ronald Reagan.

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<sup>3</sup> i.e., an individual in the set denoted by the NP argument of D.

#### 4. Exceptionally Non-local Extrapolation

The proposal in the previous section presupposes that late merge is possible into positions that are rather embedded.

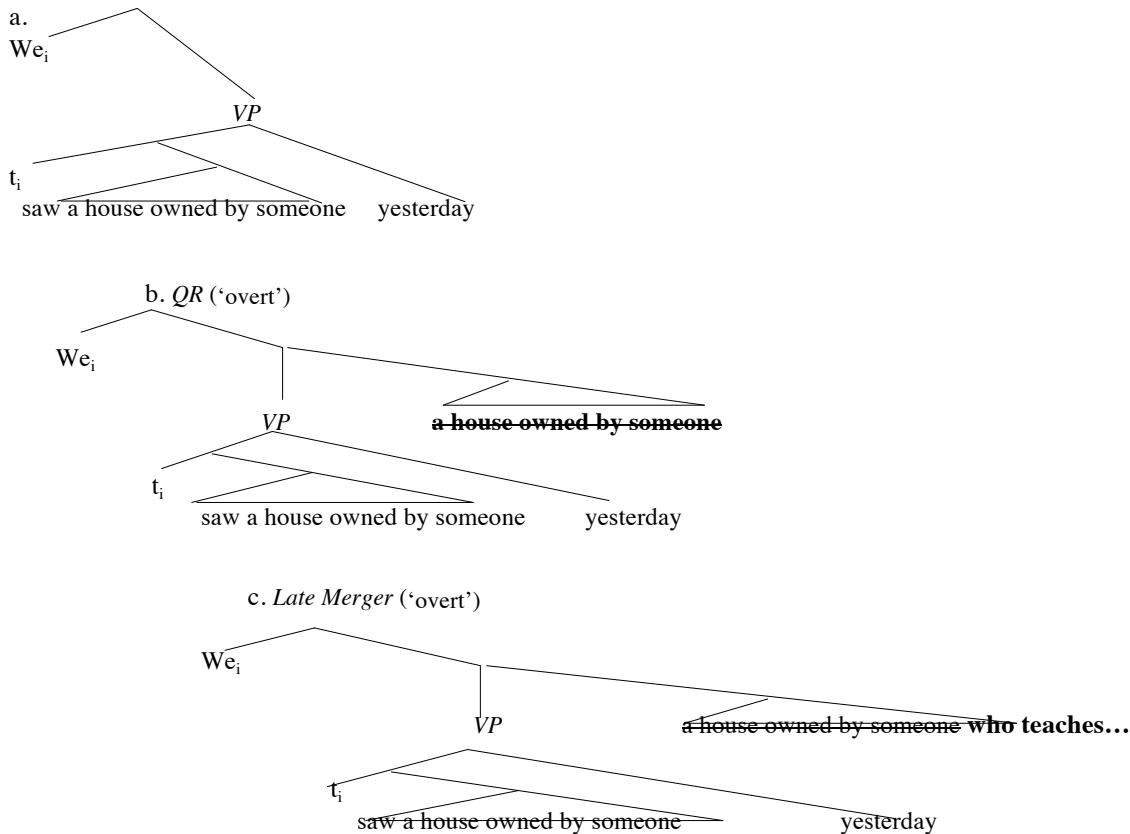
In particular, the late merged item need not be sister of the moved constituent (a conclusion that must be reached, in any event, given our assumptions about the structure of DP, [D [NP RC]]).

If we are right, late merge can disrupt the identity of a moved constituent in contrast to what has been assumed by recent accounts of late merge within the re-merge (multi-dominance) theory of movement (Johnson, Bachrach and Katzir).

Now we will argue that exceptionally non-local extrapolation satisfies locality conditions on movement, but involves exceptionally embedded late merge:

##### 4.1. Proposed derivation

- (21) We saw a house owned by someone yesterday who teaches at UCLA.



### Interpretation (by Trace Conversion)

[[A house owned by someone who teaches at UCLA]]  
 $\lambda x \text{ we saw } [\text{the thing, } x, \text{ which is a house owned by someone}]$

**Necessary Assumption:** It is not true that every constituent can undergo QR.

Otherwise, we will not predict the instances of WG reported in the literature (Fox and Nissenbaum 1999, Fox 2002). In particular, we will not predict the effect in (12) if VP can QR.

**Working Hypothesis:** Only QPs (elements that denote Generalized Quantifiers) can undergo QR.

This is a consequence of Scope Economy.<sup>4</sup>

#### 4.2. Predictions

- **Scope:** We will have systematic counter-examples to WG: extraposition need not force wide scope for the source QP because the relevant sequence of words can sometimes result from QR of a properly containing QP (with embedded late merge).

Still, extraposition will always force wide scope for a certain QP (reflexively) dominating the source QP. And, appropriately placed Islands can tell us which DP has undergone QR.

- **Trace Conversion:** Embedded late merge will be constrained by Trace Conversion (the principle that tells us how traces are interpreted)

The limitations imposed by Trace Conversions can tell us which QP has undergone QR.

- **Tense Interpretation:** Extraposition will have consequence for tense dependency (e.g. sequence of tense) only relative to items that are outside the QR-ed constituent

- **Condition C:** Extraposition will obviate Condition C only relative to potential binders that are outside the QR-ed constituent (**not today**)<sup>5</sup>

- **Locality:** Extraposition will be island sensitive when there is nothing that (properly) dominates the source QP which can undergo QR. (**not today**)

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<sup>4</sup> One could imagine various alternatives. What seems crucial to me is to rule out QR of VPs and NP complements of D.

<sup>5</sup> To understand the type of predictions that are made for Condition C, it might be helpful to look at the discussion of ex. (25) in Fox (2002).

### 4.3. Prediction for Scope

We already saw counter-examples to WG

- (22) a. I'll [[talk to you about [every paper that was recommended by any linguist] when we meet] who teaches at UCLA].  
b. I'll [[do [nothing that was prohibited by anyone] when I am student] who would have any authority over me].

**This is predicted:** the source DP need not QR to the position where the extraposed material is linearized; instead the higher DP that dominates the source DP can QR.

- (23) **Modified Williams's generalization (MWG):** When an adjunct  $\beta$  is “extraposed” from a “source QP”  $\alpha$ , there must be a QP  $\alpha'$  which reflexively dominates  $\alpha$  and the scope of  $\alpha'$  must be at least as high as the attachment site of  $\beta$  (the extraposition site).

### 4.4. Evidence for MWG:<sup>6</sup>

#### 4.4.1. Plausibility determines Scope – Setting the stage (Step 1)

- (24) **Plausibility Considerations Determine Scope:**
- a. You can do nothing **prohibited** without being expelled.  
(preferred reading: *nothing > can*)
  - b. You can do nothing **required** without being expelled.  
(*can > nothing*; # *nothing > can* )
- (25) **Plausibility Considerations Determine Scope:**
- a. You can do nothing **prohibited** by anyone who teaches in this school without being expelled.  
(preferred reading: *nothing > can*)
  - b. You can do nothing **required** by anyone who teaches in this school without being expelled.  
(*can > nothing*; # *nothing > can* )

#### 4.4.2. Illustration of William's Generalization– Setting the stage (Step 2)

- (26) a. You can do nothing without being expelled that is prohibited.  
b. #You can do nothing without being expelled that is required.
- (27) a. You can do nothing without being expelled prohibited by anyone who teaches in this school.  
b. #You can do nothing without being expelled required by anyone who teaches in this school.

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<sup>6</sup> The paradigm described here is an extension of a paradigm developed together with Jon Nissenbaum (in unpublished work) to test WG.

#### 4.4.3. Prediction of embedded late merge (illustration of MWG)

- (28) a. You can do nothing prohibited by anyone without being expelled who teaches in this school.  
b. #You can do nothing required by anyone without being expelled who teaches in this school.

#### 4.5. Trace Conversion

- (6) a. ?John [[read [a paper that is going to be recommended by a linguist] yesterday] who teaches at UCLA].  
b. \*John [[read [a paper that isn't going to be recommended by any linguist] yesterday] who teaches at UCLA].

**Account:** There are two occurrences of the trace (as there were in our account of the interaction with *alleged*). In the bad case, the low occurrence contributes a presupposition which conflict with an implicature that (obligatorily) arises from the high occurrence.

(29) **The Good Case (informally):**

There is a paper that is going to be recommended by a linguist who teaches at UCLA, s.t.

- (a) it is presupposed that this is a paper recommended by a linguist  
(b) it is asserted that John read this paper yesterday.

(30) **The Bad Case (informally):<sup>7</sup>**

There is a paper that isn't going to be recommended by any linguist who teaches at UCLA, s.t.

- (a) it is presupposed that this paper isn't recommended by any linguist (at all)  
(b) it is asserted that John read this paper yesterday.  
(c) implicature: the paper is going to be recommended by a linguist (who does not teach at UCLA)

(31) **Parallel Anaphora Contrast**

- a. John read a paper that is going to be recommended by a linguist who teaches at UCLA. And he loved this paper that is going to be recommended by a linguist.  
b. John read a paper that isn't going to be recommended by any linguist who teaches at UCLA. #And he loved this paper that isn't going to be recommended by any linguist (at all).

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<sup>7</sup> To give a more precise account of the conflict, I would have to go over the theory of obligatory Scalar Implicatures developed by Magri (2009, 2011), and doing that always requires quite a bit of time.

#### 4.6. Constraints imposed by Trace Conversion can tell us what has QR-ed

- (32) a. By tomorrow, I need to find a picture of every boy who studies with me.  
 $(\forall > \exists) (\exists > \forall)$   
b. I need to find a picture of every boy, by tomorrow, who studies with me.  
 $(\forall > \exists) * (\exists > \forall)$

This contrast follows under the assumption of F&N that the source QP *every boy...* must undergo QR. However, it doesn't follow automatically under the proposal made here that the containing QP *a picture...* can QR followed by embedded late merge.

**However:** Embedded late merge would violate the constraints imposed by Trace Conversion (specifically it will show the conflict between presupposition and implicature that we illustrated in (29-31)).

**Prediction:** In cases where the conflict does not arise, embedded late merge will be possible.

- (33) a. I need to find a picture of every boy, by tomorrow, who studies with me.  
 $(\forall > \exists) * (\exists > \forall)$   
b. I need to find every picture of a/any boy, by tomorrow, who studies with me.  
 $(\exists > \forall, \text{modulo polarity}) (\forall > \exists)$
- (34) **Parallel Contrast with Anaphora**  
a. I saw a picture of every boy who studies with me. #I hung that picture of every boy (whatsoever) on the wall.  
b. I saw every picture of any boy who studies with me. In every case, I hung that picture of a boy on the wall.

#### 4.7. Predictions for Tense

**When no distinct QP dominates the source QP, the source QP must QR and this QR should have consequences for tense interpretation:**

- (35) **Effects of Simple Extrapolation on SoT**  
a. You told me that you wouldn't mind marrying someone who was pregnant.  
(SoT possible – that is possible for both matrix and embedded past)  
b. You told me that you wouldn't mind marrying someone when we met who was pregnant.  
(SoT impossible for embedded past – that is *be pregnant* can't be evaluated in time of marriage; time of marriage can't be interpreted as contained in time of pregnancy)

**This is predicted:** extrapolation is derived by QR of *someone* to a matrix position (outside of the scope of the past tense on *would*). And being in the scope of *would* is crucial for the relevant reading.

**When the source QP is in a complex NP island, a distinct QP will QR, and consequences for tense interpretation will be more involved.**

- (36) **Non-Local extraposition – no effect relative to material in a dominating DP**
- You told me that you wouldn't mind dating a man who had married a woman who **was** pregnant.
  - You told me that you wouldn't mind dating a man who **had** married a woman when we met who **was** pregnant.

**Time of marriage can be interpreted as contained in time of pregnancy whether or not there is extraposition.**

**This is predicted:** extraposition is derived by QR of a QP that properly contains the source QP, *a man who had married a woman*, followed by embedded late merger, which creates an SoT environment. (Since *was pregnant* is inside the scope of past tense on *had*, it can receive a “present interpretation” relative to time of marriage.)

- (37) **Non-Local extraposition – there is an effect relative to material outside of dominating DPs**
- You **told** me that you wouldn't mind dating a man who **was** married to a woman who **was** pregnant.
  - You **told** me that you wouldn't mind dating a man who **was** married to a woman when we met who **was** pregnant.

**Extraposition (in (b)) makes it impossible for time of dating to be contained in time of pregnancy or of marriage.**

**This is predicted:** extraposition is derived by QR of a QP that properly contains the source QP, *a man who was married a woman*, followed by embedded late merger, which allow for “present interpretation” of *was pregnant* relative to time of marriage, but does not allow such an interpretation relative to time of dating, since *was pregnant* is outside the scope of the past tense on *would*.

## 5. Conclusion

- The interaction between *alleged* and extraposition teaches us that we can have deeply embedded late merge.
- The hypothesis we investigated is that there are no constraints on the depth of late merge other than what follows from interpretability.
- This hypothesis explains the fact that late merge appears not to be sensitive to certain islands, with various predictions about (a) scope (MWG)/SoT and (b) contextual restrictions on embedded late merge.
- Representing any of this under a re-merge theory in which a moved constituent has two mothers is not straightforward.