Adjunct Stranding, Late Merger, and the Timing of Syntactic Operations[*]

Erik Zyman · UC Santa Cruz
ezyman@ucsc.edu

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1 Introduction

- Since Lebeaux (1991), there has been considerable interest in the hypothesis that syntactic structures are not built in a completely cyclic, bottom-up fashion. . .

- . . .but rather, some syntactic elements—in particular, adjuncts—can be merged **late**, or countercyclically. (Nissenbaum 1998, Sauerland 1998, Fox & Nissenbaum 1999/2006, Stepanov 2000, 2001, Fox 2002, Bošković 2004, a.o.)

- Lebeaux (1991) put forth this hypothesis to account for what's come to be known as the (*Freidin-*)*Lebeaux effect.* Consider the following:

    (1) *Condition C: An R-expression cannot be bound*
        a.   *He$_i$ resented an inspection of John$_i$'s office.
        b.   *He$_i$ resented an inspection near John$_i$'s office.

- When a phrase containing an R-expression that violates Condition C undergoes Ā-movement, the Condition C effect remains[1]—*unless* the R-expression is contained in an <u>adjunct</u> rather than an <u>argument</u>.

    (2) *Ā-movement bleeds Condition C if the offending R-expression is inside an adjunct*
        a.   ??/*Which inspection of John$_i$'s office did he$_i$ resent?
        b.   Which inspection near John$_i$'s office did he$_i$ resent?

- Lebeaux contends that this argument/adjunct asymmetry indicates that arguments and adjuncts can enter the derivation in different ways, as described in (3) (terminology updated).

[1]Though the empirical picture here is complex (see, e.g., Stepanov 2001:95-96, and references cited there) and characterized by interspeaker variation.

(3) a. An argument of a head H <u>must</u> merge with (a projection of) H <u>in H's first-merge position</u>.

   b. An adjunct to a phrase HP <u>may</u> merge with HP <u>in a derived position of HP</u> (i.e., may merge with a non-lowest copy of HP).

- If this is so, then (2a-b) are derived as follows, explaining the contrast between them:

(4) a. *[which inspection of John$_i$'s office]$_k$ did **he**$_i$ resent [which inspection of **John**$_i$'s office]$_k$? ☐ *Condition C

   b. [which inspection <u>near</u> John$_i$'s office]$_m$ did **he**$_i$ resent [which inspection]$_m$? ☐ no Condition C violation

- Today, I will argue that a different phenomenon—**adjunct stranding** in English—provides additional evidence for Late Merger of adjuncts...

- ...and yields insights into how, and when in the derivation, this operation is carried out.

- In particular, I will argue that Late Merger of adjuncts is *obligatory*, in the following sense:

(5) **Obligatory Late Merger of Adjuncts**

   For H a phase head and XP its associated spellout domain (= complement), adjunction within the HP phase occurs immediately before spellout of XP.

1.1 Roadmap

- §2: Adverb stranding ("*exactly*-stranding")

- §3: An odd generalization: stranded adverbs are high

- §4: Adverb stranding as obligatory Late Merger

- §5: Predictions about the vP phase edge

- §6: Predictions about other types of adjuncts

- §7: Conclusion and theoretical implications

2 The phenomenon: adverb stranding

- The adverb *exactly*[2] can immediately follow a *wh*-phrase (Urban 1999; McCloskey 2000:63-64, fn. 8; see also Stroik 2009:47):[3]

(6) a. Who(m) exactly did he blame?
   b. What exactly did she devour?
   c. When exactly did he hide the donuts?
   d. Where exactly did she buy the hippo?
   e. Why exactly did he paint lemons on his car?
   f. How exactly did she toilet-paper the palace?

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[2] Also *precisely*. *Exactly* can be replaced by *specifically* in many of the sentences in (6), but not all. I illustrate the relevant phenomena with *exactly* throughout.

[3] *Exactly* and *precisely* can also immediately <u>precede</u> a *wh*-phrase: *Exactly who(m) did he blame?*, *Precisely what did she devour?* This turns out to be a largely different phenomenon, and I set it aside here (but feel free to ask me about it!).

g. How carefully exactly did he paint the toothpicks?

h. How many grapes exactly did she eat?

i. How much frosting exactly did he put on the cake?

j. What kind of wombat exactly does she want?

k. Which pretzel exactly did he sell for a million dollars?

- I assume that, in these structures, *exactly* is right-adjoined to the *wh*-phrase (henceforth its **wh-associate**):[4]

(7)

```
              DP
              [WH]
             /    \
          DP       AdvP
          [WH]     exactly
          who
```

- When such an adjunction structure is built, *wh*-movement can apparently target either the whole adjunction structure ((6)) or just the *wh*-associate ((8)). In the latter case, the adverb is **stranded**.[5]

(8) *Adverb stranding*

a. Who(m) did he blame exactly?

b. What did she devour exactly? *[etc.]*

- Adverb stranding is of interest in part because it may provide an additional argument for successive-cyclic (as opposed to truly unbounded) Ā-movement.

- The argument comes from sentences like (9a-b), which suggest that *exactly* can be stranded in any [Spec,CP] along the path of apparently unbounded *wh*-movement (Urban 1999, McCloskey 2000:ibid):

(9) a. What do you believe exactly (that) everyone said (that) she devoured?

b. What do you believe (that) everyone said exactly (that) she devoured?

3 An odd generalization: stranded adverbs are high

- Consider again the following:

(10) *Adverb-stranding alternation*

a. What exactly did she devour? (= (6b))

b. What did she devour exactly? (= (8b))

- The null hypothesis about the source of this alternation (alluded to above) is that, when an adjunction structure like [DP [DP *what*] *exactly*] is built, *wh*-movement can target either segment of the adjunction structure.

- On this hypothesis, the stranded *exactly* in (10b) is a subconstituent of the direct object in surface syntax.

- In this section, I will show that this null hypothesis is incorrect. A stranded clause-final *exactly* (henceforth **right-*exactly***) is <u>never</u> a subconstituent of an internal argument in surface syntax. Rather, it is in a high position in the right periphery of the clause. *(A question that will then arise: why should this be?)*

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[4]Though see McCloskey (2000:64, fn. 8) for discussion of an alternative analysis.

[5]See Bell (2012) for an investigation of the extent to which adjunction hosts are visible to various syntactic operations.

3.1 An unexpected paradigm

- A WH-*exactly* adjunction structure can be generated as the linearly earlier internal argument of a three-place predicate:

(11)   a.   Muriel put WHAT exactly on the table?
       b.   Who put what exactly on the table?

- On the null hypothesis, it should be possible to move *what* in a configuration like (11a) and leave *exactly* exactly where it is in the linear string.

- This <u>is</u> possible, but the result, though acceptable, is marked ((12a)). The "default way to say it" places *exactly* clause-finally ((12b)).

(12)   a.   ^MWhat did Muriel put exactly on the table?[6]
       b.   What did Muriel put on the table exactly?

(13)   *Two questions*
       a.   Why is (12b) possible?
       b.   Why is it unmarked and (12a) marked?

- This pattern is general. Another paradigm:

(14)   a.   Mildred attributed WHAT exactly to malevolent conspiracies?
       b.   Who attributed what exactly to malevolent conspiracies?
       c.   ^MWhat did Mildred attribute exactly to malevolent conspiracies?
       d.   What did Mildred attribute to malevolent conspiracies exactly?

3.2 An even more unexpected paradigm

- When a VP-internal WH-*exactly* constituent is followed by not one but <u>two</u> other low *v*P-internal constituents, a surprising fact is observed:

- The *wh*-associate can no longer be extracted, stranding *exactly* in situ. Attempting to do so produces severe degradation; for me the relevant sentences merit a full star.[7] (But *exactly* can still appear clause-finally.)

(15)   *An object-<u>wh</u>–associated <u>exactly</u> cannot be stranded to the immediate left of two low vP-internal constituents*
       a.   Muriel put WHAT exactly <u>on the table</u> with great care?!
       b.   Who put what exactly <u>on the table</u> with great care?
       c.   *What did Muriel put exactly <u>on the table</u> with great care?
       d.   What did Muriel put <u>on the table</u> with great care exactly?

- This is general:

(16)   a.   Harvey gave WHAT exactly <u>to the president</u> to annoy you?!
       b.   Who gave what exactly <u>to the president</u> to annoy you?
       c.   *What did Harvey give exactly <u>to the president</u> to annoy you?
       d.   What did Harvey give <u>to the president</u> to annoy you exactly?

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[6] As pointed out to me by Amy Rose Deal (p.c.), the *exactly* in sentences like (12a) bears an intonational fall. We will soon have a better understanding of this fact than we do now.

[7] There is some interspeaker variation on this point (Appendix A), which appears to support the claim that *right*-exactly is high.

(17) a.   Mrs. Winston sent WHO exactly to the principal without a second thought?!

      b.   Who sent who exactly to the principal without a second thought?

      c. *Who did Mrs. Winston send exactly to the principal without a second thought?

      d.   Who did Mrs. Winston send to the principal without a second thought exactly?

3.3 The beginnings of an analysis

- We can begin to understand these two unexpected paradigms if the following descriptive generalization is correct:

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(18) **Generalization** (to be revised)

   When *exactly* appears to have been stranded (by the movement of its *wh*-associate), it in fact is not in situ, but rather in a high position in the right periphery.

- This straightforwardly accounts for the facts in (15-17). When *exactly* is stranded, it may not appear in situ (inside the direct object position), but must be in the right periphery, following all the core *v*P-internal material.

- It also allows us to understand the facts in §3.1—such as (12), repeated below:

(19) a. ^{M}What did Muriel put exactly on the table?

      b.   What did Muriel put on the table exactly?

- (19b) is the default case: the *wh*-associate has been extracted, so *exactly* is in the right periphery, as it should be. (19a) is derived by extraposition past a high right-peripheral *exactly* of [$_{PP}$ *on the table*]...

- ...which makes it relatively unsurprising that it's marked compared to (19b), and that *exactly* bears an intonational fall in (19a).

- Of course, in order for this first step of the analysis to go through, it must be impossible to derive deviant sentences such as (15c) by *order-preserving double extraposition*, as follows:

(20)   *What did Muriel put __$_i$ __$_k$ **exactly** [on the table]$_i$ [with great care]$_k$?

- This is indeed impossible, as shown in Appendix A.

- The big question now is: why should *exactly* be in the right periphery (rather than in situ) when its *wh*-associate is extracted? (I.e., why is the generalization in (18) correct?)

4   Adverb stranding as obligatory Late Merger

- The analysis of this odd distributional pattern developed here is inspired largely by Fox and Nissenbaum's (1999/2006) analysis of adjunct extraposition.[8]

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[8]Fox and Nissenbaum argue that adjunct extraposition (as in *We saw a painting yesterday from the museum*, their (2b)) comes about as shown in (1) below. This analysis explains why the DP from which the adjunct appears to be extraposed always takes scope at least as high as the surface position of the adjunct, along with a number of other facts about adjunct extraposition.

(1)   a. *Step 1: covert (rightward) Quantifier Raising (QR)*
          we saw [a painting] yesterday [a painting]

      b. *Step 2: overt adjunction to the NP in its derived position*
          we saw [a painting] yesterday [a painting from the museum]

- I propose that the following holds:

(21) **Obligatory Late Merger of Adjuncts**

   For H a phase head and XP its associated spellout domain (= complement), adjunction within the HP phase occurs immediately before spellout of XP.

- N.B. This proposal is broadly similar to the one defended in Stepanov (2001), but the two analyses differ in certain crucial respects (please feel free to ask about the details).

- To see how this proposal can help us understand the distribution of *wh*-associated *exactly*, we need to consider its consequences for two different types of derivations:

(22)   a. ***Exactly*-in-situ:** Derivations in which the *wh*-associate of *exactly* does not move, and hence *exactly* can be adjoined to the *wh*-associate in the latter's base position.

   b. ***Exactly*-stranding:** Derivations in which the *wh*-associate of *exactly* does move, and *exactly* (puzzlingly) <u>cannot</u> be adjoined to the *wh*-associate in the latter's base position.

4.1 Deriving *exactly*-in-situ

(23)   *Multiple question: <u>wh</u>-associate not extracted, <u>exactly</u> in situ*
   Who put what exactly <u>on the table</u> with great care? (= (15b))

- First, the following structure is built up:

(24)
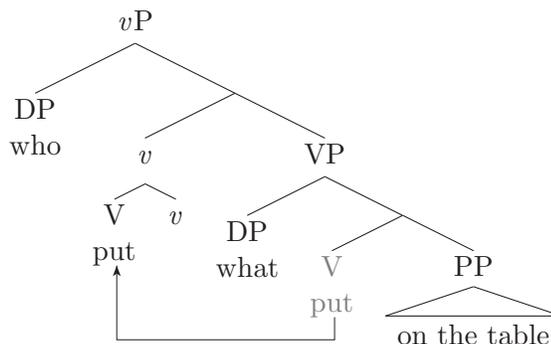
- The phase head is *v*. <u>Immediately</u> before *v*'s complement (VP) is spelled out, adjunction within the *v*P phase takes place. In this derivation, *exactly* is adjoined to *what* and [PP *on the table*] is adjoined to *v*P.[9]

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(25)

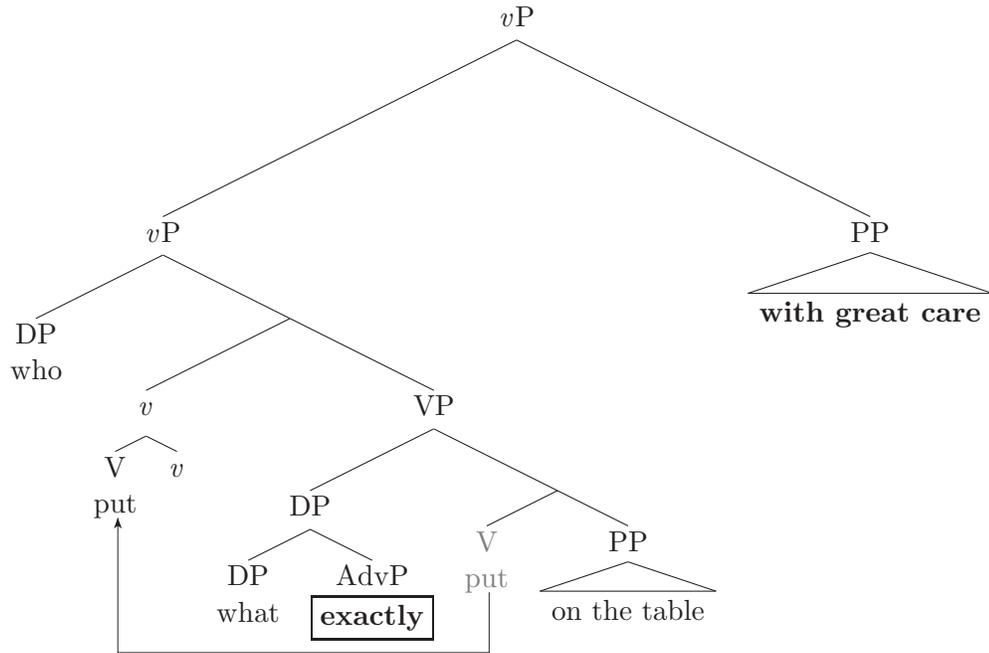- Then, VP—the complement of the phase head—is spelled out, with the adjunct *exactly* inside it. This is represented in (26) by the dots around the VP label.

(26)
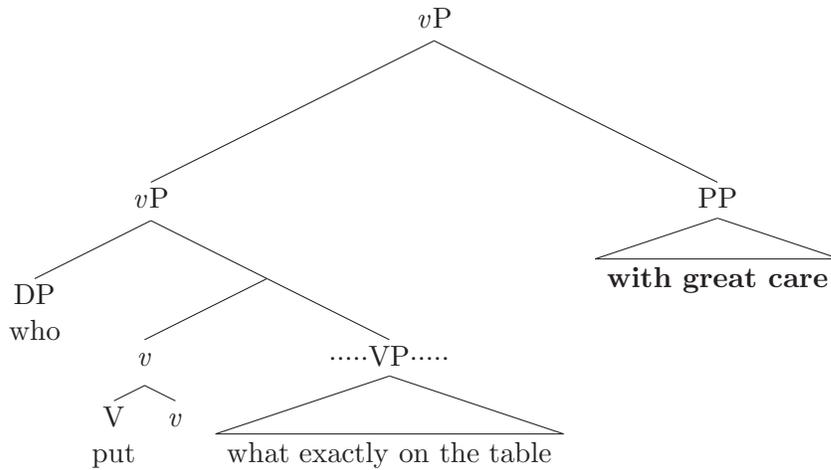
- And the derivation continues.

4.2 Deriving *exactly*-stranding

(27) *Exactly-stranding: <u>wh</u>-associate extracted, <u>exactly</u> in the right periphery*
    What did Muriel put <u>on the table</u> with great care exactly? (= (15d))

- First, the following structure is built up:

(28)

- Crucially, in this derivation—unlike in the previous one—*what* moves. It first moves to the *v*P edge, on its way to the left periphery of the clause:

(29)

- Suppose (counterfactually) that we wanted to <u>both</u> move *what* to the *v*P edge <u>and</u> adjoin *exactly* to *what* in the latter's base position. (In reality, this is precisely what's impossible.)

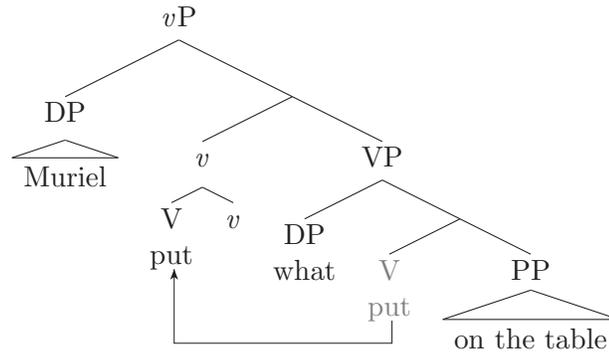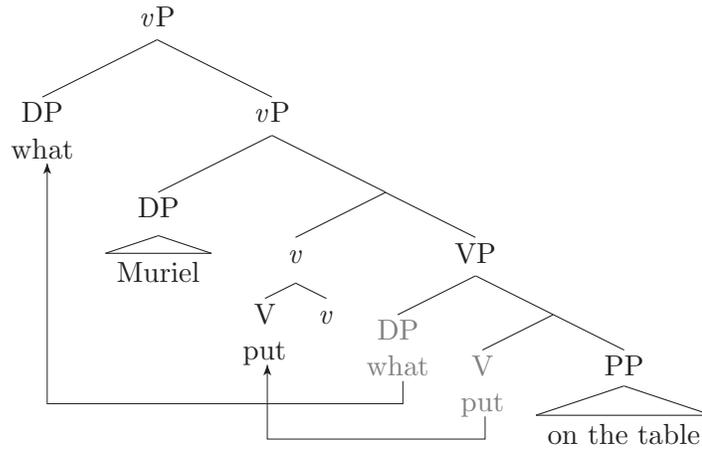- We wouldn't be able to adjoin *exactly* to *what* in its base position and then move *what* to the *v*P edge (stranding *exactly*), because adjunction within the *v*P phase <u>immediately</u> precedes spellout of VP. (So *what exactly* would be trapped in VP, and *what* wouldn't be able to get to the *v*P edge.)

- But we also wouldn't be able to <u>first</u> move *what* to the *v*P edge and <u>then</u> adjoin *exactly* to the lower copy of *what* (thereby generating *exactly*-"stranding"), on the plausible assumption that adjunction can't target a non-highest copy.

- The upshot:

(30)   If an element is going to move out of VP, it can't host an adjunct in its base position.

- The generalization we have just accounted for ((30)) is the main result illustrated by this derivation. The rest of the derivation is less crucial, but I give it below for completeness.

- Adjunction within the *v*P phase takes place:[10]

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[10][PP *With great care*] can be adjoined to either segment/level of *v*P. Here it is shown adjoining to the lower segment.

(31)

```
                                    vP
                       ┌────────────┴────────────┐
                      DP                          vP
                     what           ┌─────────────┴─────────────┐
                      ↑            vP                           PP
                      │      ┌──────┴──────┐                  with great care
                      │     DP             VP
                      │   Muriel      ┌─────┴─────┐
                      │     v         │           VP
                      │  ┌──┴──┐     DP      ┌─────┴─────┐
                      │  V     v    what     V           PP
                      │ put              ↑  put      on the table
                      │                  │
                      └──────────────────┘
```
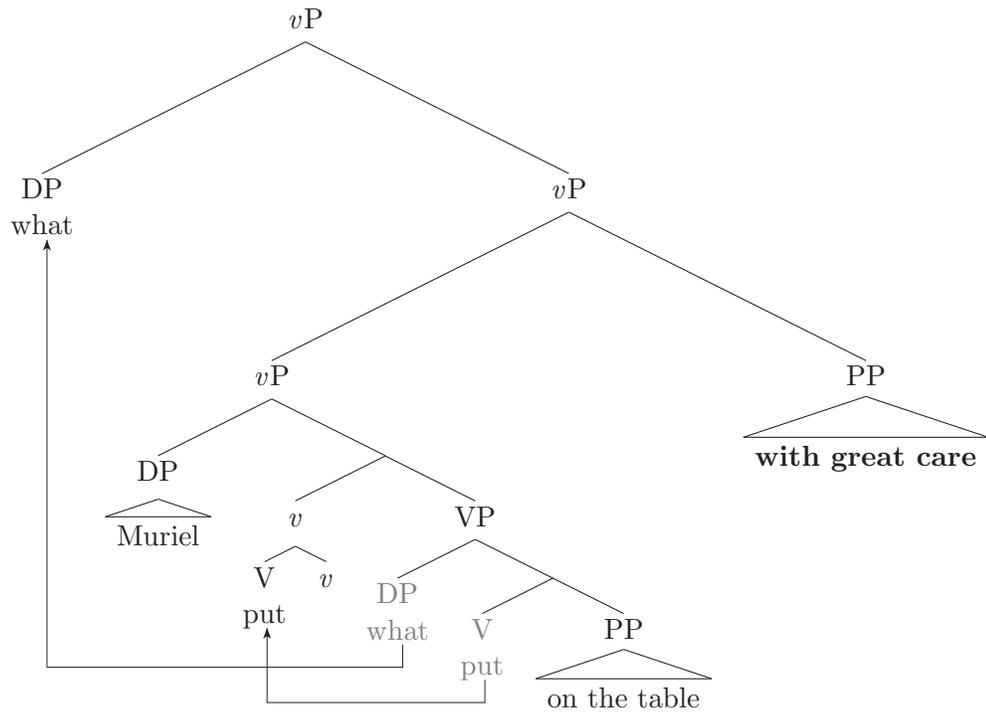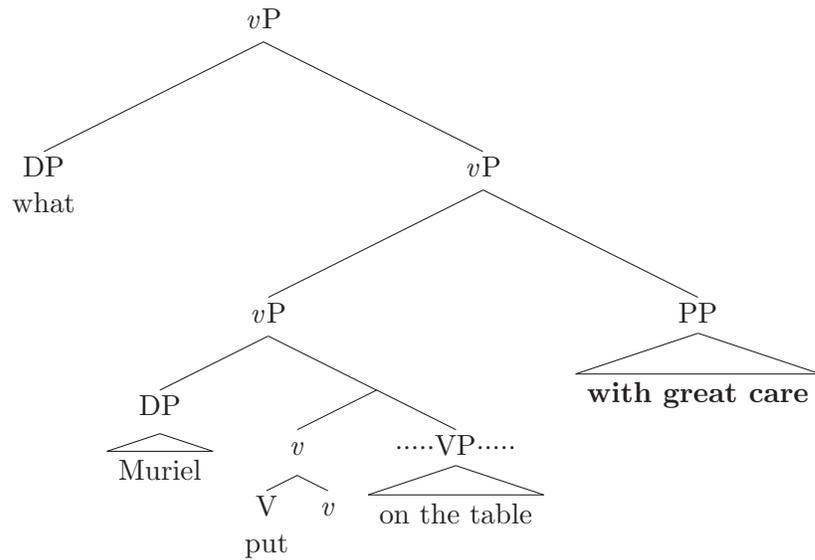
- Immediately after adjunction takes place within the *v*P phase, the complement of the phase head *v*, namely VP, is spelled out:

(32)

```
                                    vP
                       ┌────────────┴────────────┐
                      DP                          vP
                     what            ┌────────────┴────────────┐
                                    vP                        PP
                              ┌──────┴──────┐              with great care
                             DP             v
                           Muriel      ┌────┴────┐
                                       v    .....VP.....
                                    ┌──┴──┐  on the table
                                    V     v
                                   put
```

- Further structure-building produces the following:

(33)

FocP

Foc
[EPP:WH]

FinP

Fin

TP

T
did

Fin

DP

Muriel

T
did

vP

DP
what

vP

vP

PP

DP
Muriel

v

VP

with
great
care

V
put

v

on the table

DP
what
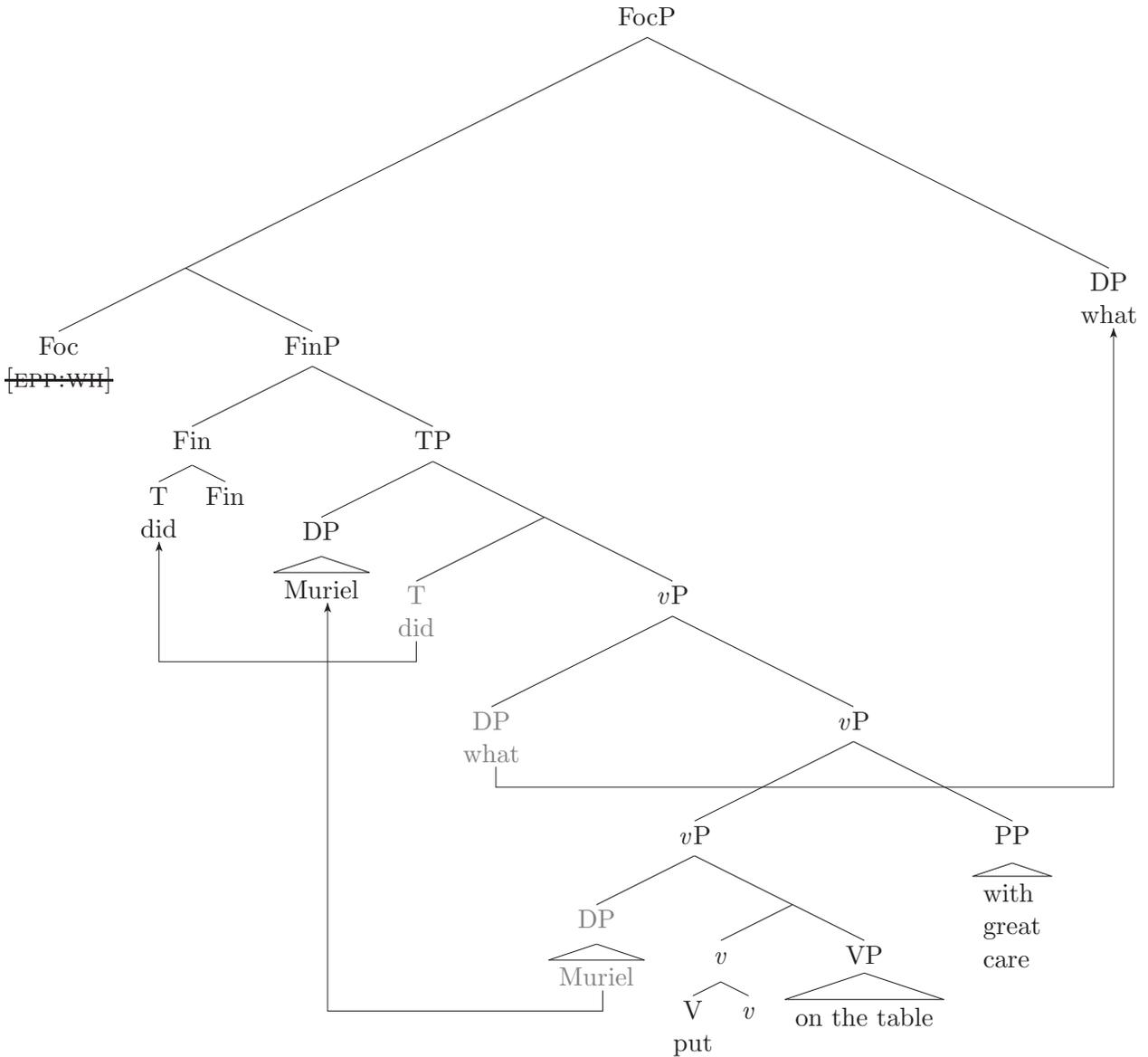
- As shown above, I adopt a "split-CP" analysis of the left periphery (Rizzi 1997). I also posit that, in English, the Foc(us) head can bear [EPP:WH], and an element second-merged with Foc (i.e., in [Spec,FocP]) is linearized to the right of its sister.[11]

- Assume that Foc is a phase head. Immediately before its complement (FinP) is spelled out, adjunction takes place within the FocP phase. In particular, *exactly* is adjoined to *what*:[12]

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[11]An alternative analysis that dispenses with these assumptions is discussed and shown to be inadequate in Appendix B.

[12]This is similar to the late adjunction posited by Fox and Nissenbaum (1999/2006) to target phrases that have undergone covert rightward QR.

(34)

FocP

Foc
[EPP:WH]
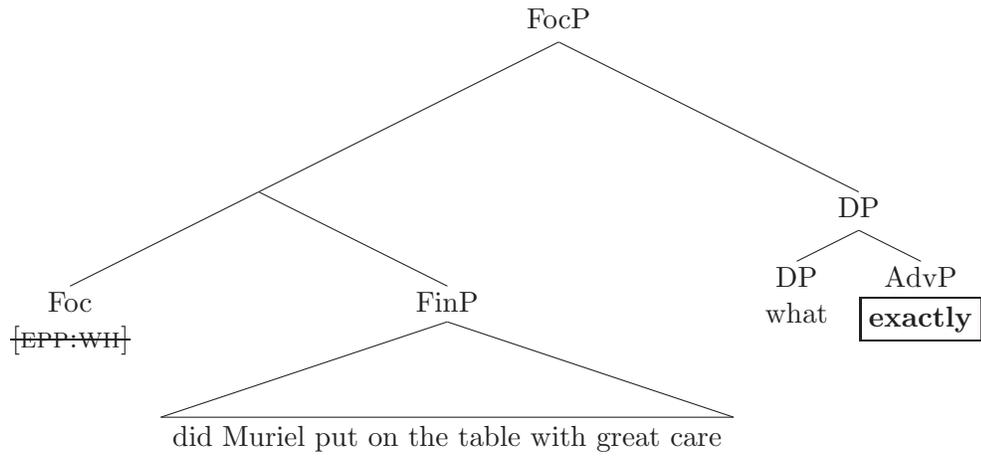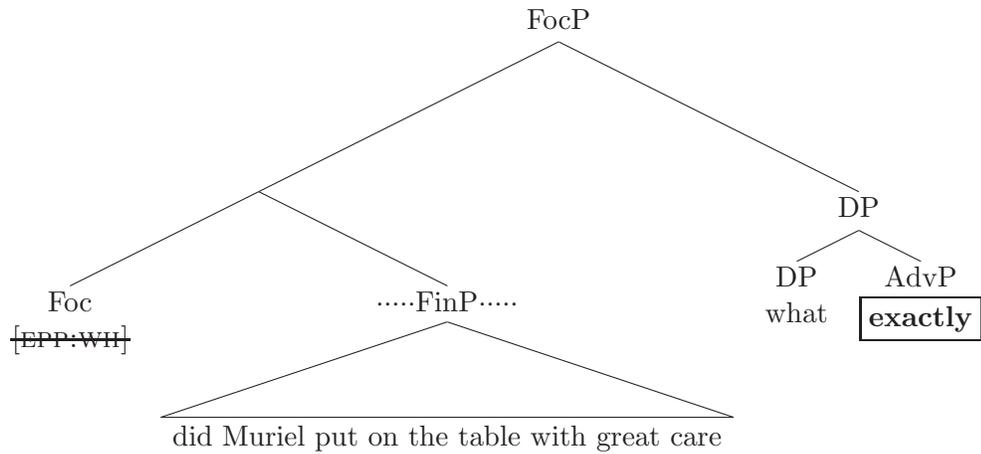
FinP

did Muriel put on the table with great care

DP

DP
what

AdvP

exactly

- Immediately after adjunction occurs within the FocP phase, the complement of Foc, namely FinP, is spelled out:

(35)

FocP

Foc
[EPP:WH]

·····FinP·····

did Muriel put on the table with great care

DP

DP
what

AdvP

exactly

- Merged in next is the highest head in the left periphery: Force. In *wh*-questions, Force bears [EPP:WH] (and selects the Foc head that also bears this feature).

- Because it bears [EPP:WH], Force attracts to its specifier either the whole adjunction structure *what exactly* or just the *wh*-associate *what*. In this derivation, the second option is chosen:

(36)

ForceP

DP
what

Force
[EPP:WH]

FocP

Foc
[EPP:WH]

·····FinP·····

did Muriel put on the table with great care

DP

DP
what

AdvP
exactly
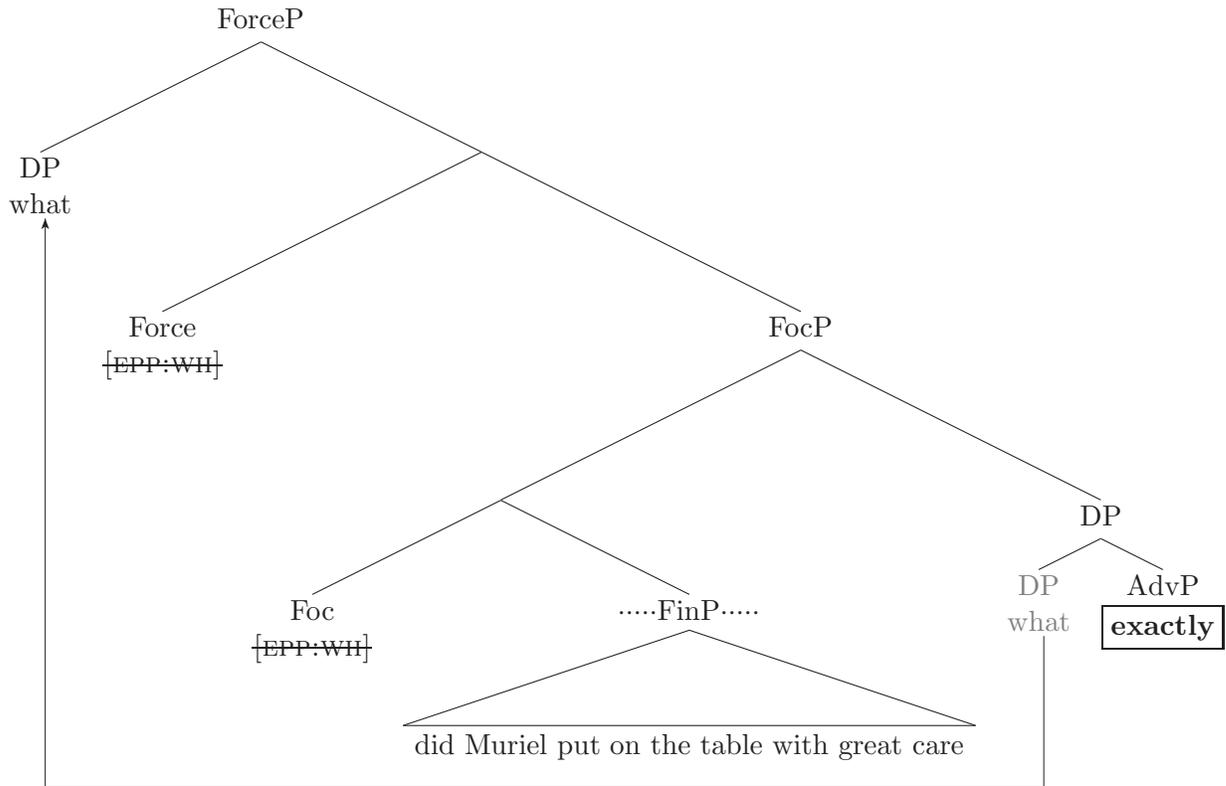
4.3 Interim conclusion

- The two derivations we have just examined—one for *exactly*-in-situ and one for *exactly*-stranding—illustrate how Obligatory Late Merger of Adjuncts (formulation repeated in (37)) can help us make sense of the odd distributional pattern we have uncovered...

- ...namely, that a *wh*-phrase inside VP can host *exactly* in its base position <u>only</u> if it doesn't move.

(37) **Obligatory Late Merger of Adjuncts**
For H a phase head and XP its associated spellout domain (= complement), adjunction within the HP phase occurs immediately before spellout of XP.

5 Predictions about the *v*P phase

- Recapitulating, the order of operations is (in part) the following:

(38)   a. Adjunction within the *v*P phase
       b. *(Then, immediately)* Spellout of the complement of *v* (= VP)

- On our analysis, as we have seen, a phrase inside VP cannot host an adjunct in its base position if it is going to move.

- But the situation at the phase *edge* is predicted to be very different:

(39) **Prediction: *exactly*-stranding at the *v*P edge**
It should be possible to move a *wh*-phrase from within VP to the *v*P edge (or base-generate it there), adjoin *exactly* to it, and subject the adjunction host to (further) *wh*-movement, stranding *exactly* at the *v*P edge.

12

- The reason: adjunction within the vP phase immediately precedes spellout of <u>VP</u> (the complement of the phase head), not <u>vP</u> (the whole phase)...

- ...therefore, a phrase in [Spec,vP] (which is outside the VP spellout domain) should be able to serve as an adjunction host and subsequently move, stranding its adjunct.[13]

- Things look good for this prediction. The relevant examples are acceptable—though, curiously, they belong to informal registers (which I indicate with an " [I] " diacritic):

(40)   a. [I]What was he exactly doing there?
      b. [I]Who were they exactly talking to?
      c. [I]What did she exactly send?

(41)   *Attested examples*
      a. What did she exactly mean? (GIRLS' help needed)?[14]
      b. What did he exactly mean by this?[15]
      c. What Did They Exactly Do To Get Rid Of Strudvick [...] because to me it looks like they should have kept him..i dont see the harm[16]
      d. what did you exactly do, to get it? Cause I already took the picture at the beginning of the game [...][17]

- There is a problem, though. Contrary to the prediction in (39), sentences such as the following are unacceptable:

(42)   a. *What had she been exactly sent?
      b. *What had she been exactly sending?
      c. *What had she been being exactly sent?

- As (42) shows, whenever a clause contains passive *be*, progressive *be*, or both, *exactly* <u>cannot</u> be stranded at the edge of its vP. This would seem to pose a severe challenge to the analysis of adverb stranding developed here.

- But suppose we follow Harwood (2015) and posit that, when present, passive *be* and progressive *be* are <u>part</u> of the clause-internal phase.

- Then, our analysis will still predict that clauses containing passive *be* and/or progressive *be* should allow *exactly* to be stranded at the left edge of the clause-internal phase...

- ...but this will now be understood as a position linearized to the <u>left</u> of these auxiliaries.

- Strikingly, this gets the facts exactly right. The sentences in (43) are acceptable, and have the informal ring we've come to expect; the contrast with (42a-c) is enormous:

(43)   a. [I]What had she exactly been sent?
      b. [I]What had she exactly been sending?
      c. [I]What had she exactly been being sent?

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[13]In fact, this is what the *what* in the rightward specifier of FocP did in (34-36).
[14]https://answers.yahoo.com/question/index?qid=20131211030457AAzaCyB
[15]http://www.anewmode.com/topic/what-did-he-exactly-mean-by-this/
[16]http://community.msgnetwork.com/eve/forums/a/tpc/f/54210655/m/237104021
[17]http://www.gamefaqs.com/boards/647136-the-amazing-spider-man/63372527

6 Predictions about other types of adjuncts: relative clauses

- If English relative clauses have a parse on which they're adjuncts, as suggested by the Freidin-Lebeaux effect...

- ...then our analysis predicts that relative clauses modifying *wh*-phrases should be strandable in the same places as *exactly*-type adverbs.

- This seems to be correct.

6.1 The basic distributional facts

- Like *exactly*, a relative clause cannot be stranded in a VP in which it is followed by two *v*P-internal constituents:

(44) a. Muriel put WHAT that was slimy <u>on the table</u> with great care?!
      b.   Who put what that was slimy <u>on the table</u> with great care?
      c. ?*What did Muriel put · that was slimy · <u>on the table</u> with great care?

- Also like *exactly*, a relative clause can be stranded clause-finally (by hypothesis, in a rightward [Spec,FocP]):

(45) What did Muriel put <u>on the table</u> with great care that was slimy?

6.2 Stranding at the ForceP phase edge

- As we have seen, *exactly* can be stranded in intermediate [Spec,CP]s along the path of *wh*-movement (now [Spec,ForceP]s). A stranded *exactly* cannot immediately <u>follow</u> an intermediate complementizer, though:

(46) a. What do you believe **exactly** (that) everyone said (that) she devoured? (= (9a))
      b. What do you believe (that) everyone said **exactly** (that) she devoured? (= (9b))
      c. What do you believe that (***exactly**) everyone said that (***exactly**) she devoured?

- On our analysis, this indicates that Force is a phase head (and hence [Spec,ForceP] is on the phase edge), but there is no lower phase head in the left periphery with a leftward specifier.

- Stranded relative clauses should behave like *exactly* here. Stranding a relative clause to the immediate left of *that* (in [Spec,ForceP]) should produce a more acceptable result than stranding it to the immediate right of *that* (in a non-phase-edge position)...

- ...though we probably shouldn't expect the good cases to be perfect, since they will involve stranding a heavy constituent sentence-internally.

- The predicted contrasts do indeed exist, and they go in the expected direction:

(47) a.   What that's really valuable did Mary say <u>that</u> Bill should keep locked up?
      b. ?What did Mary say · that's REALLY VALUABLE · <u>that</u> Bill should keep locked up?
      c. *What did Mary say <u>that</u> · that's REALLY VALUABLE · Bill should keep locked up?

(48) a.   Which singer who's really talented did John say <u>that</u> Sue should invite?
      b. ?Which singer did John say · who's REALLY TALENTED · <u>that</u> Sue should invite?
      c. *Which singer did John say <u>that</u> · who's REALLY TALENTED · Sue should invite?

6.3 Stranding at the clause-internal phase edge

- The analysis predicts that stranding a relative clause at the edge of the clause-internal phase should yield a relatively acceptable result.

- If passive and/or progressive *be* are present, the relative clause should have to be stranded to their <u>left</u>.

- If it is stranded to the <u>right</u> of one of these auxiliaries, it will be in a non-phase-edge position; this should be completely unacceptable.

- As predicted, there is a striking contrast between the sentences in (49) and those in (50):

(49) *Relative clause stranding at the edge of the clause-internal phase*

    So tell me...
  a. ?What had John · that was REALLY DIRTY · <u>washed</u> for two hours by then?
  b. ?What had John · that was REALLY DIRTY · <u>been washing</u> for two hours by then?
  c. ?What had already · that was REALLY DIRTY · <u>been washed</u> for two hours by then?
  d. ?What had already · that was REALLY DIRTY · <u>been being washed</u> for two hours by then?

(50) *A relative clause cannot be stranded <u>inside</u> the clause-internal phase (in a non-phase-edge position)*

    So tell me...
  a. *What had John <u>been</u> · that was REALLY DIRTY · <u>washing</u> for two hours by then?
  b. *What had already <u>been</u> · that was REALLY DIRTY · <u>washed</u> for two hours by then?
  c. *What had already <u>been</u> · that was REALLY DIRTY · <u>being washed</u> for two hours by then?
  d. *What had already <u>been being</u> · that was REALLY DIRTY · <u>washed</u> for two hours by then?

7 Conclusion

- The distribution of *wh*-associated adverbs such as *exactly* initially seems bizarre.

- *Wh*-movement can generally target either the whole [WH + *exactly*] adjunction structure or just the *wh*-associate...

- ...but the latter option disappears when the adjunction structure is inside VP.

- In other words, a VP-internal *wh*-phrase can host an adjunct in its base position only if it doesn't move.

- I've argued that these odd distributional facts can be explained if Late Merger of adjuncts is obligatory, in the following sense:

(51) **Obligatory Late Merger of Adjuncts**
    For H a phase head and XP its associated spellout domain (= complement), adjunction within the HP phase occurs immediately before spellout of XP.

- The analysis developed here, which is crucially based on (51), makes correct predictions about a range of cases it was not originally designed for, involving stranding at phase edges (both the ForceP phase edge and the clause-internal phase edge)...

- ...specifically, stranding of both *exactly*-type adverbs and *wh*-associated relative clauses.

- The facts of adjunct stranding, then, deepen our understanding of the precise relative timing of adjunction and other syntactic operations.

- The results of today's investigation suggest that the syntax prioritizes satisfying featural requirements (such as those imposed by selectional features, EPP features, and unvalued features that trigger Agree)...

- ...and only at the last possible minute adds "inessential" or "peripheral" elements (i.e., adjuncts).

8   Appendix A: double extraposition and its implications

8.1   The basic pattern

- In §3.3, I argue that sentences like (52) are unacceptable because when *exactly* appears to have been stranded VP-internally, it is in fact in a high right-peripheral position. I.e., it actually <u>can't</u> be stranded VP-internally.

(52)   *What did Muriel put exactly <u>on the table</u> <u>with great care</u>? (= (15c))

- For this partial analysis to go through, it must be impossible to derive (52) by placing the stranded *exactly* in the right periphery and then extraposing both vP-internal PPs past it, as follows:

(53)   *What did Muriel put __$_i$ __$_k$ **exactly** [on the table]$_i$ [with great care]$_k$?

- Fortunately, there is reason to believe that such a derivation is indeed impossible.

- Apparently, when two vP-internal constituents undergo extraposition/heavy shift, they <u>obligatorily reverse their order</u>:[18]

(54)   a.   Muriel put <u>the extremely heavy iguana</u> <u>on the scratched-up metal table</u> **yesterday**.
         b.   *Muriel put **yesterday** <u>the extremely heavy iguana</u> <u>on the scratched-up metal table</u>.
         c.   Muriel put **yesterday** <u>on the scratched-up metal table</u> <u>the extremely heavy iguana</u>.

- This phenomenon is general:

(55)   a.   Harvey gave <u>his collection of porcelain wombats</u> <u>to the president of Mozambique</u> **today**.
         b.   *Harvey gave **today** <u>his collection of porcelain wombats</u> <u>to the president of Mozambique</u>.
         c.   Harvey gave **today** <u>to the president of Mozambique</u> <u>his collection of porcelain wombats</u>.

(56)   a.   Mrs. Winston sent <u>the incorrigible miscreant in her math class</u> <u>to the ever-feared principal's office</u> **exasperatedly**.
         b.   *Mrs. Winston sent **exasperatedly** <u>the incorrigible miscreant in her math class</u> <u>to the ever-feared principal's office</u>.
         c.   Mrs. Winston sent **exasperatedly** <u>to the ever-feared principal's office</u> <u>the incorrigible miscreant in her math class</u>.

[18]See Jayaseelan (1990:66) and Kubota and Levine (2015:11) for some discussion of related issues. I here use the terms *extraposition* and *heavy shift* interchangeably.

8.2 Implications for *exactly*-stranding sentences

- In this connection, consider again the following unacceptable *exactly*-stranding sentences:

(57) a. *What did Muriel put exactly <u>on the table</u> <u>with great care</u>?
   b. *What did Harvey give exactly <u>to the president</u> <u>to annoy you</u>?
   c. *Who did Mrs. Winston send exactly <u>to the principal</u> <u>without a second thought</u>?

- We have just explained (though not as deeply as we would like to) why none of these can be derived by placing *exactly* in the right periphery and extraposing the two final PPs past it.

- Our claim that two *v*P-internal constituents undergoing extraposition <u>must</u> reverse their order predicts that the unacceptable sentences in (57) should become acceptable if the two post-*exactly* constituents are reversed.

- This prediction is correct:

(58) a. What did Muriel put exactly <u>with great care</u> <u>on the table</u>?
   b. What did Harvey give exactly, <u>to annoy you</u>, <u>to the president</u>?
   c. Who did Mrs. Winston send exactly <u>without a second thought</u> <u>to the principal</u>?

8.3 Interspeaker variation

- One fact I haven't mentioned yet: not all speakers require two *v*P-internal constituents undergoing extraposition to reverse their order.

- For example, D. Rudin (2013:1ff.) accepts (59) on a reading on which *a lecture about heavy shift* and *to my classmates* are two separate arguments of *give*:

(59) %I gave with an air of resignation a lecture about heavy shift to my classmates.

(ibid:1, (2); diacritic added)

- This suggests that Rudin does allow derivations like the following:

(60) %I gave $\_i$ $\_k$ **with an air of resignation** [a lecture about heavy shift]$_i$ [to my classmates]$_k$.

- I have claimed that (for speakers like me) sentences like (57a-c) are unacceptable because a stranded almost-clause-final *exactly* must be in the right periphery, and the two PPs cannot extrapose past it while preserving their order.

- In idiolects like Rudin's that do allow order-preserving double extraposition, such sentences should be acceptable. Things look promising for this prediction. Deniz Rudin informs me that, for him, the following two sentences are indeed acceptable:

(61) a. %What did Muriel put exactly <u>on the table</u> <u>with great care</u>?
   b. %What did Harvey give exactly <u>to the president</u> <u>to annoy you</u>?

9 Appendix B: how high is clause-final stranded *exactly*?

- In the derivation in §4.2, clause-final stranded *exactly* ("right-*exactly*") is shown adjoining to *what* in a rightward [Spec,FocP] and being stranded there (by further movement of *what* to a leftward [Spec,ForceP]).

- A possible alternative: Foc doesn't have a rightward specifier in English. Instead, right-*exactly* is at the (right) edge of the *v*P phase.

- This alternative would be in the spirit of Fox and Nissenbaum's (1999/2006) analysis of English adjunct "extraposition" (fn. 8). Although they don't explicitly propose that overt QR targets the <u>*v*P</u> edge as such, this is a natural implementation of their proposal.

- If right-*exactly* can also be analyzed as at the right edge of *v*P, then the number of rightward edges/specifiers of phase heads in English can be kept to one (the *v*P edge) rather than two (the *v*P edge and the FocP edge).

- This alternative is not viable, though. Right-*exactly* is higher than *v*P—in the C-layer, in fact.

9.1 Evidence from *v*P-preposing

- *v*P-preposing can carry along a clause-final manner adverb:

(62)   a. I know that plenty of people would be willing to read that paper superficially. But <u>read it carefully</u>, who would?

   b. No one has ever sung the first song in this book halfheartedly. <u>Sung it enthusiastically</u>, on the other hand, who hasn't?

- . . .or strand it ((63)). (Small caps denote focal stress. For me, the italicized words in (63) must also be pronounced emphatically.)

(63)   a. I know that plenty of people would be willing to read the SMITH paper SUPERFICIALLY. But <u>read the JONES paper</u>, *who would* CAREFULLY?

   b. No one has ever sung the FIRST song in this book HALFHEARTEDLY. <u>Sung the SECOND song</u>, on the other hand, *who hasn't* ENTHUSIASTICALLY?

- But right-*exactly* cannot be carried along by *v*P-preposing. Instead, it must be stranded:

(64)   I know that plenty of people like to eat tomatoes.
   a.   But eat peppers, who would exactly?
   b. *But eat peppers exactly, who would?

(65)   I'm well aware that no one has ever yodeled in the big library.
   a.   But yodeled in the small library, who hasn't exactly?
   b. *But yodeled in the small library exactly, who hasn't?

- This suggests that right-*exactly* is not at the right edge of *v*P, but higher.

9.2 Evidence from sluicing

- Right-*exactly* can survive sluicing, as shown in (66a-c).[19] (These sentences have an elevated ring to them, as is typical of sentences in which a sluicing site is followed by overt material in the same clause.)

(66) a. What should we read TODAY to impress our ENGLISH teacher? And what ~~should we read~~ TOMORROW exactly, to impress our GERMAN teacher?[20]

  b. Which dishes did he order with great gusto without worrying about their prices? And which ~~did he order~~ with TREMENDOUS gusto exactly, without even THINKING about their prices?

  c. When did she visit the Atlantic Ocean despite her fear of water? And when ~~did she visit~~ the ARCTIC CIRCLE exactly, despite her fear of SNOW?

- Since sluicing elides at least TP, right-*exactly* must be higher than TP.

10 References

Bell, Taylor. 2012. "The (In)visibility of Adjunction Hosts in the Syntax." M.A. thesis, University of California, Santa Cruz.

Bošković, Željko. 2004. "Be Careful Where You Float Your Quantifiers." *Natural Language and Linguistic Theory* 22: 681-742.

Fox, Danny. 2002. "Antecedent-Contained Deletion and the Copy Theory of Movement." *Linguistic Inquiry* 33.1: 63-96.

Fox, Danny, and Jon Nissenbaum. 1999. "Extraposition and scope: A case for overt QR." *Proceedings of the 18th West Coast Conference on Formal Linguistics.* Ed. Sonya Bird, Andrew Carnie, Jason D. Haugen, and Peter Norquest. Somerville, MA: Cascadilla Press. 132-44.

Fox, Danny, and Jon Nissenbaum. 2006. "Extraposition and scope: A case for overt QR." In *Syntax: Critical Concepts in Linguistics.* Ed. Robert Freidin and Howard Lasnik. London: Routledge. 51-64.

Harwood, William. 2015. "Being progressive is just a phase: celebrating the uniqueness of progressive aspect under a phase-based analysis." *Natural Language and Linguistic Theory* 33: 523-73.

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[19] In these sentences, the right-peripheral *exactly* is followed by an adjunct to ensure that it is not an instance of the non-*wh*-associated focus-sensitive adverb *exactly* shown in (1):

(1) a. An EXCELLENT student didn't read Goethe exactly.

  b. A GOURMAND didn't order the dishes with tremendous gusto exactly.

  c. A VALIANT EXPLORER didn't visit the Arctic Circle exactly.

The post-*exactly* adjuncts in (66) eliminate this possibility because they cannot follow focus-sensitive *exactly* ((2)), which apparently has a strong affinity for absolute clause-final position:

(2) a. *An EXCELLENT student/*BETHANY didn't read Goethe exactly(,) to impress our German teacher.

  b. *A GOURMAND didn't order the dishes with tremendous gusto exactly(,) without even thinking about their prices.

  c. *A VALIANT EXPLORER didn't visit the Arctic Circle exactly(,) despite her fear of snow.

[20] The phrases elided in (66) are remnant constituents, as the struck-through text should make clear.

Jayaseelan, K. A. 1990. "Incomplete VP Deletion and Gapping." *Linguistic Analysis* 20 (1-2): 64-81.

Kubota, Yusuke and Robert Levine. 2016. "Pseudogapping as pseudo-VP ellipsis." To appear in *Linguistic Inquiry*. Available online at ⟨http://ling.auf.net/lingbuzz/002504⟩.

Larson, Richard K. 1988. "On the Double Object Construction." *Linguistic Inquiry* 19.3: 335-91.

Larson, Richard K. 1990. "Double Objects Revisited: Reply to Jackendoff." *Linguistic Inquiry* 21.4: 589-632.

Lebeaux, David. 1991. "Relative Clauses, Licensing, and the Nature of the Derivation." *Syntax and Semantics* 25: 209-29.

Nissenbaum, Jon. 1998. "Derived Predicates and the Interpretation of Parasitic Gaps." *Proceedings of the 17th West Coast Conference on Formal Linguistics.* Ed. Kimary Shahin, Susan Blake, and Eun-Sook Kim. Stanford, CA: CSLI Publications. 507-21.

Rizzi, Luigi. 1997. "The Fine Structure of the Left Periphery." *Elements of Grammar: A Handbook of Generative Syntax.* Ed. Liliane Haegeman. Dordrecht: Kluwer. 281-337.

Rudin, Deniz. 2013. "Heavy NP Shift as Post-Syntactic Phrasal Shunting." Manuscript, University of California, Santa Cruz.

Sauerland, Uli. 1998. *The Meaning of Chains.* Ph.D. dissertation, MIT.

Stepanov, Arthur. 2000. "The Timing of Adjunction." In *Proceedings of NELS 30.* Ed. Masako Hirotani, Andries Coetzee, Nancy Hall, and Ji-Yung Kim. Amherst, MA: GLSA. 597-611.

Stepanov, Arthur. 2001. "Late Adjunction and Minimalist Phrase Structure." *Syntax* 4.2: 94-125.

Stroik, Thomas. 2009. *Locality in Minimalist Syntax.* Vol. 51. Cambridge, Massachusetts / London, England: The MIT Press. Linguistic Inquiry Monographs.

Urban, Emily. 1999. "*Exactly* stranding." M.A. thesis, University of California, Santa Cruz.