Too Heavy to Move: an analysis of heavy noun phrase shift and related phenomena

Ling 491 Senior Essay · Zhipeng (Nick) Huang

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Abstract

Heavy noun phrase shift refers to the phenomenon where a "heavy" noun phrase (NP) is displaced to the right of its canonical position. In English, heavy NP shift most commonly refers to the object (in square brackets) being found at the right edge of the sentence, to the right of indirect objects, adverbs, prepositions, etc.

(1)   I gave _ to the students [presents that I had brought back from Spain].

(2)   Romeo drank _ yesterday [the poison that he bought from the apothecary].

Despite the name, heavy NP shift does not cause the rightward movement of all heavy NPs; it turns out that most of the time, only direct objects participate in this phenomenon. For example, indirect objects do not undergo heavy NP shift:

(3)   *I gave _ presents [my neighbors living downstairs and next door].

In this senior essay, I explore Brooke's proposal (2008) that heavy NPs actually do not move rightward, but are found in their original position instead, because they are "too heavy" to move leftward to their usual position. Novel evidence for his proposal from negative polarity items will be provided. I will argue that this *in situ* analysis explains why heavy NPs do not move in certain contexts (such as in (3)). I further claim that the *in situ* analysis at least also accounts for so-called extraposition from objects (4b) and sentential subject extraposition (5b).

(4)   (a) I read a book about Grimm's Law yesterday.
         (b) I read a book yesterday about Grimm's Law.

(5)   (a) [That he ate ten hotdogs] is amazing.
         (b) It is amazing [that he ate ten hotdogs].

Contents

1 Introduction

1.1 When do heavy noun phrases (NPs) move?

Heavy NP shift refers to the phenomenon where a "heavy" noun phrase (or in today's parlance, a determiner phrase) is displaced to the right of its canonical position. In English, heavy NP shift most commonly refers to the object being found on the right edge of the sentence, to the right of indirect objects, adverbs, prepositions, etc.[1]

(6)   (a) I gave _ to the students [presents that I had brought back from Spain].

   (b) Romeo drank _ yesterday [the poison that he bought from the apothecary].

   (c) Romeo drank _ in the room [the poison that he bought from the apothecary].

Curiously, heavy NP shift occurs in fairly restricted circumstances—usually when the noun phrase is the direct object of the verb—even though the name suggests that noun phrases of all syntactic positions can shift, as long as they are "heavy." Heavy NP shift does not take place under the following circumstances:

[1]A note about the marking of gaps and traces: I will use from now on the underscore (_) to mark a position where a constituent (typically in square brackets) is expected. For example,

(i)   I read _ yesterday [a book about Sir William Jones].

implies that the constituent *a book about Sir William Jones* can be sometimes found where the underscore is:

(ii)   I read [a book about Sir William Jones] yesterday.

Using this notation prevents the pre-judgment of whether the constituent has moved from the position of the underscore, or did not move to the position of the underscore.

1. When the heavy NP is the agent of an unergative (7 a) or transitive verb (7 b). Note that the insertion of expletive *there* does not improve the acceptability of such sentences ((7 c) and (7 d)). On the other hand, an indefinite theme NP that is heavy can be placed sentence-finally (i.e., undergo heavy NP shift) if there is expletive *there*, although the resulting sentence can come across as being stilted or archaic (compare (7 e) and (7 f)).

(7)   (a)   *_ Resigned [a/the mayor who was accused of bribing local electoral officials].

      (b)   *_ Ate the pie [three/the students who had been up since 5 a.m.]

      (c)   *There _ resigned [a/the mayor who was accused of bribing local electoral officials].

      (d)   *There _ ate the pie [three/the students who had been up since 5 a.m.]

      (e)   *Fell [a/the boy wearing the blue anorak].

      (f)   There fell three stars from the sky.

2. The subject of passive constructions (bearing a theme theta role) also may not undergo heavy NP shift (8), unless the subject is indefinite and the expletive *there* is placed sentence-initially (9).

(8)   *_ Was appointed as class secretary [a/the student who bribed his acquaintances into voting for him].

(9)   There was caught [a terrorist wanted for bombing a military base].

3. A third impossibility occurs with the indirect object of a double object construction (10 a). Dative constructions with overt prepositions must be used instead (10 b).

(10)   (a)   *I gave _ presents [my neighbors living downstairs and next door].

(b) I gave presents to my neighbors living downstairs and next door.

4. A fourth impossibility occurs with prepositional phrases with what would otherwise be sentence-final adverbs. If the prepositional phrase contains a heavy NP and precedes such an adverb, heavy NP shift is not possible. (If the adverb does not intervene, then it is unclear whether heavy NP shift has occurred. I will assume the null hypothesis that it has not.)

(11) (a) *We should go with _ the next time [the plan that has the lowest likelihood of failure].

(b) *I sent off presents to _ yesterday [my good friends in Belgium].

5. A fifth impossibility occurs with modifiers (eg. *right*, *all*, *completely*) in particle–verb constructions. Particle–verb constructions usually permit the appearance of the noun between the verb and the particle (12 a), or following the particle (12 b). As the noun phrase gets heavier, the less acceptable the former construction (12 c), presumably because it is more difficult to produce or parse the particle as being associated with the verb. Heavy NP shift is almost obligatory in this instance (12 d).

(12) (a) I ate the cake up.

(b) I ate up the cake.

(c) #I ate [the strawberry and chocolate cake with plenty of icing that we baked yesterday] up.

(d) I ate up [the strawberry and chocolate cake with plenty of icing that we baked yesterday].

The particle–verb construction facts above are not too surprising. What is curious is that a modifier intervening between the verb and particle would block heavy NP shift (13 a).

(13) (a) ?*I will look _ right up [Mary and John's mailing addresses].

(b) I will look [Mary and John's mailing addresses] right up.

1.2   Organization of the senior essay

Any model of heavy NP shift has to account for the above set of syntactic facts. This essay will attempt to do so, in section 2, by firstly determining the syntactic structures of a sentence with heavy NP shift, through tests with negative polarity items. After doing so, the syntax of the heavy NP shift—how a heavy NP actually "shifts" in a derivation—will be analyzed. In particular, I will argue for the "too heavy to raise" analysis, first proposed by Brooke (2008). I also try to account for why verb phrases that permit heavy NP shift show islandhood effects, a phenomenon first observed by Wexler and Culicover (1980). The essay will then proceed in section 3 to account for the phenomena listed above. I will also examine if the proposal can be extended to other related phenomena, such as extraposition, in section 4, before concluding in section 5 with the implications of this analysis on syntax and the language faculty.

2   *Too heavy to move*

I assume that English syntax is antisymmetric, as outlined in Kayne (1994), and adverbs are generated as adjuncts that c-command the head of the VP and the object.[2] Such a structure would account for the natural scope of the adverb.

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[2]It is also possible to assume, along the lines of Cinque (1999), that adverbs are generated in the specifier of functional projections that dominate the verb phrase.

(14)

```
                    vP
              ┌──────┴──────┐
              v             XP
              │         ┌────┴─────┐
            read        DP         X'
                     ┌───┘      ┌───┴────┐
                  the book      X        VP
                             ┌───────┴────────┐
                            Adv              V'
                             │          ┌─────┴────┐
                         yesterday      V         DP
                                        │          │
                                      t_read   t_the book
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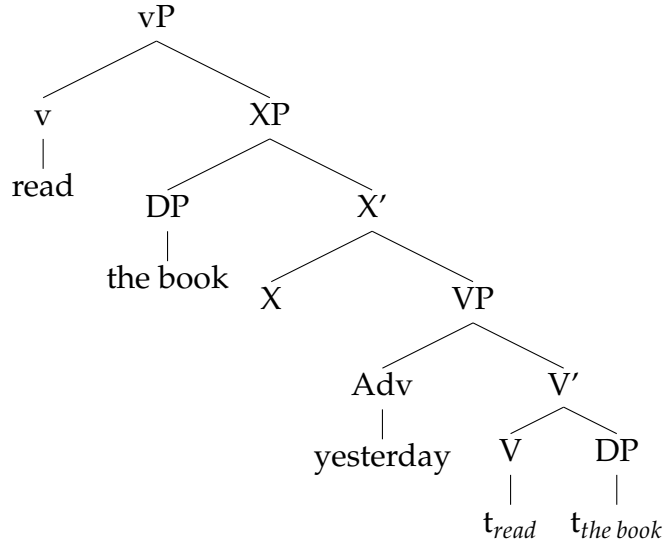
The idea that I pursue in this senior essay is the one first proposed in Brooke (2008), where heavy NPs appear on the right edge of a sentence because they fail to raise, as if they were too heavy to move. This entails adopting a theory of object movement mooted by Johnson (1991) or Bowers (2002), where the verb and object moves across the adverb independently (14). The Verb Object Adverb word order commonly encountered in English is thus a derived order. The motivation of the raising of verb and object is unclear—it is probably not for Case, since heavy NP shift constructions are well-formed even though the heavy NPs do not raise. Regardless of why raising may or may not take place, because a heavy DP is left *in situ*, it appears in its original position, to the right of the adverb. I will also continue to use the term "heavy NP shift" to describe this construction, even though the analysis pursued in this senior essay rules out any kind of rightward movement.

The differences in raising possibilities, and the fact that Minimalist syntactic frameworks do not admit incomplete derivations, mean that we have to posit two different types of verb phrases: one in which the (heavy) NP object obligatorily raises to produce the canonical Verb Object Adverb order, and another where the NP is always left *in situ*.

Brooke builds his case by only pointing out that PP adjuncts to VP may bind heavy

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objects (*I gave to Mary_i the book she_i had always wanted to buy*). In the following sections, I provide additional evidence from negative polarity items (NPIs) in favor of his proposal and Johnson's theory of object movement, in that adverbs appearing sentence-finally are c-commanded by all preceding constituents. I also point out the structural similarities between heavy NP shift and Exceptional Case Marking (ECM) constructions, and elaborate on Brooke's observation that particle–verb constructions provide similar structural evidence for such an analysis of heavy NP shift. Both ECM and particle–verb constructions show that there are two positions available for direct objects in English.

2.1 The structurally-low position of heavy NPs

In this section, I show that a heavy NP is c-commanded by all syntactic constituents preceding it, including adjuncts that otherwise appear sentence-finally. The following is one such example: the negation in the adverb licenses an NPI in the heavy object. (For clearer illustration, in this section, all constituents containing an NPI will be marked with square brackets, while all negation-containing constituents will be underlined.)

(15) The evidence presented so far supports <u>in no way</u> [any of the claims made by the plaintiffs].

I take this to be evidence against the rightward adjunction model where the heavy NP c-commands the clause (16 a) or predicate (16 b); if such structures were the case, then we would expect (15) to be ungrammatical as the NPI is not c-commanded by a negative trigger.

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(15) The evidence presented so far supports <u>in no way</u> [any of the claims made by the plaintiffs].

I take this to be evidence against the rightward adjunction model where the heavy NP c-commands the clause (16 a) or predicate (16 b); if such structures were the case, then we would expect (15) to be ungrammatical as the NPI is not c-commanded by a negative trigger.

(16) (a)

TP
- TP
  - The evidence … supports t_i in no way
- DP$_i$
  - any of the claims …

(b)

TP
- DP
  - The evidence …
- T′
  - T′
    - supports t_i in no way
  - DP$_i$
    - any of the claims …

Next, we consider the position of the object relative to the adverb in canonical Subject Verb Object Adverb sentences. The following examples show that the object c-commands the adverb, since a trigger in the object licenses an NPI adverb.

(17) (a) The evidence presented so far supports <u>none of the plaintiff's claims</u> [in any way].

(b) I saw <u>no one</u> in the house [at all].

(c) Scientists have found <u>no water</u> on Mars [yet].

Even with double object constructions, it appears that the indirect object c-commands the direct object as well as the adverb (18 a). The direct object in turn c-commands the adverb (18 b).

(18) (a) The boss gave <u>no one</u> [any slack at all].

(b) Despite the court order, the company has given their customers <u>no refunds</u> [yet].

Assuming that adverbs are found in the same syntactic position in canonical Subject Verb Object Adverb constructions, and heavy NP shift constructions, we can posit the following c-command relationships (where X > Y means X c-commands Y):

(19) Verb > Indirect object > Direct object > Adverb > Heavy NP

2.2 All VPs that permit heavy NP shift are strong phases

As claimed above, there are two types of verb phrases: one that allows for heavy NP shift (showing Verb Adverb Object word order), and one where the object NP obligatorily raises to produce a Verb Object Adverb order. In this section, I first note that the first set of verb phrases are weak syntactic islands (cf. Wexler and Culicover (1980)), and then argue that all verb phrases that allow for heavy NP shift contain strong phases (in the sense of Chomsky (2001))—even passive and unaccusative ones.

2.2.1 Islandhood of VPs with heavy NP shift

It is usually possible to extract wh-phrases from objects:

(20) What did you read a book about _ yesterday?

However, if the object has undergone heavy NP shift, it becomes impermeable to *wh-*extraction.

(21) (a) *?What did you read yesterday a book about _?

(b) *Who was there banned in China a biography of _?

(c) *Which machine did there arise this morning a problem with _?

This has been cited as evidence in favor of analyzing heavy NP shift as rightward movement, since movement of a constituent apparently causes the "freezing" of the syntactic projection that exhaustively dominates it (Wexler and Culicover (1980)). Because the projection freezes, nothing can be extracted from it. This generalization is not quite true; Ross (1967) and Chomsky (2008) have observed that in passive sentences, it is possible to extract out of subject noun phrases, which in turn have raised from an object position.

(22) Of which car were the hoods damaged by the explosion? (Ross (1967):242)

(23) It was the car (not the truck) of which the driver was found. (Chomsky (2008):147)

One possible solution, mentioned in Chomsky (2001) and hinted at in Brooke (2008), is that the phonology has intervened before syntax can raise the *wh*-phrase (see Chomsky (2001):21, where he discusses Th(ematization)/Ex(traction), his term for what I consider to be heavy NP shift in passives and unaccusatives). Under a cyclic view of linguistic derivation, once the derivation is sent to Spell-Out and given a phonological form, it becomes inaccessible to syntactic operations. This presupposes that heavy NP shift takes place at an early stage of the derivation.

However, Chomsky's analysis is inadequate because it does not capture all the restrictions on extraction from heavy NP shift constructions. Another ban observed by Wexler and Culicover prevents the extraction of the complement of a PP adjunct to the verb phrase—in other words, preposition stranding is not possible. Consider (24 a), which has a canonical word order: extraction of the complement of the PP adjunct turns out to be fine; however, extraction from (24 b), with heavy NP shift, is not.

(24) (a) Who did you buy the 200-page biography of Sir William Jones from _?

(b) *Who did you buy from _ the 200-page biography of Sir William Jones?

Since the PP adjunct is not subject to heavy NP shift, and there is no reason to think that the adjunct has moved, Chomsky's Spell-Out analysis does not account for the ban on preposition stranding. In contrast, Wexler and Culicover's freezing analysis accounts for it, although the freezing principle is more stipulative in nature. They further point out that verb phrases in which heavy NP shift is observed are actually weak syntactic islands. DPs cannot be extracted from these verb phrases, whether they are from the object itself or from adjuncts.

The island effects associated with heavy NP shift, and the lack of island effects in VPs showing canonical word order, is consistent with the hypothesis that there are two types of verb phrases: one in which the object obligatorily raises (which also permits extraction), and one in which the object does not (and extraction is disallowed). In the next section, I will argue that we can replace Wexler and Culicover's freezing account with a phase-based account. This has the advantage of grouping heavy NP shift and the associated island effects with other phenomena that also impose restrictions on movement and agreement, while eliminating the need to appeal to another principle.

2.2.2 XP is a strong phase
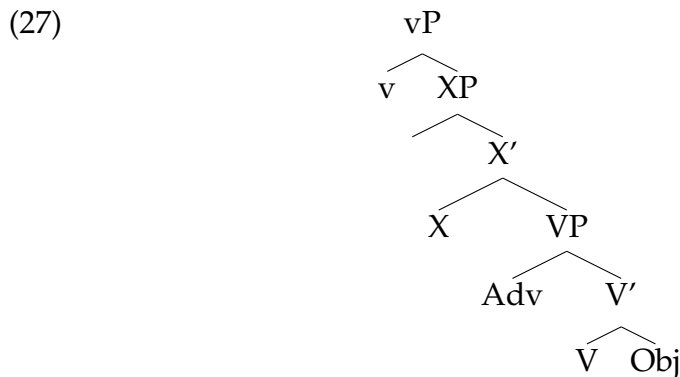
I propose to account for the bans on extraction from a verb phrase with the Phase Impenetrability Condition (PIC). In particular, I claim that XPs that allow for heavy NP shifts are strong phases.

(25) PIC: The domain of H is not accessible to operations at ZP, but only H and its edge, where HP is in the c-command domain of Z, and where HP and ZP are both strong phases. (Chomsky (2001))

(26) $[_{ZP}$ Z $[\ldots [_{HP} \beta [H \alpha]]]$

Taking the edge of a phrase to be the head and its specifier, the PIC effectively states that α, the domain of H, is inaccessible to Z, although β and H itself are. However, under the PIC, α remains accessible to operations from/to other heads that are found between ZP and HP.

Let us consider the interactions between extraction and heavy NP shift. Assume that extraction in the form of *wh*-movement and topicalization is due to features on a structurally high head, such as C. I have previously argued that heavy object DPs and adverbs are generated in VP, and that the verb moves from V to v, possibly via X. Hence, the overall structure of a vP would resemble the following:

(27)

```
              vP
             /  \
            v    XP
                 / \
                  X'
                 /  \
                X    VP
                    /  \
                  Adv   V'
                       / \
                      V   Obj
```

Assume further that XPs are always strong phases only in heavy NP shift constructions, while they are not strong phases elsewhere. If so, the PIC can account for the lack of *wh*-movement of arguments[3] in heavy NP shift constructions with active transitive verbs (28 a).

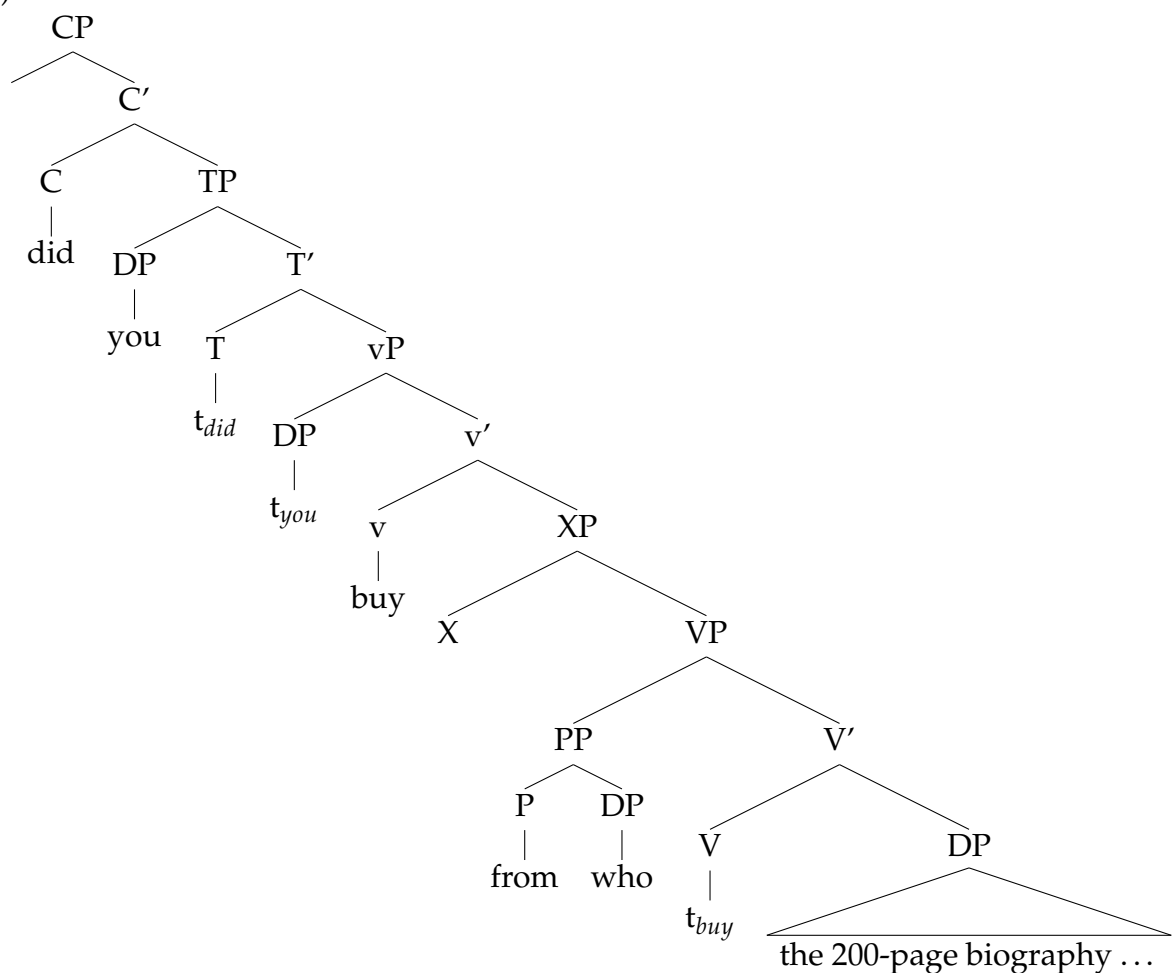There are three strong phases in such constructions: CP, vP and XP (28 b). In addition to being a strong phase, vP is usually thought of as having features that trigger *wh*-raising

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[3]It is crucial to distinguish between adjuncts and arguments, since adjuncts can be extracted with ease from heavy NP shift constructions, such as *From who did you buy yesterday _ the 200-page biography of Sir William Jones?*

to Spec,vP, because, if it did not, then *wh*-phrases in object position would never raise to the edge of vP to become accessible to raising from C to Spec,CP. Under heavy NP shift, because X is also the head of a strong phase (albeit without *wh*-raising features), the domain of XP becomes inaccessible to v, according to the PIC. Hence, the *wh*-raising features on v and C fail to cause *wh*-phrases in the domain of XP to raise.

(28) (a) *Who did you buy from _ the 200-page biography of Sir William Jones?
      (b)

CP
└ C′
  ├ C
  │ └ did
  └ TP
    ├ DP
    │ └ you
    └ T′
      ├ T
      │ └ t*did*
      └ vP
        ├ DP
        │ └ t*you*
        └ v′
          ├ v
          │ └ buy
          └ XP
            ├ X
            └ VP
              ├ PP
              │ ├ P
              │ │ └ from
              │ └ DP
              │   └ who
              └ V′
                ├ V
                │ └ t*buy*
                └ DP
                  └ the 200-page biography …

By allowing for syntactic operations at an intermediate level between two strong phases to operate on the lower phase, the PIC also allows for an easy explanation of number and person agreement in heavy NP shift in unaccusative or passive constructions, assuming that unaccusative and passive vPs are not strong phases. For instance, in (29), T (*has*) is

able to agree with the theme DP (*a 24-volume set* ...), but C, as the head of a strong phase, will be unable to effect any syntactic operation on VP, which is in the c-command domain of XP. This explains the ungrammaticality of (30), where there is agreement between *be* and the theme argument, but the theme argument cannot undergo *wh*-movement.

(29)
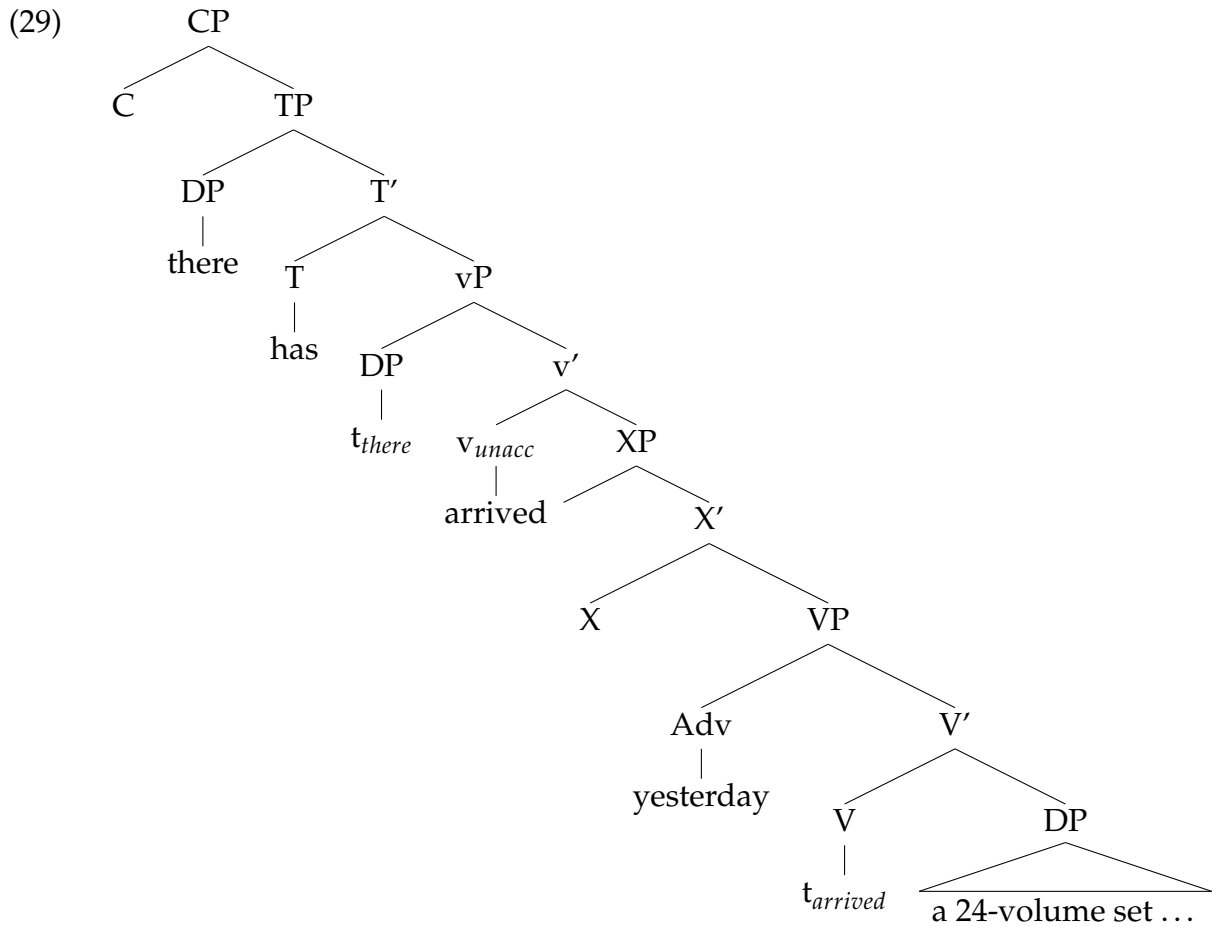
(30)   *What kind of book about Sir William Jones was there bought yesterday?

In short, the locus of heavy NP shift seems to lie in the syntactic properties of X: if there is heavy NP shift, then it can be concluded that X is a strong phase head and is missing an EPP feature.[4] The islandhood of heavy NP shift constructions is also due to XP being a strong phase.

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[4]Another alternative, suggested by Bob Frank, is that XPs are always strong phases. X in regular constructions has a strong *wh* feature, in addition to the EPP feature, that causes *wh*-raising to Spec,XP, which ultimately facilitates *wh*-raising to Spec,CP, while X in heavy NP shift is missing both the EPP and the *wh*

2.3 Supporting evidence from exceptional case marking

Additional support for the raising of objects to produce a canonical word order can also be seen from exceptional case marking (ECM) constructions with adverbs (first noted in Postal (1974)), or from arguments made in favor of an AgrOP projection, to which an object raises in order to get accusative Case. As Bowers (1993) shows, the subject of an embedded clause in an ECM construction is sometimes found preceding an adverb that modifies the ECM verb:

(31)   We proved [Smith] conclusively _ to be the thief. (Bowers (1993):632)

The semantics of such a sentence suggests that the adverb should c-command the verb, which in turn c-commands the embedded clause and its subject. The disparities in the linear order arises due to the independent raising of the verb and the subject noun phrase.

2.4 Particle–verb constructions

Brooke also observes that particle–verb constructions ("phrasal verbs;" p. 7) are another instantiation of the too-heavy-to-move proposal, but did not give specifics, which I will provide in this section. First, note the parallels between the particle–verb examples with a "light" object (a-b) and a "heavier" object (c-d).

(32)   (a) They ate it up.

(b) *They ate up it.

(c) They ate the cake up.

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features. Either way, the analysis depends on having two types of Xs: one with the feature bundle ⟨EPP, not-strong phase⟩ and one with ⟨strong phase⟩ (my analysis), or ⟨EPP, *wh*, strong phase⟩ and ⟨strong phase⟩ (Frank's). There seems to be no easy way to test to see which analysis is technically correct.

(d) They ate up the cake.

(32 a) and (32 b) show that pronouns must appear to the left of the particle. However, (32 c) and (32 d) show that there is no such requirement for noun phrases; in fact, the longer/heavier the noun phrase, the less acceptable it is for it to appear between the verb and the particle.

The grammaticality of (32 d) shows that there is at least another position, right after the particle, in which the object can appear. Since the preceding of a constituent α by another constituent β is a reliable indicator that β c-commands α, this is evidence that the particle c-commands the direct object in (32 d). Hence, the direct object must have originated from a position at least as low as the position it occupies in (32 d), before it moves (under certain circumstances) across the particle.

2.5 Problems with other models of heavy NP shift

2.5.1 Remnant movement analysis does not predict c-command facts...

The too-heavy-to-move analysis of heavy NP shift is quite different from the analysis in den Dikken (1995), which sees heavy NP shift as a combination of movement of the heavy NP, and the later raising of the remnant VP, which contains the adverb.

(33) [read t_j tomorrow]$_i$ [the article ...]$_j$ t_i

If den Dikken's analysis were correct, there would be no c-command relationship between a negative adverb and an NPI object. Furthermore, it is unclear to what position the heavy NP moves.

2.5.2 . . . and neither does Light Predicate Raising

In Larson (1988a,b), heavy NP shift is seen as 'light predicate raising' (Larson (1988b): 347), where V′ raises to a higher position. Consider the following tree for ditransitive constructions:

(34)
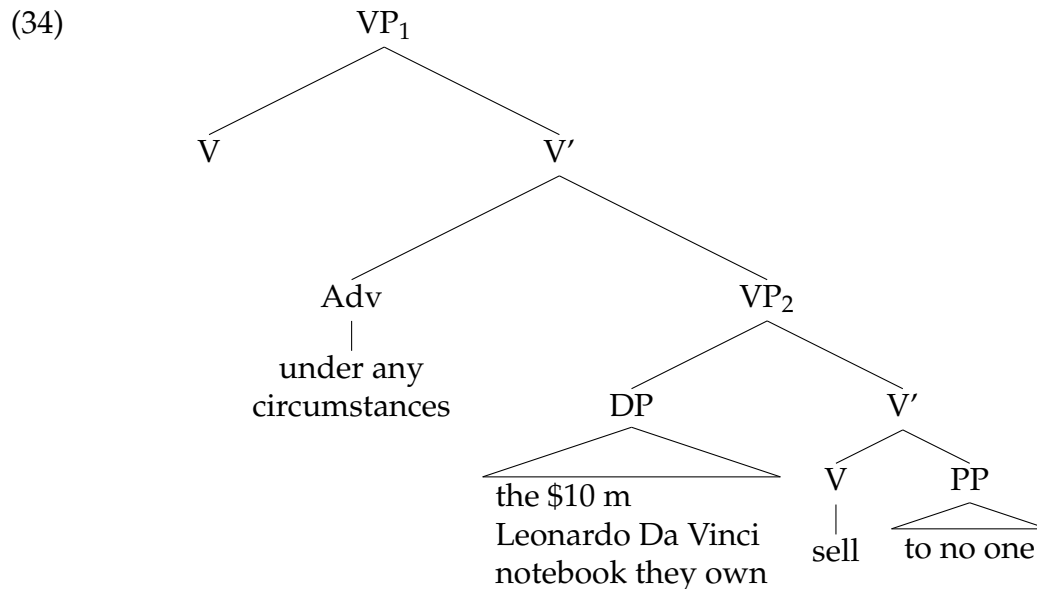
    The heavy NP, *the $10 m Leonardo Da Vinci. . .* , is found on the right edge of the clause because V′ raises. However, as seen in (34), light predicate/V′ raising predicts that the dative *to no one* ends up c-commanding nothing but the verb. Hence a trigger in the dative should not license an NPI adverb (as seen in the Larsonian bracketing in (35)), contrary to fact.

(35)   The family will [sell [to no one]] under any circumstances the $10 million Leonardo Da Vinci notebook they own.

Another difference between Larson's and the present analysis is that Larson's analysis of light predicate raising would only account for heavy NP shift in ditransitive constructions; it would not work for transitive sentences unless one assumes that the theme argument is merged in a specifier position (e.g., Spec,VP$_2$ in (34)) even for transitive verbs.

2.5.3 Parasitic gaps $\not\Rightarrow$ (Rightward) A'-movement

An argument in support for the rightward movement analysis is the observation that heavy NP shift permits parasitic gaps:

(36) I shelved _ without reading [these books about the Sapir-Whorf hypothesis].

A-movement does not license parasitic gaps (37 a), but (37 b) shows that A'-movement may. Hence, the argument goes, heavy NP shift must be a kind of (rightward) A'-movement.

(37) (a) *These books were shelved _ without reading _.

     (b) Which books did you shelve _ without reading _?

However, if we were to follow Nunes (2001) in adopting a copy theory of movement, and dividing A'-movement into sideward movement, responsible for parasitic gaps and across-the-board movements, and the more-conventional "upward" movement, then the facts no longer necessarily support the rightward movement analysis. If so, parasitic gaps do not provide compelling evidence in favor of the rightward movement/adjunction analysis of heavy NP shift.[5]

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[5]However, it is not necessarily the case that Nunes' analysis is the right account for parasitic gaps in heavy NP shift. Under sideward movement, the same noun phrase is copied and merged, resulting in multiple copies. In heavy NP shift with parasitic gaps, we might end up with two copies of the heavy noun phrase DP: one (DP^1) in the adjunct, and one more (DP^2) as the complement of the verb, such that neither copy c-commands the other.

(i)
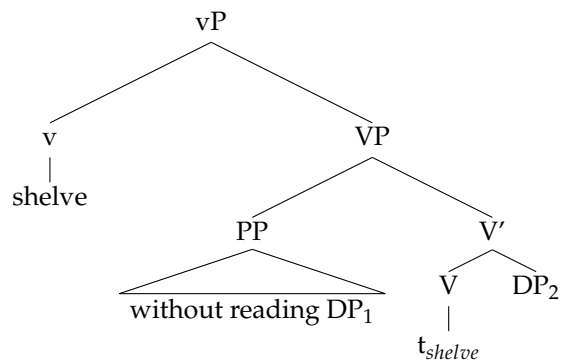
Nunes' solution for parasitic gaps and across-the-board constructions entails forming "chains" of copies that c-command all lower copies in the chain, and then deleting all but one copy in the chain. Leaving aside

2.5.4 Scopal effects

Another argument in support of the rightward adjunction model of heavy NP shift is the observation that a heavy NP tends to take scope over the rest of the sentence, as if it c-commanded the rest of the clause. The following sentences illustrate the differences:

(38) (a) Every student studies two widely-spoken regional languages until eighth grade. (every > two, two > every)

(b) Every student studies until eighth grade two widely-spoken regional languages. (?every > two, two > every)

It seems that this conclusion is in fact too strong. First, it is possible to produce an alternative reading where the lower NP takes scope over the higher one by adding lexical material (39 a). Second, the scopal facts do not agree with the c-command facts. Third, context matters (39 b). These three factors suggest that scope is not simply a function of the c-command relationships between two quantifiers. Consequently, scope should not be taken as strong evidence for c-command relationships.

(39) (a) Every student studies until eighth grade two widely-spoken regional languages of his or her choice.

(b) In Europe, every student studies until eighth grade two widely-spoken regional languages. (not necessarily {English, French}, but possibly {English, French}, {Portuguese, Spanish}, {German, Dutch}, {Italian, Serbo-Croat}...)

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the question of which copy is deleted—there is no easy syntactic test to find out which—it is clear that the chain-forming and deletion mechanisms that work for parasitic gaps and across-the-board constructions are ineffective in heavy NP shift. There is no chain to be formed since DP^1 does not c-commands DP^2, nor vice-versa, and hence deletion cannot occur. Having said that, the process of sideward movement (merging multiple copies of the same constituent) might still be valid for heavy NP shift, although a different theory of chain formation and copy deletion has to be formulated. I leave this topic to future research.

2.5.5 Why a FocusP analysis of heavy NP shift is inadequate

Similar to the remnant movement account of heavy NP shift is an analysis where a heavy NP is actually focused, which accounts for the observation that heavy NPs receive greater intonational prominence in heavy NP shift constructions. In the strongest form of this analysis, there is a focus projection (FocP) between VP and a higher functional projection YP which introduces the adverb. The heavy NP, being focused, raises to Spec,FocP.

(40)

```
                    vP
                ┌────┴────┐
                v         YP
                │      ┌───┴───┐
              read   Adv       Y′
                      │     ┌───┴────┐
                  yesterday Y       FocP
                              ┌──────┴──────┐
                             DP            Foc′
                          ┌───┴───┐     ┌───┴───┐
                    a book about …    Foc      VP
                                             ┌──┴──┐
                                             V     DP
                                             │     │
                                          t_read  t_a book…
```
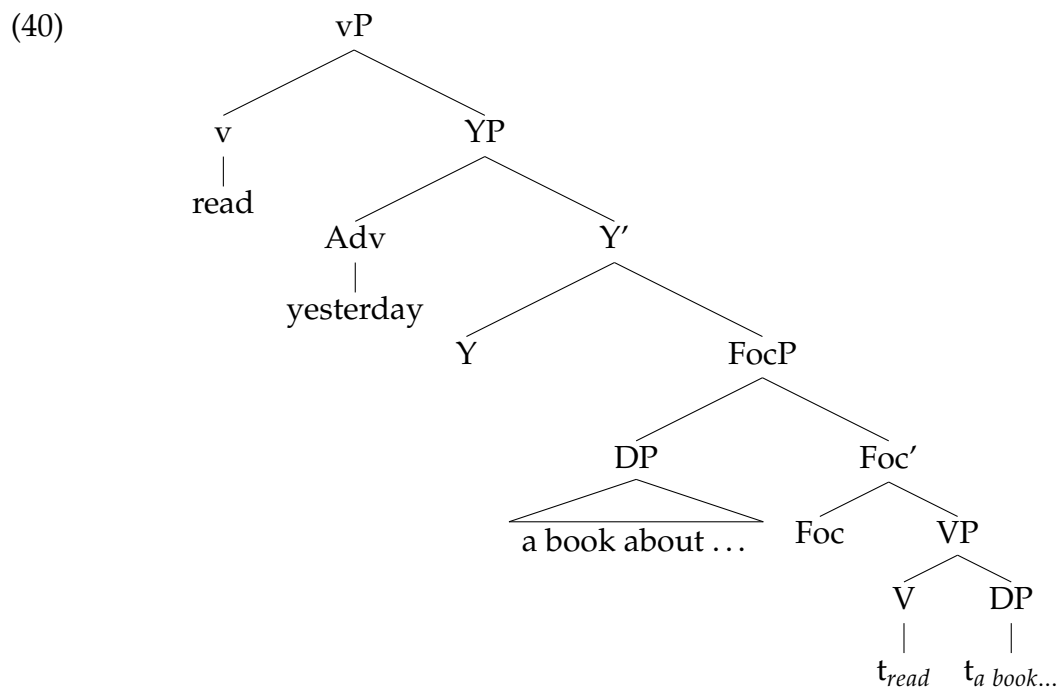
There are several theoretical problems with this analysis. First, because it requires additional functional projections, it is more complicated, and hence less desirable, than the analysis in (14), where the heavy NP is left *in situ*. Second, influential syntactic accounts of focus tend to have FocP in a relatively high structural position, dominating TP (Rizzi (1997)) or (the equivalent of) vP (see Belletti and Shlonsky (1995) and Belletti (2001) for focused subjects in Italian, among others): a low FocP dominated by vP, as in (40), is seldom encountered in the literature. Third, the FocP analysis of heavy NP shift does not predict all possible readings of a given sentence. Consider the following heavy NP shift

sentence:

(41) John only introduced to Mary [the students from Germany and France].

If we claim that under heavy NP shift, the heavy NP *the students from Germany and France* is focused, then the focus adverb *only* should apply only to the heavy NP, but not other NPs. That is to say, (41) would be true if and only if Mary met the students from Germany and France, but she did not meet students from other countries. However, other readings are available: for example, (41) is true if only Mary (and not Tom, Peter, Sally …) met the students from Germany and France. The FocP analysis does not predict the existence of this reading, since *Mary* is not expected to be raised to Spec,FocP.[6] A third unexpected reading is the reading that *the only thing that John did was to introduce the students from Germany and France to Mary*, where the entire verb phrase is focused.[7]

The various issues raised in the paragraphs above suggest that a focus-centered analysis of heavy NP shift is inadequate.

3 Accounting for phenomena: Why certain heavy NPs do not move

In this section, I extend the "too-heavy-to-move" analysis to explain ungrammatical instances of heavy NP shift. I argue that some of these instances of ungrammaticality arise because the NPs are never found in a structurally low position that corresponds to the right edge of a sentence.

---

[6]This is not a problem if both *Mary* and *the students from Germany and France* are raised to specifier positions of FocP, but it is unclear to me if there could be multiple foci in a single utterance.

[7]This reading implies that John did not do anything else, such as, tell Mary what the students' research projects were about.

3.1 Subjects

By treating heavy NP shift as leaving behind NPs *in situ*, and not the rightward movement of a heavy NP, it becomes possible to explain why in many instances heavy subject NPs are not found close to the right edge of a sentence. As external arguments, these subjects are generated in a specifier position, to the left of the verb, and hence, outside of XP. Because X alone determines whether an NP in its domain undergoes heavy NP shift, external arguments are never found sentence-finally in the same way internal arguments sometimes are. Only if the verb phrase raises across the subject would we expect to see the subject in a sentence-final position. Since verb phrases do not typically move, subjects are rarely found on the right edge.

(42)   *(There) _ ate the pie [twelve/the students who had been up since 5 a.m.]

In passive and unaccusative constructions, it is possible to obtain sentences with the expletive *there* if the heavy NP is indefinite. I consider such sentences to be manifestations of heavy NP shift as well, as what would otherwise be a subject noun phrase appears sentence-finally.

(43)   (a) There arrived in England [a brooding and suicidal Danish prince].

       (b) There were tasered on the dance floor [several drunk and rowdy students].

(44)

```
                        TP
             ┌──────────┴──────────┐
            DP                     T′
             │            ┌────────┴────────┐
          There           T                vP
                          │        ┌────────┴────────┐
                        were      DP                 v′
                                   │         ┌────────┴────────┐
                                t_there     v_passive          XP
                                             │          ┌───────┴───────┐
                                          tasered       X              VP
                                                              ┌─────────┴─────────┐
                                                             PP                   V′
                                                        ┌─────┴─────┐        ┌─────┴─────┐
                                                    on the dance floor       V          DP
                                                                             │
                                                                         t_tasered   several drunk
                                                                                     and rowdy students
```
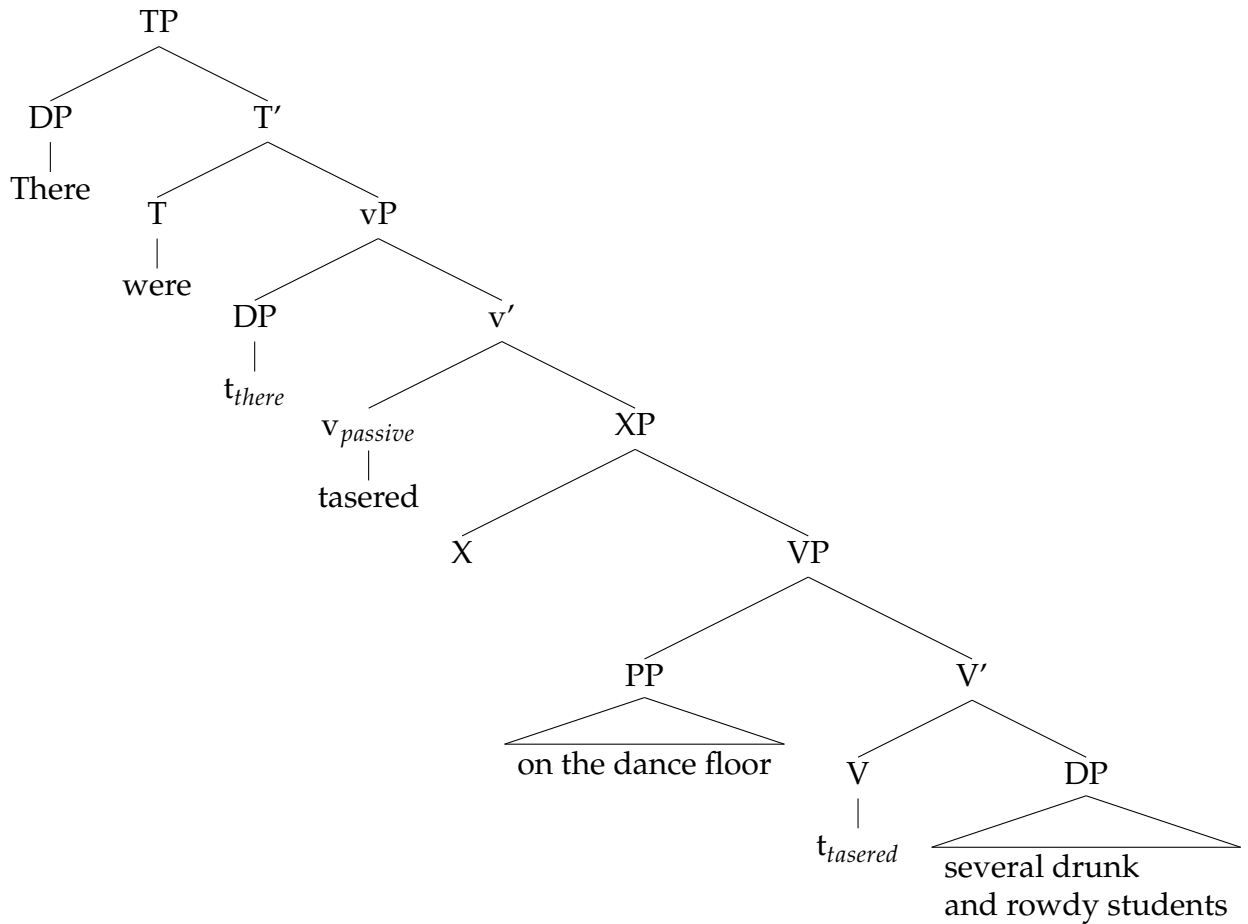
The unaccusative and passive examples thus provide evidence that, first, subjects of unaccusative and passive sentences originate from a position to the right of the verb; second, an EPP feature causes the raising of these arguments to their canonical position; third, when there is an expletive *there* that fulfills the EPP feature, the argument does not raise at all, instead remaining in its original position to the right of the verb.

However, expletive insertion is not attested in transitive or unergative constructions:

(45)   *There have [three/the students who had been up since 5 a.m.] eaten the pie.

(46)   *There have [twenty/these police chiefs from various parts of the country] resigned in protest of the new laws.

The ban on transitive expletive constructions in English has been discussed in the litera-ture; one influential account for it is found in Bowers (2002). According to this analysis, expletives are merged in the vP, and are then raised to Spec,TP. Because English expletives are "quasi-arguments," they can be merged as if they were agent arguments, in Spec,vP (specifically in his proposal, in Spec,PredicateP). Because it is presumably not possible to have two arguments—an expletive and the actual argument—in the same syntactic posi-tion, it is not possible to derive something like (45) or (46).

3.1.1 Predicate–Subject word order in infinitival and small clauses

However, external arguments do appear after the verb in embedded infinitival and small clauses.

(47) (a) I consider _ an idiot [any person who tries to touch the electrified fence].

   (b) Journalists described _ as inadequate [the rescue efforts organized by local authorities in response to the earthquake].

   (c) I find _ to be very useful [the 30-page guide on how to use LATEX].

   (d) We chose _ to be class president [the overzealous and resume-padding student].

The ordering of the constituents in the embedded clause can be accounted for via predicate fronting (48 a), or by rightward movement of the subject within the embedded clause (48 b).

(48) (a) I consider [an idiot]$_i$ any person who tries to touch the electrified fence t_i.

   (b) We chose t_i to be class president [the overzealous and resume-padding student]$_i$.

25

We can rule out the model where the heavy NP adjoins to the right edge of the main clause, by observing that the heavy NP subject does not end up c-commanding the matrix subject, as it would if adjoining did happen: if that were true then we should expect a Principle A (All reflexives are bound) violation in (49 a), and see (49 b) as grammatical.

(49) (a) The two governments$_i$ see as idiots [each other$_i$'s prime minister and president].

(b) *Each other$_i$'s government regard _ as threats [the two countries with a territorial dispute]$_i$.

The grammaticality of (50) suggests that either there is predicate fronting, or the subject has moved to the right edge of the embedded clause. The heavy NP subject, in square brackets, seems to c-command the reflexive that precedes it. Given the lack of lexical and functional material in small clauses, it is difficult to find tests that show whether the predicate has fronted (where the grammaticality comes from reconstruction effects) or the subject has undergone rightward movement (where the grammaticality comes from c-command). However, it should be noted that the predicate fronting account provides an alternative to the rightward movement analysis of heavy NP shift.

(50) The police considers to be/as each other$_i$'s enemies [the two feuding Mafia families]$_i$.

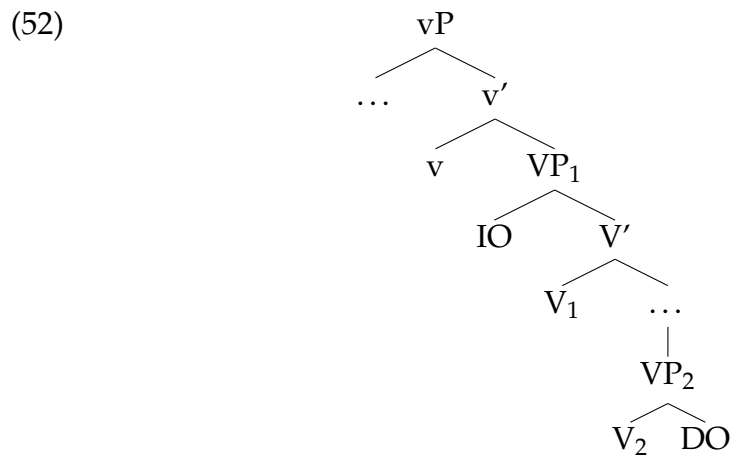## 3.2   Indirect objects in double object constructions

We also observe that heavy NP indirect objects in double object constructions are never found at the end of sentences:

(51) *I sent _ my answers [the professor and the teaching assistant].

One possible explanation is that this sentence is syntactically well-formed, but comes across as infelicitous as it has another possible reading in which a set of answers is the recipient of two humans.

A syntactic analysis is also possible. Here, I adopt a nested VP analysis of double object constructions (Aoun and Li (1989), Harley (2002), among others). (52) represents the underlying structure, before movement takes place. The verb eventually raises to v, which explains the linear order of constituents.

(52)

```
                        vP
                      /    \
                   …         v′
                           /    \
                         v        VP₁
                               /      \
                            IO         V′
                                     /    \
                                  V₁        …
                                            |
                                          VP₂
                                         /    \
                                       V₂      DO
```

(51) is only odd because we presume that the heavy I(ndirect) O(bject) *the professor and the teaching assistant* has been left in its base position, while the D(irect) O(bject) *my answers* has raised across it. Instead, I propose that the eventual landing site of DO—presumably Spec,XP—is an intermediate position between IO and V_2.[8] Because the eventual landing site of DO is still in the c-command domain of IO, it is not possible for a heavy IO to appear after the DO under any circumstances.

3.3 Complements of PPs

Heavy NP complements of prepositions do not move:

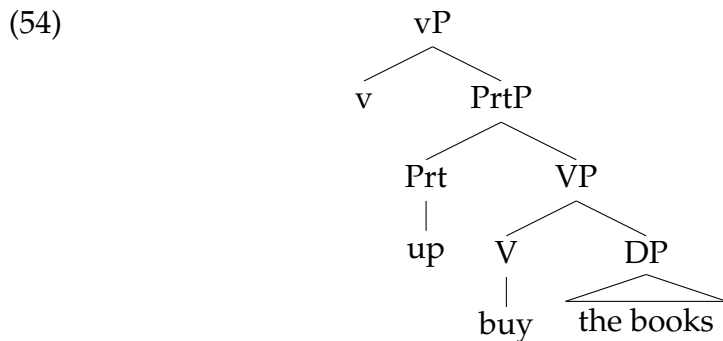[8]It is not inconceivable that IO eventually raises as well, but whether it does or not is irrelevant here.

(53) *I sent off presents to _ yesterday [my good friends in Belgium].

The framework adopted in this senior essay rules out rightward movement of constituents. Hence, to derive a sentence like (53), one would have to generate the prepositional phrase, and then have the head move to a higher position. Alternatively, the heavy NP would have to raise to a slightly higher position, before the remnant prepositional phrase, containing the trace of the heavy NP, raises to its ultimate position. Both scenarios do not seem to have sound syntactic motivations behind them. Hence, such movements are most likely impossible, which explains the ungrammaticality of the resulting constructions.

3.4   Direct objects of Verb-Modifier-Particle constructions

As has been noted before, heavy NPs in particle–verb constructions tend to get displaced to the right. However, when the particle is preceded by an adverbial modifier, no heavy NP shift is permitted.

I use a variant of Nicol's (2002) analysis of particle–verb constructions, where the particle originates in a position (Prt) higher than the verb. The verb–particle order is obtained when V moves to v (perhaps first through Prt, forming a V-Prt complex).

(54)

```
                    vP
                 /     \
                v       PrtP
                      /     \
                    Prt      VP
                     |      /    \
                    up    V       DP
                          |      / \
                         buy   the books
```

A conventional analysis might treat the modifier as an adverb, since the modifier adds description to the event. However, note that the class of modifiers is very small (e.g.

right, *all*, *partway*, *plumb*, the last two being somewhat dialectal in distribution), and does not include most adverbs, since adverbs are usually not allowed between the verb and the particle. Conversely, the modifiers are usually not found in sentence-final positions, unlike most adverbs (55).[9]
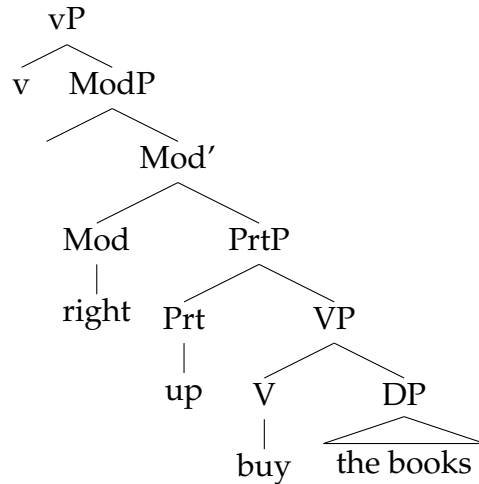
(55) (a) They bought the books right up.

(b) They ate the cake all up.

(c) *They bought the books up right.

(d) *They ate the cake up all.

(e) *They bought the books quickly up.

(f) *They ate the cake hungrily up.

(g) They bought the books up quickly.

(h) They ate the cake up hungrily.

These modifiers form a very small and closed class of morphemes. This and their unique syntactic distribution suggest that these modifiers are not adverbs, but heads of syntactic projections that take PrtP as complements (56). The c-command relationship then accounts for the scopal relationship between the modifier and the particle–verb construction.

---

[9]Known exceptions are *completely* and *partway* (Jackendoff (2002)).

(56)

```
                          vP
                        /    \
                       v     ModP
                             /    \
                           Mod'
                          /     \
                        Mod      PrtP
                         |      /    \
                       right  Prt     VP
                               |     /   \
                              up    V      DP
                                    |     /    \
                                   buy   the books
```

Claiming that modifiers are actually heads will allow us to attribute to these modifiers the syntactic feature that make the fronting of NPs obligatory: the EPP feature. Hence, heavy NP shift/leaving NPs *in situ* is not possible.

4 Extending the *in situ* hypothesis to other phenomena

If heavy NP shift is simply the stranding of a noun phrase in its base position, it seems reasonable to conjecture that other constituents might be left *in situ* in similar positions. In this section, I provide evidence from extraposition that supports this hypothesis.

4.1 Extraposition in complex noun phrases

Similar to heavy NP shift, extraposition also involves constituents being found in non-canonical positions. Extraposition most commonly occurs in complex noun phrases, as the following examples show:

(57) (a) A girl who wore a bright green dress entered.

(b) A girl _ entered [who wore a bright green dress].

(c) I read a book about Grimm's Law yesterday.

(d) I read a book _ yesterday [about Grimm's Law].

It seems to be the case, from (57 b) and (57 d), that internal arguments bearing a theme theta-role can undergo extraposition. On the other hand, external arguments inconsistently undergo extraposition: it is not possible with definite external arguments (58 a), but fine with indefinite ones (58 b). That said, even with indefinite external arguments, the choice of the internal argument also apparently matters (58 c).

(58) (a) *The woman _ sued the man [who was almost run over by his car].

(b) A woman _ sued the man [who was almost run over by his car].

(c) ?A woman sued me [who was almost run over by my car].

Ziv and Cole (1974) suggest that these disparities are due to the role of the extraposed element in the discourse; for example, a constituent is extraposed if it is "assertative;" if it is not clearly relevant, and hence "appositive," or if it is a proper name, it cannot be extraposed (p. 773) (see also Ziv (1975)). Since these constraints appear to be outside of the domain of syntax, I will not discuss them further. However, I will discuss the syntactic issues related to extraposition from subject noun phrases in section 4.3.1.

4.1.1 Internal-Ex

For the lack of a catchier name, let us call extraposition from internal arguments, Internal-Ex(traposition). Like Bianchi (2000) and Henderson (2005), I argue that Internal-Ex is another instance of leaving a constituent in its original position. The evidence for this claim comes from c-command relationships. (59) shows that extraposition is not rightward movement and adjunction to a higher projection, since *the authors* in the extraposed

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constituent does not c-command the associated pronoun *their*, thus violating Condition C (R-expressions must be free).

(59) *I read their$_i$ paper yesterday [where the authors$_i$ claimed to have discovered the secret to everlasting youth].

Similarly, tests involving NPIs show that the extraposed element is c-commanded by elements preceding it: (60 a) shows that the extraposed element is c-commanded by negation in the main clause, and (60 b) shows that it is c-commanded by the rest of the internal argument that precedes it.

(60) (a) We did not receive any abstracts _ yesterday [on any Austronesian languages].

(b) I saw few people _ yesterday [with any tattoos on their foreheads].

The analysis of noun phrases that is most consistent with the proposal above involves raising the head of the noun phrase away from the rest of it, an analysis promoted in Bianchi (2000) and Henderson (2005). According to this line of inquiry, determiners can form a constituent with just the head of the noun phrase, instead of forming a constituent with the rest of the noun phrase:

(61) (a) [[a girl] [who wore a bright green dress]]

(b) [[a book] [*Op* about Grimm's Law]]

Such a proposal for complex noun phrases has a structural parallel in exceptional case marking (ECM) constructions, discussed in section 2.3. As mentioned, ECM constructions sometimes feature a similar paradox in linear order, such that an adverb that modifies the matrix verb appears inside a complex constituent, e.g. *conclusively* within the infinitival clause *the witness to have lied* in (62). Note the structural similarity between (63) and (61 a).

(62)   The DA will prove the witness conclusively to have lied. (Bowers (2002):632)

(63)   [[the witness] [to have lied]]

4.1.2   Extraposed sentential subjects are in a syntactically low position[10]

Sentential subject extraposition results in a heavy clausal constituent on the right edge
(64 b).

(64)   (a) [That human language is so complex] is amazing.

       (b) It is amazing [that human language is so complex].

Similarly, c-command tests show that they are syntactically similar to both Internal-Ex
and heavy NP shift. Specifically, sentential subjects are c-commanded by elements that
precede them. Consider the following control sentences:

(65)   (a) I *(don't) believe [that Mary lifted a finger to help].

       (b) I *(don't) think [that he would ever say such a thing].

NPIs in extraposed sentential subjects are c-commanded by the predicate, showing that
the entire sentential subject is similarly c-commanded. Note that some predicates, such as
surprise and *horrify*, are considered to be licensors, at least because they are also psycho-
logically downward-entailing like other NPI licensors (see Linebarger (1987) for a detailed
exposition).

(66)   (a) It surprised me [that Mary lifted a finger to help].

       (b) It horrified all of us [that he would ever say such a thing].

       (c) It is unlikely [that Mary will lift a finger to help].

---

[10]I am grateful to Larry Horn for pointing out to me the subtleties of NPI licensing.

(d) It is not possible [that he would ever say such a thing].

Another piece of evidence that the sentential subject is syntactically low comes from binding. The ungrammaticality of (67) can be accounted for as a violation of Condition C, which suggests that the experiencer (*him*) c-commands the sentential subject.

(67) *It _ surprised him$_i$ [that John$_i$ failed his exam].

The sentential subject facts here are consistent with the core proposal in this senior essay: that a heavy constituent is found in a syntactically low position. However, they also present another syntactic problem: if the sentential constituent is the subject, why should it be found in a position that is c-commanded by the predicate and the accusative-marked experiencer? For constructions that are compatible with sentential subject extraposition, is there a core structure that is also consistent with Baker's Uniformity of Theta Assignment Hypothesis (1988)?

I argue that there is such a structure, and it is one where the sentential subject originates in a syntactically low position. What appears to be extraposition is simply the sentential subject left in its original position, and the appending of the expletive *it*, analogous to the usage of expletive *there* in passive and unaccusative constructions. First, Alrenga (2005a) points out that subject extraposition is not available for all sentences with sentential subjects: compare the (marginally) acceptable (68 a) with the ungrammatical (68 b). Second, there is no equivalent of a *by*-passive counterpart to such sentences (69 b). Both observations suggest that in extraposition-compatible sentences, the sentential subject is not found in a position similar to that of external arguments or causers, contra the analysis in Schueler (2004):109. Hence, one cannot rule out a scenario where the sentential subject is generated in a position that is c-commanded by the experiencer and the predicate.

34

(68) (a) [That his mother is the judge] doesn't guarantee his acquittal. (Alrenga (2005b))

  (b) *It doesn't guarantee his acquittal [that his mother is the judge].

(69) (a) It surprised John [that Mary was late].

  (b) *John was surprised by [that Mary was late].

4.2   Extraposition of clauses from "direct object position"

Another kind of extraposition of clauses is what Postal and Pullum (1988) call "clausal extraposition from direct object position," where the expletive *it* precedes a clause, and both items are "governed" by the verb (p. 642). Examples of this construction include the following:

(70) (a) I take it [that you will pay]. (Jespersen (1949):63)

  (b) Everyone would prefer it [for you to come early]. (Rosenbaum (1967):53)

  (c) They doubt it (very much) [that he is always late]. (ibid. p. 34)

Superficially, it seems that the clause has been moved to the right of the utterance, and the expletive *it* is left in its original position. For instance, consider a sentence like (71), which is semantically identical to (70 c):

(71) They doubt [that he is always late] very much.

I consider this construction to be similar to Internal-Ex (see section 4.1.1), and in so doing, adopt the proposal of Stroik (1996) that the matrix verb in these constructions is an ECM verb and must assign accusative case to a noun in its complement. Evidence for analyzing the matrix verb as one that assigns accusative case comes from passivization: we observe

that *it* raises to subject position (72 b), just like the subject of the clausal complement of a passive ECM verb (72 a).

(72) (a) He is believed *t* to be the murderer.
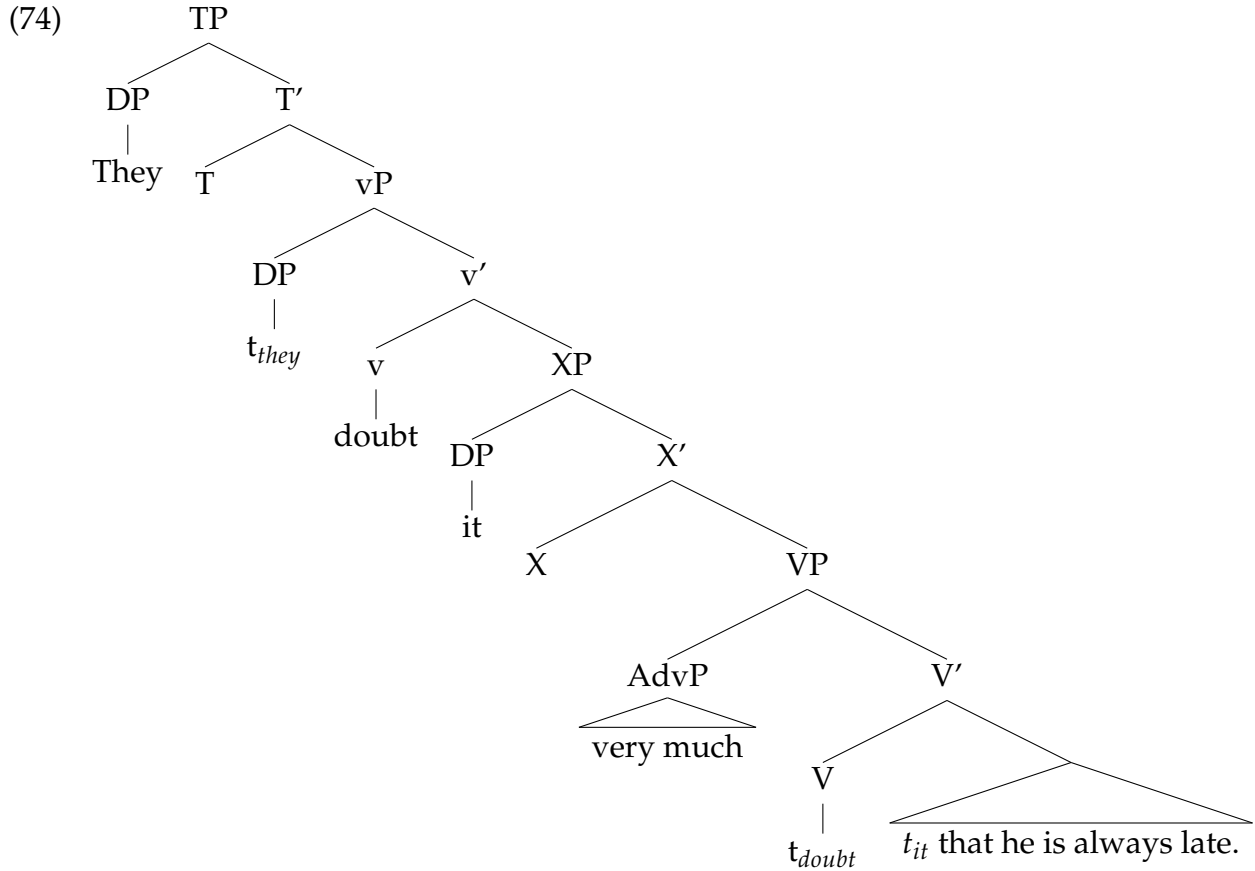
(b) It is preferred *t* for you to come early.

Like Stroik, I further assume that there is a small clause-like constituent that consists of the expletive *it* and the clause,[11] contra Postal and Pullum (1988). That is to say, (70 b) has a structure as bracketed in (73).

(73) Everyone would prefer it$_i$ [t_i [for you to come early]].

By adopting this structure, together with the Johnson-like assumptions about the verb phrase, it becomes possible to account for the word order in (70 c) with the tree in (74). Not only is this analysis consistent with the facts, it also dismantles Postal and Pullum's objection to the "small clause" analysis: that adverbs modifying the matrix verb should not intervene between *it* and the clause, if *it* and the clause form a constituent. As (74) shows, the presence of an adverb between *it* and the clause is due to *it* raising independently to Spec,XP. Considering the fact that the clause that is left *in situ* is probably structurally, if not phonologically, complex, it might make sense to think of this kind of extraposition as another instance of "too heavy to move."

---

[11]Stroik explicitly claims that this constituent is a CP, and *it* is in Spec,CP. However, the status of this constituent is not important to the analysis here.

(74)

```
                    TP
          ┌──────────┴──────────┐
         DP                     T′
          │              ┌──────┴──────┐
        They             T             vP
                             ┌─────────┴─────────┐
                            DP                   v′
                             │           ┌───────┴───────┐
                          t_they         v               XP
                                         │        ┌───────┴───────┐
                                       doubt      DP              X′
                                                   │        ┌──────┴──────┐
                                                   it       X             VP
                                                       ┌──────────────────┴──────────┐
                                                      AdvP                           V′
                                                    △                         ┌──────┴──────┐
                                                 very much                    V             △
                                                                             │        t_it that he is always late.
                                                                           t_doubt
```

4.3 Unexplained cases

4.3.1 External-Ex

There remains a final type of extraposition that is unaccounted for in this analysis: sentences where the modifier of a subject is extraposed or found on the right edge of the sentence, such as those in (75) and (76), where the extraposed constituent is bracketed. Since this kind of extraposition occurs with external arguments of unergative/transitive verbs, I will call it External-Ex(traposition). The binding facts in (76) show that in External-Ex the subject c-commands the extraposed element, as Condition C is not violated.

(75) A man _ met with me [from the secret police].

(76) A boy$_i$ _ failed [who did not do his$_i$ homework].

While (76) is evidence that the extraposed element is not in a structurally-high position (as predicted wrongly by the rightward adjunction model), it seems to suggest that the extraposed element is in a rightward-branching specifier (77). The rightward-branching specifier is unexpected since until now, the theory of heavy NP shift and extraposition developed in this essay has been able to do without any kind of rightward movement and rightward-branching.

(77)
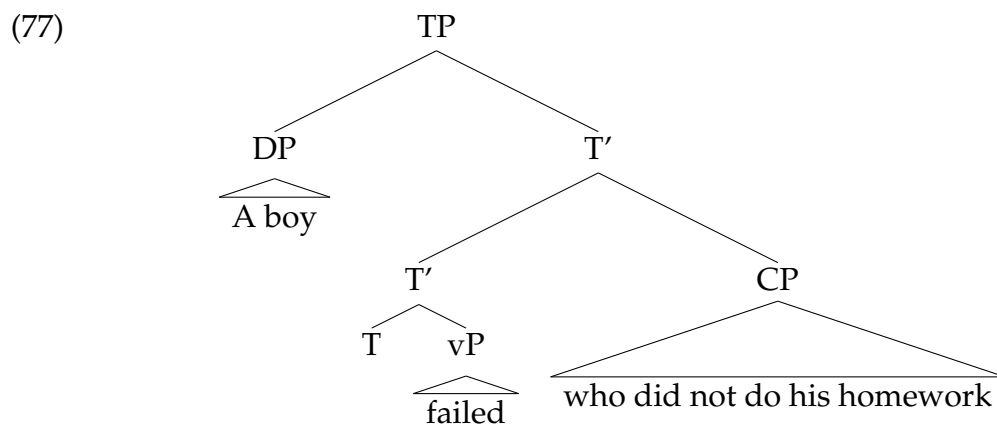
A Kaynian anti-symmetric, leftward-movement analysis might explain the linear order and c-command facts with the following derivation, although such an analysis raises questions about the nature of the functional projections in such a construction, and why these movement operations are necessary:

1. Initial tree: [[$_{DP}$ A boy] [$_{CP}$ who did not do his homework]] [$_{T'}$ failed]

2. T' fronts: [$_{T'}$ failed] [[$_{DP}$ A boy] [$_{CP}$ who did not do his homework]] $t_{T'}$

3. DP raises: [$_{DP}$ A boy] [$_{T'}$ failed] [t_{DP} [$_{CP}$ who did not do his homework]] $t_{T'}$

Another possibility to consider is that External-Ex takes place post-syntactically, in which case (77) does not exist. Consider raising constructions, such as the one in (78 a). It is clear that syntactically, negation (*didn't*) takes place at the matrix clause level, because *ever* in

the embedded clause is licensed. However, *didn't* does not license the extraposed relative clause. It must be that *didn't seem to ever fall sick* forms a single constituent before External-Ex occurs, as in (78 b). In fact, the ungrammaticality persists in sentences with multiple raising predicates (79)—extraposition from a constituent seems to take place only after the constituent has participated in almost all movement operations. Hence, External-Ex is different from the *in situ*-type extraposition that is analyzed in the previous sections, where movement of a heavy constituent fails to take place. The very different nature of this operation suggests that it might be non-syntactic.

(78) (a) *?According to the scientists, people _ didn't seem to ever fall sick [who drank a single drop of the witchdoctor's herbal brew].

(b)

```
                         TP
           ┌──────────────┴──────────────┐
         DP                               │
          │              ┌────────────────┴────────────┐
       People            │                              │
                 ┌────────┴────────┐                    CP
          didn't seem to ever fall sick          ┌──────┴────────────┐
                                        who drank a single drop of his herbal brew
```
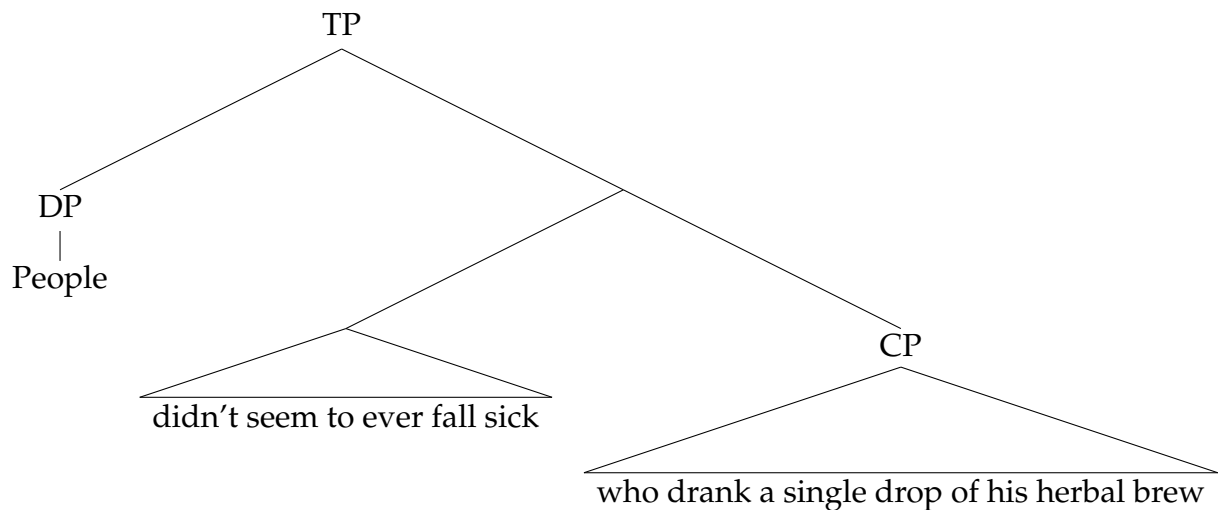
(79) *?People _ are not likely to appear to seem to ... ever fall sick [who drank a single drop of the witchdoctor's herbal brew].

4.3.2 Constraints on which heavy constituents can be left *in situ*

The previous sections have argued that heavy constituents can be raised or left *in situ*; if so, it should be fine for a heavy relative clause or adjunct to be found in Spec,vP or Spec,TP

while the rest of the subject raises. The following examples show that such stranding *in situ* is not possible for the subjects of embedded clauses.

(80) (a) *The man _ wasn't [who was on his way to the concert] robbed (; he was assaulted). (in Spec,vP)

(b) *A man _ seems [who was on his way to the concert] to have been robbed. (in Spec,TP)

(c) *A man _ seems to have [who was on his way to the concert] been robbed. (in Spec,vP)

(d) *The prosecutor proved the woman conclusively [who was arrested by the police] to be guilty. (in Spec,TP)

(e) *The prosecutor proved the woman conclusively to [who was arrested by the police] be guilty. (in Spec,vP)

Note that it is possible for a heavy relative clause or adjunct to be found *in situ*, if it is on the right edge of the sentence; contrast the ungrammatical (80 b) and (80 c) and the grammatical (81). Further, as (82 a) and (82 b) show, the same constituents can be found on the right edge of a nominalized verb as well. These examples suggest that leaving a heavy constituent *in situ* occurs in a limited set of contexts. The generalization seems to be that a constituent *H* can be left *in situ* iff *H* is on the right edge of certain syntactic projections: perhaps one such projection is XP (cf. the tree in (14)), since several other properties of heavy NP shift also seem to center around XP.

(81) A man _ seems to have been robbed [who was on his way to the concert].

(82) (a) [The reading aloud of papers _ last night [about Grimm's Law]] annoyed the neighbors.

(b) [The burning _ last night [of the volume of papers on Grimm's Law]] alarmed the neighbors.

5   Implications about heaviness and universal grammar

If the too-heavy-to-raise proposal of Brooke (2008) and myself is correct, then this suggests several things about the language faculty. First, at least two syntactic phenomena are related to this constraint relating heaviness to raising: Heavy NP shift, as Brooke suggested, as well as sentential subject extraposition, and perhaps to a lesser extent, the clausal extraposition from "direct object position" described in Postal and Pullum (1988). Object extraposition (Bianchi (2000); Henderson (2005)) is less sensitive to heaviness (the object in (83), *an article about John*, is arguably not heavy at all) but has similar syntactic properties as the first two phenomena.

(83)   I saw an article yesterday about John.

Second, whether it is phonological[12] or morphological in nature, heaviness affects syntactic processes. Because the framework adopted here does not admit violations of syntactic processes—features are either checked, or do not exist at all—we must assume that there are at least two types of verb phrases that differ in their featural set: one in which the object noun phrase raises contains an EPP feature, and one in which no such feature exists. Hence, heaviness influences the choice of syntactic objects or features that are introduced in a syntactic derivation.

That said, the relationship between heaviness and raising/not-raising seems to be unclear, and it is also unclear what role the language faculty has exactly in this relationship:

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[12]For example, Brooke argues that it is phonological; I remain agnostic about the nature of "heaviness."

other than the counter-example in (83), which shows that the *in situ* analysis is not solely dependent on heaviness, some languages do not appear to permit heavy NP shift at all, which suggests that the relationship is by no means universal: Kayne (2005), citing others, mentions Haitian and Bambara (p. 222) as two such VO languages. On the other hand, Chinese languages, as observed by Brooke (2008), display Adverb Verb Object order only, and never Verb Object Adverb order, which suggests that object NPs are always left *in situ* regardless of heaviness.

Third, at least in English, heavy constituents tend to be found at the end of clauses; I have claimed that a more accurate generalization is that they are found at the right edge of XP. There is hence something special about this location, which is reserved for heavy constituents; perhaps it is taxing for the listener/speaker to handle a lot of information at the beginning or in the middle of an utterance, since all the information has to be held in short-term memory. Arnold et al. (2000) point out earlier research that show that speakers begin sentences without working out the exact wording.[13] Hence, not raising a heavy NP might buy the speaker more time for production. However, feature-motivated movement can bleed/"override" this strong preference for the right edge.

Lastly, as can be seen on the general prohibition on "shifting" heavy subject NPs, it appears to be not possible to move constituents to the right, although there is really nothing inherently inappropriate about rightward movement to right-branching specifiers. This can be taken as support for the proposal contained in Kayne (1994) that specifiers are generated to the left of heads, assuming that the result of movement is adjunction. The idiosyncratic nature of this ban suggests that it might be related to the language faculty.

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[13]However, this does not imply that they do not work out the syntactic structure of their utterances before beginning.

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