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**A Minimalist Approach to Preposition Stranding and Pied-Piping
in English**

(英語における前置詞残留及び随伴へのミニマリスト・アプローチ)

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**A Minimalist Approach to Preposition Stranding and Pied-Piping
in English**

by
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Abstract

In English, when an object of a preposition is questioned or relativized, there are two choices: whether the *wh*-pronoun is fronted on its own or with other constituents including it. The former is called preposition stranding, while the latter is called pied-piping. Crosslinguistically, it is rare that both preposition stranding and pied-piping are possible in relative and interrogative clauses. Furthermore, English has an interesting history related to these phenomena. Preposition stranding was impossible in Old English except for restricted contexts, but became widely accepted in the course of Middle English. Moreover, pied-piping also shows remarkable distribution in finite and infinitive clauses.

The aim of this thesis is to account for preposition stranding and

pied-piping within the framework of the minimalist program. Chapter 2 is investigates the historical development of preposition stranding in English within the framework of the minimalist program by incorporating the model of cyclic linearization advocated by Fox and Pesetsky (2003, 2005a). It is claimed that preposition stranding is possible as long as there is no ordering contradiction between a preposition and its object. The cyclic linearization approach allows us to explain the facts preposition stranding was allowed only in restricted contexts in Old English, and its range of use was greatly expanded in the course of Middle English. This change in preposition stranding that happened in Middle English is shown to be closely related to the loss of inherent Case assignment by prepositions.

Chapter 3 discusses pied-piping in finite clauses in English. As we saw above, not only PP but also other phrases or categories are available for pied-piping. However, the situation is more complicated. There is a major gap in the acceptability of pied-piping between relative and interrogative clauses. Therefore, it is argued that relative clauses and interrogative clauses are different from each other in the mechanism for pied-piping.

Chapter 4 is devoted to pied-piping in infinitival relative clauses in English. In infinitival relative clauses, an overt relative pronoun can appear only when it pied-pipes a preposition. To give a syntactic explanation to this fact, the syntactic structure of infinitival relative clauses is reconsidered. Based on the revised structure of infinitival relative clauses, it is shown that pied-piping is accepted in infinitival relative clauses by the economy condition on the derivation.

Chapter 5 is the conclusion of this thesis.

Abbreviation

The following abbreviations are used in this thesis:

AP	adjective phrase
CI	conceptual-intentional
CP	complementizer phrase
DP	determiner phrase
FL	the faculty of language
ME	Middle English
OE	Old English
OP	null operator
PP	prepositional phrase
QP	quantifier phrase
SM	sensorimotor
SMT	strong minimalist thesis
Spec	specifier
TP	tense phrase
VP	verb phrase
ϕ/\emptyset	null or abstract element

Chapter 1

Introduction

1.1. General Introduction

In English, when an object of a preposition is questioned or relativized, there are two choices: whether the *wh*-pronoun is fronted on its own or with other constituents including it, which is illustrated by the examples of interrogative clauses and relative clauses in (1) and (2), respectively:

(1) a. Who are they doing it for?

b. [For whom] are they doing it?

(cf. Huddleston and Pullum (2002:627-628))

(2) a. He's the one who I bought it from.

b. He's the one [from whom] I bought it.

(cf. Huddleston and Pullum (2002:627-628))

The former case is termed preposition stranding while the latter case is termed pied-piping, both first introduced by Ross (1967): in (1a) and (2a), the *wh*-pronoun *who* is preposed on its own, leaving the preposition *for/from* 'stranded,' while the preposition *for/from* is 'pied-piped' along with the *wh*-pronoun *whom*, so that the whole PP *for whom/from whom* is fronted.

While English allows a free choice between preposition stranding and pied-piping, such freedom of choice is infrequent crosslinguistically.¹ More concretely, while preposition stranding is rather free in English and the Scandinavian languages, it appears only in restricted contexts in Germanic languages like Dutch and German (cf. van Riemsdijk (1978)). Furthermore, the history of English shows an interesting change about preposition stranding. In short, preposition stranding was impossible in Old English except for restricted contexts, but became widely accepted in the course of Middle English. Such being the case, various explanations have been given for the phenomenon of preposition stranding from both synchronic and diachronic perspectives (Abels (2003), Allen (1980), Amano (1982), Fischer et al. (2000), Hornstein and Weinberg (1981), van Kemenade (1987), Ohkado (1990), van Riemsdijk (1978), among others).

On the other hand, pied-piping also has noteworthy characteristics about its occurrence. First, in addition to PP-pied-piping like (1b) and (2b), various categories can be pied-piped, as illustrated in (3):

- (3) a. She's just sat her final exam, [the result of which] we expect
next week. (pied-piping of DP)
(Huddleston and Pullum (2002: 1040))
- c. The tree, [seated next to which] they found themselves, had
been planted on the highest point in the park. (pied-piping of AP)
(Nanni and Stillings (1978: 311))
- d. In two of them, normal serum concentrations of bile acids have
been attained, [concomitantly with which] there has been

associated improvement in liver function and physical growth.

(pied-piping of AP) (taken from Sharp et al. (1967: 733))

- e. I became disturbed by a ‘higher criticism’ of the Bible, [to refute which] I felt the need of a better knowledge of Hebrew and archaeology. (pied-piping of infinitival categories)
(Huddleston and Pullum (2002: 1043))

However, pied-piping is not applied unlimitedly, as illustrated in (4):

- (4) a. * The men, [for whom to be invited to the elegant parties] was a privilege, were appropriately appreciative.
(pied-piping of infinitival categories with overt subjects)
(Huddleston and Pullum (2002: 1040))
- b. * They bought a car, [that their son might drive which] was a surprise to them. (pied-piping of finite clauses)
(Nanni and Stillings (1978: 311))

There is a good deal of discussion in the literature as to what makes such various kinds of pied-piping possible (Cable (2010a, b), Cowper (1987), Grimshaw (1991, 2000, 2005), Heck (2008, 2009), Honda (1993), Webelhuth (1992), among others). Next, English infinitival relative clauses have a remarkable characteristic about pied-piping. Consider the following examples:

- (5) a. I found an usher to buy tickets from.

- b I found an usher from whom to buy tickets.
- c. * I found an usher whom to buy tickets from.

(cf. Emonds (1976: 192))

- (6) a. I found an usher for Mary to buy tickets from.
- b. * I found an usher from whom for Mary to buy tickets.
- c. * I found an usher whom for Mary to buy tickets from.

(cf. Emonds (1976: 192))

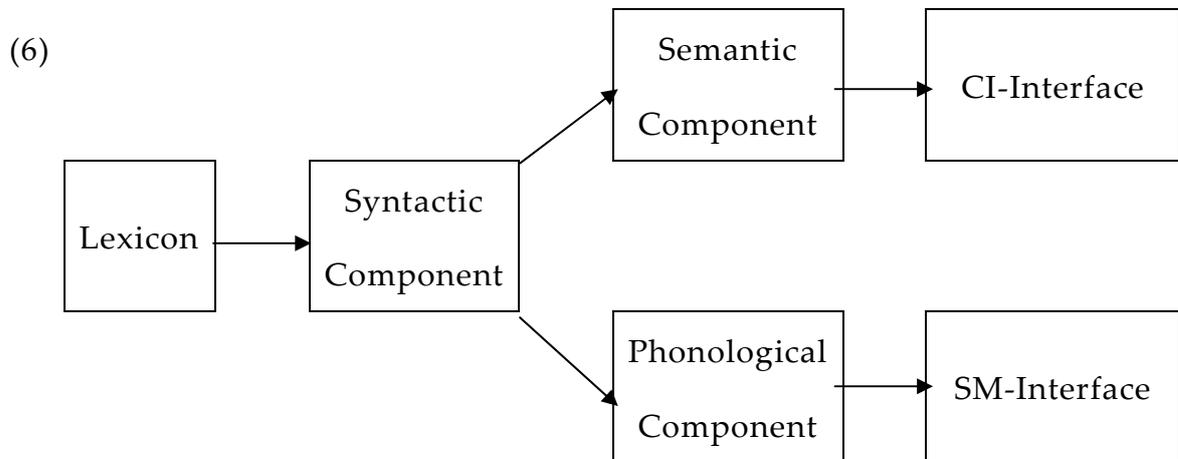
It follows from (5) and (6) that an overt relative pronoun can appear only when it pied-pipes a preposition and at the same time there is no understood subject.

Bearing these properties in mind, I will investigate preposition stranding and pied-piping from synchronic and diachronic points of view, and propose an elaborated analysis of preposition stranding and pied-piping within the framework of the minimalist program by Chomsky (2000, 2001, 2004, 2007, 2008) relying on some theoretical tools by Fox and Pesetsky (2003, 2005a, b) and Pesetsky and Torrego (2001, 2004, 2007) as occasion arises.

1.2. Theoretical Background

Consistently, this thesis adopts the framework of the recent program of the generative grammar, namely, the minimalist program by Chomsky (2000, 2001, 2004, 2007, 2008). He formulates what is called “the strong minimalist thesis (SMT),” which holds that language is an optimal way to link sound and meaning. In the generative grammar, syntax plays an important role in link sound and meaning. The architecture of the faculty of language (FL) is

briefly schematized as in (6):



A lexicon is a dictionary, in which all lexical items and their information about syntax, semantics, and phonology are stored. In generating a sentence, the first step is to form a lexical array by choosing lexical items required to generate the sentence from the lexicon. Next, in the syntactic component, the chosen lexical items are combined together by a series of syntactic computations, thereby forming a syntactic structure. The syntactic structure serves as input into two other components. One is the semantic component, which maps the syntactic structure maps it to the C(onceptual)-I(ntentional) interface; the other is the phonological component, which maps the syntactic structure to the S(ensory)-M(otor) interface. The whole process from lexicon to interfaces is called derivation.

In the syntactic component, the most important operations are Merge and Move. Merge is an operation by which two constituents are combined together to form a single larger constituent. Move is an operation by which a constituent (or its copy) is displaced from one position to another in a

syntactic derivation. More concretely, Move is triggered by another operation, Agree, which establish a relation such as agreement or Case checking between a probe (an unvalued feature) and another instance of the same feature.

1.3. The Organization of This Thesis

The body of this thesis is organized as follows. Chapter 2 investigates the historical development of preposition stranding in English within the framework of the minimalist program by incorporating the model of cyclic linearization advocated by Fox and Pesetsky (2003, 2005a). It is claimed that preposition stranding is possible as long as there is no ordering contradiction between a preposition and its object. The cyclic linearization approach allows us to explain the facts preposition stranding was allowed only in restricted contexts in Old English, and its range of use was greatly expanded in the course of Middle English. This change in preposition stranding that happened in Middle English is shown to be closely related to the loss of inherent Case assignment by prepositions.

Chapter 3 discusses pied-piping in finite clauses in English. As we saw above, not only PP but also other phrases or categories are available for pied-piping. However, the situation is more complicated. There is a major gap in the acceptability of pied-piping between relative and interrogative clauses. Therefore, it is argued that relative clauses and interrogative clauses are different from each other in the mechanism for pied-piping.

Chapter 4 is devoted to pied-piping in infinitival relative clauses in English. In infinitival relative clauses, an overt relative pronoun can appear

only when it pied-pipes a preposition. To give a syntactic explanation to this fact, the syntactic structure of infinitival relative clauses is reconsidered. Based on the revised structure of infinitival relative clauses, it is shown that pied-piping is accepted in infinitival relative clauses by the economy condition on the derivation.

Chapter 5 is the conclusion of this thesis and summarizes the proposals made in each chapter.

Notes to Chapter 1

¹ It should be noted that formality affects the choice between preposition stranding and pied-piping in English. In other words, there is a tendency for preposition stranding to be avoided in the most formal style (Huddleston and Pullum (2002: 628-631)).

Chapter 2

On the Historical Development of Preposition Stranding in English

2.1. Introduction

In Present-day English (PE), preposition stranding is widely attested in a number of contexts such as *wh*-interrogative clauses, relative clauses, clauses with topicalized elements, and passives, as illustrated in (1) respectively:¹

- (1) a. Which book have they talked about?
b. This is the book (which/that) they talked about.
c. This book, they talked about.
d. This book has been talked about.

On the other hand, some studies have observed that the possibility of preposition stranding was very limited in early stages of English (Allen (1980), van Kemenade (1987), and Fischer et al. (2000) among others). According to these studies, preposition stranding was possible in Old English (OE) only when the object was a pronoun, or in relative clauses introduced by the complementizer *þe* 'that', while its possibility became greatly expanded in Middle English (ME).

The aim of this chapter is to account for the historical development of

preposition stranding in English within the recent framework of the minimalist program by Chomsky (2000, 2001, 2004, 2007, 2008), incorporating the model of cyclic linearization of syntactic structure advocated by Fox and Pesetsky (2005a). I will argue that the cyclic linearization approach can give a theoretical explanation for the correlation between preposition stranding and word order pointed out by Amano (1982) and Ohkado (1990). It is also argued that the historical expansion of preposition stranding which happened in ME can be attributed to the change of the categorial status of prepositional phrases, which was closely related to the loss of inherent Case assignment by prepositions.

The organization of this chapter is as follows. Section 2.2 reviews basic facts about the historical development of preposition stranding in English, focusing on the change from OE to ME. Section 2.3 examines previous analyses and points out their problems. Section 2.4 presents an explanation for the historical change of preposition stranding in terms of the model of cyclic linearization advocated by Fox and Pesetsky (2005a). Section 2.5 is a conclusion of this chapter.

2.2. Historical Facts

This section reviews some historical facts on the development of preposition stranding, and clarifies the issues to be addressed. Briefly speaking, preposition stranding was impossible in OE except for restricted contexts, but became widely accepted in the course of ME. In this section, we will look closely at the constructions which involve preposition stranding, contrasting it with pied-piping. The relevant data mainly come from studies by Allen

(1980), van Kemenade (1987), and Fischer et al. (2000), supplemented by the data collected from *The York-Tronto Helsinki Parsed Corpus of Old English Prose* (Taylor et al. 2003: henceforth, YCOE).

2.2.1. OE

2.2.1.1. Preposition Stranding by Pronouns

According to my investigation by YCOE, there was no instance in which a preposition follows its full NP object, i.e. no NP-P in OE. On the other hand, when the object was a pronoun, this order was sometimes inverted, though less commonly, as illustrated in (1). Their distribution in YCOE is summarized in (2):

(1) a. P-Pron.:

Sum man wæs asend fram Gode sylfum to us,
some man was sent from God himself to us
'A man was sent from God himself to us'

(coaelhom,ÆHom_1:37.21)

b. Pron.-P:

Ða cwæð se Hælend him to be þam
then said the Savior them to about the
hetelan deofle ðus
wicked devil thus

'then the Savior said thusly to them about the wicked devil'

(Alc. P. IV. 107 / Allen (1980: 54))

(2) The Distribution of a Preposition and Its Pronominal Object in OE

	OE1	OE2	OE3	OE4
P-Pron.	1 (100%)	202 (92%)	1621 (96%)	182 (77%)
Pron.-P	0 (0%)	18 (8%)	67 (4%)	54 (23%)

Furthermore, the pronominal object could be separated from the preposition governing it and appear in the left periphery of *vP* or *CP*, or it could undergo topicalization, which van Kemenade (1987) analyzes as cliticization to *C*.²

(3) Preposition stranding with personal pronouns

- a. *ða wendon hi me heora bæc to*
 then turned they me their back to
 ‘then they turned their back to me.’

(Boeth. II. p. 8. 12 / Allen (1980: 55))

- b. *& bæd þæt him mon brohte þone triumphan*
 and ordered that him they brought the victory
ongean
 to
 ‘and ordered them to bring victory to him’

(Oros, 126, 1 / van Kemenade (1987: 145))

- c. *& him þa siððan se feondscipe wæs*
 and him then afterwards the enmity was
betweonum weaxende
 between growning
 ‘and between them enmity was afterwards growning’

(Oros. P. 232.26 / Allen (1980: 53))

The same holds for the locative pronoun *þær*, except for the fact that *þær* always preceded the preposition governing it (van Kemenade (1987: 146)).³

The following examples illustrate *þær* preceding the preposition and preposition stranding with *þær*:

(4) Obligatory *þær*-P:

Awyrtwala gradignysse of þinre heortan, and aplanta
root up greediness from thy heart and plant
þær on þa soðan lufe
there in the true love

‘Root up greediness from thy heart, and plant therein the true love’

(Alc. Th. vol. 2 p. 408.1 / Allen (1980: 61))

(5) Preposition stranding with the locative pronoun *þær*:

a. ðæt þu *þær* nane myrhþe *on* nafdest
that there you no joy in not-had

‘that you did not take joy in that’

(Bo 7.15.11 / Fischer et al. (2000: 66))

b. he *ðær* wearð from þæm burgwarum *in* abroden
he there was by the citizens in dragged

‘he was dragged in there by citizens’

(Or 3.9.73.8 / Fischer et al. (2000: 66))

Preposition stranding by pronominal object as in (5) disappeared in the

course of ME, along with the loss of OV and V2.

There is another construction in which a pronominal object might be separated from the preposition governing it, namely prepositional passives, as illustrated by a PE example in (6):

(6) *This* has been talked *about*.

However, prepositional passives were impossible, while passivization itself was possible in OE as illustrated in (7):

(7) Passivization (not by an object of a preposition):

Dis is *ðurh* God gedon

this is through God done

'this is done through (i.e. by) God' (Alc. P. III. 34 / Allen (1980: 68))

2.2.1.2. Preposition Stranding in Relative Clauses

In OE, preposition stranding was also found in finite relative clauses introduced by the complementizer *þe*. In contrast, in relative clauses introduced by the relative pronoun *se* only and in those introduced by *se þe*, preposition stranding was not allowed and pied-piping was obligatorily applied. This contrast is illustrated by the examples in (8):

(8) a. *þe* relative clauses:

& het forbærnan þæt gewrit *þe* hit on
and ordered burn the writ that it in
awriten wæs
written was

‘and ordered to burn the writ that it was written in’

(Oros, 141, 22 / van Kemenade (1987: 147))

b. *se* relative clauses:

Tirus & Sidon syndon twa burga, *be þam*
Tyrus and Sidon are two cities about which
spræc *se* Hælend
spoke the Lord

‘Tyrus and Sidon are two cities which the Lord spoke about’

(AHP, XVII, 52 / van Kemenade (1987: 149))

c. *se þe* relative clauses:

on þære readan sæ on þære ðe he besanc to
in the Red Sea in which that he sanc to
grunde
the bottom

‘in the Red Sea, in which he sank to the bottom’

(ASL, XXV, 348 / van Kemenade (1987: 151))

Preposition stranding like (6a) has survived into PE, with *þe* replaced by *that* in ME.⁴ On the other hand, relative clauses with *se* as in (6b, c) disappeared by the beginning of ME with the loss of *se*. Replacing the types of

preposition stranding as in (6b, c) a new type of relative clause introduced by a *wh*-phrase emerged in ME (as we will see in section 2.2 below). The examples in (6) show that preposition stranding was possible in OE relative clauses unless relative pronouns appeared overtly.⁵

In the same fashion as *þe* relative clauses, which does not involve an overt relative pronoun, infinitival relative clauses in OE showed preposition stranding, as illustrated in (7):

(7) infinitival relative clauses:

Gif ðær ðonne sie gierd mid to ðreanne, sie ðær
 if there then be rod with to beat be there
 mid to wreðionne
 with to support

‘If there is a rod to beat with, let there also be a staff to support with’

(CP 17.127.1/ Fischer et al. (2000: 66))

2.2.1.3. Interrogative Clauses and Clauses with Topicalization Constructions

We saw in section 1 that preposition stranding can also be seen in interrogative clauses and topicalization constructions in PE, but it was impossible in OE. Both constructions showed pied-piping in OE, as illustrated in (8):

- (8) a. interrogative clauses (obligatory pied-piping):

Mid hwam mage we bicgan hlaf ðisum folce;
 with what can we buy bread this people
 ‘With what can we buy bread for this people?’

(AHTh. I. 182. 6 / van Kemenade (1987: 152))

- b. topicalization (obligatory pied-piping):

On ðisne enne god we scelon geleafan
 ‘In this, one god we must believe.’

(ASL. I. 38 / van Kemenade (1987: 152))

2.2.1.4. Summary

To sum up, in OE, preposition stranding was possible when the object was a pronoun, or in relative clauses without overt relative pronouns, namely, *þe* relative clauses and infinitival relative clauses.

2.2.2. ME

The word order of a preposition and its object in ME scarcely inverted. The result of investigation by *the Penn-Helsinki Parsed Corpus of Middle English*, Second edition (PPCME2) is summarized in (9):

(9) The Distribution of a Preposition and Its Pronominal Object in OE

	ME1	ME2	ME3	ME4
P-Pron.	1699 (96%)	1069 (100%)	3361 (99.95%)	3831 (98%)
Pron.-P	76 (4%)	0 (0%)	2 (0.05%)	76 (2%)

According to Nakao (1972: 388-389), the word order of a preposition and its object (i.e. P-NP) was scarcely inverted in ME, except when prosodic factors were at work. Simultaneously, preposition stranding with pronominal objects such as (3) and (5) became unavailable after 1200 (Fischer and van der Wurff (2006: 198)).

In the course of ME, however, preposition stranding other than those mentioned above became possible in a greater variety of contexts. As we saw above, relative clauses introduced by *þe* has survived into PE with *þe* replaced by *that*, while those introduced by *se* (*þe*) disappeared by the beginning of ME with the loss of *se*. Instead, *wh*-interrogative clauses were newly emerged in ME. According to Allen (1980), the first sporadic instances of preposition stranding in *wh*-interrogative clauses and *wh*-relative clauses appeared at the beginning of the thirteenth century, as illustrated in (10) and (11) respectively:

(10) Interrogative clauses:

nuste nan kempe, *whæm* he sculde slæn on
 not-knew no soldier whom he should strike on
 ‘No soldier knew whom he should strike at’

(L. Brut 27487 / Allen (1980: 225))

(11) *Wh*-relative clauses:

Her is whamm guw birrþ follogenn, *whamm* all
 here is whom you behooves follow whom all
 mannkinn birrþ lefenn *onn*
 mankind behooves believe in

‘Here is the man whom it behooves you to follow, who it behooves
all mankind to believe in’ (Orm. 12887 / Allen (1980: 225))

In addition, some types of preposition stranding began to appear in topicalization and passive constructions, as illustrated in (12) and (13) respectively. As observed by Allen (1980) and van Kemenade (1987), although preposition stranding in these constructions was rare in the thirteenth century, it became more common in the fourteenth century.

(12) Topicalization:

Ah *ðe gode* ich ga aa bisiliche *abuten*
but the good I go ever busily about
‘but I always diligently pursue the good’

(St Marg. p. 30. 35 / Allen (1980: 227))

(13) Passives:

heo schal beo greate idollen, leafdiluker leoten of
she shall be greater honored lady-liker thought of
þen a leafdi of hames
then a lady of homes

‘she shall be more greatly honored, thought of as more ladylike than
a house wife’ (T. A. Wisse p. 58. 7 / Allen (1980: 227))

2.3. Section Summary

In the light of the historical facts above, we are now facing the following

problems concerning the historical development of preposition stranding in English:

- (i) Why was preposition stranding only possible in restricted contexts (i.e. when the object was a pronoun and in relative clauses without overt relative pronouns) in OE?
- (ii) Why did preposition stranding become more common in ME, appearing in interrogative and relative clauses introduced by *wh*-phrase, passives, and topicalization constructions?

The remainder of this chapter will be devoted to answer these questions within the recent framework of the minimalist program, by incorporating the model of cyclic linearization proposed by Fox and Pesetsky (2005a).

2.3. Previous Studies

Before presenting a new analysis of the development of preposition stranding, this section reviews two previous studies of preposition stranding. Though both of them have some problems, their findings will prove to be beneficial to the analysis proposed below.

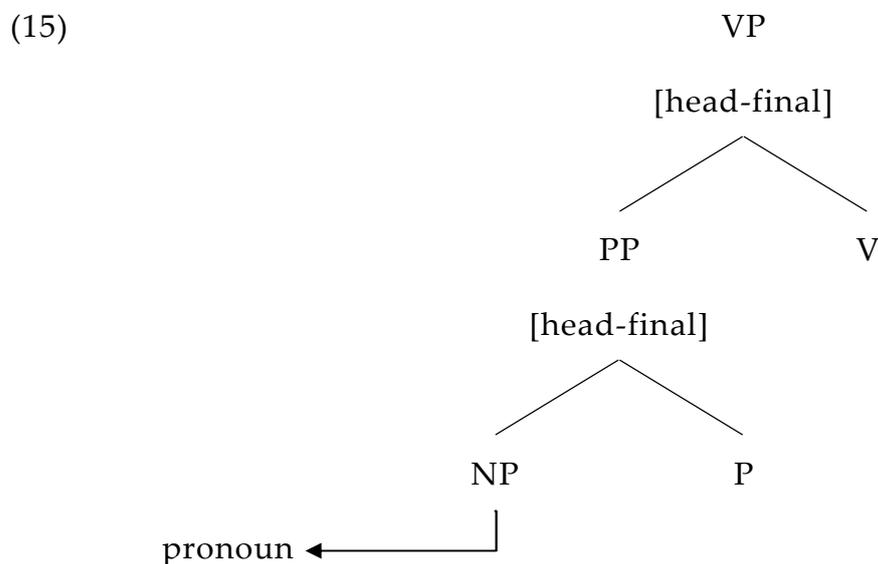
2.3.1. A Head-Complement Parameter Based Approach: Ohkado (1990)

Ohkado (1990) argues that the possibility of preposition stranding hinges on the values of the Head-Complement Parameter (cf. Chomsky (1986)) in VP and PP and proposes the condition summarized as in (14):

(14) Preposition stranding is possible iff the Head-Complement Parameter value in VP is non-distinct from that in PP.

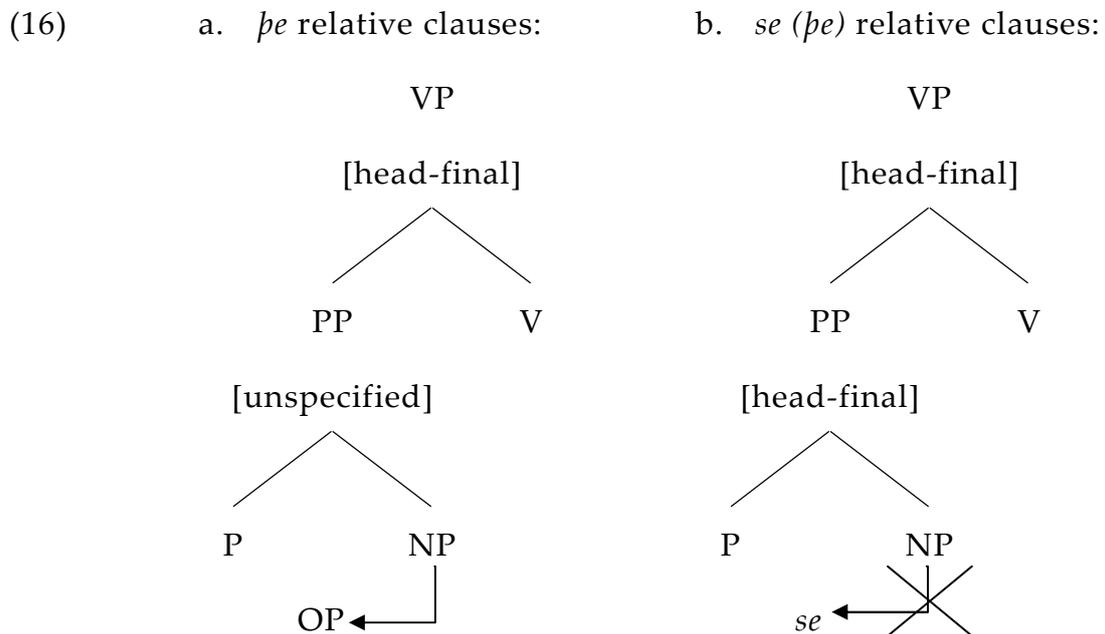
(cf. Amano (1982: 273), Ohkado (1990: 203))

On the basis of (14), Ohkado's account for preposition stranding in OE goes as follows. First, the derivation of preposition stranding with a pronominal object as in (2b) and (3b) is schematized in (15):



As is well known, OE was an OV language (van Kemenade (1987)), which indicates that VP had the Head-Complement Parameter value [head-final]. Since a preposition could follow its pronominal object as we saw in (2b) and (4) above, PP could have the value [head-final] when it had a pronominal object. Therefore, preposition stranding was possible because both VP and PP had the same values (i.e. [head-final]), satisfying the condition in (14). Next, assuming that a relative clause is derived by the movement of a relative pronoun or an empty operator (cf. Chomsky (1977)), the derivation of

preposition stranding in relative clauses like (6) is schematized in (16):



According to Ohkado (1990: 210), the PP in *þe* relative clauses had the value [unspecified] because its object was empty, and therefore, preposition stranding was possible as in (16a), with the value in VP non-distinct from that in PP. Meanwhile, the values were distinct between VP and PP in *se (þe)* relative clauses, so that preposition stranding was not allowed as in (16b).

It is generally known that English underwent a word order change from OV to VO in ME. Moreover, as we saw in 2.2, the word order of a preposition and its object (i.e. P-NP) was scarcely inverted in ME, except when prosodic factors were at work. These facts indicate that both VP and PP came to have the same Head-Complement Parameter values (i.e. [head-initial]) in any context in ME. This is why the possibility of preposition stranding became greatly expanded, as illustrated in (10)-(10).

It is true that the condition in (14) to some extent characterizes the

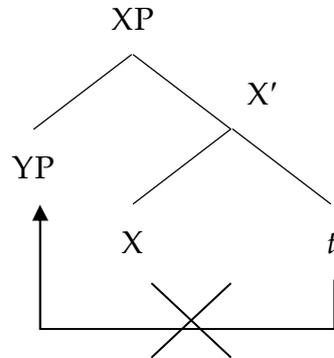
historical development of preposition stranding, but it is not clear why the non-distinctness of the Head-Complement Parameter values in VP and PP makes preposition stranding possible. Furthermore, the explanation for preposition stranding in *be* relative clauses in (16a) rests on the mere stipulation that PP with an empty operator has the value [unspecified]. It will be shown in section 4 that the cyclic linearization approach does not suffer from these problems, while capturing the relevance of word order for the possibility of preposition stranding.

2.3.2. A Phase Based Approach: Abels (2003)

As observed in van Riemsdijk (1978), while preposition stranding is rather free in PE, it is possible only in restricted contexts in other Germanic languages. There are a number of approaches which attempt to account for such cross-linguistic variation of preposition stranding by postulating a parameter concerning PP. Adopting Chomsky's (1973) subjacency condition, van Riemsdijk (1978) argues that PP is a bounding node in all languages and the relevant parameter is whether it has an escape hatch position (i.e. [Spec, PP]) or not.⁶ Therefore, some languages have it while others do not, and only those that have it permit preposition stranding. Recently, van Riemsdijk's approach has been revived in terms of the minimalist program by Abels (2003). The relevant parameter Abels postulates is whether P is a phase head or not.⁷ He argues that P is a phase head in Germanic languages in which preposition stranding is not allowed, whereas P is not a phase head in languages like PE where preposition stranding is rather free. Furthermore, in accounting for preposition stranding, he assumes the

Anti-locality Constraint, as schematized in (17):

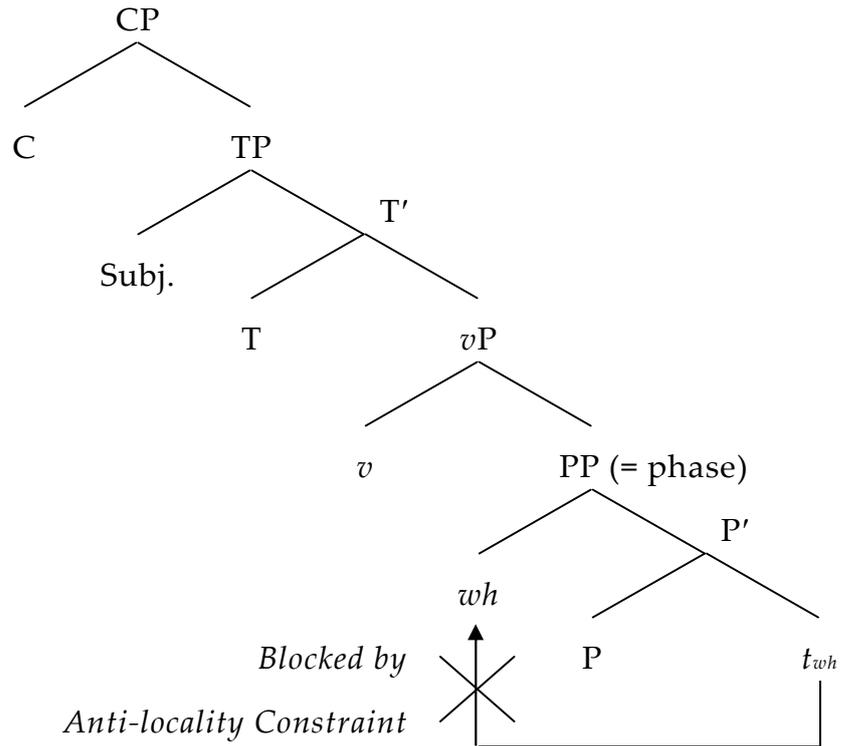
(17) Anti-locality Constraint:



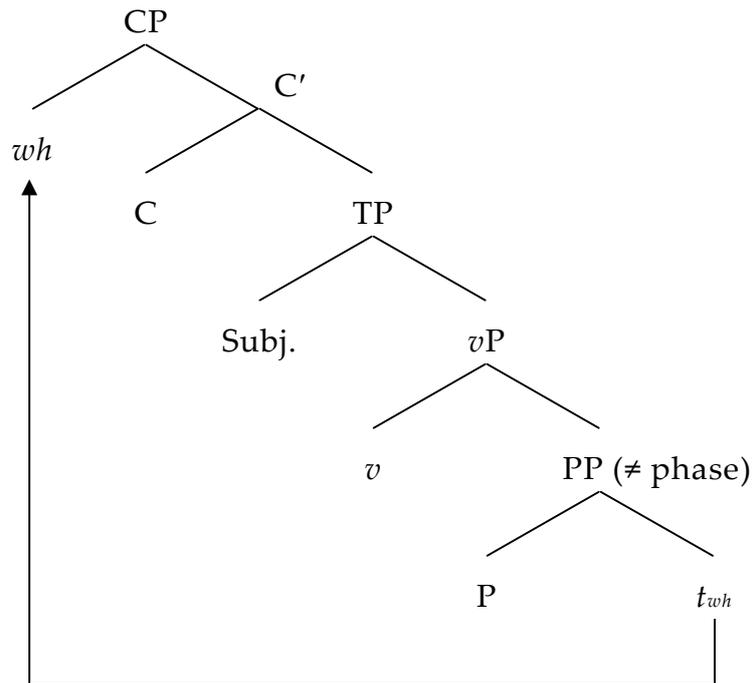
(Abels (2003: 12))

This constraint prohibits the movement from the complement position to the specifier position within the same projection.⁸ The parameter on the phasehood of PP and the Anti-locality Constraint make it possible to account for the cross-linguistic difference in the acceptability of preposition stranding. In languages where P is a phase head, the object of the preposition has to stop off at [Spec, PP] when it moves out of PP. However, such movement is ruled out by the Anti-locality Constraint in (17). Therefore, preposition stranding is not allowed in those languages, as shown in (18a) below. In contrast, in languages where P is not a phase head, preposition stranding is possible because the object of the preposition can move out of PP without passing through [Spec, PP], as shown in (18b):

(18) a.



b.



One of the key notions in Abels' (2003) approach, the Anti-locality Constraint in (17), has received support from a number of studies, which show that it allows a unified explanation of various phenomena in English and other languages (see Grohmann (2003) and Takita (2009) among others).

On the other hand, the other key notion, the parameter on the phasehood of PP, simply restates the fact that preposition stranding is possible in some languages but not in others.⁹ Therefore, unless independent evidence is provided for P as a (non-)phase head in the relevant languages, it would be theoretically desirable to assume that PP is a phase in all languages, along the lines of van Riemsdijk's (1978) original proposal. Moreover, Abels' approach is not sufficient to deal with differences in the acceptability of preposition stranding among constructions within a language. Especially relevant is the situation in OE, where preposition stranding was allowed only in restricted contexts. It is not clear how his approach can account for the fact of OE that preposition stranding was allowed in *þe* relative clauses, but not in *se* (*þe*) relative clauses. Retaining the benefits of the Anti-locality Constraint in (17), the remainder of this chapter develops a new analysis of preposition stranding that dispenses with the parameter on the phasehood of PP, by building it upon the model of cyclic linearization proposed by Fox and Pesetsky (2005a).

2.4. Analysis

2.4.1. Cyclic Linearization

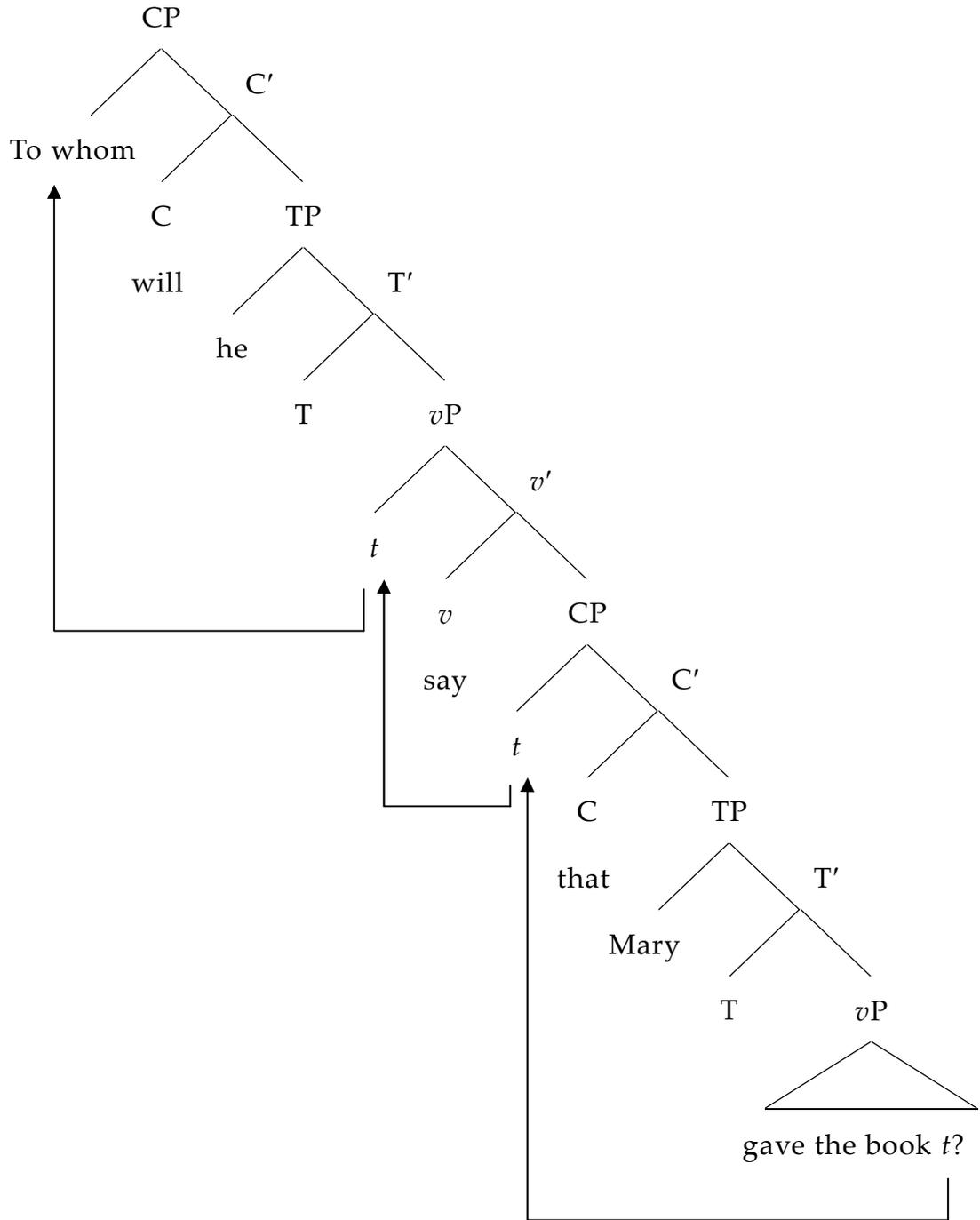
Fox and Pesetsky (2005a) attempt to derive successive cyclicity without recourse to the Phase Impenetrability Condition (PIC) (cf. Chomsky (2000, 2001)), arguing that successive-cyclic movement is forced by linearization of syntactic structure that applies in the mapping from syntax to phonology. The gist of their proposal is summarized as follows:

- (19) a. Each time Spell-out applies at a Spell-out domain, it yields a linearization of the constituents of the domain (i.e. their relative order is fixed).
- b. Information about linearization, once established at a given Spell-out domain, is never deleted in the course of a derivation.

The list of Spell-out domains includes at least CP, *v*P/VP, and DP.¹⁰ According to (19), the derivation converges unless the set of information about linearization which is established at each Spell-out domain contains an ordering contradiction.

Let us see how the necessity of successive-cyclic movement follows from this cyclic linearization model. Consider the non-successive-cyclic derivation in (20), in which *to whom* moves directly to the embedded [Spec, CP] without first stopping off at the embedded [Spec, *v*P]:

(20)

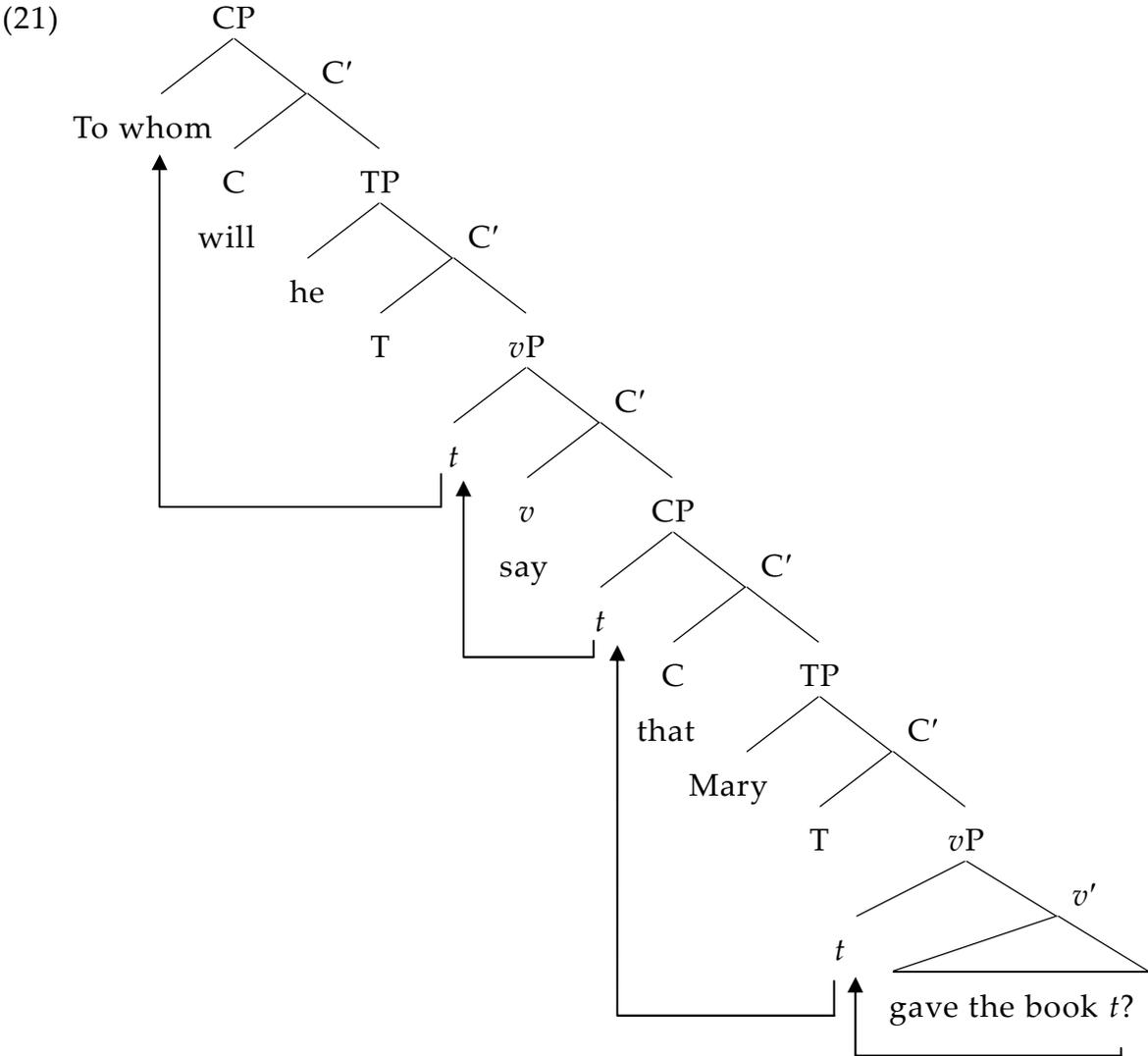


a. embedded *vP*: *gave* < *the book* < *to whom*

b. embedded CP: *to whom* < *that* < *Mary* < embedded *vP* (*gave the book*) (=gave)

In the embedded *vP*, Spell-out applies to yield the linearization in which *gave* precedes *the book* and *the book* precedes *to whom*, as shown in (20a). When

the derivation reaches the embedded CP, the linearization is established in which *to whom* precedes *that*, *that* precedes *Mary*, and *Mary* precedes *vP*, more precisely, its first constituent *gave*, as shown in (20b). This derivation is ruled out because the relative ordering between *to whom* and *gave* is contradicted at the two Spell-out domains. Next consider the successive-cyclic derivation in (21), in which *wh*-movement proceeds through the specifiers of each Spell-out domain:



- a. embedded *vP*: *to whom* < *gave* < *the book*
- b. embedded CP: *to whom* < *that* < *Mary* < embedded *vP* (*gave the book*) (=gave)
- c. matrix *vP*: *to whom* < *say* < embedded CP (*that Mary gave the book*) (=that)
- d. matrix CP: *to whom* < *will* < *he* < matrix *vP* (*say that Mary gave the book*) (=say)

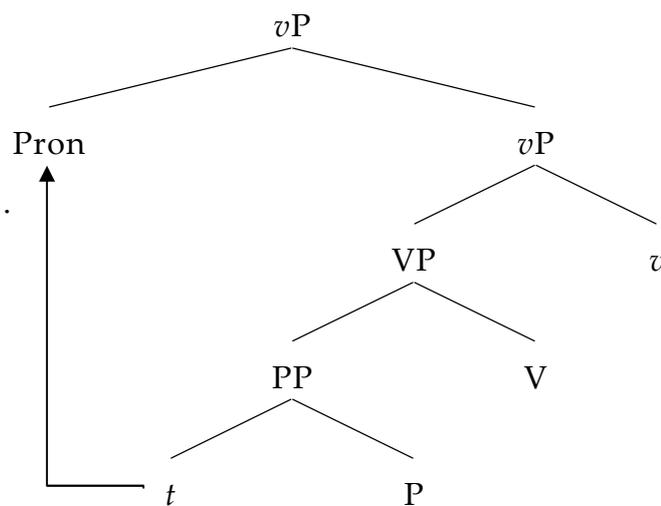
In the embedded *vP*, *to whom* moves to [Spec, *vP*] revising the word order of *vP*, and Spell-out applies to yield the linearization of its constituents, as shown in (21a). Then, *to whom* stops off at the embedded [Spec, CP] and the matrix [Spec, *vP*] on its way to the matrix [Spec, CP], yielding the set of linearization information in (21b-d). This derivation converges because there is no ordering contradiction in (21); especially, the relative ordering between *to whom* and *gave* is kept unchanged in the course of the derivation. If this is correct, successive cyclicity is derived not from the PIC, but from the cyclic linearization model as formulated in (19).

Before proceeding, let us mention two consequences of this cyclic linearization model which will be relevant for the subsequent discussion on preposition stranding. One is that movement out of a Spell-out domain does not have to stop off at its specifier unless it causes an ordering contradiction, contrary to what the PIC dictates. The other is that because cyclic linearization is a mechanism working in the mapping between syntax and phonology, it does not apply to constituents with no phonological content.

2.4.2. Preposition Stranding in OE

This section offers an explanation for the distribution of preposition stranding in OE in terms of the cyclic linearization approach. Recall the discussion in section 2.3.1. According to Amano (1982) and Ohkado (1990), preposition stranding is possible iff the Head-Complement Parameter values are non-distinct between VP and PP. Assuming that PP is a Spell-out domain (see Sabbagh (2007) for arguments based on rightward movement), it can be argued that an object may move out of PP without causing an ordering contradiction if VP and PP have the same Head-Complement Parameter values, thereby deriving the relevance of word order for the possibility of preposition stranding under the cyclic linearization approach. Consider first the derivation of preposition stranding with pronominal objects in (22), where P follows Pron. (pronominal object) within PP, a possibility which was available only for pronominal objects as exemplified in (2b) and (4).¹¹

(22) Preposition stranding with pronominal objects (see (2b) and (3b))

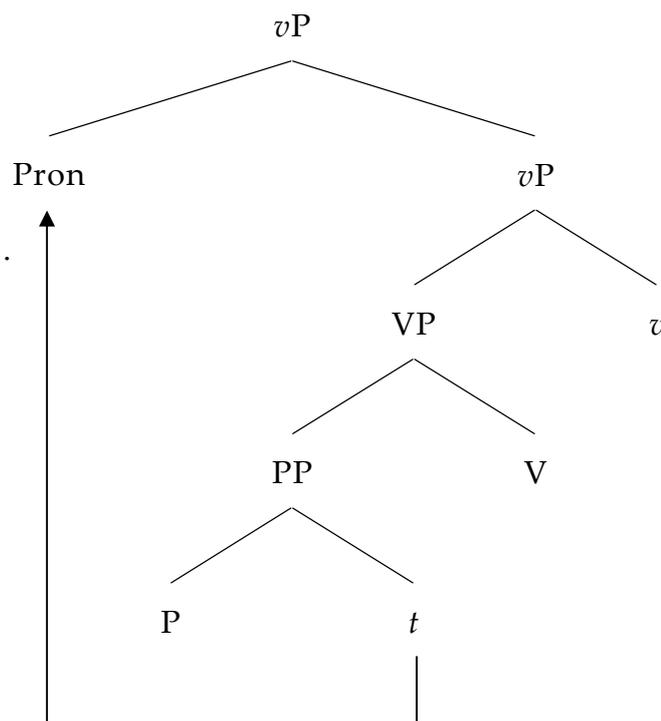


a. PP: Pron. < P

b. vP: Pron. < PP (=P) < V < v

When Spell-out applies at the level of PP, it is established that Pron. precedes P, as shown in (22a). Then, at the level of *v*P, Pron. moves to [Spec, *v*P], yielding the linearization in which Pron. precedes P, the first constituent of PP with phonological content, as shown in (22b). Therefore, preposition stranding with pronominal objects was possible, inducing no ordering contradiction. On the other hand, if a full NP object moves out of PP (by topicalization, or scrambling of the sort observed in Germanic languages), it would cause an ordering contradiction, as shown in (20):

(20) * Preposition stranding with full NP objects



a. PP: P < NP

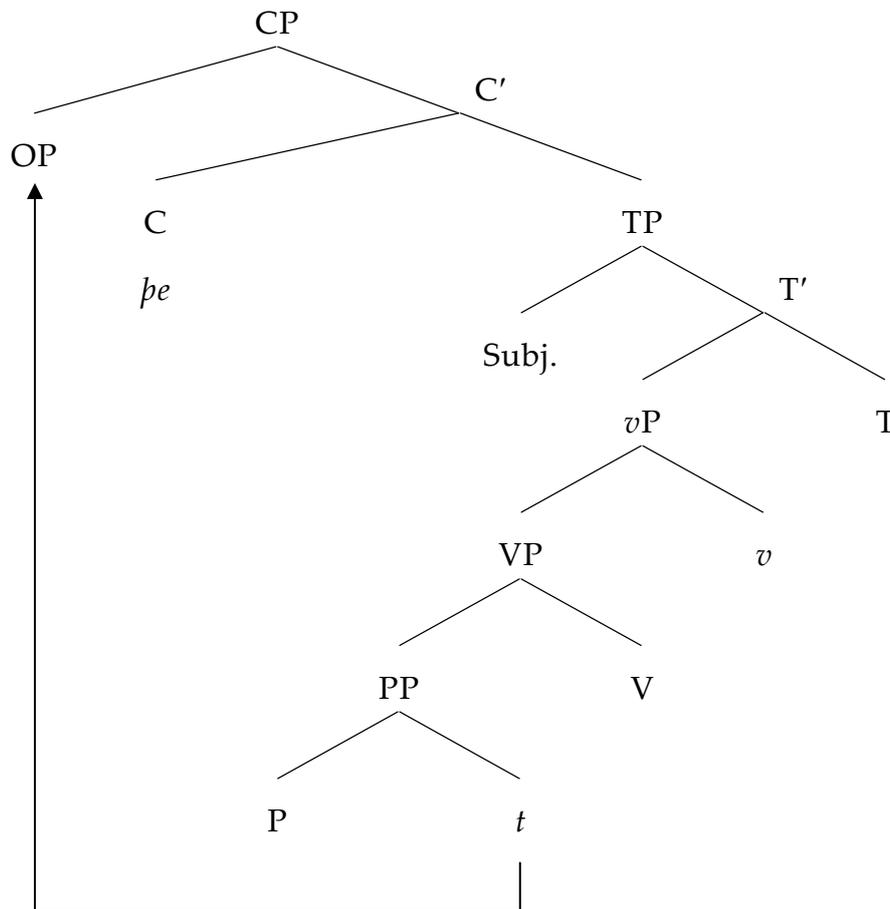
b. *v*P: NP < PP (=P) < V < *v*

Note that, because of the Anti-locality Constraint in (17), NP cannot move to [Spec, PP] to revise the order P-NP before Spell-out. Therefore, the

linearization produced at the level of *v*P does contradict that produced at the level of PP. This is how preposition stranding with full NP objects was excluded in OE.¹²

Now let us turn to preposition stranding in *þe* relative clauses exemplified in (6a). The derivation is shown in (21), which involves the movement of OP (empty operator) directly to [Spec, CP] (~~striking through~~ indicating no phonological content):

(21) Preposition stranding in *þe* relative clauses (see (6a))

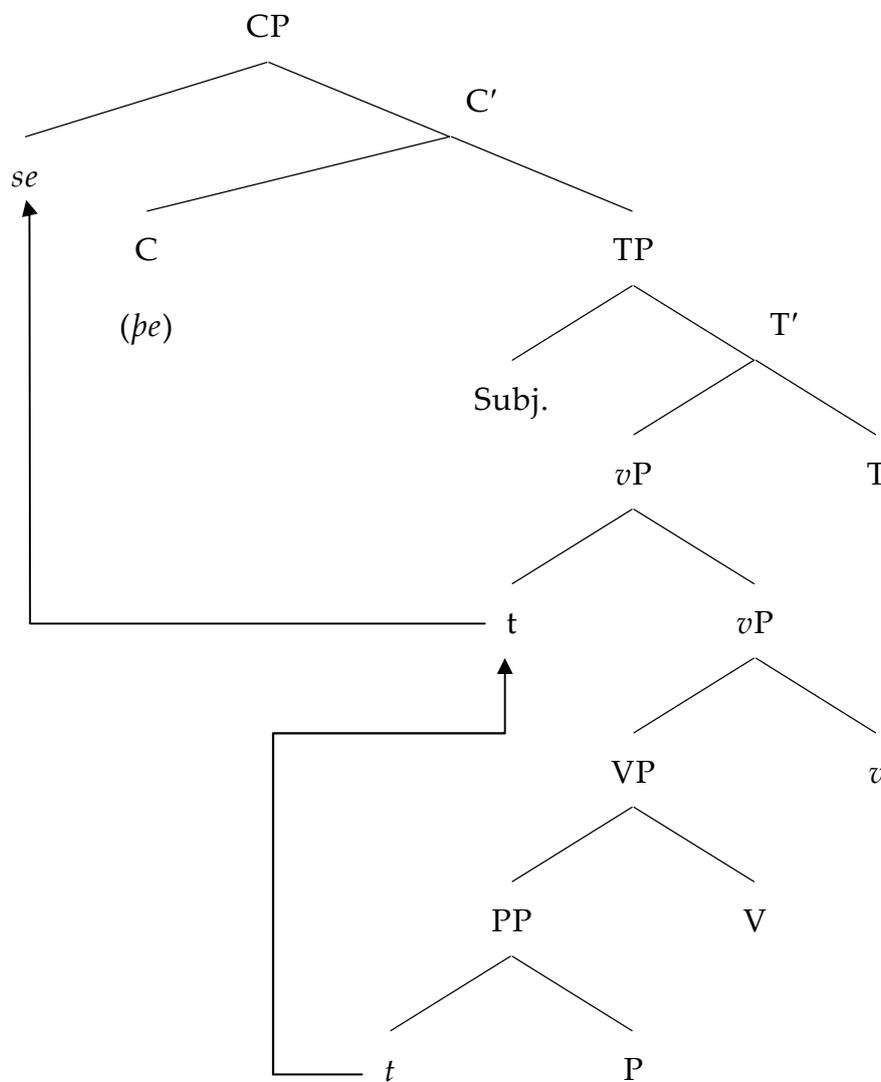


- a. PP: P < ~~OP~~
- b. *v*P: PP (=P) < V < *v*
- c. CP: ~~OP~~ < *þe* < Subj. < *v*P (=P) < T

Since an empty operator does not have phonological content, it does not enter into cyclic linearization, so that it does not cause an ordering contradiction if it moves out of PP without stopping off at the specifiers of Spell-out domains. This is why preposition stranding was possible in *þe* relative clauses in OE.

We are now in a position to see how preposition stranding in *se* (*þe*) relative clauses is ruled out.

(22) * Preposition stranding in *se* (*þe*) relative clauses (see (6b, c))



- a. PP: P < *se*
- b. vP: *se* < PP (=P) < V < *v*

c. CP: *se* < (*þe* <) Subj. < *vP* (=P) < T

As shown in (22), the relative pronoun *se* moves to [Spec, CP] via [Spec, *vP*]. Due to the Anti-locality Constraint in (17), it cannot stop off at [Spec, PP] to revise the order P-NP at the level of PP. As is obvious, the relative ordering between *se* and P is contradicted in PP and *vP*/CP. Therefore, preposition stranding in *se* (*þe*) relative clauses was not allowed in OE.¹³

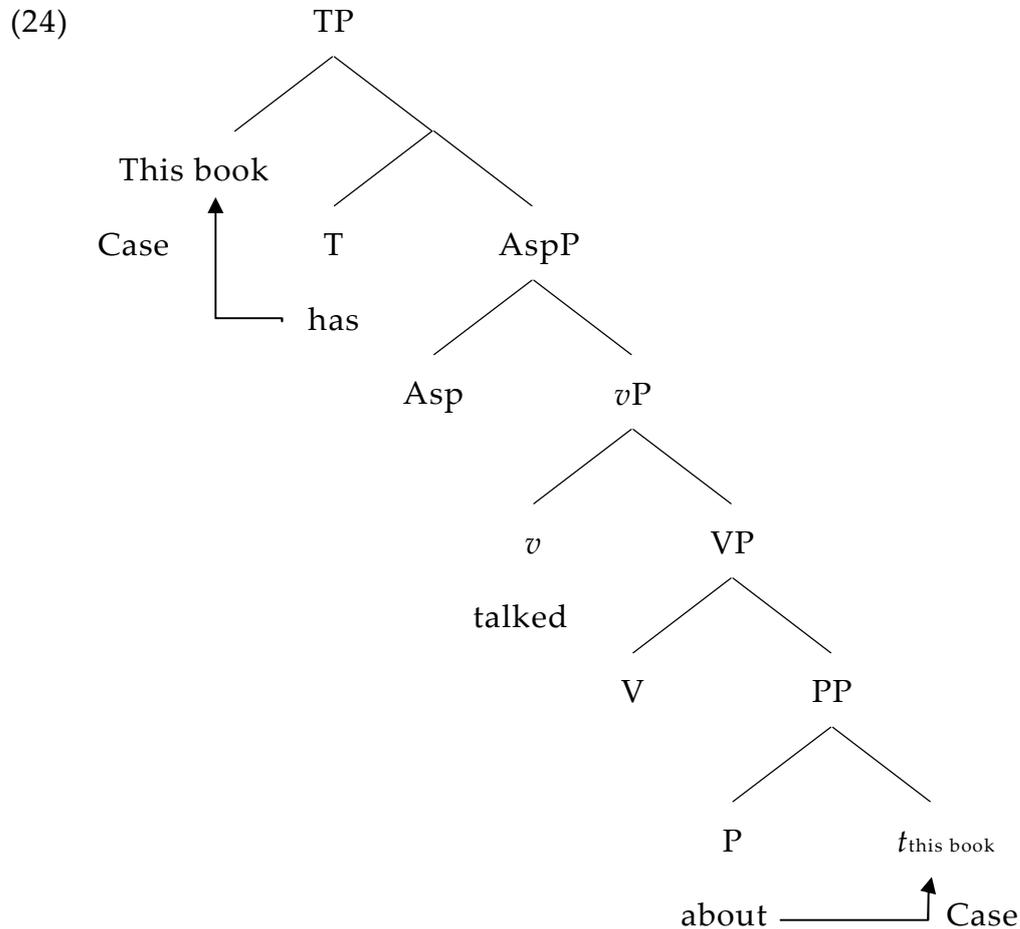
To sum up, it has been demonstrated in this subsection that the cyclic linearization approach correctly predicts that preposition stranding was possible only with pronominal objects and in *þe* relative clauses in OE; the two contexts had in common the property of causing no ordering contradiction.

Before closing this subsection, we should mention the fact that preposition stranding in passives was impossible in OE; that is, so-called prepositional passives or pseudo-passives, which are illustrated by the PE example in (23), were not allowed in OE:

(23) This book_i has been talked about *t_i*.

As it stands, the cyclic linearization approach would predict that prepositional passives were allowed with pronominal objects, as they are derived in the manner of (19), contrary to fact. We follow van Kemenade (1987) in assuming that preposition stranding in passives was disallowed in OE because inherent Case assigned by P cannot be absorbed by the passive morpheme: if the object moves to [Spec, TP] out of PP, it would cause Case

conflict between inherent Case assigned by P and nominative Case assigned by T:

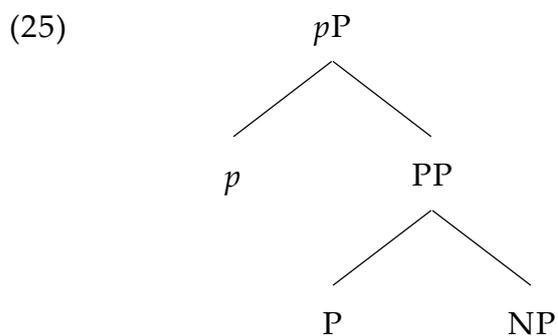


Therefore, the absence of prepositional passives in OE would be explained away independently, so that it does not pose any problems for the cyclic linearization approach to preposition stranding.

2.4.3. Preposition Stranding in ME

There are two factors which contributed to the historical development of preposition stranding in ME. One is that the Head-Complement Parameter values became [head-initial] in VP and PP, including the case of PP with

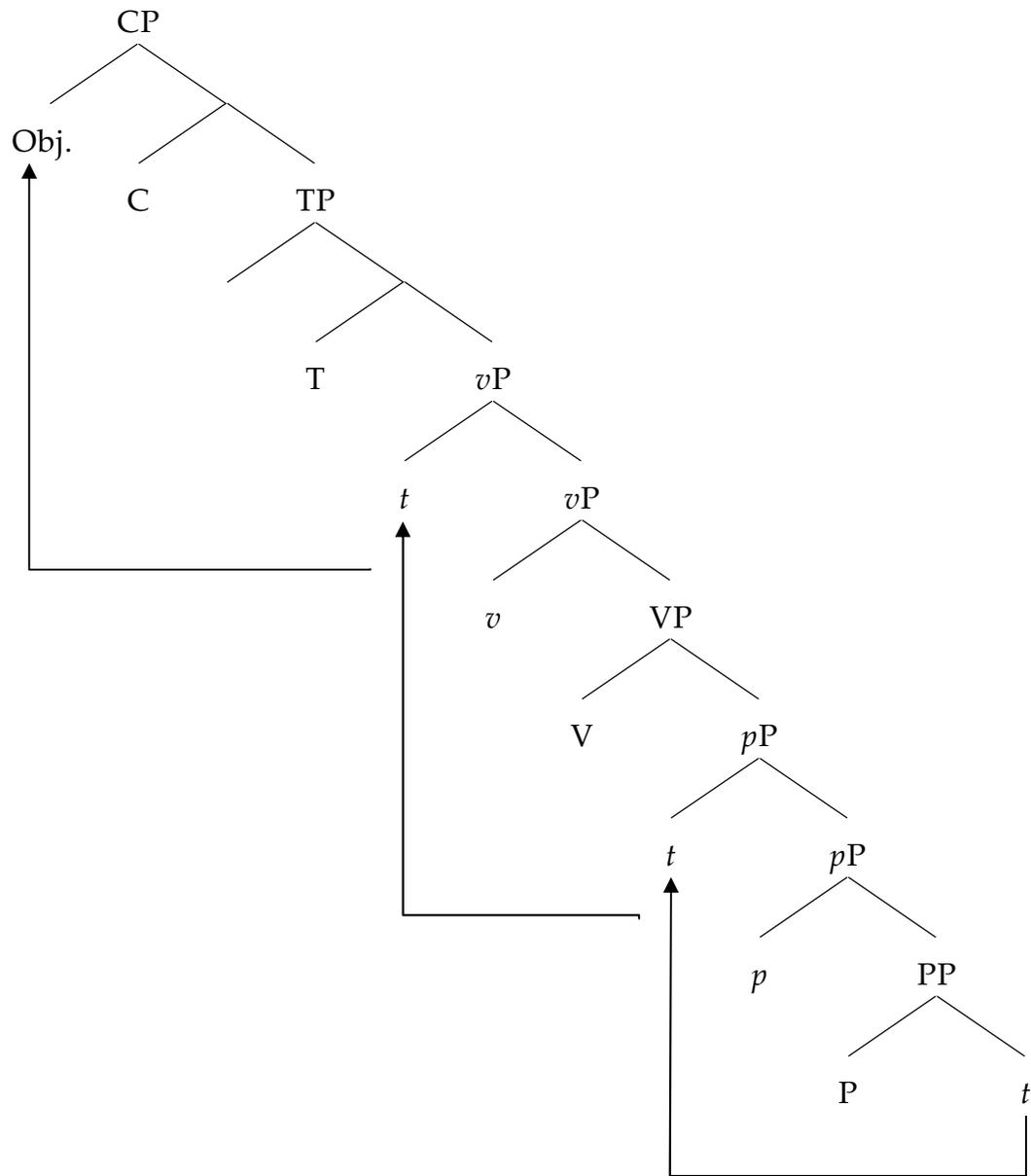
pronominal objects (see section 3.1). The other is the change of Case assignment by P. According to van Kemenade (1987), P assigned inherent Case in OE, while V and P came to assign the same kind of Case in ME, i.e. structural accusative Case. We take it to mean that P assigns accusative Case in the same way as V does from ME onwards: prepositional phrases have the following structure parallel to v^*P , as schematized in (25):¹⁴



Chomsky (2007, 2008) argues that uninterpretable ϕ -features are inherited from a phase head to the non-phasal head of its complement, which makes it possible that T and V assign nominative and accusative Case via Agree, respectively. By the same reasoning, P acquires the ability of assigning accusative Case via Agree by inheriting uninterpretable ϕ -features from the phase head p . This means that there was a structural change of prepositional phrases from PP to pP in ME, which was closely related to the loss of inherent Case assignment by P.¹⁵ If this is correct, it is natural to assume that pP counts as a Spell-out domain from ME onwards.¹⁶

With this in mind, consider the following derivation of preposition stranding in relative and interrogative clauses introduced by *wh*-phrase, and topicalization, which became available in ME (Obj. = *wh*-phrase or topic):

(26) Preposition stranding in *wh*-relative clauses, *wh*-interrogative clauses, and topicalization (see (10), (8), and (12))



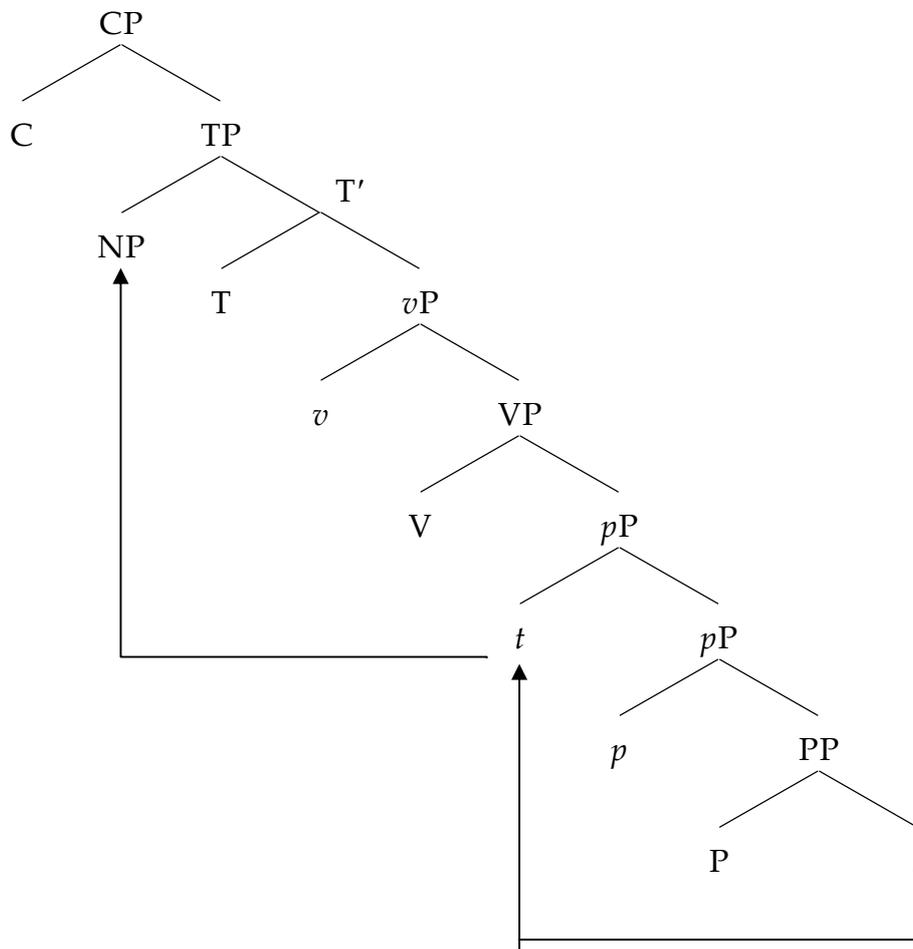
- a. pP : $\text{Obj} < p < PP (=P)$
- b. vP : $\text{Obj} < v < V < pP$
- c. CP : $\text{Obj} < C < \text{Subj.} < T < vP$

In (26), *Obj.* first moves up to [Spec, pP] to revise the ordering between *P* and *Obj.*, yielding the linearization in which *Obj.* precedes *P*.¹⁷ It should be

noticed that this movement does not violate the Anti-locality Constraint in (17) because there are projections of p which provides uninterpretable ϕ -features responsible for accusative Case assignment by P. Then, Obj. moves up to [Spec, CP] via [Spec, v P], so the derivation converges because there is no ordering contradiction with Obj. preceding all the constituents of each Spell-out domain including P.

Let us turn to preposition stranding in passives which also became available in ME. Following Chomsky (2001), it is assumed that passive (and unaccusative) v P is not a Spell-out domain or a phase, so that wh -movement does not have to stop off its specifier.

(27) Preposition stranding in passives (see (10))



- a. $pP: NP < p < PP (=P)$
- b. $CP: C < NP < T < v < V < pP$

In (27), NP first moves up to [Spec, pP] to revise the ordering between P and NP, yielding the linearization in which NP precedes P. Again, this movement does not violate the Anti-locality Constraint in (17).¹⁸ Then, NP moves up to [Spec, TP], which causes no ordering contradiction with NP preceding P throughout the derivation.¹⁹

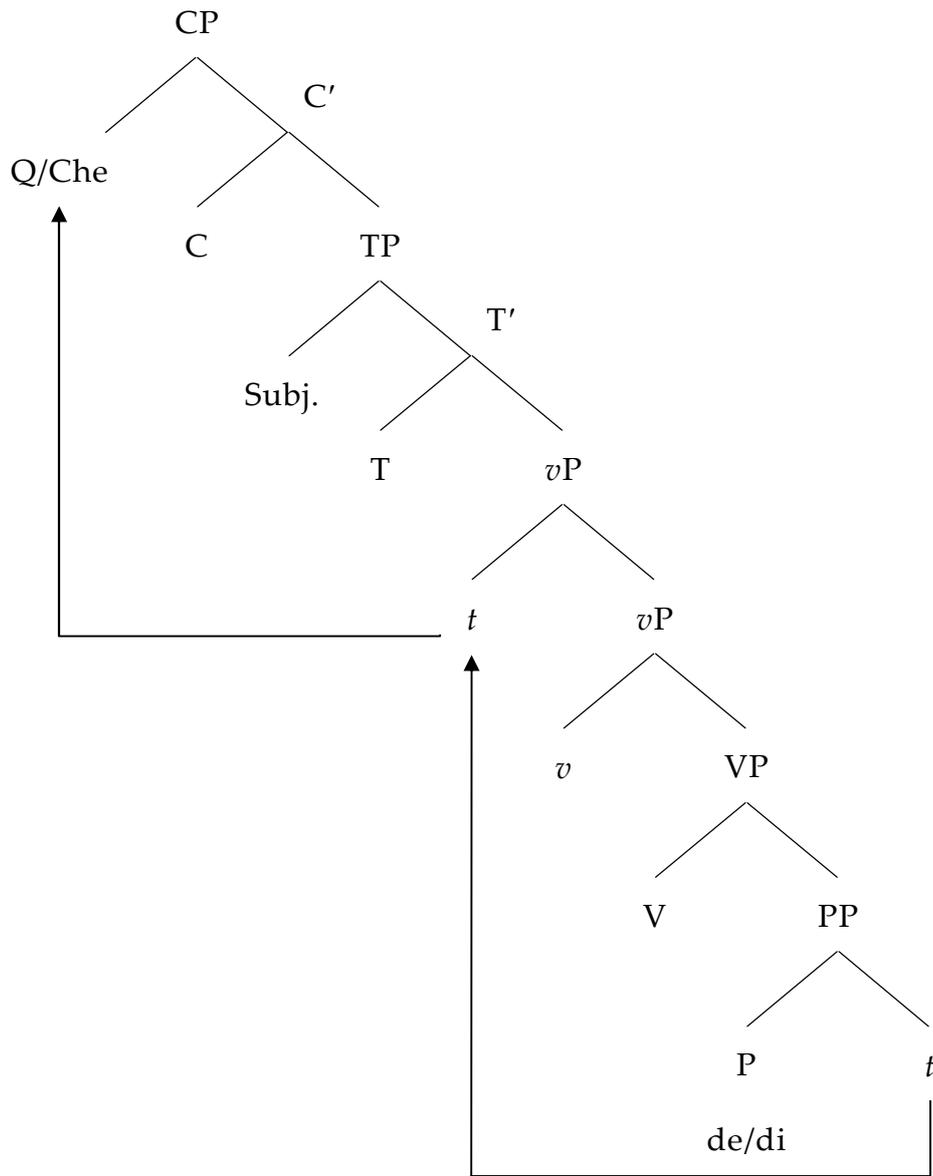
To sum up, the possibility of preposition stranding was expanded in ME due to the change of Case assignment by P: the loss of inherent Case assignment led to the change of the categorial status of prepositional phrases, which in turn made possible preposition stranding in various contexts without causing an ordering contradiction.²⁰

2.5. Preposition Stranding in Other Languages

We have so far discussed the phenomena of preposition stranding in early English only, but we have not examined in any detail other languages. This section, therefore, is concerned with preposition stranding in Romance and Germanic, and establishes that the analysis based on cyclic linearization can cover the phenomenon of preposition stranding in those languages.

In Romance such as French and Italian, preposition stranding is impossible in general:²¹

(30) * Preposition stranding in *wh*-interrogatives (see (28))



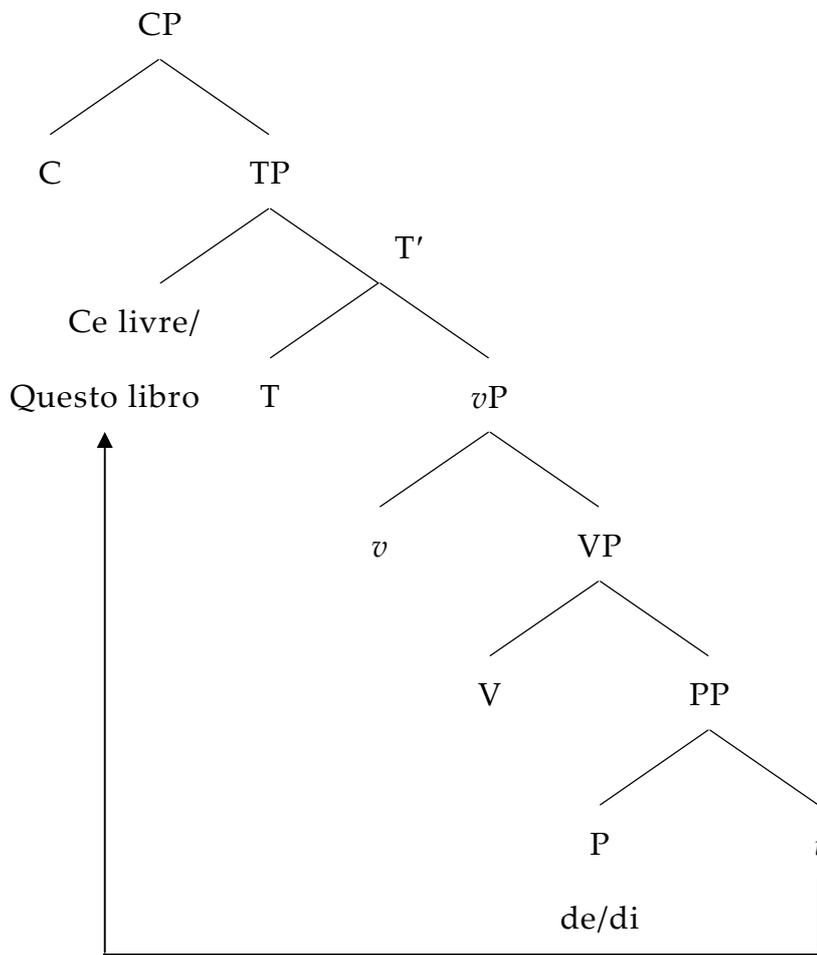
- a. PP: P (= *de/di*) < *Q/Che*
- b. *vP*: *Q/Che* < *v* < V < PP (= P) (= *de/di*)
- c. CP: *Q/Che* < C < T < *v* < V < PP (= P) (= *de/di*)

As shown in (30), the *wh*-pronoun *Q/Che* moves to [Spec, CP] via [Spec, *vP*]. The Anti-locality Constraint in (17) prevents the *wh*-pronoun from stopping off at [Spec, PP] to revise the order P-*Q/Che* at the level of PP. The relative ordering between the *wh*-pronoun (*Q/Che*) and P (= *de/di*) is obviously

contradicted between PP and *vP*/CP. Therefore, preposition stranding is impossible in *wh*-interrogatives.

We can also attribute the impossibility of preposition stranding under A-movement (i.e. prepositional passives) to the ordering contradiction between PP and *vP*/CP.

(31) * Preposition stranding in A-movement (see (29))



- a. PP: P (= *de/di*) < *Ce livre/Questo libro*
- b. CP: C < *Ce livre/Questo libro* < T < *v* < V < PP (= P) (= *de/di*)

As mentioned above, because passive *vP* is not counted as a Spell-out domain or phase, *Ce livre/Questo libro* directly moves up to [Spec, TP]. As shown in

(31), there is an ordering contradiction between PP and CP: *Ce livre/Questo libro* follows P (= *de/di*) at PP, while it precedes P at CP.²² This is why preposition stranding is impossible in A-movement.

Now let us move on to Germanic like Dutch, German and Frisian, where preposition stranding appears only in restricted contexts. In Dutch, a certain type of pronouns, called R-pronoun, always appears to the left of a preposition, as illustrated below:

- (32) a. op hem 'on him' (Dutch)
 * op het 'on it'
 * op er 'on there'
 er op 'there on'
- b. op die 'on that one'
 * op dat 'on that'
 * op daar 'on there'
 daar op 'there on'
- c. op die 'on whom'
 * op wat 'on what'
 * op waar 'on where'
 waar op 'where on' (van Riemsdijk (1978: 37))

Moreover, R-pronoun such as *er/daar* 'there' and *waar* 'where' can be separated from the preposition governing it. (33) shows that, preposition stranding is possible with R-pronouns:

(33) Preposition stranding with R-pronouns (possible):

a. *Waar* heb je [_{PP} *t_{Wie}* *op*] gerekend? (Dutch)

where have you on counted

'What did you count on?'

b. *Ik* heb *er* niet [_{PP} *t_{Wie}* *op*] gerekend

I have there not on counted

'I did not count on it' (van Riemsdijk (1978: 135))

Meanwhile, preposition stranding is not possible with pronouns other than R-pronouns, as exemplified in (34):

(34) Preposition stranding with other pronouns (impossible)

* *Wie* heb je [_{PP} *op* *t_{Wie}*] gerekend? (Dutch)

who have you on counted

'Who did you count on?' (van Riemsdijk (1978: 137))

Other Germanic languages like German and Frisian also have R-pronouns, which allow preposition stranding:

(35) a. *Wo* hast du [_{PP} *t_{Wo}* *für*] gestimmt? (German)

what have you for voted

'What did you vote for?'

b. *Da* habe ich nicht [_{PP} *t_{Wo}* *mit*] gerechnet.

there have I not with counted

'I didn't expect that.' (Abels (2003: 195))

(36) a. *Wêr tinksto [PP t_{Wêr} oan]?* (Frisian)

where think-you of

‘What do you think of?’

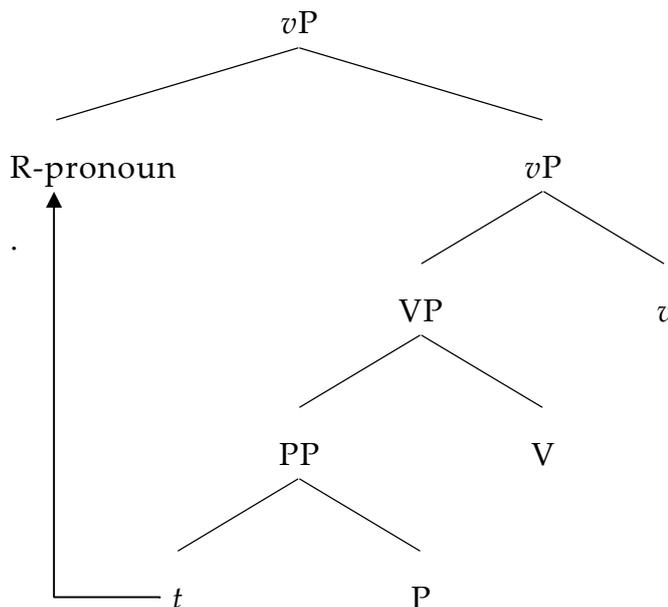
b. *Dêr hie se langst [PP t_{Wêr} nei].*

there had she longing for

‘She was longing for it.’ (cf. Hoekstra (1995: 97))

It is well-known that Germanic languages are OV-language. In addition, we have seen above that P is postpositional when the object is R-pronoun. With these in mind, we can account for the facts in (33)-(36) in exactly the same way as preposition stranding with pronouns in OE. The extraction of R-pronouns does not yield an ordering contradiction between PP and *vP*, while that of other pronouns does. First, the derivation of preposition stranding with R-pronouns such as (33), (35) and (36) is shown in (37):

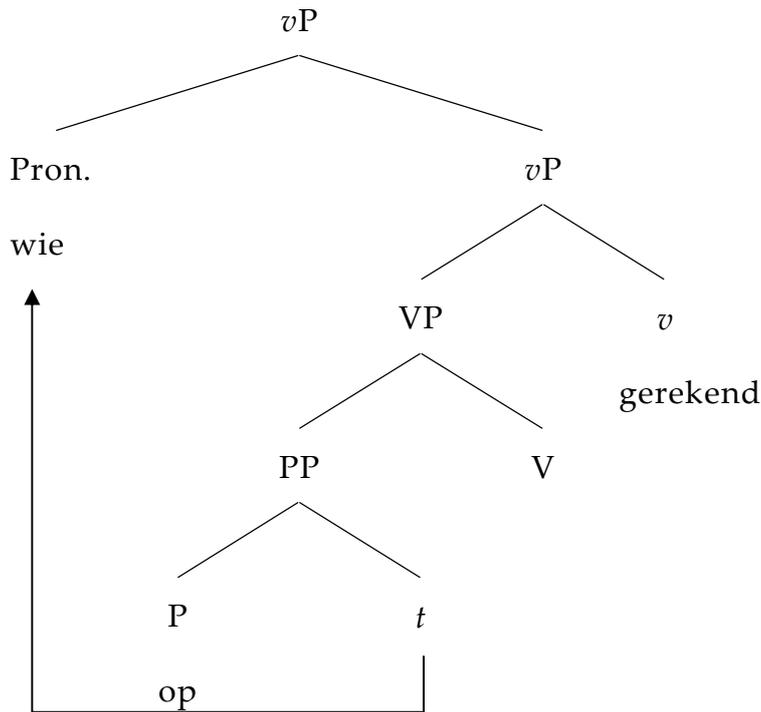
(37) Preposition stranding with R-pronoun (see (33), (35) and (36))



- a. PP: R-pronoun (= *waar/er; wo/da; wêr/dêr*) < P (= *op; für/mit; oan/nei*)
- b. *v*P: R-pronoun (= *waar/er; wo/da; wêr/dêr*) < PP (=P) (= *op; für/mit; oan/nei*) < V < *v* (= *gerekend; gestmmt/gerechnet; thinksto/langst*)

When Spell-out applies at the level of PP, it is established that R-pronoun precedes P, as shown in (37a). Then, at the level of *v*P, R-pronoun moves to [Spec, *v*P], yielding linearization in which R-pronoun precedes P (and V/*v*). With no ordering contradiction, therefore, preposition stranding with R-pronouns is possible. Although we will not go into the whole derivation, it is clear from (37) that linearization information in which R-pronoun precedes P is preserved until the level of CP (i.e. the final Spell-out domain). On the other hand, the extraction of other pronouns than R-pronoun from PP like (34) would cause an ordering contradiction, as shown in (38):

(38) * Preposition stranding with other pronouns (see (34))



- a. PP: P (= *op*) < Pron. (= *wie*)
- b. vP:Pron. (= *wie*) < PP (=P) (= *op*) < V < v (= *gerekend*)

Note that the Anti-locality Constraint in (17) prevents a pronoun (*wie*) from moving to [Spec, PP] to revise the order P-Pron. before Spell-out applies at the level of PP. Therefore, the linearization produced at the level of *vP* (i.e. P follows Pron.) does contradict that produced at the level of PP (i.e. P precedes Pron.). This is how preposition stranding is possible with R-pronouns and impossible with other pronouns in Germanic languages.

In this connection, the following examples from Dutch are worth notice:

- (39) a. Je zei dat hij [PP de boom in] (Dutch)
 you said that he the tree in

geklimmen is.

climbed is

'You said that he climbed in to that tree.'

b. *Welke boom* zei je dat hij [PP *tWelke boom in*]

which tree said you that he in

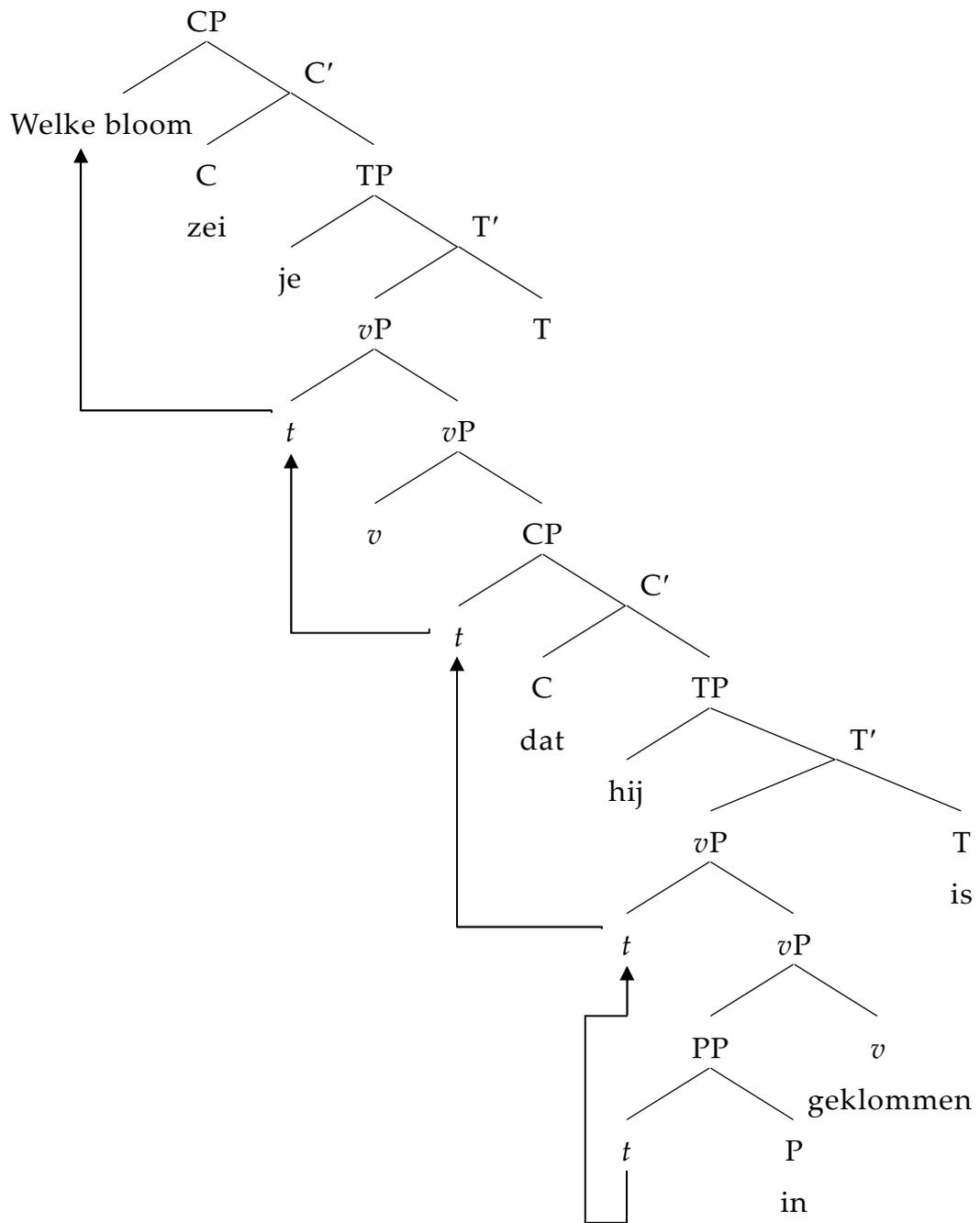
geklimmen is?

climbed is

'Which tree did you say that he climbed into?' (Law (2006: 636))

Although we saw above that R-pronoun always precedes the preposition governing it, some Ps can be postpositional even with other pronouns or full NP in Dutch; in (39a), P (= *in*) following its complement (= *de boom*) is postpositional. Furthermore such Ps allow preposition stranding, as shown in (39b).²³ Considering that Dutch is an OV language and P is postpositional, the derivation of preposition stranding in (39b) is schematized as follows:

(40) * Preposition stranding with other pronouns (see (39b))



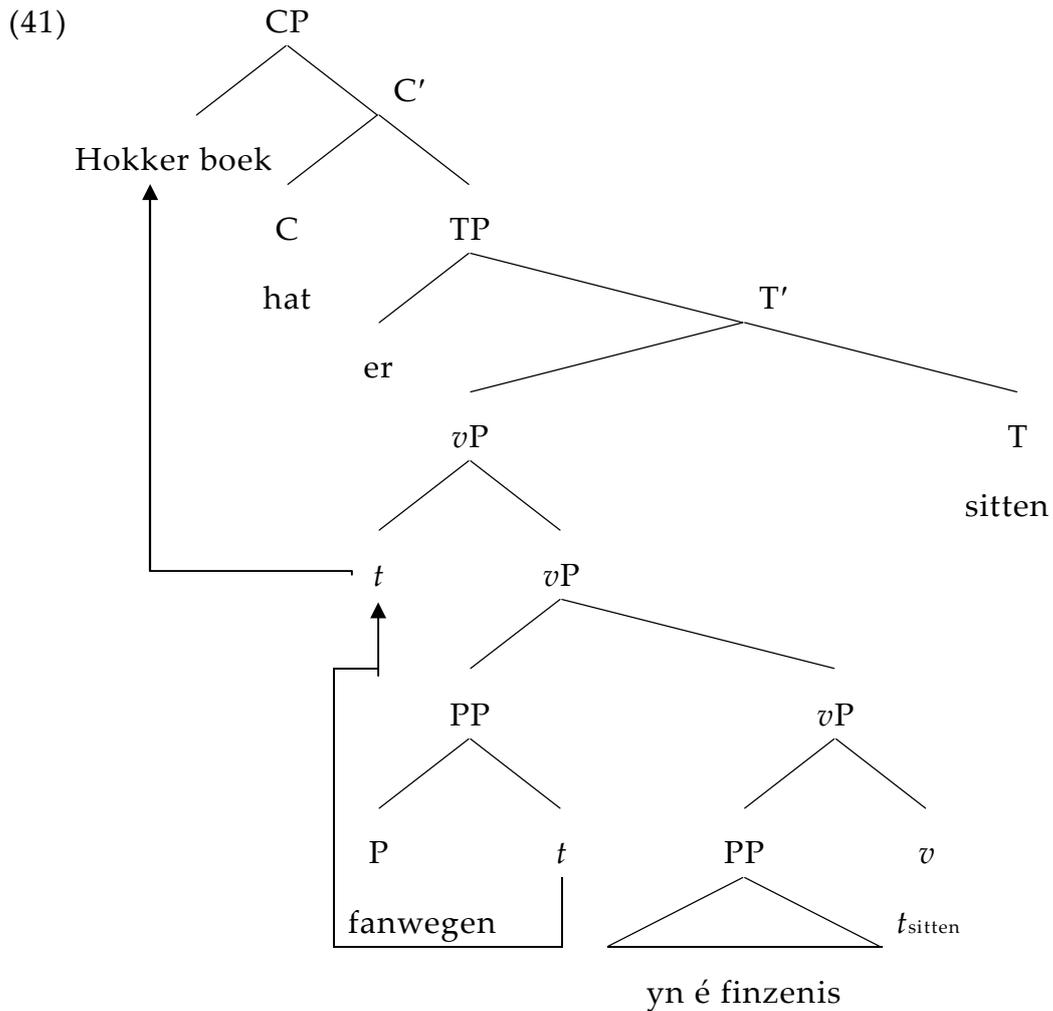
- a. PP: *Welke bloom* < P (= *in*)
- b. embedded vP: *Welke bloom* < P (= *in*) < v (= *geklommen*)
- c. embedded CP: *Welke bloom* < C (= *dat*) < *hij*
< vP (= *in geklommen*) < T (= *is*)
- d. matrix CP: *Welke bloom* < C (= *zei*) < *je* < v < CP
(= *dat hij in geklommen is*)

As shown in (40), linearization information produced at the level of PP (i.e. P *in* follows *Welke boom*) is reserved throughout the whole derivation. This is why preposition stranding with postpositional *in* like (39b) is accepted.

Another interesting fact is found in Frisian. Consider the following examples:

- (40) a. *Hokker kandidaat stimme jimme op?* (Frisian)
 which candidate vote you for
 ‘Which candidate do you vote for?’ (Hoekstra (1995: 97))
- b. * *Hokker boek hat er [PP fanwegen t_{Hokker boek}] yn*
 which book had he because-of in
 é finzenis sitten?
 the prison sat
 ‘Which book was he in prison because of?’ (Hoekstra (1995: 98))

In Frisian, the majority of adpositions can appear either to the left or right of their complement, we can therefore predict that most adpositions can be stranded at least by *wh*-movement. This prediction is borne out by (36a). However, a few prepositions lack a postpositional counterpart, and it is impossible for such preposition to be stranded by *wh*-movement, as illustrated by *fanwegen* ‘because-of’ in (36b). Taking it into consideration that Frisian is an OV language and *fanwegen* is always prepositional, the impossibility of preposition stranding in (36b) can be accounted for in terms of the following derivation:



- a. PP: P (= *fanwegen*) < *Hokker boek*
- b. vP: *Hokker boek* < PP (= P) (= *fanwegen*) < PP (= *yn é finzenis*) < *v*
(= *sitten*)
- c. CP: *Hokker boek* < C (= *hat*) < *er* < vP (= *fanwegen yn é finzenis*) < *v* < T (= *sitten*)

As shown in (41), the *wh*-phrase (= *Hokker boek*) moves to [Spec, CP] via [Spec, vP]. Due to the Anti-locality Constraint in (17), it cannot stop off at [Spec, PP] to revise the order P-*Hokker boek* at the level of PP. The relative ordering between *Hokker boek* and P (= *fanwegen*) is contradicted in PP and vP/CP. Therefore, preposition stranding is impossible when the preposition does not

have postpositional counterpart.

To sum up, the approach based on cyclic linearization can deal with cross-linguistic behavior of preposition stranding. In Romance, preposition stranding is impossible because extraction out of PP yields an ordering contradiction between P and the object. In Germanic, preposition stranding is possible when the object is R-pronoun or when P can be postpositional, because the relative ordering between R-pronouns and P is kept unchanged.

2.6. Conclusion

This chapter has attempted to account for the historical development of preposition stranding in English within the recent framework of the minimalist program by incorporating the model of cyclic linearization proposed by Fox and Pesetsky (2005a). It has been argued that preposition stranding is possible as long as there is no ordering contradiction between a preposition and its object, and the cyclic linearization approach allows us to provide a principled explanation for the facts that preposition stranding was only possible in restricted contexts in OE, and that its possibility was greatly expanded in the course of ME. In addition, it has shown that the approach proposed here can account for preposition stranding in other languages than English.

Notes to Chapter 2

¹ Although a detailed analysis of preposition stranding in PE is beyond the scope, it should be noted that its possibility is restricted, depending on the relation between V and P/PP. First, preposition stranding is generally impossible when the object moves out of adjunct PPs, as illustrated in (i). This is due to a violation of some constraint prohibiting extraction from adjuncts (Huang (1982), Chomsky (1986, 2004), and Müller (2010)).

- (i) a. * What time did John arrive at?
(Hornstein and Weinberg (1981: 56))
- b. * The room, John hit Mary in.
- c. * Third round was lost in by Rockey. (van Riemsdijk (1978: 220))

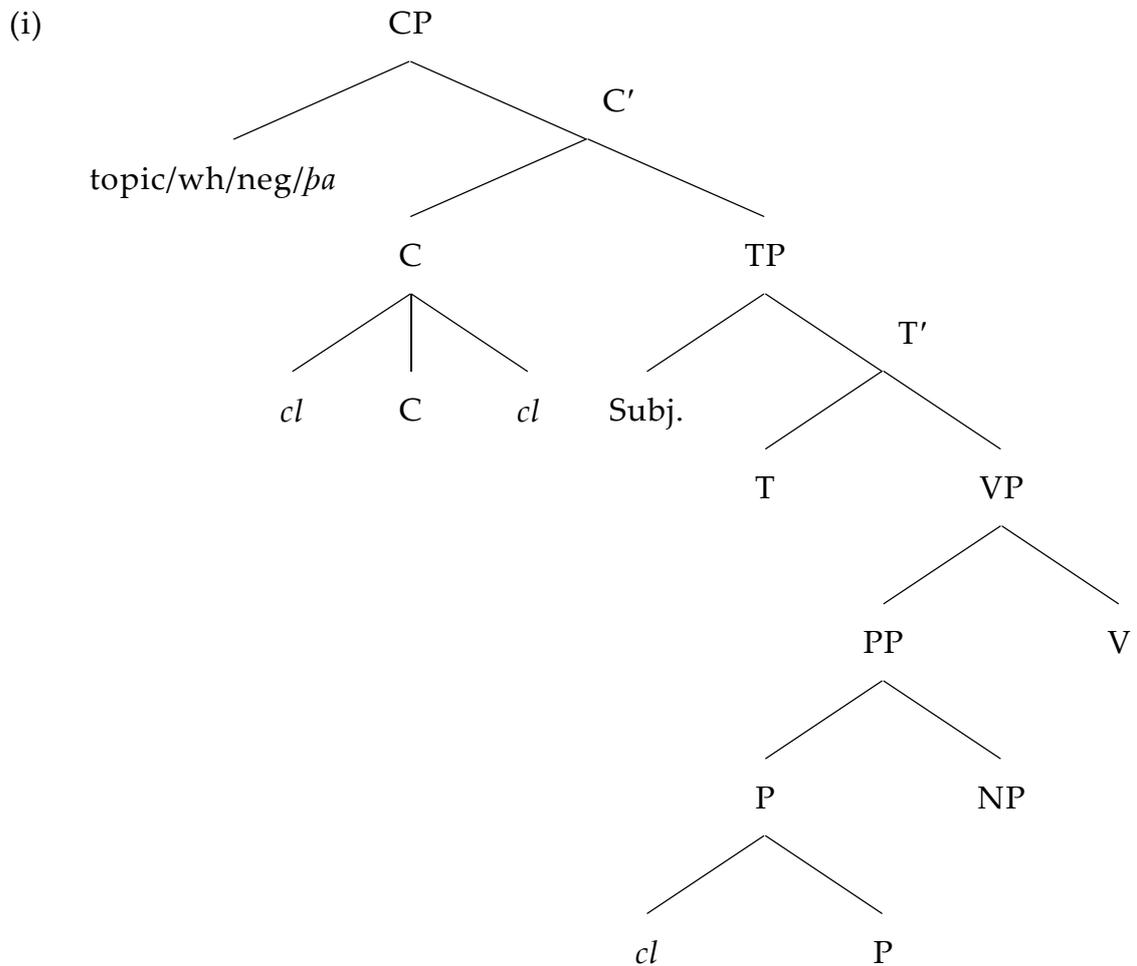
Furthermore, it is often claimed that preposition stranding requires V and P to be reanalyzed as a single complex verb (cf. Hornstein and Weinberg (1981)). In this respect, passives behave differently from A'-constructions, in that reanalysis is obligatory in the former, but not in the latter. This is shown by the following contrast, where reanalysis cannot apply because of the intervention of adverbials between V and P.

- (ii) a. That's something that I would pay *twice* for.
- b. These are the books that we have gone *most thoroughly* over.
(Bresnan (1982: 54))
- (iii) a. * Everything was paid *twice* for.

b. * Your books were gone *most thoroughly* over. (Bresnan (1982: 54))

The necessity of reanalysis in passives is plausibly related to the fact that they involve Case absorption; see section 4.2 and footnote 12 for related discussion.

² Van Kemenade (1987) argues that pronouns in OE are clitics, which can appear in various positions illustrated by *cl* in the following structure.



(cf. van Kemenade (1987: 133))

First, pronominal objects of a preposition can appear to the left of a preposition, which is illustrated by the example in (2) and (6). Second, pronouns can appear to the left or right to a finite verb moved to C, which is illustrated in (3) and (7). More precisely, pronouns encliticize on a finite verb in C in topic-initial contexts, and procliticize in contexts with initial *wh-*, negative and *þa*.

³ Expressions like (4) have survived into PE as lexicalized units such as *therein*, *thereat*, and *thereon* (Fischer and van der Wurff (2006: 198)). As *þær* always preceded the preposition governing it, it therefore would be more accurate to call the phenomenon in (5) *postposition stranding*, but I will continue to use the term *preposition stranding* for the sake of convenience.

⁴—There was another type of relative clause, which was introduced by *þæt* ‘that’ (isomorphic to and a source of the demonstrative pronoun *þæt*), and it has also survived in to PE as *that* relative clause. It appears that *þæt* relative clauses had an option of pied-piping, contrary to *þe* relative clauses:

- (i) fram ðam godcundum worde, ðurh þæt ðe ealle
 from the divine world, throufh that the all
 þing sind geworhte
 things are made

‘from the divine world, through which all things are made’

(c1000 Ælfric *CHom* II.363.14-15 / Ukaji (2000: 249))

That being said, the example like this is ambiguous in that it exemplifies either pied-piping or the demonstrative pronoun. Therefore, we will not count *þæt* relative clauses as constructions which have pied-piping.

⁵ When *þær* was used as a locative relative pronoun, preposition stranding was exceptionally possible:

- (i) a. oð þæt he gestod bufon ðam gesthuse, þær
 until that he stood above the inn where
 ðæt cild in wunode
 the child on stayed
 ‘until it (the star) stood above the inn where the child was
 staying’ (ÆCHom, I, 5.78.21 / Fischer et al. (2000: 66))

I will not investigate preposition stranding in *þær* relative clauses separately in what follows, because it can be analyzed in the same way as preposition stranding with the locative pronoun *þær*.

⁶ Van Riemsdijk (1978) claims that preposition stranding as a result of extraction is subject to the general constraint on extraction in (i):

(i) The Head Constraint:

... X_i ... [Hⁿ ... [H' ... Y_i ... H ... Y_j ...]_{H'} ...]_{Hⁿ} ... X_j ...

(where H is the phonologically specified (i.e. non-null) head and Hⁿ

is the maximal projection of H) (van Riemsdijk (1978: 160))

The Head Constraint in effect states that direct extraction of an element out of a certain phrase is impossible if that element originates in the lowest branching level of that phrase. The parametrized factor deriving the cross-linguistic patterns is then taken to be the distribution of [Spec, PP] positions for use as escape hatch.

⁷ Abels (2003) argues that van Riemsdijk's (1978) analysis is empirically lacking in that it would predict that nothing can escape from PP without violating the head constraint in languages with no preposition stranding: those languages may still allow smaller constituents embedded within the complement of a preposition to escape PP, as illustrated below:

(i) German:

[_{PP} Über	welches	Thema]	hast	du	mich	noch mal
about	which	topic	have	you	me	again
[_{PP} nach	einem	Buch	<i>t</i> Über welches Thema]	gefragt?		
after	a	book	<i>t</i> about which book	asked		

'Which topic did you ask me about a book on again?' (Abels (2003: 211))

In the above example, PP *Über welches Thema* undergoes extraction out of larger PP. It is therefore empirically inadequate to treat the (im)possibility of preposition stranding as purely the extractability from PP. Abels' (2003) version of an escape hatch based approach is designed with these considerations in mind.

⁸ Abels (2003) argues that the Anti-locality Constraint is induced by the nature of last resort. In his approach, movement is construed as a last resort operation, and is legitimate only if it leads directly to the establishment of new feature checking possibilities. If the closest possible relationship between two nodes (i.e. mutual c-command) holds between a head and its complement, no additional locally determined feature checking possibilities could arise from movement of that complement to the specifier, so that such movement is illegitimate.

⁹ A similar problem arises in van Riemsdijk's (1978) approach. The parameter he postulates (i.e., whether PP has an escape hatch position, namely [Spec, PP], or not) is also a restatement of the fact that preposition stranding is possible in some languages but not in others.

¹⁰ Fox and Pesetsky (2003, 2005a) suggest that there is a variation of Spell-out domains across languages, especially between *v*P and VP: *v*P is a Spell-out domain in English, while VP is so in Scandinavian languages like Swedish. Furthermore, in Korean, Ko (2007) argues that *v*P is a Spell-out domain possibly in addition to VP.

¹¹ Linearization information of matrix CP is not represented in (19), because landing sites for pronouns are not fixed. As we have seen in note 3, one can regard pronouns as clitics or weak pronouns, which adjoin to C (van Kemenade (1987, 1997) or move to the specifier of a functional projection between CP and TP, which can be identified as, for example, AgrP (Fischer et

al. (2000), Haeberli (2002), Tanaka (2000)) or FinP (Nawata (2009))

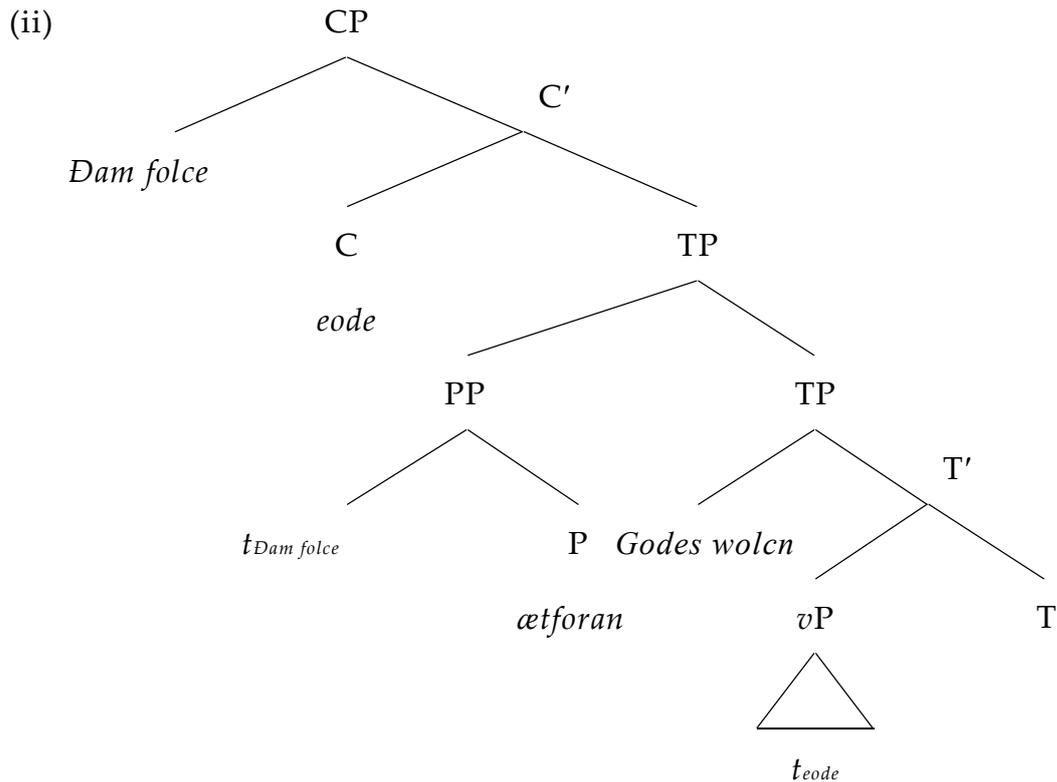
¹² One might wonder why P could follow its pronominal object, but not its full NP object within PP in OE. This is the observed fact of OE (see (2b) and (4)) that can be traced back to the historical development of adpositions in which they were postpositions in Proto-Indo-European (Lehman (1974: 234)), and they were still postpositional when their objects were pronouns in Proto-Germanic (Hopper (1975: 41)). Therefore, the possibility of head-final P in the case of pronominal objects would be a residue of prehistoric OE (which disappeared in ME; see section 2.3.1).

In this connection, it should be of interest to note Wende's (1915) findings that there are a number of examples of preposition stranding with full NP objects in Gregory's dialect, where P was often postpositional even when the object was full NP (cf. Allen (1980: 72)):

- (i) a. *Ðam folce eode ætforan symle Godes wolcn*
the people-DAT went before always God's cloud
'The people, God's cloud always went before'

(Alc. Th. Vol. 2 p. 196.7 / Allen (1980: 72))

In the above example, the full NP *þam folce* is separated from the preposition governing it *ætforan* by topicalization, which is manifested by dative Case marking on it. This preposition stranding is possible because it does not yield an ordering contradiction, as illustrated below with adjunction of the adverb *symle* "always" omitted for simplicity:



- a. PP: **Obj, (Ðam folce) < P (ætforan)**
- b. CP: **Obj, (Ðam folce) < C (eode) < P (ætforan)**
 <Subj. (Godes wolcn)

When Spell-out applies at the level of PP, it is established that Obj. precedes P, as shown in (ii-a). Then, at the level of CP, Obj. moves to [Spec, CP] yielding the linearization in which Obj. precedes P, as shown in (ii-b).

¹³ This account assumes that P preceded the relative pronoun *se* within PP in OE. This would be supported by the fact that the demonstrative *se*, which was isomorphic to (and a source of) the relative pronoun, always followed P unlike personal or locative pronouns (cf. Allen (1980))

¹⁴ It is standardly assumed that inherent Case is assigned from a head to its

complement based on θ -role assignment, which is formulated by Chomsky (1986: 194) as follows:

(i) Uniformity Condition

If α is an inherent Case-marker, then α Case-marks NP if it θ -marks the chain headed by NP

Therefore, prepositional phrases in OE did not have the split projections as in (25)

¹⁵ There have been a number of studies suggesting that prepositional phrases are *pP* in PE (Abels (2003), Matsubara (2000), and Svenonius (2008, 2010) among others). Matsubara (2000) adduces the possibility of prepositional subjects in PE (e.g., *Under the bed is a nice place to hide.*) in order to argue for the *pP* analysis. Then, the development of prepositional subjects might provide a clue to determining when *pP* emerged in the history of English. I have investigated the distribution of prepositional subjects by employing *The York-Toronto-Helsinki Parsed Corpus of Old English Prose* (YCOE) and *The Penn-Helsinki Parsed Corpus of Middle English, Second edition* (PPCME2), and found out that they began to be attested in the latter half of the fourteenth century (24 examples in ME3 (1550-1420)). Thus, apart from the theory-internal argument on Case assignment in the text, this result could provide independent support for the structural change of prepositional phrases in ME.

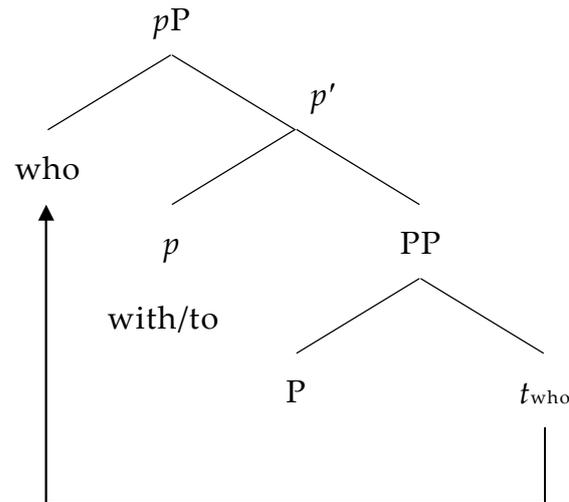
¹⁶ We therefore assume that prepositional phrases as a whole, whether they are PP or *pP*, count as a Spell-out domain. Then, one might wonder what prepositional phrases have in common with CP and/or *vP* to be qualified as a Spell-out domain. It should be mentioned in this connection that there have been some studies which draw a parallelism between CP and PP. For example, based on the hypothesis that functional projections are “extended” projections of lexical heads they dominate, Grimshaw (1989, 2000, 2005) claims that just as CP is the largest extended projection of V, so PP is the largest extended projection of N. Based on this claim, it may be suggested that (in addition to *vP*) the largest extended projections of N and V count as Spell-out domains. In the case of prepositional phrases, *pP* is a Spell-out domain if they have split projections as in (25); otherwise, PP is a Spell-out domain. See also Emonds (1985) for related discussion.

¹⁷ The movement to [Spec, *pP*] is confirmed by the facts from “Sluicing” (Ross (1969));

- (i) a. John left, but I don’t know *who with*. (van Riemsdijk (1978: 240))
b. Speaker A: He has been talking to someone.
Speaker B: Who to? (cf. Radford (2009: 206))

Given that sluicing is a result of TP-deletion after *wh*-movement (Merchant (2001)), it follows from a *wh*-pronoun followed by a preposition such as *who with* or *who to* in the above examples that the *wh*-pronoun actually moves to [Spec, *pP*], and then the whole *pP* moved to [Spec, CP], as illustrated below:

(ii)



I will not pursue the question of why *pP* with a *wh*-pronoun in its specifier cannot be seen other contexts than sluicing.

¹⁸ The movement of NP to [Spec, *pP*] in (27), which serves to revise the ordering between P and NP, is not motivated by Case checking, but it is possible since it does not violate the Anti-locality Constraint. See Bošković (2007) for a mechanism of successive-cyclic movement without feature checking in intermediate positions.

¹⁹ Alternatively, the rise of preposition stranding in passives could be accounted for by updating van Kemenade's (1987) analysis based on reanalysis, an operation which combines V and P into a complex verb. According to her, reanalysis became available in ME because P came to assign structural accusative Case, and the word order change from OV to VO led to the linear adjacency between V and P. When the reanalyzed structure in (i) is passivized, the passive morpheme absorbs structural accusative Case assigned by the complex verb, as shown in (ii), which in turn allows the

support to the cyclic linearization approach, and argues against the Head-Complement Parameter based approach.

²¹ According to King and Roberge (1990), Acadian French spoken in Prince Edward Island, Canada, allows relatively free preposition stranding:

- (i) a. *Quoi-ce* que tu as parlé hier à Jean *de*?
what-it that you have talked yesterday to John about
'What did you talk to John about yesterday?'
- b. Robert a été parlé beaucoup de au meeting
Robert has been talked a lot of at meeting
'Robert talked about a lot at the meeting'

Due to lack of access to more detailed description of the language, we will not discuss this dialect of French any further.

²² Of course, we can attribute the impossibility of preposition stranding under A'-movement to Case-conflict, just as we did so in analyzing prepositional passives in OE in (24).

²³ Van Riemsdijk (1978) argues that, in cases like (35), P is not really postpositional, but it incorporates into V, as shown in (i) below:

- (i) a. Je zei dat hij [_{PP} *t*_{in} de boom] [_V in+geklommen] is. (= (35a))

- b. Welke boom zei je dat hij [_{PP} *t*_{in} *t*_{Welke boom}] [_V in+geklimmen] is?
 (= (35a))

As a result, the head position of PP is empty and the Head Constraint (cf. note 6) no longer applies. However, there are some facts that do not fall under this account: P clearly does not incorporate into V, yet extraction from PP is possible, as illustrated in (ii) below:

- (ii) a. *Welke boom* krom Jan [_{PP} in *t*_{Welke boom}]?
 which tree climbed Jan in
 ‘Which tree did Jan climb into?’

- b. Ik geloof dat Jan *de boom* gisteren [_{PP} in *t*_{de boom}]
 I think that Jan the tree yesterday in
 is geklimmen.
 is climbed
 ‘I think that Jan climbed into that tree yesterday.’

- c. *Welke boom* zei je dat hij [_{PP} in *t*_{Welke boom}] is
 which tree said you that he in is
 geklimmen?
 climbed
 ‘Which tree did you say that he climbed into?’ (Law (2006: 637))

Chapter 3

On Pied-Piping in Finite Clauses in English

3.1. Introduction

A *wh*-pronoun can move on its own or with other constituents including it in relative and interrogative clauses, as illustrated in (1) and (2) respectively:

- (1) a. He's the one who I bought it from.
b. He's the one [from whom] I bought it.

(cf. Huddleston and Pullum (2002:627-628))

- (2) a. Who are they doing it for?
b. [For whom] are they doing it?

(cf. Huddleston and Pullum (2002:627-628))

The latter cases are called *pied-piping*, first introduced by Ross (1967): the preposition *to* is pied-piped along with the relative/interrogative pronoun *who(m)*, so that the whole PP *from whom/for whom* moves (to [Spec, CP]). As we will see closely later, *pied-piping* ranges widely in its size and categorial

type, though there is some limitation on its availability. A large number of analyses have been proposed to account for the phenomena of pied-piping (Cable (2010a, b), Cowper (1987), Grimshaw (1991, 2000, 2005), Heck (2008, 2009), Honda (1993), Webelhuth (1992), among others). Most of these studies argue that there is a certain mechanism which enables some phrases or categories including *wh*-pronouns to move but forbids others. However, relative and interrogative clauses are so different from one another in the available phrases or categories for pied-piping that it is not enough to merely assume a certain mechanism.

The purpose of this chapter is to account for the phenomena of pied-piping, discerning two different types of pied-piping: pied-piping in relative clauses and pied-piping in interrogative clauses. The organization of this chapter is as follows. Section 3.2 outlines the data of pied-piping of various categories. Section 3.3 reviews the previous studies, pointing their problems. Section 3.4 presents a new analysis of pied-piping. Section 3.5 is the conclusion of this chapter.

3.2. Outline of the Data

This section reviews the basic facts about pied-piping according to the types of pied-piped categories, which some previous studies fail to notice. As will be shown, the acceptability of pied-piping is higher in relative clauses than in interrogative clauses.

Let us first consider simpler cases. When a *wh*-pronoun occupies the specifier of DP in the genitive, i.e. *whose*, it pied-pipes the whole DP (cf. Abney (1987)):

- (3) a. I wonder [whose book] they read? (Grimshaw (2000: 129))
 b. [whose essay] he plagiarized (Huddleston and Pullum (2002: 1043))

The same holds true for AP and AdvP:

- (4) a. [How old] is John? (Webelhuth (1992: 122))
 b. [How fast] did John run? (Webelhuth (1992: 123))

How in the specifier of AP/AdvP pied-pipes the whole AP/AdvP.

We have already seen in (1) and (2) that a *wh*-pronoun in the complement of a preposition can pied-pipe the whole PP in both relative and interrogative clauses. It should be noted, however, that preposition stranding is preferred over pied-piping of PP in English, and that such preference is especially remarkable in embedded interrogative clauses.¹

When PP with a *wh*-complement is a complement of a noun, pied-piping of the whole DP/NP is possible in relative clauses but not in interrogative clauses. The contrast between relative and interrogative clauses is illustrated by the examples in (5) and (6), respectively:²

- (5) a. Reports [the covers of which] the government prescribes the
 height of the lettering on almost always put me to sleep.
 (Ross (1986: 121))
 b. She's just sat her final exam, [the result of which] we expect
 next week. (Huddleston and Pullum (2002: 1040))
 (6) a. * [The problems of what] did he solve?

(Ortiz de Urbina (1993: 190))

- b. * I asked [the rumors about whom] shocked him.

(Webelhuth (1992: 121))

Pied-piping of DP(/NP) such as (5) is acceptable more highly in appositive (or non-restrictive) relative clauses than in restrictive relative clauses (Huddleston and Pullum (2002: 1040)).

The similar observation holds in pied-piping of AP. The contrast between relative and interrogative clauses is illustrated by the examples in (7) and (8), respectively:

- (7) a. This is the kind of woman [proud of whom] I could never be.

(Webelhuth (1992: 128))

- b. The tree, [seated next to which] they found themselves, had been planted on the highest point in the park.³

(Nanni and Stillings (1978: 311))

- c. The many varieties of mammalian skin secretions perform a wide range of functions, [prominent among of which] is sexual attention.

(Huddleston and Pullum (2002: 629))

- (8) a. * [Proud of whom] is John? (Webelhuth (1992: 122))

- b. * Horace wanted to know [proud of who] Egbert was.

(Heck (2009: 169))

It is possible for a *wh*-complement of a preposition to pied-pipe the whole AP which takes the PP as its complement in relative clauses as in (7), but

impossible in interrogative clauses as in (8). As shown in (7), pied-piping of AP is possible both when the pied-piped AP is evidently fronted by relativization and when it apparently remains in situ, and it is more likely to be accepted in appositive relative clauses than in restrictive relative clauses (Huddleston and Pullum (2002: 1042)).

Some adverbs derive from adjectives, and such adverbs seem to show the same contrast as the original adjectives with respect to the acceptability of pied-piping, as illustrated in (9) and (10):

- (9) a. Trinh [...] discussed the “subjectivity of a non-I/plural I” [...] as a strategy to counter hegemonic Western conceptualizations of the self as a single, unitary, fixed (mental) entity that owns a body, [independently of which] it creates knowledge. (taken from Ellingson (2006: 306))
- b. In two of them, normal serum concentrations of bile acids have been attained, [concomitantly with which] there has been associated improvement in liver function and physical growth. (taken from Sharp et al. (1967: 733))
- (10) a. * [Independently of whose work] did John find the principle? (Honda (1993: 30))
- b. * [Far from where] did she go? (de Urbina (1993: 190))

Pied-piping of AdvP is acceptable in appositive relative clauses (only marginally), but not in interrogative clauses.

Furthermore, there is another type of pied-piping, which may be called

clausal pied-piping (Ishihara (1984)). As its name suggests, this type of pied-piping involves the fronting of a clausal constituent that contains a *wh*-pronoun:

- (11) a. I became disturbed by a ‘higher criticism’ of the Bible, [to refute which] I felt the need of a better knowledge of Hebrew and archaeology. (Huddleston and Pullum (2002: 1043))
- b. The elegant parties, [to be admitted to one of which] was a privilege, had usually been held at Delmonico’s.
(Nanni and Stillings (1978: 311))
- c. The loud music, [listening to which] made her nervous, finally ended. (Nanni and Stillings (1978: 314))
- d. John went to buy wax for the car, [washing which], Mary discovered some scratches in the paint. (Ishihara (1984: 399))

Clausal pied-piping is restricted to appositive relative clauses. In (11a) and (11b), pied-piped infinitival clauses serve as a purpose adjunct and a subject in appositive relative clauses, respectively. As shown in (11c) and (11b), pied-piped clausal constituents can be gerundive or participial, respectively. Clausal pied-piping, however, does not apply freely, and has two limitations on its use. First (and most importantly), a pied-piped clause must not include an overt subject:

- (12) a. * The men, [for whom to be invited to the elegant parties] was a privilege, were appropriately appreciative.

(Nanni and Stillings (1978: 317))

b. * The man, [whose singing songs loudly] disturbed us, finally moved away. (Nanni and Stillings (1978: 318))

c. * This is the man, [with whom reading the letter] Mary left the room. (Ishihara (1984: 404))

(13) a. * The elegant parties, [for us to be admitted to one of which] was a privilege, had usually been held at Delmonico's.

(Nanni and Stillings (1978: 311))

b. * The loud music, [her listening to which] annoyed the neighbors, finally ended. (Nanni and Stillings (1978: 314))

c. * This is the letter, [with Mary reading which aloud], John got up to leave. (Ishihara (1984: 405))

As illustrated in (12) and (13), clausal pied-piping with an overt subject is ungrammatical whether the subject is the relative pronoun or not. Second, a pied-piped clause must be non-finite, so that pied-piping of a finite CP is ungrammatical, as illustrated in (14):

(14) a. * They bought a car, [that their son might drive which] was a surprise to them. (Nanni and Stillings (1978: 311))

b. * The car, [the idea that which might be a lemon] was a surprise to them, was painted bright orange.

(Nanni and Stillings (1978: 318))

It follows from the facts in (12)-(14) that clausal pied-piping is accepted if and only if the pied-piped clauses lack both tense and overt subjects.

Although we saw above that relative clauses are more permissive in pied-piping than interrogative clauses, some studies have observed that matrix interrogative clauses allow a wide range of pied-piping if they receive echo readings (e.g. Cowper (1987), Heck (2008), de Vries (2006a)), as illustrated below:

- (15) a. [Affected by WHAT] was the area?
- b. [Pictures of WHICH family] are on sale?
- c. [To hire WHICH person] would be a real scoop? (Heck (2008: 169))

Note that the corresponding pied-piping is impossible in embedded interrogative clauses, where echo readings are essentially unavailable. *Wh*-words in echo questions are interpreted in terms of the discourse context (cf. Sobin (1990)), so in what follows, examples such as (15) are put aside which are thought to receive echo readings.

The acceptability of pied-piping according to pied-piped categories and clausal types is summarized in the following table:

	Interrogative clauses	Relative clauses
PP	ok	ok
DP	out	ok
AP	out	ok
AdvP	out	ok
Non-finite clauses	out	ok (with no overt subjects)
Finite Clauses	out	out

As shown in the table, relative clauses are more permissive in the acceptability of pied-piping than interrogatives. In the light of these facts, the following two questions will arise:

- (I) What is the mechanism which makes pied-piping (im)possible?
- (II) Why do relative and interrogative clauses differ in the acceptability of pied-piping?

In the subsequent section, we will review the previous studies of pied-piping, pointing out that they cannot give the satisfactory answer to the questions above.

3.3. Previous Studies

Reviewing the descriptive data, we have raised the two questions in the end of the last section. As for the first question, there have been three

approaches proposed. The most widely held is the mechanism of feature percolation (Chomsky (1973), Cowper (1987), Grimshaw (1991, 2000, 2005), Honda (1993), Webelhuth (1992)). By contrast, two mechanisms have been proposed without recourse to feature percolation: a violable constraint, Local Agree, by Heck (2008, 2009) and the Q-based analysis by Cable (2010a, b). This section reviews these three previous approaches to pied-piping in turn.

3.3.1. Feature Percolation

In this subsection, we will review one of the most influential analysis of pied-piping, feature percolation by Grimshaw (1991, 2000, 2005), who argues that the *wh*-feature percolates through an ‘extended’ projection.

Grimshaw posits the functional feature [\pm F] in addition to categorial features such as [\pm V, \pm N]. With this feature specification, she considers a categorial label to be a pair consisting of a categorial specification and a functional specification, as shown in (16) and (17):

- (16) a. V [verbal] {F0}
 b. I [verbal] {F1}
 c. C [verbal] {F2} (Grimshaw (2000: 117))
- (17) a. N [nominal] {F0}
 b. D [nominal] {F1}
 c. P [nominal] {F2} (Grimshaw (2000: 117))

Lexical heads such as V and N share the categorial features with the functional heads that govern them: V shares the feature [verbal] with I and C

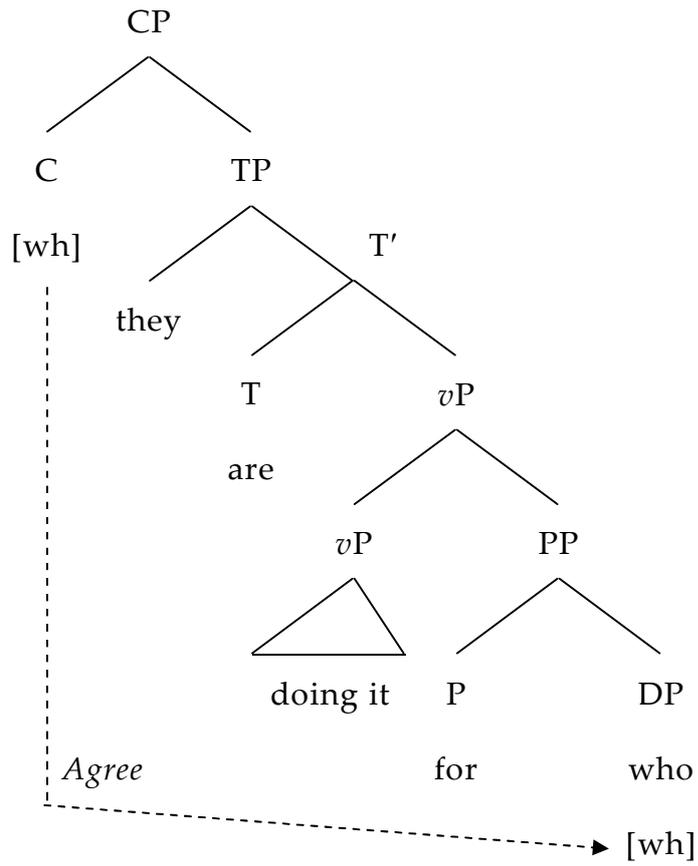
which govern it, as shown in (16); N shares the feature [nominal] with D and P which govern it, as shown in (17). Furthermore, functional heads are different from the relevant lexical heads with respect to the functional value: the lexical heads (V and N) have the value [F0], the functional heads governing the lexical heads immediately (I and D) have the value [F1], and the functional heads governing the functional heads with [F1] (C and P) have the value [F2]. A lexical head and the layers of functional heads governing it share the same categorial feature, forming a projection with a lexical head, that is, an *extended projection*. Under this assumption, a phrase can be both a configurational complement to a head, and also a part of the same projection.

Based on the notion of an extended projection, let us take a look at how the analysis based on an extended projection derives restrictions on pied-piping. Consider first pied-piping of PP, which is acceptable.

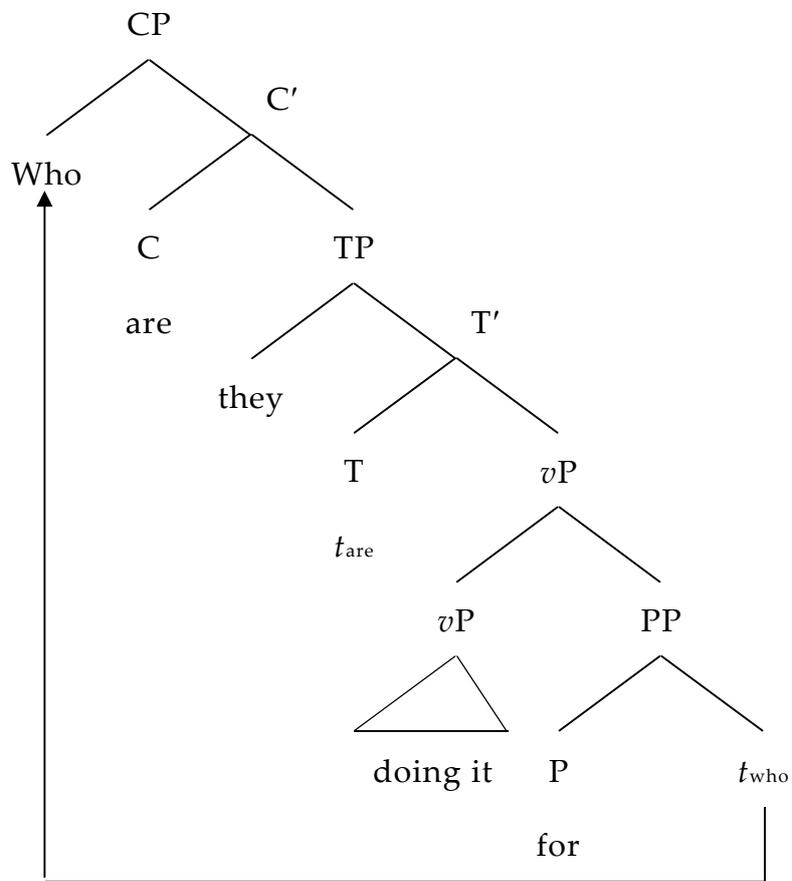
- (18) a. Who are they doing it for?
- b. [For whom] are they doing it?

Given the standard assumption that *wh*-movement is triggered by Agree between the interrogative C as a probe and the *wh*-element as a goal in terms of *wh*-feature (cf. Chomsky (2000, 2001), the account based on feature percolation goes as follows. In (18a), Agree applies in terms of *wh*-feature between the interrogative C and the *wh*-pronoun *who* in terms of [wh], with the fronting of *who* to follow, as illustrated in (19):

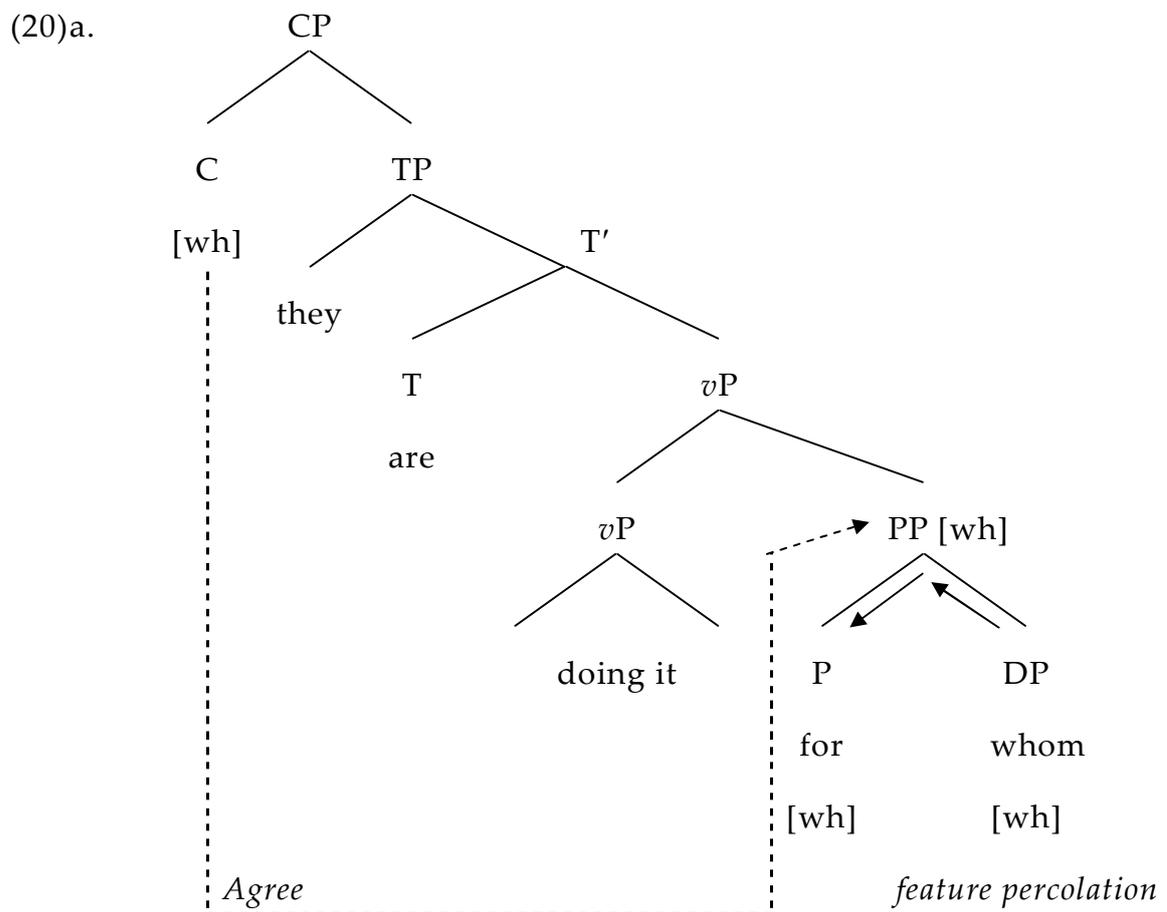
(19)a.

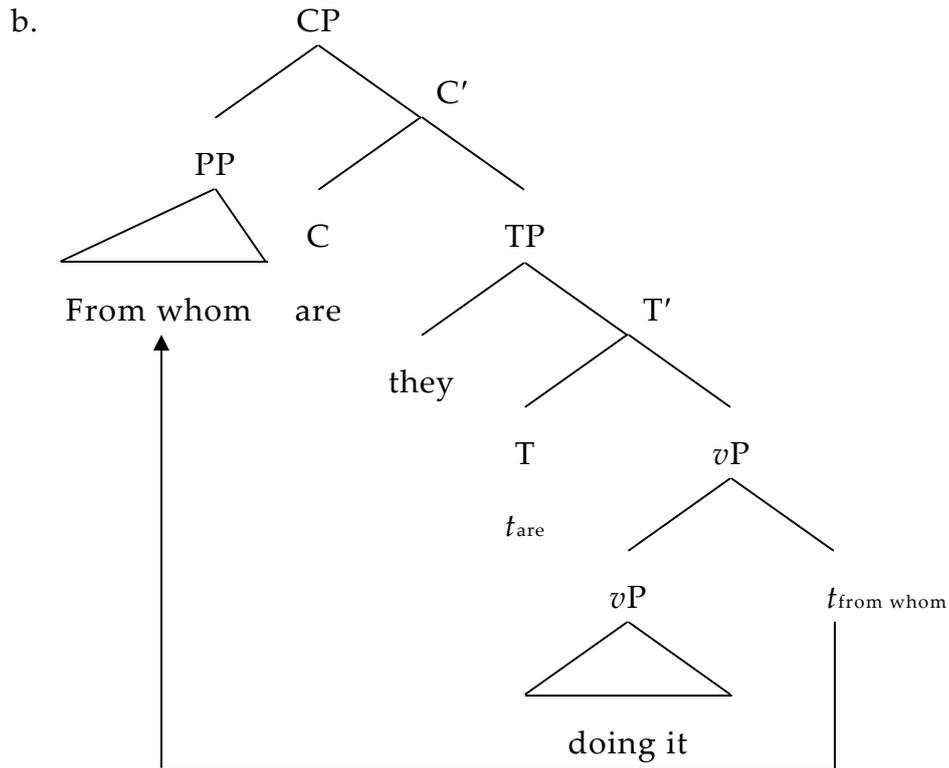


b.

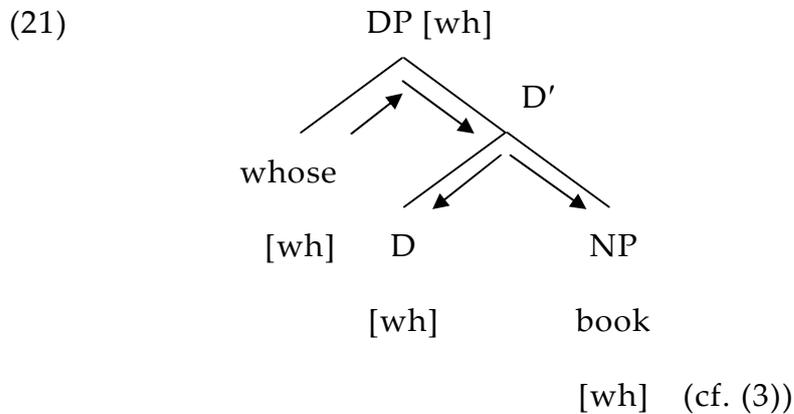


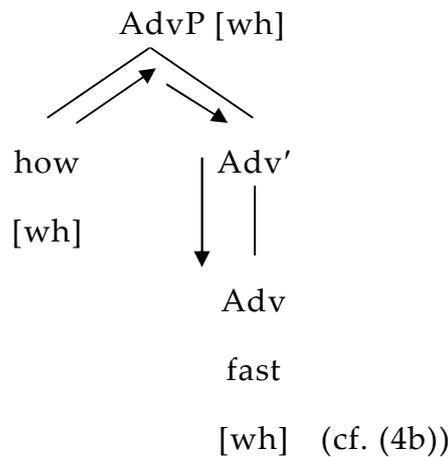
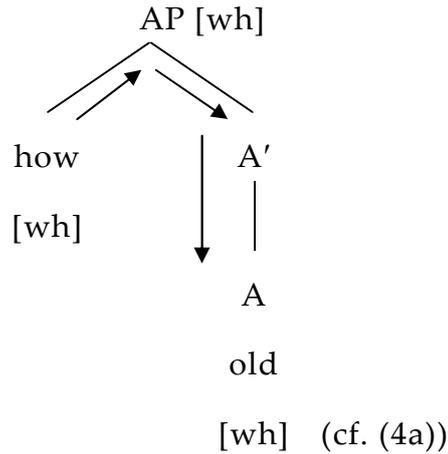
In (18b), on the other hand, the preposition (*for*) forms an extended projection with the *wh*-pronoun (*whom*), because P and D share the same categorial feature (i.e. [nominal]) and the functional value of P {F2} is higher than that of D {F1}. Then, the *wh*-feature of *whom* can percolate from the complement onto the preposition (*for*), so that the whole PP (*for whom*) bears the *wh*-feature. Consequently, Agree applies between C and the PP (*from whom*) in terms of [wh], followed by the fronting of *from whom*, as schematized in (20):





Feature percolation is applied not only when a *wh*-pronoun occupies the complement as in (18) but also when it occupies the specifier, so pied-piping of DP/AdjP/AdvP in (3) and (4) is also considered as a consequence of feature percolation. Feature percolation within the pied-piped categories (*whose book*, *how old*, and *how fast*) in (3) and (4) are illustrated in (21):





Although the analysis based on an extended projection can deal with pied-piping of PP or pied-piping of DP/AP/AdvP by specifier nicely, it is evidently unable to account for pied-piping of various types of categories. Under this analysis, a *wh*-pronoun (= DP) in the complement position forms an extended projection only with P, because P has the same categorial feature [nominal] as D and P's functional feature {F2} is higher than D's {D1}. Therefore, it would be predicted that pied-piping is only limited to PP. In section 2, however, we saw instances of pied-piping of DP, AP, AdvP, and non-finite clausal constituents. There are other ways than introducing the notion of an extended projection in order to circumscribe the area of feature percolation available (e.g. Cowper (1987), Webelhuth (1992)), but all of them

are concerned only with pied-piping in interrogative clauses, without consideration of pied-piping in relative clauses. Moreover, even if some solutions proffer to define the scope of feature percolation, they can hardly explain why there is a difference in acceptability of pied-piping between relative and interrogative clauses, which implies that the analyses based on feature percolation cannot answer the latter question that we raised in the previous section, repeated here.

- (II) Why do relative and interrogative clauses differ in the acceptability of pied-piping?

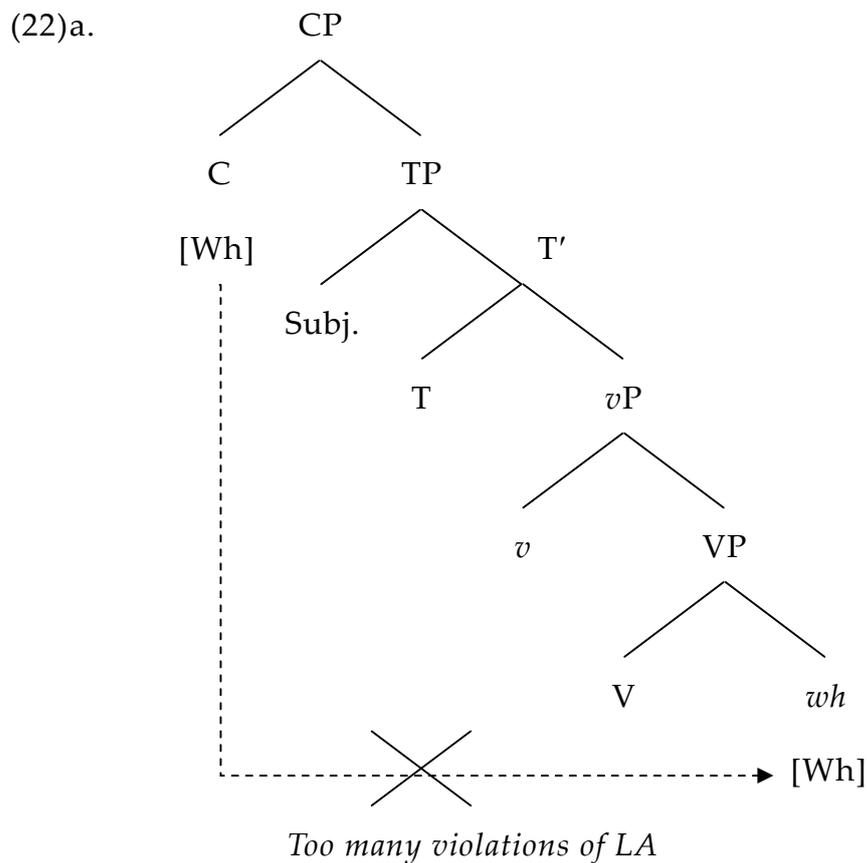
3.3.2. Local Agree

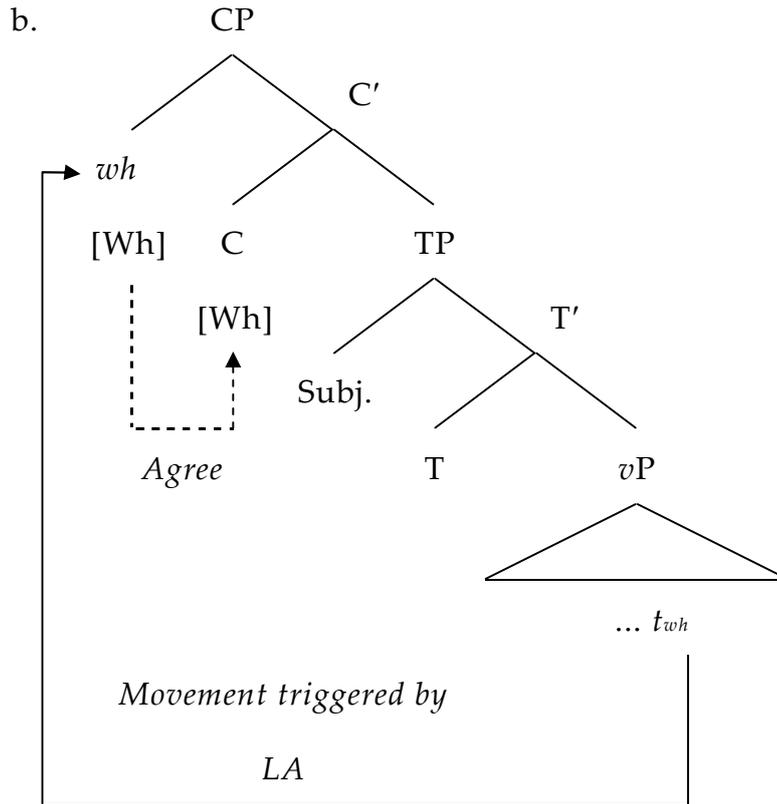
Assuming that feature percolation should be eliminated from the theory of grammar if it cannot be reduced to one of the elementary operations Merge or Move, Heck (2008, 2009) proposes an alternative approach based on Agree. He adopts the standard assumption in the minimalist program that *wh*-movement is triggered by Agree between C as a probe and the *wh*-word as a goal. However, the way Agree triggers this movement is different: *wh*-movement is not triggered by an EPP or edge feature of C, but by the following constraint in (21):

(21) Local Agree (LA)

If a goal γ in Σ matches an active probe β , then no phrase boundary (XP) dominates γ but not β . (Heck (2009: 80))

LA is completely satisfied only when β and γ are sisters. What is important in Heck's view is that LA is a *violable* and *gradient* constraint in the optimality-theoretic sense: there can be some phrase boundaries between the probe β and the goal γ , but the acceptability decreases as more phrase boundaries intervene between them. Therefore, LA minimizes the distance between a probe and its goal in terms of intervening phrasal boundaries, and therefore forces movement of a goal towards the probe. *Wh*-movement triggered by LA is schematized briefly as follows:

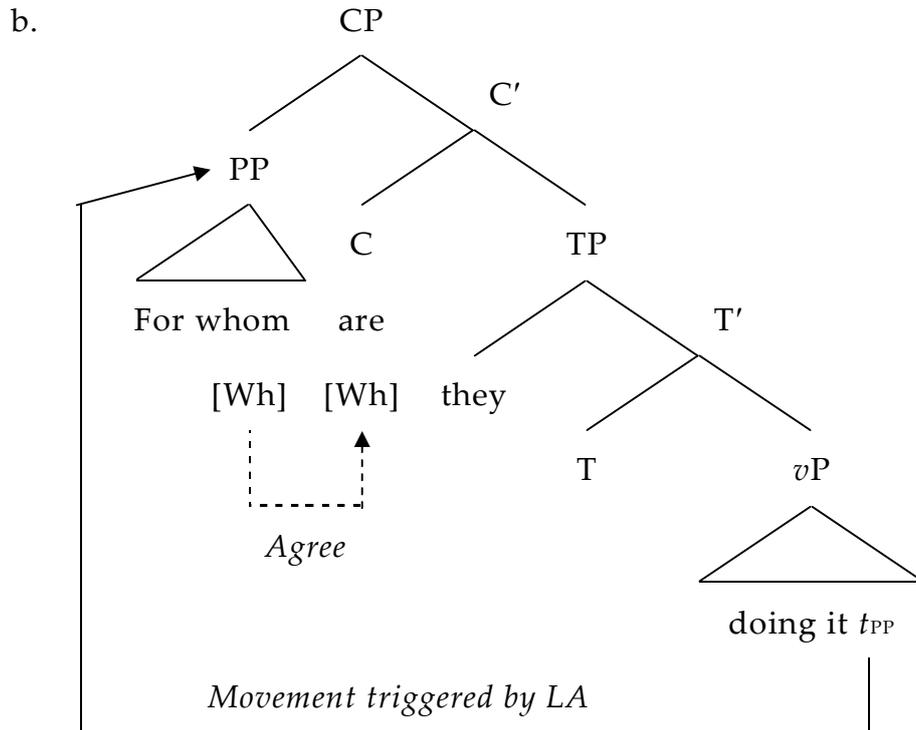




If a *wh*-word remains in situ, as shown in (22a), there are three phrasal boundaries intervening between C and the *wh*-word, i.e. TP, vP, and VP. Therefore, (22a) incurs three violations of LA, resulting in ill-formedness. In (22b), on the other hand, LA minimizes the distance between C and the *wh*-word, forcing *wh*-fronting. As a consequence, *Agree* applies between C and the *wh*-word in [Spec, CP] without violation of LA because there is no phrasal boundary intervening between them.⁴

Heck's account of pied-piping goes as follows. As mentioned above, LA is a violable constraint. This indicates that in some cases LA is violated, nevertheless the derivation does not crash. That is where pied-piping is involved. Consider pied-piping of PP first:

(23) a. [For whom] are they doing it?



As in the usual *wh*-movement, *wh*-feature of C requires the *wh*-word to move to the front because Agree should be applied locally. In (23b), however, it is not the *wh*-word but PP including it that is be fronted. Note that this derivation actually commits a violation of LA because there is one phrasal boundary (i.e. PP) intervening between C and *whom*. Nevertheless this derivation is not impossible. Let us turn to pied-piping of finite CP, which is inadmissible:

LA-based analysis does not depend on the types of pied-piped categories to judge the grammaticality of pied-piping, it can cope with various kinds of pied-piping. However, Heck's analysis fail to answer the second question raised in section 2, repeated here:

(II) Why do relative and interrogative clauses differ in the acceptability of pied-piping?

Because both relative and interrogative clauses are derived by *wh*-movement triggered by LA, it is not possible for Heck's analysis to make a grammatical distinction between them. We saw in section 3.2 that there is a grammatical contrast between relative and interrogative clauses, which is illustrated by the following examples:

(25) a. She's just sat her final exam, [the result of which] we expect next week. (Huddleston and Pullum (2002: 1040))

b. * [The problems of what] did he solve?
(Ortiz de Urbina (1993: 190))

(26) a. This is the kind of woman [proud of whom] I could never be.
(Webelhuth (1992: 128))

b. * [Proud of whom] is John? (Webelhuth (1992: 122))

(27) a. In two of them, normal serum concentrations of bile acids have been attained, [concomitantly with which] there has been associated improvement in liver function and physical

growth. (taken from Sharp et al. (1967: 733))

b. * [Independently of whose work] did John find the principle?

(Honda (1993: 30))

Furthermore, if the acceptability of pied-piping relates to how much LA is violated as Heck argues, pied-piping of non-finite clausal categories with overt subjects in appositive relative clauses should be accepted as well as those without overt subjects because they belong to the same category. However, that is not the case, as illustrated in (28)-(30):

(28) a. The elegant parties, [to be admitted to one of which] was a privilege, had usually been held at Delmonico's.

(Nanni and Stillings (1978: 311))

b. The loud music, [listening to which] made her nervous, finally ended. (Nanni and Stillings (1978: 314))

c. John went to buy wax for the car, [washing which], Mary discovered some scratches in the paint. (Ishihara (1984: 399))

(29) a. * The men, [for whom to be invited to the elegant parties] was a privilege, were appropriately appreciative.

b. * This is the man, [with whom reading the letter] Mary left the room.

c. * Jane knows the man, [after whose seeing the house] Mary drew up the loan papers. (Ishihara (1984: 404))

(30) a. * The elegant parties, [for us to be admitted to one of which]

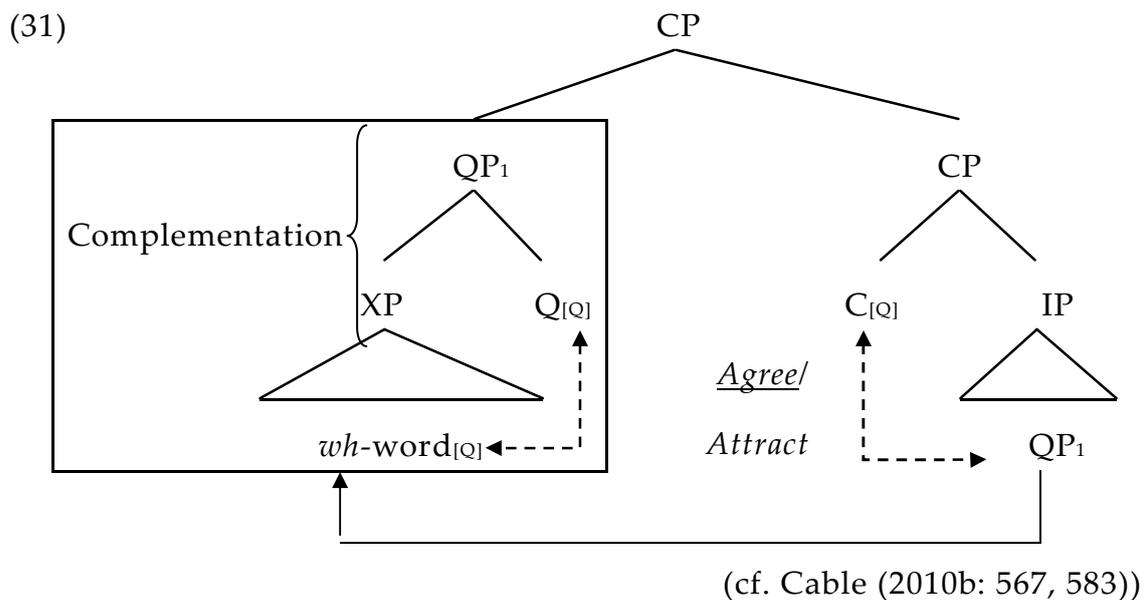
was a privilege, had usually been held at Delmonico's.

- b. * This is the letter, [with Mary reading which aloud], John got up to leave.
- c. * No one recognized the strange man, [upon [John's seeing whom]], Mary called the police. (Ishihara (1984: 405))

Pied-piping of non-finite clausal categories is accepted when the subjects are not expressed overtly as shown in (28), while it is not accepted with overt subjects as shown in (29) and (30).

3.3.3. The Q-based Analysis

Cable (2010a, b) puts forth a novel theory of *wh*-interrogative clauses. Its central claim is that it is Q-particles, not *wh*-words, that bear the feature triggering *wh*-fronting. His Q-based theory of *wh*-movement is schematized as follows:

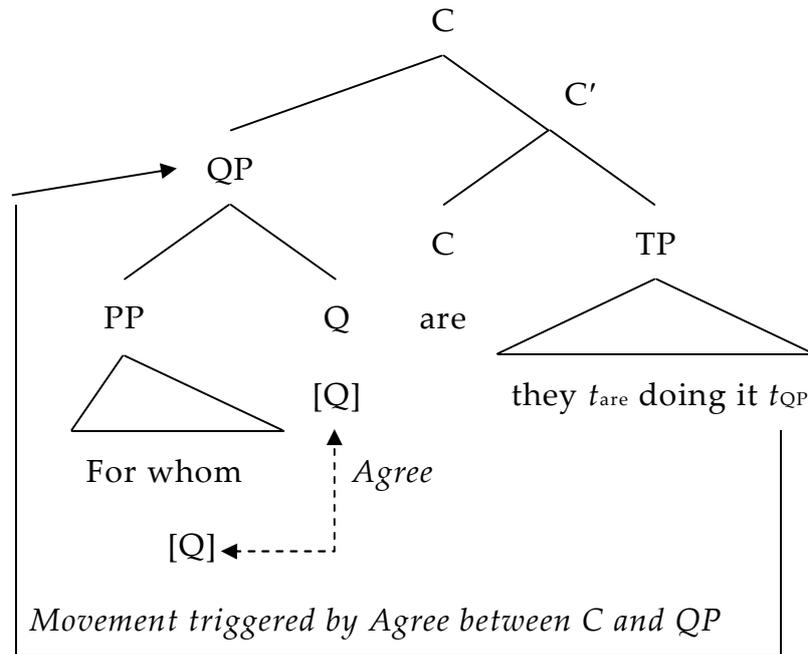


As illustrated above, a *wh*-interrogative clause contains three key syntactic elements: a *wh*-word, the interrogative complementizer *C*, and a so-called Q-particle, which is a null element in English. A Q-particle is assumed to merge with some phrase XP containing a *wh*-word, taking that phrase as its complement. Note that Cable confirms the existence of Q-particles from the data of Tlingit, an endangered and under-documented language in North America, in which Q-particles are realized overtly.⁵ Finally, the interrogative complementizer *C* is assumed to probe and Agree with the QP projected by this Q-particle in terms of [Q] feature, and not with the *wh*-word itself. As a consequence of this Agree, the QP moves to [Spec, CP]. Since the QP contains the *wh*-word, the *wh*-word is brought along into [Spec, CP] as a secondary effect of the movement of QP to [Spec, CP]. In addition, Cable assumes that in English a Q-particle must agree with a *wh*-word within a QP.

Cable's analysis of pied-piping goes as follows. Consider pied-piping of PP first:

(32) a. [For whom] are they doing it?

b.



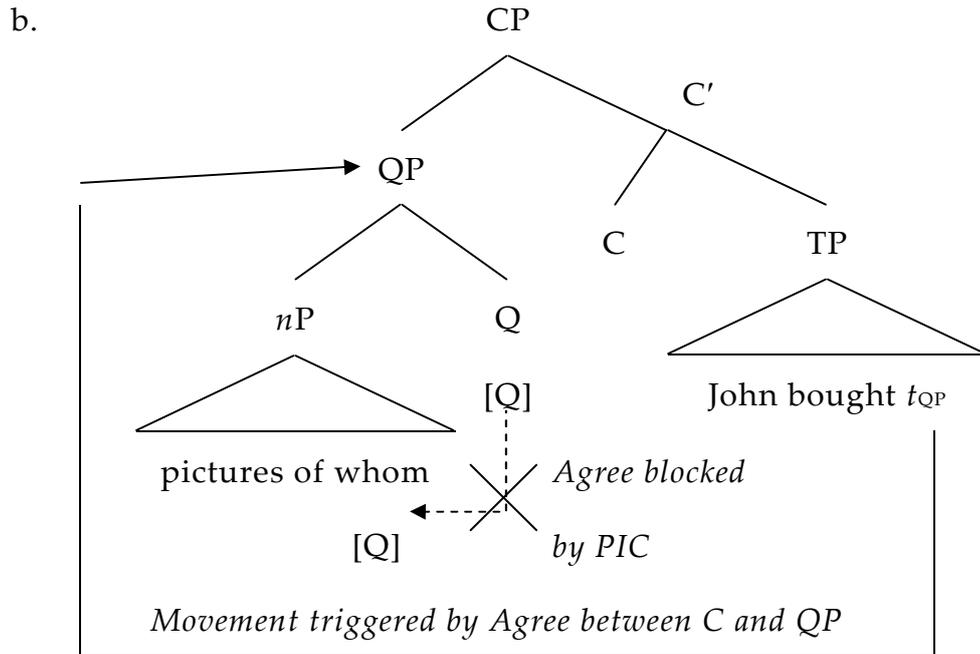
As shown in (32b), QP taking PP *for whom* as its complement moves to [Spec, CP] by Agree between C and QP in terms of [Q]; in turn, Agree applies between *whom* and Q-particle within QP. Cable claims that the Q-based analysis can explain why NP/DP and AP cannot be pied-piped in interrogative clauses. Following Embick and Marrantz's (2008) view that every lexical projection (VP, NP, AP) is a complement to a phase head (*v, n, a*), Cable argues that Agree is blocked between the *wh*-word and the Q-particle in the case of pied-piping of NP/DP or AP, due to the violation of the Phase Impenetrability Condition (PIC), which is stated as in (33):

(33) In phase α with head H, the domain of H is not accessible to operations outside α , only H and its edge are accessible to such operations. (Chomsky (2000: 108))

Then, the derivations of pied-piping of NP/DP and AP are illustrated as follows:

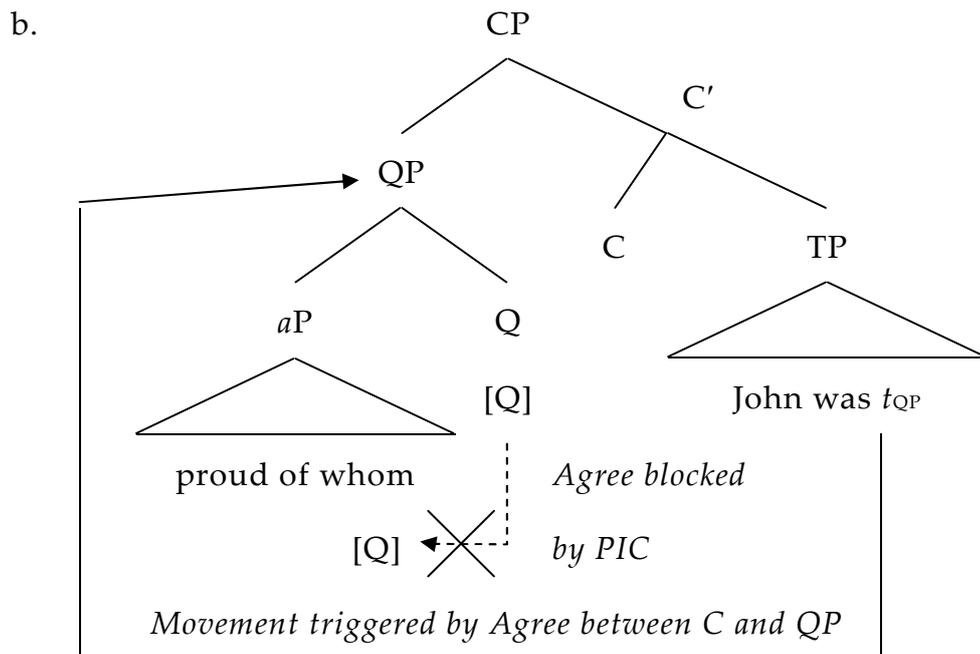
(34) a. *I wonder [[_{NP} pictures of whom] John bought]?

(Cable (2010b: 580))



(35) a. * I wonder [[_{AP} proud of whom] John was]?

(Cable (2010b: 580))



In both (34) and (35), QP including *nP/aP* with a *wh*-pronoun moves to [Spec, CP] by Agree between C and QP in terms of [Q], but Agree cannot apply between *whom* and Q-particle within a QP because it is impossible for [Q] to probe into *nP/aP* (i.e. a phase).

Although Cable's analysis goes well to some degree in explaining pied-piping, it faces the same problems as Heck's. First, the Q-based analysis cannot explain why relative and interrogative clauses differ from each other with respect to the acceptability of pied-piping. It would predict that pied-piping of NP/DP and that of AP is impossible in relative clauses in the same way as in interrogative clauses in (34) and (35). However, we saw in section 3.2 that relative clauses allow pied-piping of both DP and AP. Second, the Q-based analysis cannot explain why, in appositive relative clauses, clausal categories with overt subjects can be pied-piped while those without overt subjects cannot.

3.3.4. Summary

In this section, we have seen three representative approaches to pied-piping, all of which are far from satisfactory. They overlook the facts that relative and interrogative clauses are different from each other in the acceptability of pied-piping. That is why they fail to offer full explanation of pied-piping. In the following section, therefore, pied-piping will be dealt with differently between relative and interrogative clauses.

3.4. Analysis

This section offers an explanation for the facts about pied-piping that we

saw in section 2 within the framework of the minimalist program. Section 3.4.1 deals with the cases of pied-piping in which the *wh*-pronoun occupies the specifier. Section 3.4.2 accounts for pied-piping in relative clauses. Section 3.4.3 investigates pied-piping in interrogative clauses in terms of the revised version of feature percolation by feature sharing (Pesetky and Torrego (2007)).

3.4.1. Pied-Piping by Specifiers

We picked up pied-piping with a *wh*-pronoun in the specifier in (3) and (4) first in section 2, repeated here as (36) and (37):

- (36) a. I wonder [whose book] they read? (Grimshaw (2000: 129))
b. [whose essay] he plagiarized (Huddleston and Pullum (2002: 1043))
- (37) a. [How old] is John? (Webelhuth (1992: 122))
b. [How fast] did John run? (Webelhuth (1992: 123))

Contrary to previous approaches based on feature percolation treat pied-piping by specifiers as a result of feature percolation, I will argue that this type of pied-piping is triggered simply by a requirement of the Left Branch Condition (LBC) proposed by Ross (1986: 127), which blocks movement of the leftmost constituent of a nominal, adjectival, or adverbial expression. Since *whose* and *how* occupy [Spec, DP] and [Spec, AP/AdvP], LBC prevents *whose* and *how* from being extracted out of the DP and AP/AdvP, respectively. As a result, a *wh*-pronoun in the specifier always pied-pipe the whole phrase. This accounts for the grammaticality of (36) and (37), and, at

the same time, the ungrammaticality of (38) and (39).⁶

- (38) a. * Whose have you read [t_{whose} book]? (cf. (36a))
b. * whose he plagiarized [t_{whose} essay] (cf. (36b))
- (39) a. * How is John [t_{how} old]? (cf. (37a))
b. * How did John run [t_{how} fast]? (cf. (37b))?

3.4.2. Pied-Piping in Relative Clauses

As mentioned at the end of section 3.3.4, previous studies fail to distinguish between pied-piping in relative clauses and pied-piping in interrogative clauses, even though they differ from each other in the acceptability of pied-piping. Therefore, I will distinguish relative clauses from interrogative clauses in terms of the mechanism for pied-piping, arguing that, in relative clauses, pied-piping is derived by topicalization followed by the identification of the relative pronoun with the head, and in interrogative clauses by the combination of feature percolation and *wh*-movement (as is generally assumed).

Relativization as a kind of topicalization is originally suggested by Emonds (1979). Moreover Webelhuth (1992) develops an account for pied-piping of larger categories in relative clauses based on topicalization analysis. He claims that, in relative clauses, the large phrase containing the *wh*-relative pronoun undergoes topicalization, and furthermore that this *wh*-word occurring within this proposed phrase receives interpretation as an indexical pronoun. Take pied-piping of AP and the corresponding topicalization of AP with an indexical pronoun in exemplification:

- (40) a. his wife [proud of whom] he has never been
b. His wife is intelligent. But [proud of her] he has never been.

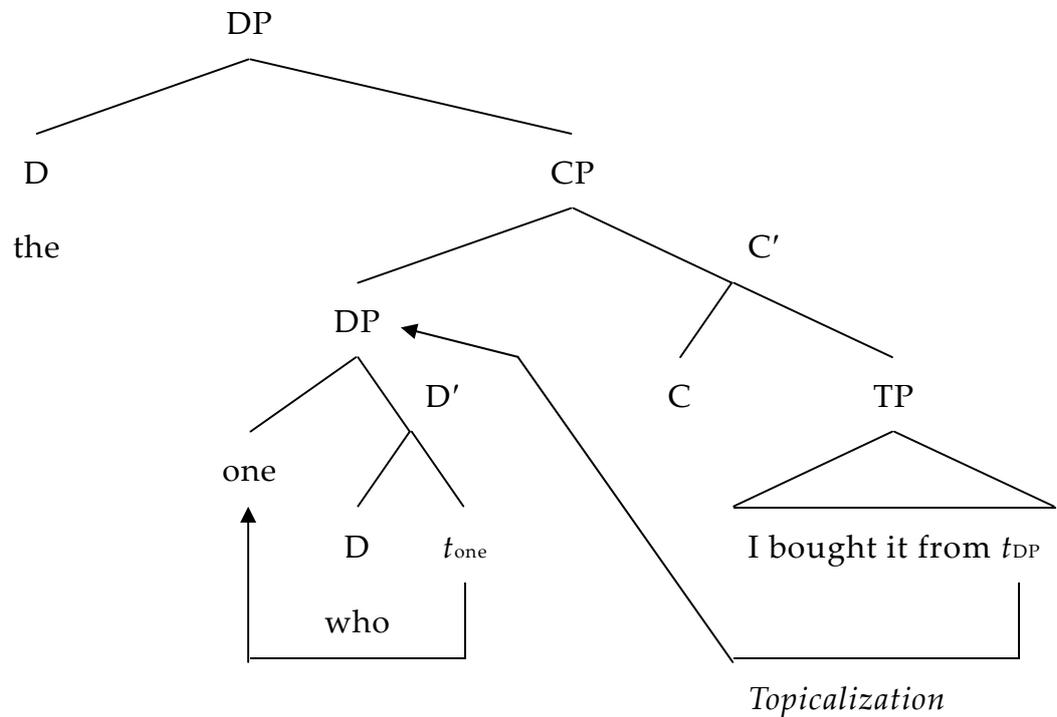
(Webelhuth (1992: 130))

Webelhuth's analysis draws a parallel between the relation of the relative pronoun *whom* to the head of the relative *his wife* in (40a) and the relation of the personal pronoun *her* to its discourse antecedent *his wife* in (40b). Following Webelhuth (1992), I will assume that relativization is a kind of topicalization.

As for the identification of the relative pronoun with the head noun (i.e. the antecedent NP), we will adopt the head-raising analysis in restrictive relative clauses (Bianchi (2000), Kayne (1994), Vergnaud (1974)), and its application to appositive relative clauses (de Vries (2006b)). According to the head-raising analysis, the head noun originates within the relative clause at the position of the gap, and is *raised* to the front. The derivation of restrictive relative clauses is schematized in (41):

(41) Derivation of restrictive relative clauses

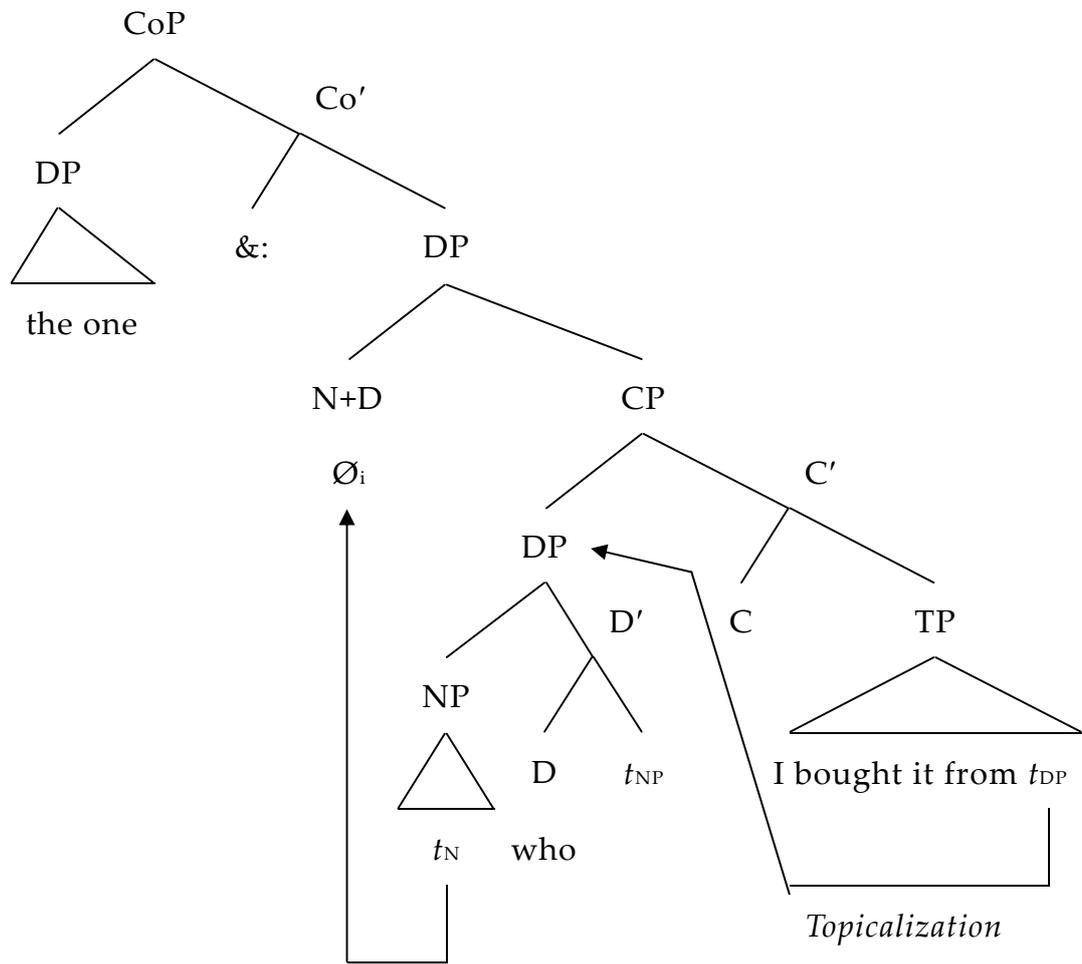
(e.g. *the one who I bought it from*)



First, the relative determiner (*who*) selects an NP-complement (*one*). Then the NP (*one*) moves to [Spec, DP] within the relative DP. The relative DP as a whole (*one who*) is selected as the complement of the preposition (*from*), and then moves to [Spec, CP] by topicalization. Finally, the whole relative CP (*one who I bought it from*) is selected as the complement of the outer determiner (*the*).

(42) Derivation of appositive relative clauses

(e.g. *the one, who I bought it from*)



(cf. de Vries (2006b))

On the other hand, the derivation of the appositive relative construction in (42) also goes through the raising, though there are a few differences. It is not the head noun itself but the abstract NP that is selected by the relative determiner (*who*) and moves to [Spec, DP] within the relative DP. The relative DP moves from the complement of the preposition (*from*) to [Spec, CP]. Moreover, N moves to the empty external D, which selects the relative CP. This complex N+D can be spelled out; for example, *Annie, who is our*

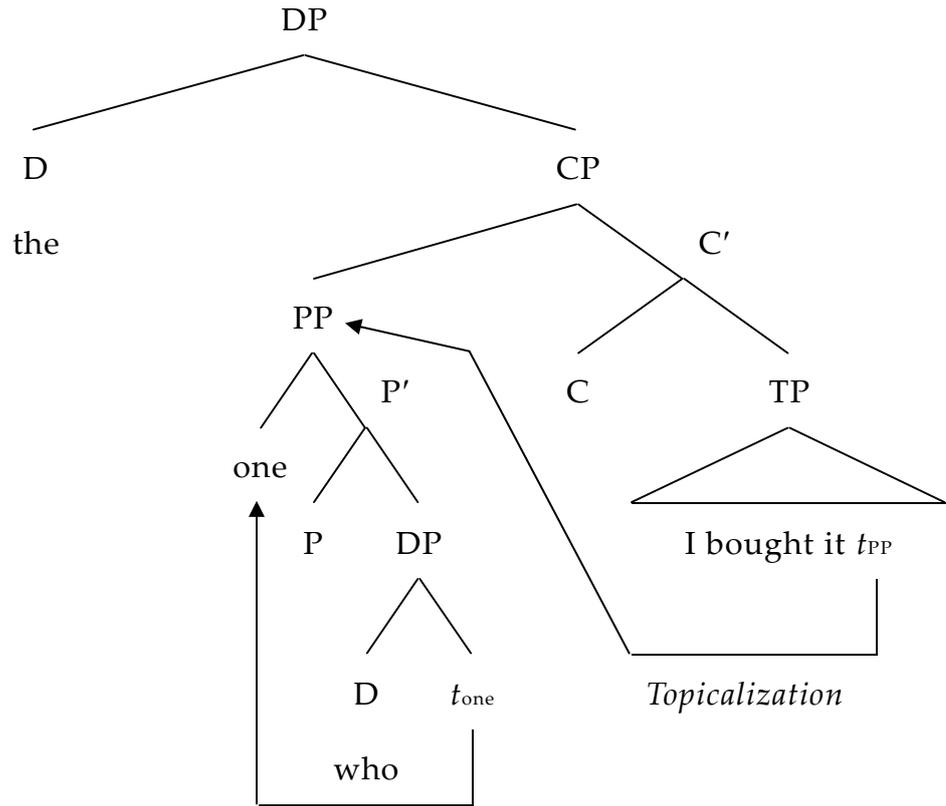
manager can become *Annie*, or *she who is our manager* (de Vries (2006b: 244)). The appositive relative DP is coordinated to the antecedent DP (*the one*). According to de Vries (2006b), in (42), &: represents the head of a specifying coordination phrase, which can be paraphrased as ‘that is,’ ‘or (rather),’ or ‘namely.’ In short, both restrictive and appositive relative clauses are derived by the raising of the head-noun.

Now we are in a position to account for pied-piping in relative clauses based on the derivation in (41) and (42). Let us first take pied-piping of phrasal categories. Relevant examples are repeated here:

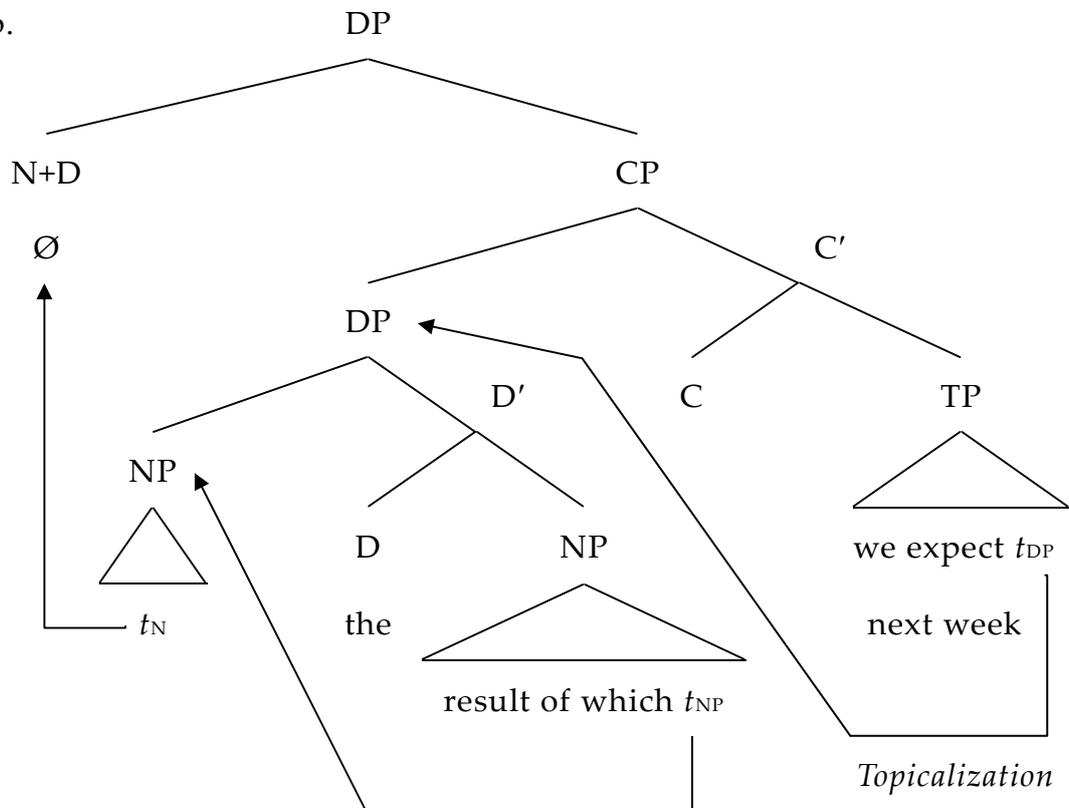
- (43) a. He’s the one [from whom] I bought it. (pied-piping of PP)
- b. She’s just sat her final exam, [the result of which] we expect next week. (pied-piping of DP)
- c. The tree, [seated next to which] they found themselves, had been planted on the highest point in the park.(pied-piping of AP)
- d. In two of them, normal serum concentrations of bile acids have been attained, [concomitantly with which] there has been associated improvement in liver function and physical growth. (pied-piping of AdvP)

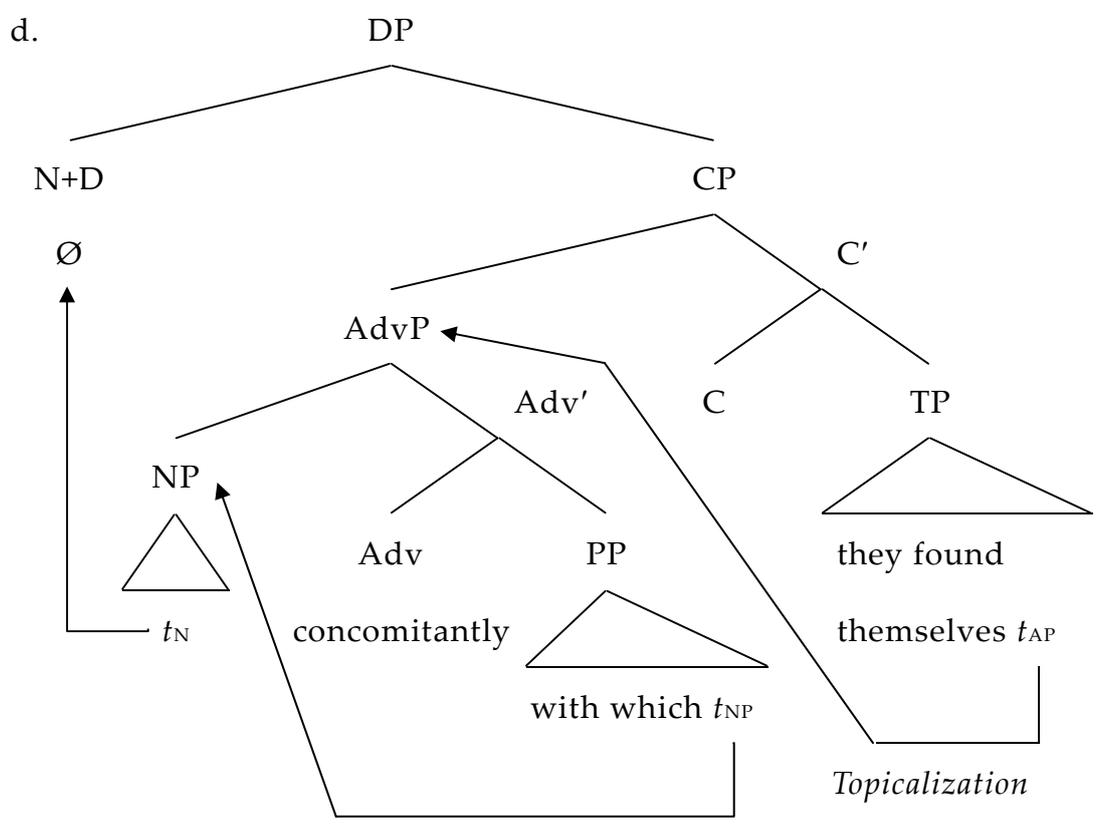
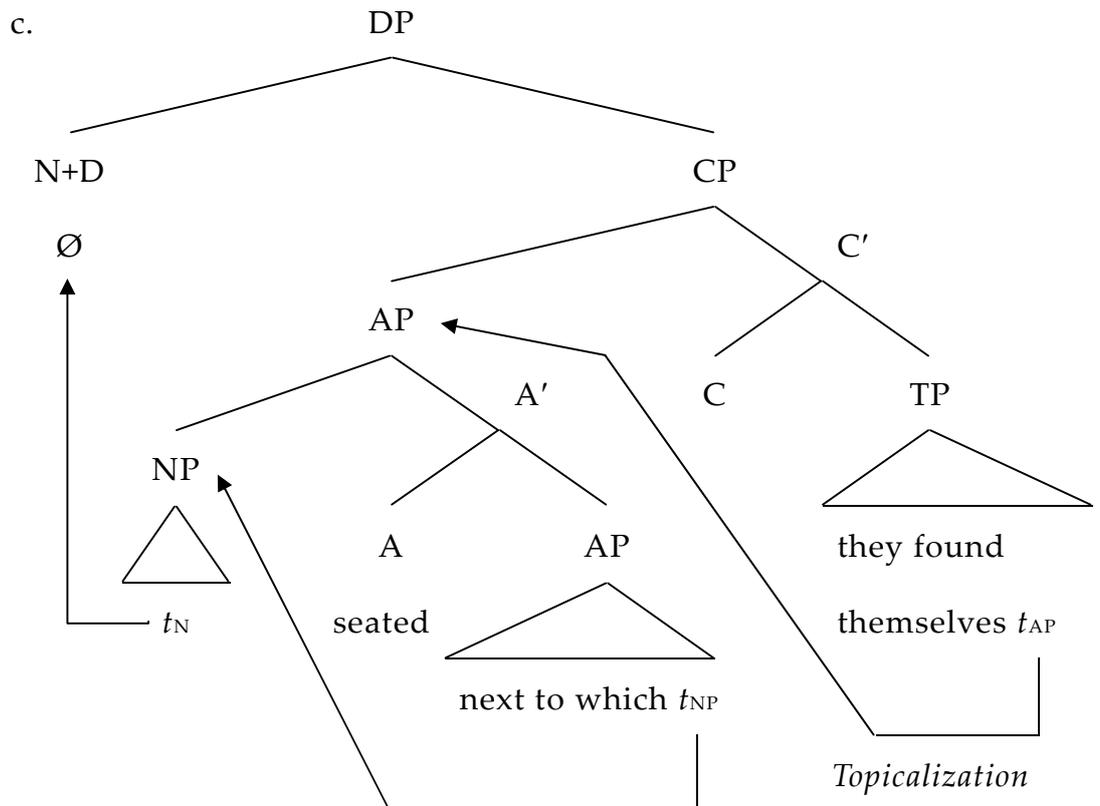
The derivation of a relative clause in each example is schematized as follows:

(44) a.



b.





In each example, the pied-piped phrase is raised to [Spec, CP] by topicalization. Then, the head noun or the abstract NP moves to the specifier of the pied-piped phrase. The relative CP is selected by D.

Now let us turn to the derivation of clausal pied-piping. We saw that clausal pied-piping is accepted if and only if the pied-piped clauses lack both tense and overt subjects. Relevant examples are cited here again:

- (45) a. The elegant parties, [to be admitted to one of which] was a privilege, had usually been held at Delmonico's.
(Nanni and Stillings (1978: 311))
- b. The loud music, [listening to which] made her nervous, finally ended. (Nanni and Stillings (1978: 314))
- c. John went to buy wax for the car, [washing which], Mary discovered some scratches in the paint. (Ishihara (1984: 399))

In order to account for clausal pied-piping, we will make the following proposal:

- (46) a. Pied-piped infinitive categories do not consist of CP, but PP.
- b. Pied-piped gerundive categories are verbal gerund.
- c. Pied-piped participial categories are headed by a null preposition.

As for (46a), there are many pieces of evidence to support that some *to*-infinitive clauses are prepositional. For example, Abe (1986) claims that

there is a class of verbs whose *to*-infinitive complements are best analyzed as PP. Consider the following examples with *try*:

- (47) a. Jane tried to be a parachutist.
b. * Jane tried that she was a parachutist. (Riddle (1975: 468))
- (48) * Jane tried (for) Bill to do his homework.
(Stockwell et al. (1973: 555))
- (49) a. * To open the door was tried by Bill.
b. To come early would be preferred by everybody.
(cf. Rosenbaum (1967: 53))

(47) illustrates that a certain type of verbs cannot take a finite CP as its complement. In addition, as shown in (48), when this type of verbs take *to*-infinitive complements, overt subjects cannot appear. Moreover, it follows from the contrast illustrated in (49) that passivization of *to*-infinitive complements of this type of verbs is impossible. Besides *try*, there are other verbs which show the same pattern in (47)-(48) such as *condescend*, *challenge*, *force*, and so on. Based on these facts, Abe (1986) develops the analysis of *to*-infinitives as PP. Moreover, it is reasonable to think that the infinitival *to* in infinitival relative clauses are not TP in the light of the distribution of expletive *there*. This follows from the contrast in (50):

- (50) a. I will arrange for *there* to be someone to meet the visitors at the
airport. (Radford (2009: 309))
b. * He has some books for *there* to be in the library.

(cf. He has some books that *there* are in the library.)

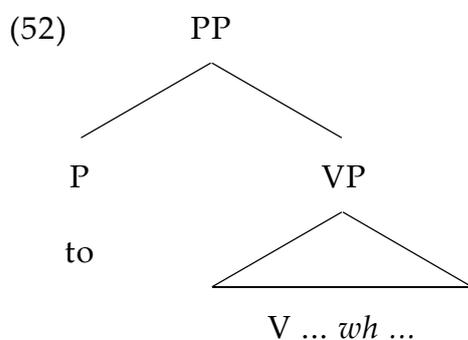
(Berman (1974: 37))

Expletive *there* can appear in normal infinitive clauses like (50a) which are thought to be CP, while it cannot in infinitival relative clauses like (50b). Given that expletive *there* is directly merged in [Spec, TP] to satisfy EPP requirement for T to project a nominal specifier (Chomsky (2001)), it follows from the contrast in (50) that infinitival relative clauses do not include TP. Note that the absence of expletive *there* is also observed in bare infinitive clauses, which do not contain TP, as illustrated in (51):

(51) * We saw *there* be fewer complaints. (Safir (1993: 57))

As C must project above TP, it follows that infinitival relative clauses lack both CP and TP.

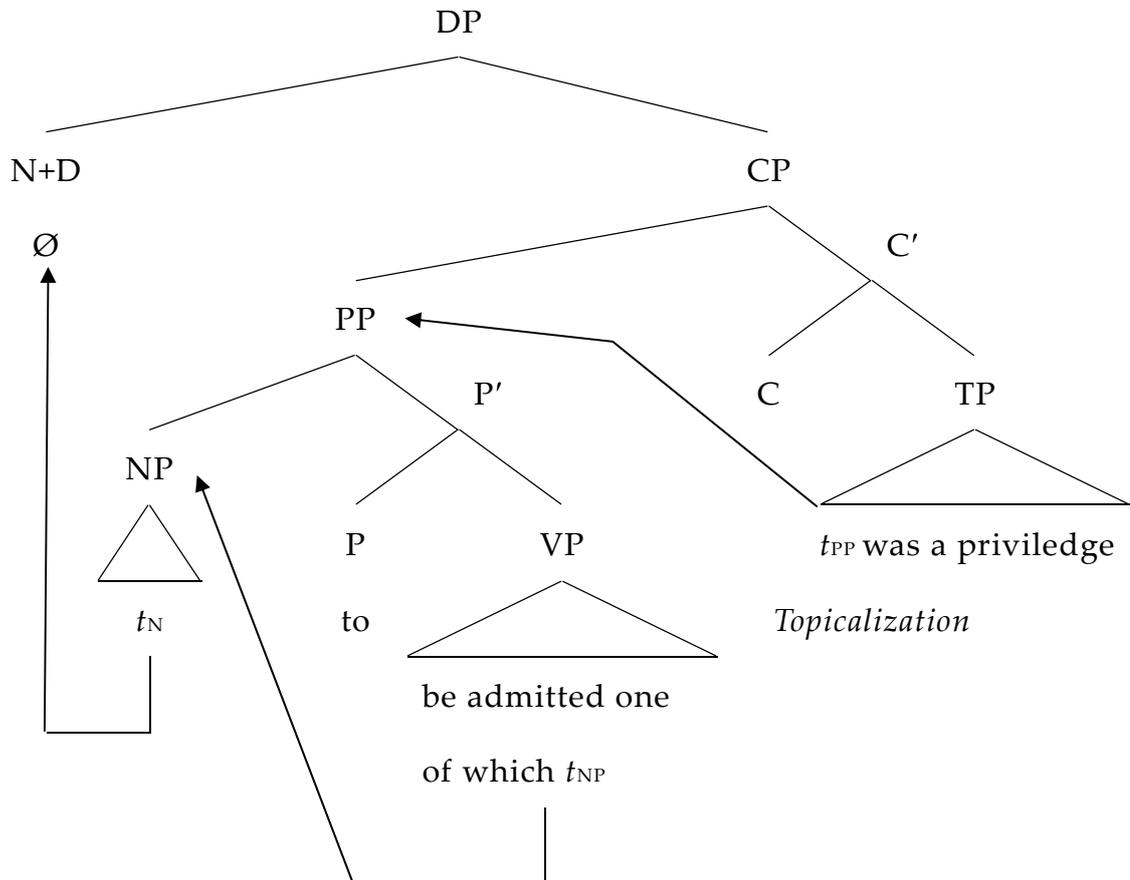
More precisely, pied-piped infinitives have the following structure, in which *to*-infinitives are PP taking VP as complement:



Given this structure, the derivation of an infinitive category (45a) goes in the

same fashion as that of pied-piping PP:

- (53) The elegant parties, [to be admitted to one of which] was a privilege, had usually been held at Delmonico's.



As the pied-piped infinitive categories are PP, clausal pied-piping is derived in the same way as pie-piping of PP, as illustrated in (53). The pied-piped infinitival PP is raised to [Spec, CP] by topicalization. Then, the abstract NP moves to the specifier of the relative PP.

Pied-piped infinitives are PP, which does not contain subjects, so that subjects cannot appear in pied-piped infinitives. Therefore, because pied-piped infinitives whose structures are (52) do not have subjects,

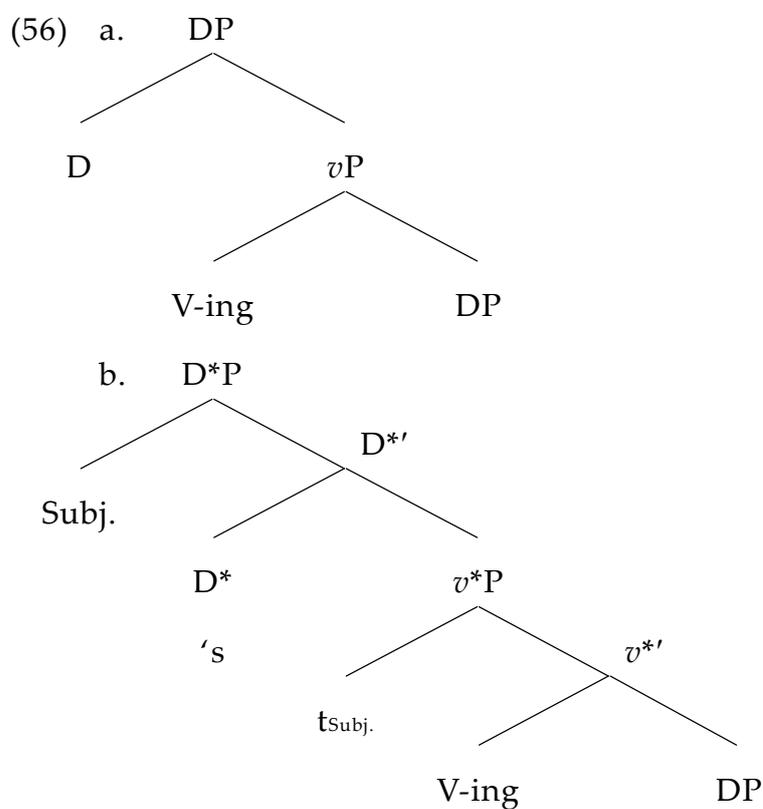
pied-piped infinitives with overt subjects, repeated here as (54) and (55), are impossible by nature:

(54) * The men, [for whom to be invited to the elegant parties] was a privilege, were appropriately appreciative.

(55) * The elegant parties, [for us to be admitted to one of which] was a privilege, had usually been held at Delmonico's.

As for (46b) (repeated below), following Abney (1987) that verbal gerund is a noun phrase containing verb phrase internally, I will propose the following structures for pied-piped gerundive categories:

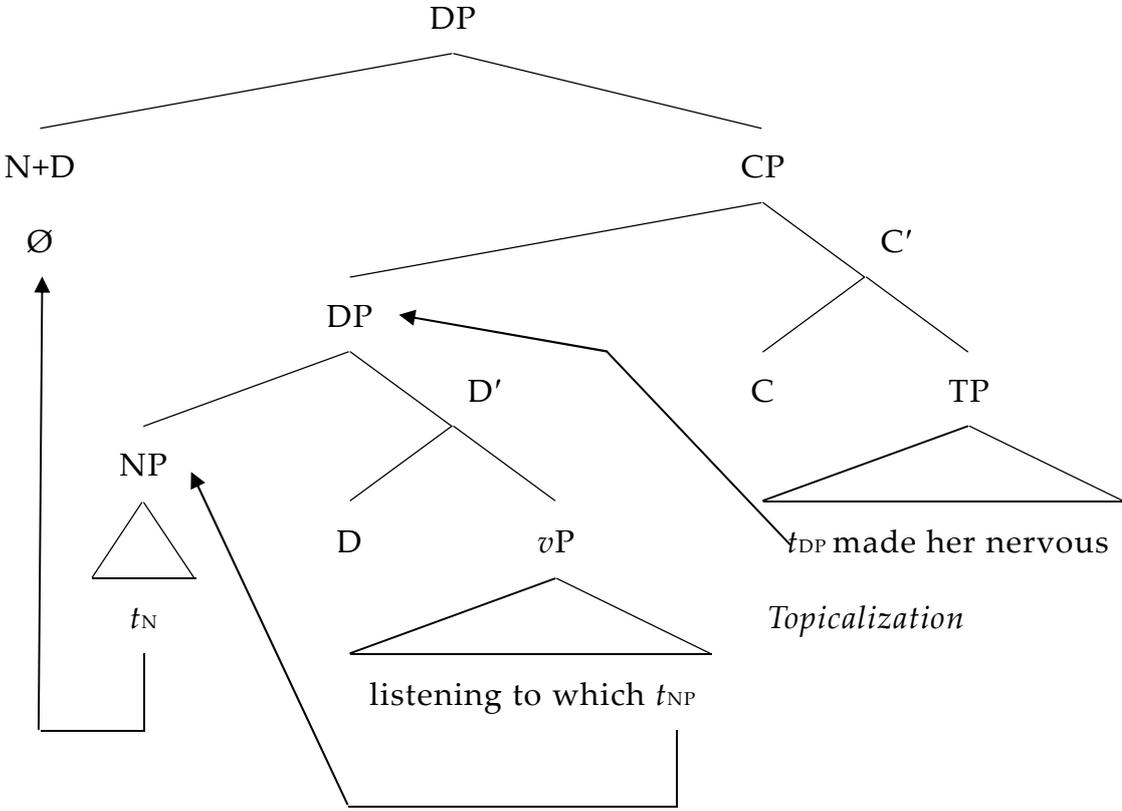
(46) b. Pied-piped gerundive categories are verbal gerund.



As shown in (56a), when the verbal gerund lacks an overt subject, the internal verb phrase forms *vP* which do not have an external argument. On the other hand, when the verbal gerund has an overt subject, as shown in (56b), it forms *v*P* which has an external argument. For the sake of convenience, the verbal gerund with *vP* inside is represented as *DP*, and that with *v*P* inside as *D*P*.

Given the structure in (56), the account of pied-piping of gerundive categories goes as follows. The derivation of pied-piping of gerundive categories without overt subjects proceeds in the same fashion as that of normal *DP*, as shown in (57):

(57) The loud music, [listening to which] made her nervous, finally ended.



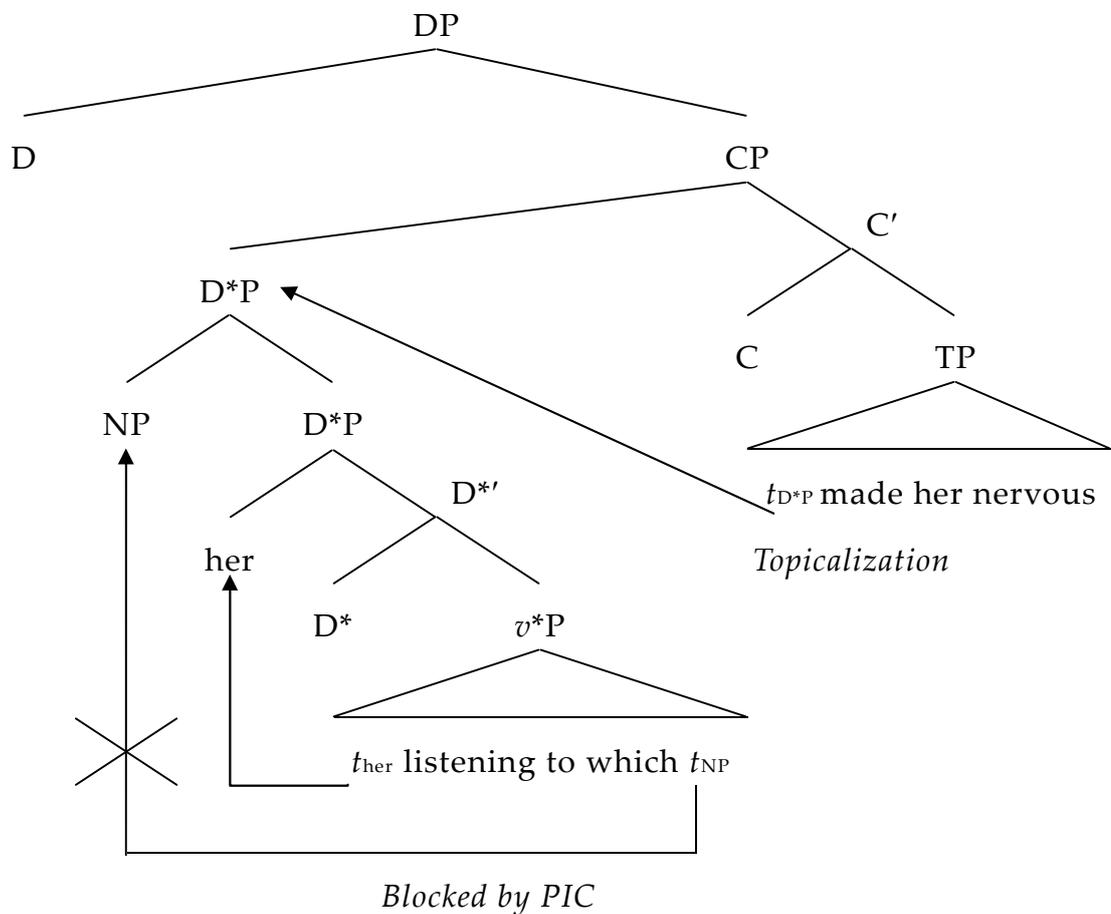
The pied-piped gerundive DP is raised to [Spec, CP] by topicalization. Then, the abstract NP moves to the specifier of the gerundive DP.

Now let us turn to the pied-piping of gerundive DP with overt subjects, which is ill-formed. First, when the overt subject is a personal pronoun such as *her*, pied-piping of the gerundive DP is ruled out due to the violation of PIC, which is cited here again as (58). The derivation is as in (59).

(58) In phase α with head H, the domain of H is not accessible to operations outside α , only H and its edge are accessible to such operations.

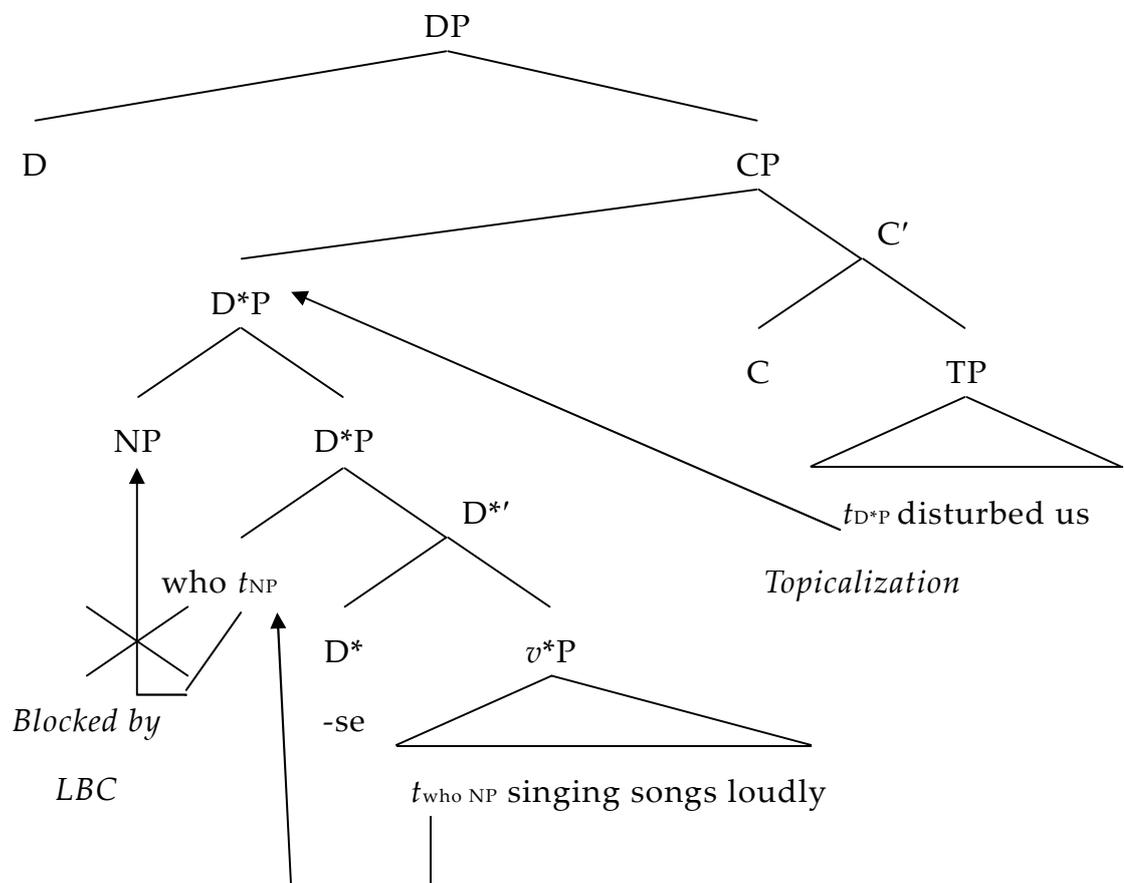
(Chomsky (2000: 108))

(59) a. * The loud music, [**her listening to which**] made her nervous, finally ended.



The pied-piped gerundive D*P is raised to [Spec, CP] by topicalization. However, within the pied-piped D*P, the relative pronoun (*which*) with the abstract NP is not accessible because it is in the domain of v^* (= a phase head), in accordance with PIC in (58). Therefore, because the abstract NP cannot move out of v^* P to the outer specifier of D*P, the derivation crashes. Next, when the overt subject is the relative pronoun (*whose*), pied-piping of the gerundive DP is ruled out because of the violation of the Left Branch Condition (LBC), which blocks movement of the leftmost constituent of a nominal expression:

- (60)b. * The man, [whose singing songs loudly] disturbed us, finally moved away.

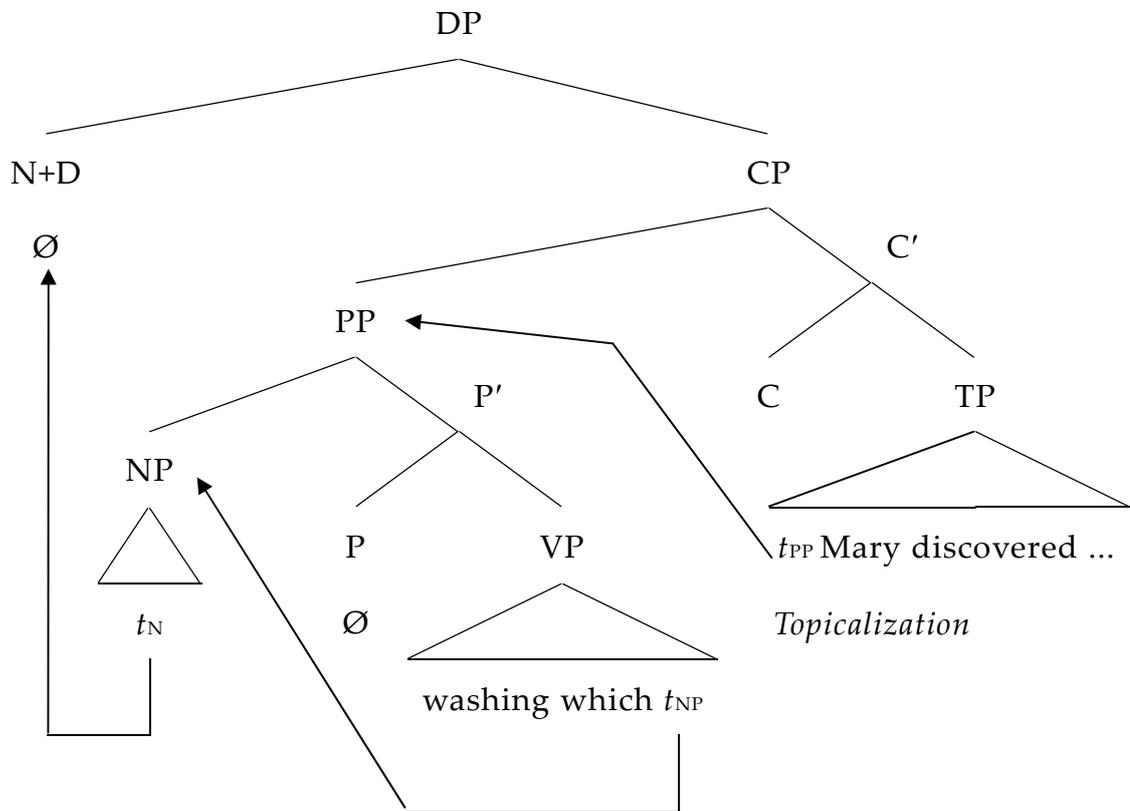


The pied-piped gerundive D*P is raised to [Spec, CP] by topicalization. Then, the relative pronoun (*who*) with the abstract NP moves from [Spec, v*P] to [Spec, D*P], the relative pronoun (*who*) and the genitive marker (*'s*) in D* are together realized as *whose*. Note that this movement does not violate PIC, because the relative pronoun (*who*) is in the edge of the phase (i.e. [Spec, v*P]). However, the abstract NP cannot move to the outer specifier of D*P, because it occupies [Spec, D*P], namely, the leftmost position. Therefore, the derivation crashes because of the violation of LBC.

As for (46c) (repeated below), we can safely say that a participial construction without an overt subject is a kind of gerundive headed by a null preposition, because we can make a paraphrase of, for example, the sentence “Washing the car, Mary discovered some scratches in the paint” by the sentence “*During* washing the car, Mary discovered some scratches in the paint.” Then, assuming that participial categories without subjects are PP, the derivation of pied-piping of participial categories without overt subjects proceeds in the same fashion as that of PP, as shown in (61):

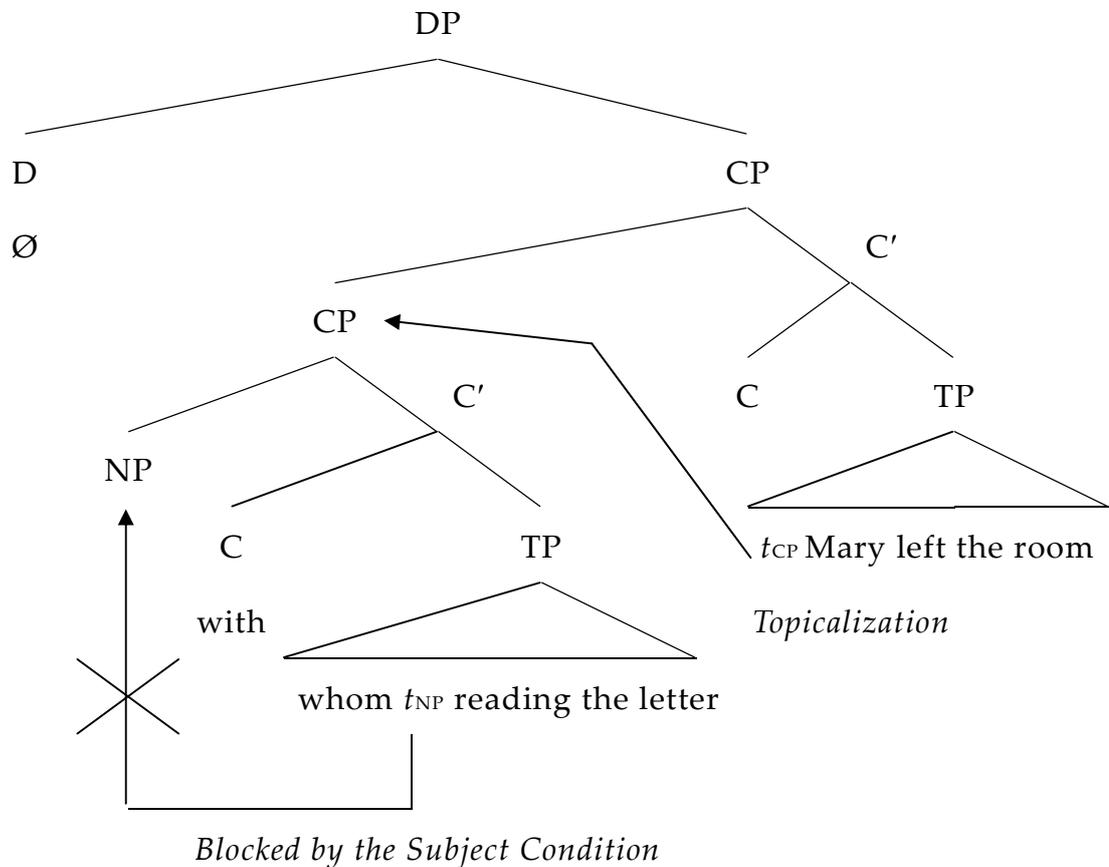
- (46) c. Pied-piped participial categories are headed by a null preposition.

- (61) John went to buy wax for the car, [washing which], Mary discovered some scratches in the paint.



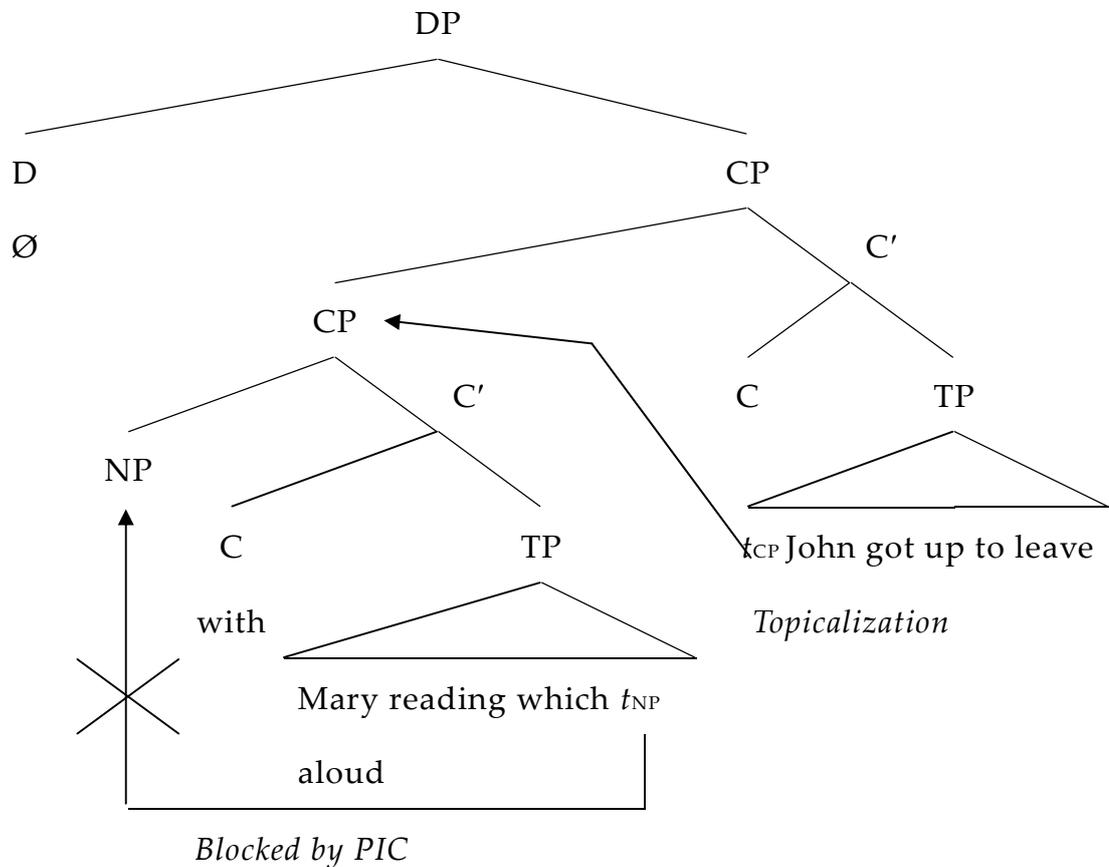
The pied-piped participial PP is raised to [Spec, CP] by topicalization. Then, the abstract NP moves to [Spec, PP]. On the other hand, when an overt subject is present, the pied-piped participial category is introduced by *with* as an absolute participial construction. Given that *with*-absolute construction is CP, consider first the derivation of pied-piping of participial categories with *wh*-subjects is excluded as in (62):

(62) *This is the man, [with whom reading the letter] Mary left the room.



The *with*-absolute CP is raised to [Spec, CP] by topicalization. However, the abstract NP cannot move out of the relative DP in [Spec, TP], because of the subject condition (Chomsky (1973), Huang (1982)), according to which no elements can be moved out of a subject. (The subject condition is refined in terms of the minimalist program in Chomsky (2008).)⁷ Next, the derivation of pied-piping of participial categories with a personal pronominal subject such as *her* is ruled out as in (63):

- (63) *This is the letter, [with Mary reading which aloud], John got up to leave.



The *with*-absolute CP is raised to [Spec, CP] by topicalization. However, within the pied-piped CP, the relative pronoun (*which*) with the abstract NP is not accessible because it is in the domain of v^* (= a phase head), in accordance with PIC in (58). Therefore, because the abstract NP cannot move out of v^*P to [Spec, CP], the derivation crashes.

Let us sum up the discussion in this subsection. First, we made an assumption that relativization is a kind of topicalization, which indicates that any categories are able to be pied-piped. In addition, based on the head-raising analysis, we assumed that the head noun or the abstract NP

within the relative pronoun moves to the specifier of pied-piped category. Then, we argued that pied-piping is possible when the head noun or the abstract NP successfully moves to the specifier of the pied-piped category, while it is impossible because some conditions (such as PIC, LBC, and the subject condition) prevent the head noun of the abstract NP from moving to the specifier of the pied-piped category.

3.4.3. Pied-Piping in Interrogative Clauses

Contrary to pied-piping of relative clauses, which involves raising of pied-piped categories by topicalization, we take pied-piping in interrogative clauses to be simply triggered by feature percolation. However, as Heck (2008, 2009) argues, feature percolation should be eliminated from the theory of grammar as it stands because it is not triggered by the elementary operations in the minimalist program, namely Merge and Move. Therefore, before going into explanation of pied-piping in interrogative clauses, I will restate the mechanism of feature percolation in terms of the minimalist program. More specifically, we argue that feature percolation is a result of Agree as feature sharing proposed by Pesetsky and Torrego (2007), contrary to the ‘assignment’ version of Agree by Chomsky. They propose that when Agree applies between a probe feature F at a syntactic location α and a goal feature F at a location β , the output is a single feature F shared by the two locations.

(64) Agree (Feature sharing version)

- (i) An unvalued feature F (a *probe*) on a head H at syntactic

location α (F_α) scans its c-command domain for another instance of F (a *goal*) at location β (F_β) with which to agree.

- (ii) Replace F_α with F_β , so that the same feature is present in both locations. (Pesetsky and Torrego (2007: 268))

Pesetsky and Torrego (2007) furthermore propose the new theory of feature valuation, in which valuation and interpretation are independent of one another. (This is also in contrast to Chomsky (2000, 2001), where valuation and interpretation are biconditional: a feature is uninterpretable if it is unvalued.) Consequently, there are four states that a given feature may be in, as illustrated in (65):

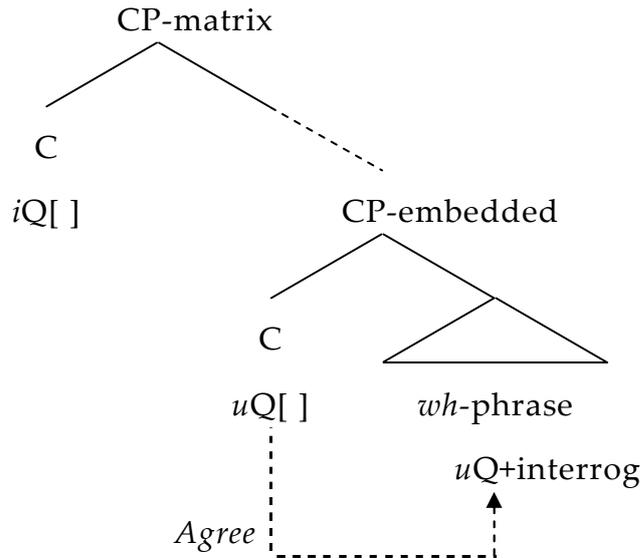
(65) Types of features

uF <i>val</i> uninterpretable, valued	iF <i>val</i> interpretable, valued
uF [] uninterpretable, unvalued	iF [] interpretable, unvalued

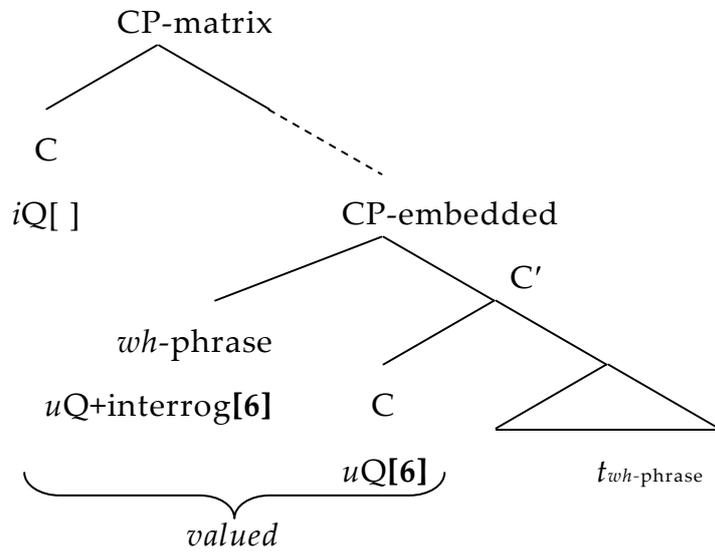
(cf. Pesetsky and Torrego (2007: 269))

Under Pesetsky and Torrego's (2007) analysis, the successive cyclic *wh*-movement in interrogative clauses goes as follows:

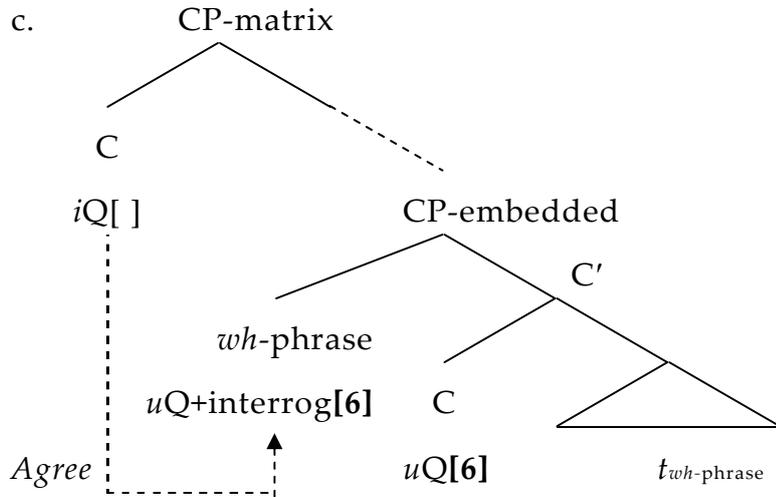
(66) a.

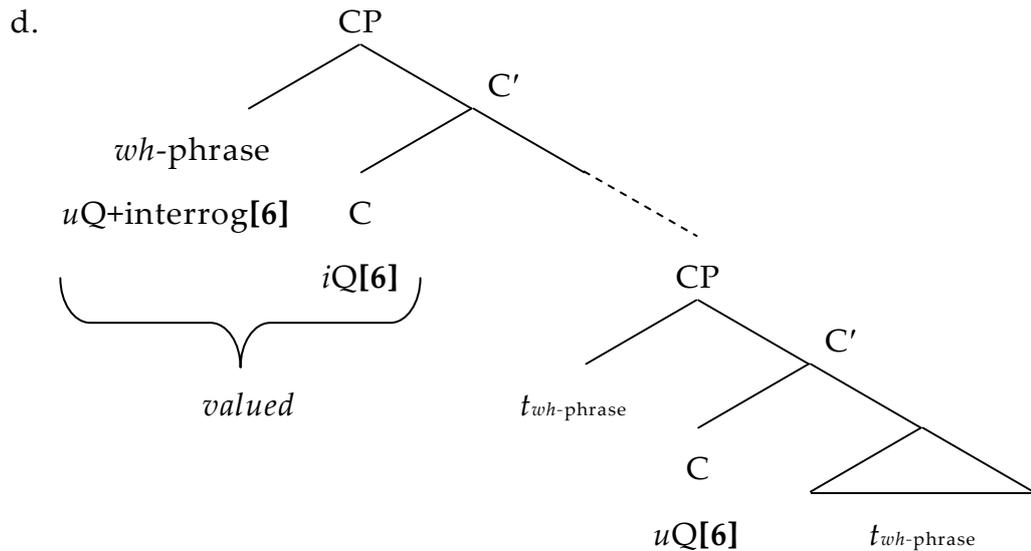


b.



c.

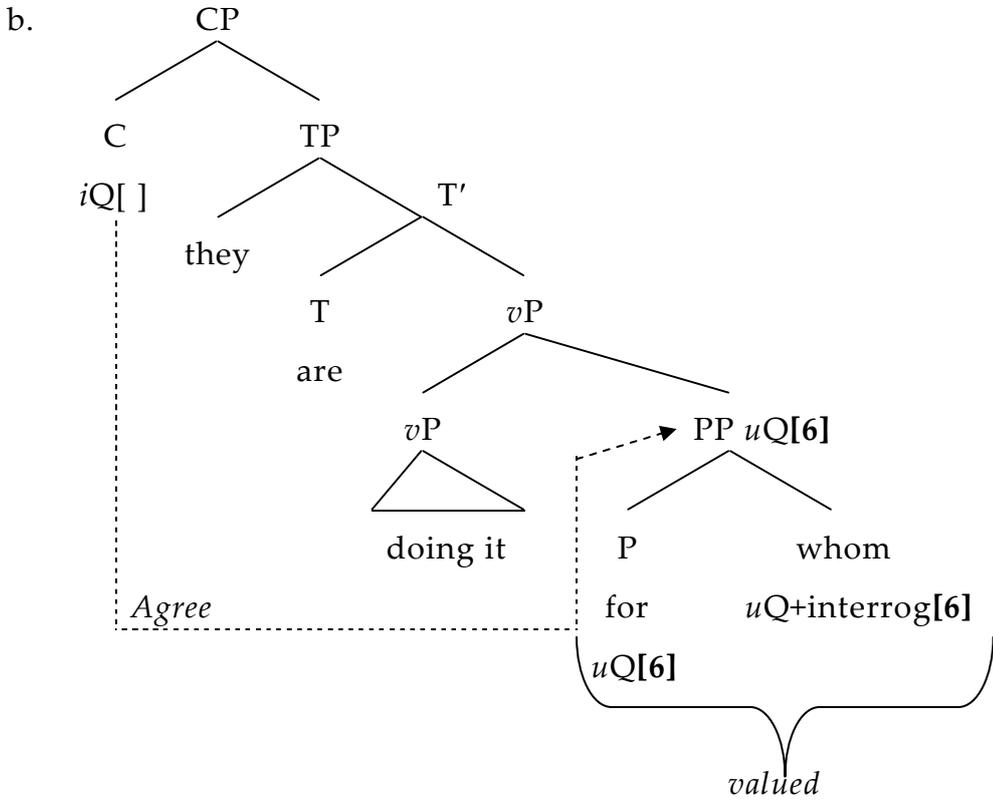
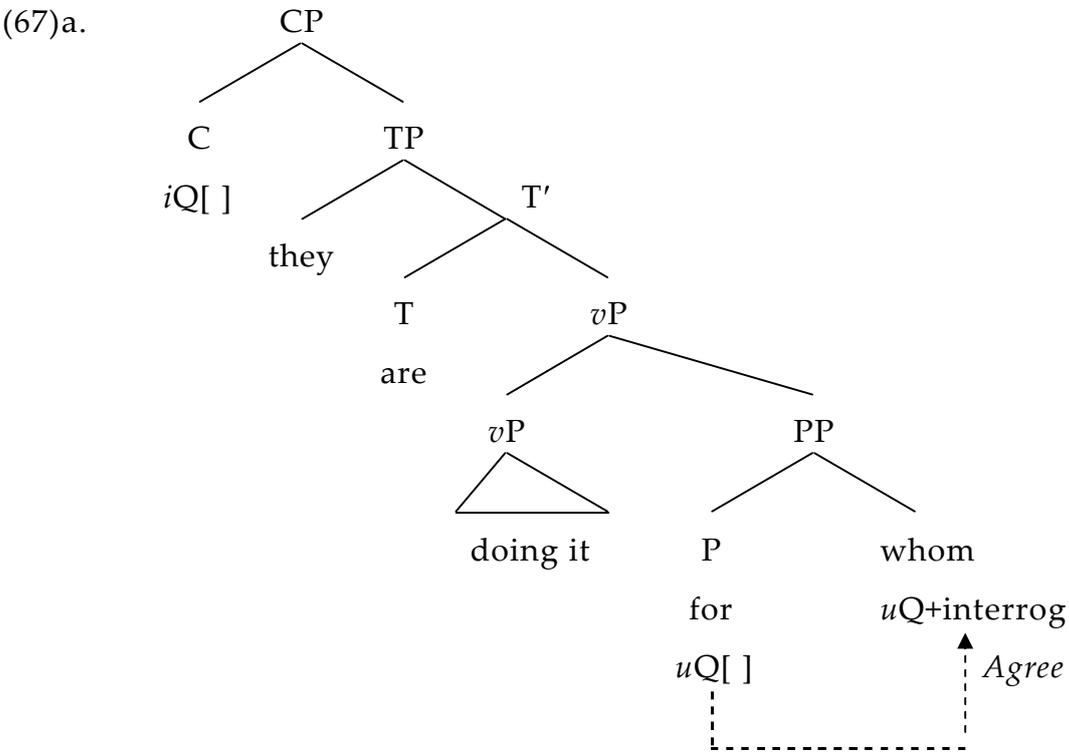


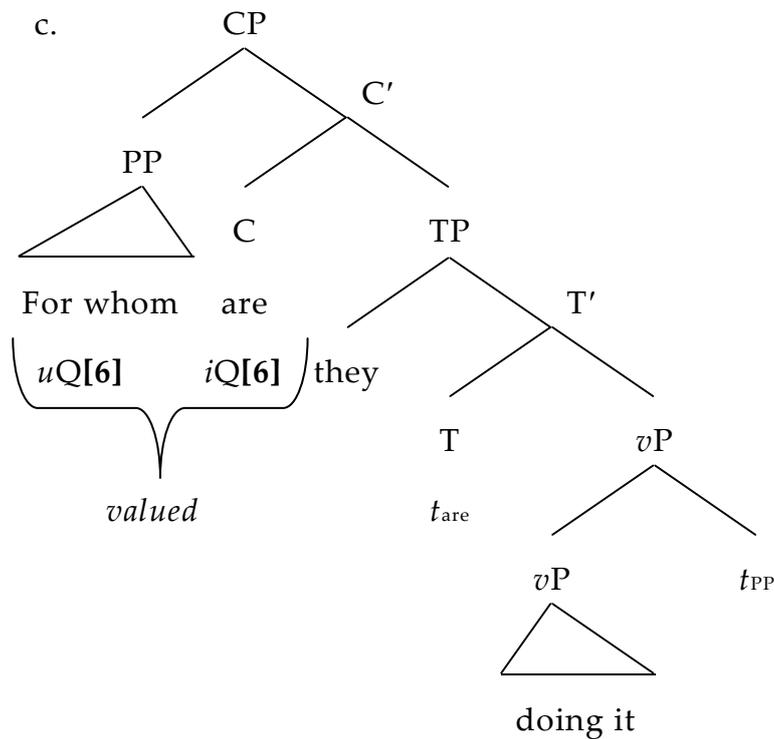


As shown in (66a), embedded C has an uninterpretable and unvalued Q(uestion)-feature ($uQ[]$), which acts as a probe and receives its value from an uninterpretable counterpart ($uQ+interrog$) on a wh -phrase by Agree as feature sharing. As a result of feature sharing, these two features receive the same value indicated by [6].⁸ After the valuation, as shown in (66b), the wh -phrase moves to [Spec, CP] in the embedded clause. In the same manner, matrix C with an interpretable but unvalued Q-feature ($iQ[]$) receives its value ([6]) from an uninterpretable counterpart ($uQ+interrog[6]$) on the moved wh -phrase by Agree with feature sharing, as shown in (64c). As in (64d), after the valuation, the wh -phrase moves up to [Spec, CP] in the matrix clause. Eventually, in the whole CP, there are three instances of the single feature indexed by [6]. As for other categories identifiable as a phase (i.e. v^*P), Pesetky and Torrego (2007: 289) takes these categories to bear $uQ[]$, like C in embedded clauses.

With these assumptions in mind, let us consider the derivation of

pied-piping in interrogatives in (2b):



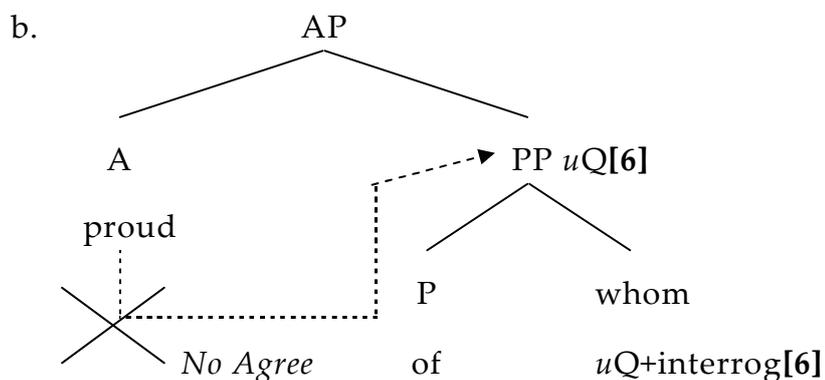
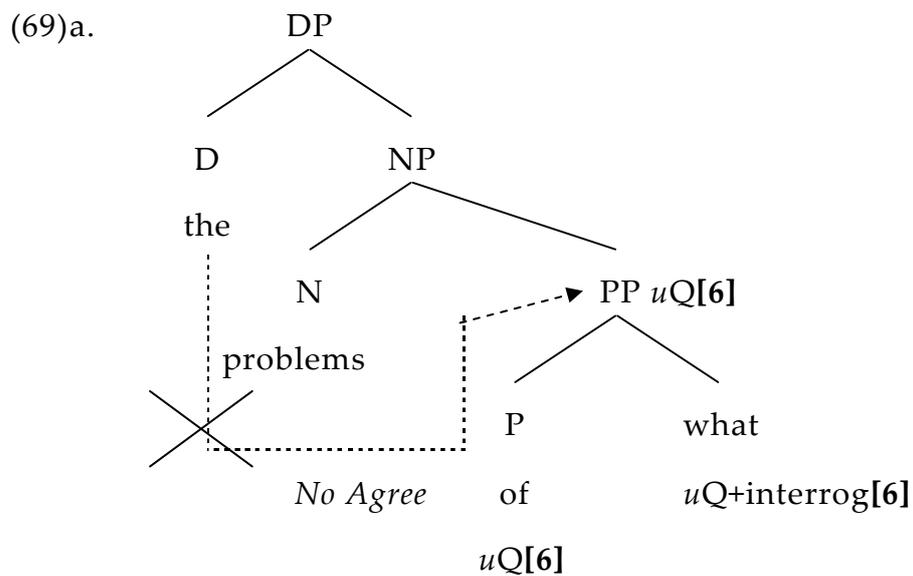


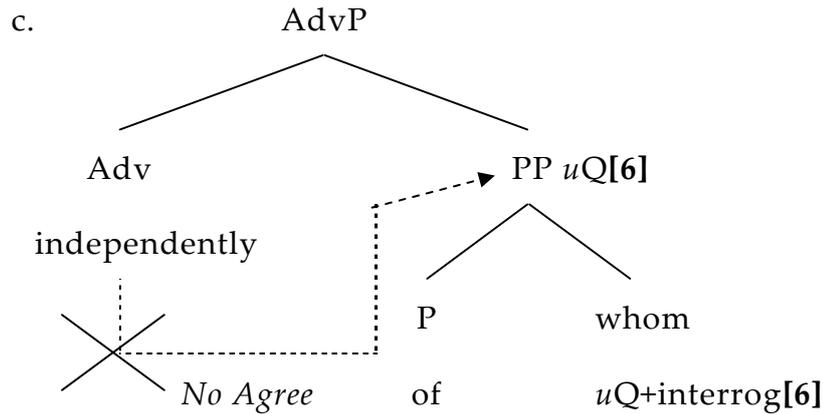
Assuming that PP is a phase (cf. Abels (2003) and Matsumoto (2013a)) and that a phase head bears $uQ[]$, as shown in (67a), Agree applies between P with $uQ[]$ and *whom* with $uQ+$ interrog, and then they receive the same value indicated by the indices [6]. Because both head and complement (i.e. *for* and *whom*) bear the common value, the whole PP incidentally bear the same feature $uQ[6]$. This process is actually the revised version of feature percolation in terms of feature sharing. As a consequence, the whole PP serves as a goal, which is probed by C with $iQ[]$. Finally, C receives the value [6], followed by the movement of PP to [Spec, CP].

We saw in section 3.2 that pied-piping of PP is possible while other phrases than PP is impossible. Relevant examples are repeated here:

- (68) a. * [The problems of what] did he solve? (pied-piping of DP)
 b. * [Proud of whom] is John? (pied-piping of AP)
 c. * [Independently of whose work] did John find the principle?
 (pied-piping of AdvP)

A question arises here: why can pied-piping be applied only to PP in interrogative clauses? The answer to this is that because categories other than PP are not phases. This means that D, A, and Adv do not bear $uQ[]$, so that they cannot establish Agree relation with PP including a *wh*-phrase (= a bearer of uQ), as schematized in (69):





Since Agree as feature sharing do not occur within DP, AP, and AdvP, they do not have *uQ* for *iQ* on C to probe. Therefore, pied-piping of those categories is not possible.

To sum up, we began by restating feature percolation in terms of feature sharing, and argued that pied-piping is made possible by feature sharing within the pied-piped category.

3.5. Conclusion

We have explored the possibility of accounting for pied-piping within the framework of the minimalist program, raising the two issues, repeated here:

- (I) What is the mechanism which makes pied-piping (im)possible?
- (II) Why do relative and interrogative clauses differ in the acceptability of pied-piping?

As for (I), our answer is that in relative clauses, pied-piping is triggered by topicalization and is restricted to phrasal categories and clausal categories without overt subjects by PIC, and that in interrogative clauses, on the other

hand, pied-piping is triggered by feature sharing (the revised version of feature percolation). As for (II), in relative clauses, where pied-piping is triggered by topicalization, the acceptability of pied-piping is high, though pied-piping of clausal categories with overt subjects are banned subject to PIC, LBC, or the subject condition. By contrast, in interrogative clauses, feature percolation via feature sharing is applied only to PP, so that the acceptability is so low that only pied-piping of PP is accepted.

Notes to Chapter 3

¹ Although some speakers (e.g. Kayne (1994)) reject pied-piping of PP in both relative and interrogative clauses, it is safe to assume that pied-piping of PP is grammatical, for pied-piping of PP is preferred over preposition stranding even in embedded interrogatives in some cases. First, pied-piping of PP is favored in highly formal contexts. Consider the following contrast:

- (i) a. * I wonder [for what] he was hoping.
- b. I am not able to say [for what kind of outcome] he was hoping.

(Huddleston and Pullum (2002: 629))

Embedded interrogatives are inclined to disfavor pied-piping of PP, as illustrated in (ia). In (ib), however, the relative formality of the expressions *I am not able to* and *what kind of outcome* matches that of pied-piping of PP, and consequently this sentence is acceptable with high formality. Second, if the pied-piped PP is an adjunction, pied-piping is grammatical after all, as exemplified in (ii):

- (ii) a. I'd like to know [in what manner] Dickens died.
- b. * I'd like to know what manner Dickens died in.

(Heck (2008: 123))

² According to Ross (1986), pied-piping of larger DP is possible in relatives, as illustrated below:

- (i) a. Reports [the covers of which] the government prescribes the height of the lettering on almost always put me to sleep.
- b. Reports [the lettering on the covers of which] the government prescribes the height of are shocking waste of funds.
- c. Reports [the height of the lettering on the covers of which] the government prescribes should be abolished. (Ross (1986: 121))

In addition, he points out the impossibility of pied-piping of DP when it involves coordinated DP or clauses, as illustrated in (ii) and (iii) respectively:

(ii) * The boy [Bill and who(m)] I watched was vain. (Ross (1986: 124))

(iii) * They will give me a hat [I won't like which] I know.

(Ross (1986: 125))

Based on these observations, Ross (1986: 128) proposes the following convention:

(iv) The Pied-Piping Convention:

Any transformation which is stated in such a way as to effect the reordering of some specified node NP, where this node is preceded and followed by variables in the structural index of the rule, may apply to this NP or to any non-coordinate NP which dominates it, as long as there are no occurrences of any coordinate node, nor of the node S, on the branch connecting the higher node and the specified node.

³ Nanni and Stillings (1978) analyze *seated* in (7b) as an adjective based on the criteria by Wasow (1977):

(i) a. *Adjectives can occur in pronominal position.*

The seated woman was wearing the black cape.

b. *Adjectives can occur as complements to a small class of verbs such as remain.*

The woman remained seated.

c. *Past participles to which un- may be prefixed only in the passive or complement position of the verb are adjectives.*

He was elected, but unseated for treating.

(cf. Nanni and Stillings (1978: 311))

⁴ For the sake of simplicity, the details of successive cyclic movement are omitted.

⁵ Tlingit *wh*-questions have the general form in (ii), as illustrated by (i).

(i) Waa sá sh tudinookw i éesh?
how Q feels your father
'How is your father feeling?'

(ii) *General form a Tlingit wh-question*

[_{CP} ... [[... *wh*-word ...] Q] ... main-predicate ...] (Cable (2010: 568))

A Tlingit *wh*-question requires the *wh*-word to precede the main predicate of

the clause. Furthermore, the *wh*-word must be followed by the Q particle (interrogative particle) *sá*, which either directly follows the *wh*-word or a phrase properly containing it.

⁶ I will leave the account of LBC under the minimalist program for future research (see Bošković (2005) for discussion).

⁷ According to Chomsky (2008: 150), “an A-chain becomes invisible to further computation when its uninterpretable features are valued.” In (62), the uninterpretable Case feature of the relative DP (*whom* + the abstract NP) in [Spec, TP] (= A position) is valued via Agree with T, so that the extraction of the abstract NP is impossible.

⁸ Pesetsky and Torrego (2007) use indices in brackets like [6] to indicate multiple instances of a single feature, though the numbering seems to have no special meanings.

Chapter 4

On Pied-Piping in Infinitival Relative Clauses in English

4.1. Introduction

English infinitival relative clauses have a remarkable characteristic about pied-piping, as illustrated in (1) and (2):

- (1) a. I found an usher to buy tickets from.
b. I found an usher from whom to buy tickets.
c. * I found an usher whom to buy tickets from.

(cf. Emonds (1976: 192))

- (2) a. I found an usher for Mary to buy tickets from.
b. * I found an usher from whom for Mary to buy tickets.
c. * I found an usher whom for Mary to buy tickets from.

(cf. Emonds (1976: 192))

In infinitival relative clauses without overt subjects, the relative pronoun *whom* can appear when it pied-pipes the preposition *from* dominating it as in (1b), but it cannot by itself with the preposition stranded as in (1c). On the other hand, when there are overt subjects *for Mary*, infinitival relative clauses do not permit the relative pronoun to appear overtly whether pied-piping of

the preposition is applied or not, as in (2b, c). Needless to say, such a restriction is not imposed on finite relative clauses:

- (3) a. I found an usher from whom Mary can buy tickets.
b. I found an usher who Mary can buy tickets from.

As shown in (3), finite relative clauses allow both pied-piping and preposition stranding.

It is possible to account for infinitival relative clauses with overt subjects like (2a-c) in terms of the following structures:

- (4) a. I found [_{DP} an usher [_{CP} OP for [_{TP} Mary to buy tickets from]]].
b. * I found [_{DP} an usher [_{CP} from whom for [_{TP} Mary to buy tickets]]].
c. * I found [_{DP} an usher [_{CP} whom for [_{TP} Mary to buy tickets from]]]. (cf. Lasnik (1990))

One can attribute the ungrammaticality of (2b, c) to the violation of the doubly-filled COMP filter (Chomsky and Lasnik (1977)), according to which CP cannot be lexically filled by an overt complementizer (*that/if/for*) and an overt specifier: examples in (2b, c) are ungrammatical because they contain an overt *wh*-word/phrase (*from*) *whom* that serves as the specifier of an overt complementizer *for*. However, infinitival relative clauses with no overt subjects like (1a-c) are beyond this approach. The structures of examples in (1a-c) are illustrated in (5):

- (5) a. I found [_{DP} an usher [_{CP} OP [_{TP} PRO to buy tickets from]]].
 b. I found [_{DP} an usher [_{CP} from whom [_{TP} PRO to buy tickets]]].
 c. * I found [_{DP} an usher [_{CP} whom [_{TP} PRO to buy tickets from]]].

(cf. Lasnik (1990))

(5c) satisfies the requirement of the doubly-filled COMP filter in that only [Spec, CP] is filled by overt elements (*from whom*); nevertheless, it is ungrammatical. Although the analysis in which infinitival relative clauses have CP has enjoyed considerable support within the study of generative grammar, the problem of pied-piping in infinitival relative clauses illustrated in (1) and (2) has remained unanswered.

The aim of this chapter is to give a syntactic explanation of peculiar properties of infinitival relative clauses that we saw above within the framework of the minimalist program by Chomsky (2000, 2001) in view of the Economy Condition put forth by Pesetsky and Torrego (2001, 2004). The organization of this chapter is as follows. Section 4.2 reviews previous analyses of infinitival relative clauses, especially those within the framework of the minimalist program since Chomsky (1995). Section 4.3 presents an explanation for infinitival relative clauses. Section 4.4 is the conclusion of this chapter.

4.2. Previous Studies

English infinitival relative clauses and their peculiar properties we saw above were pointed out by Emonds (1970: 200-204), and have been discussed by a number of studies (Chomsky (1977, 1980), Chomsky and Lasnik (1977),

Emonds (1976, 1985), among others). Specifically, this section picks up two previous studies, which were proposed within the framework of the minimalist program, and points out their problems.

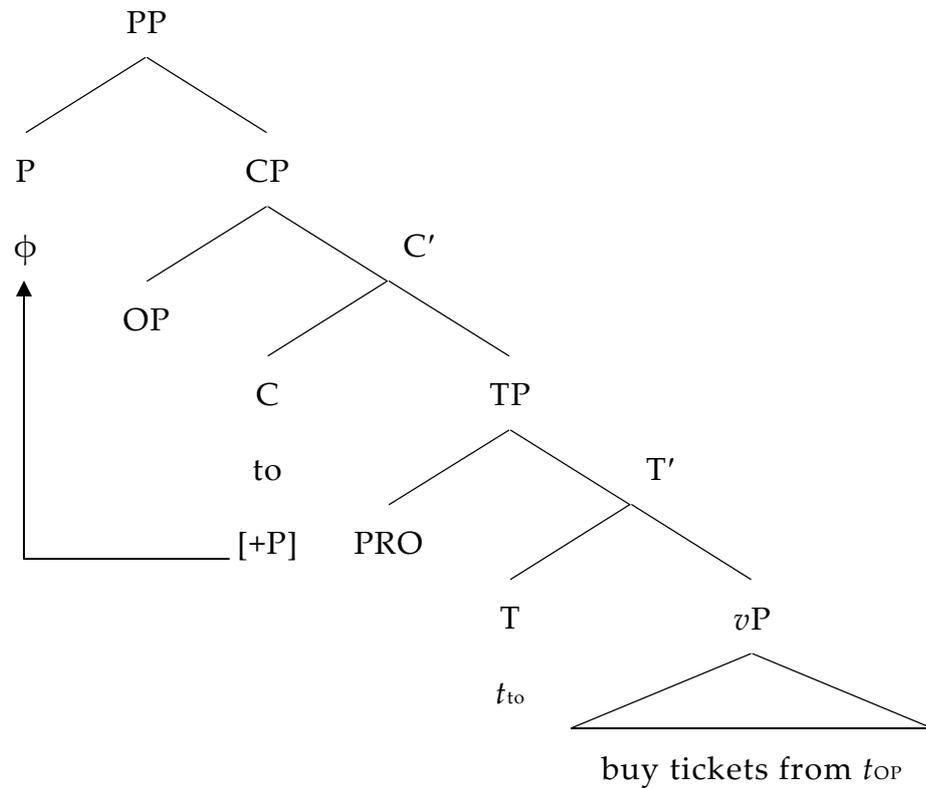
4.2.1 Hasegawa (1998)

Within the framework of the minimalist program, especially in terms of Checking Theory by Chomsky (1995), Hasegawa (1998) attempts to account for infinitival relative clauses assuming that they are PP headed by a null P. In particular, he makes the following proposals as an analysis of infinitival relative clauses:

- (6) a. An IR (Infinitival Relative) is a PP headed by a null P which takes a (infinitival) CP as its complement.¹
- b. A (head containing a) [+P(reposition)] feature must move(/be attracted) to the null head P.²
- c. The complementizer *for* is a 'prepositional complementizer' which has a [+P] feature, and it must move to the null head P position.
- d. The infinitival *to* (optionally) contains a [+P] feature, and it moves to the null head P position (when *for* is absent), after the movement to the C position. (Hasegawa (1998: 7))

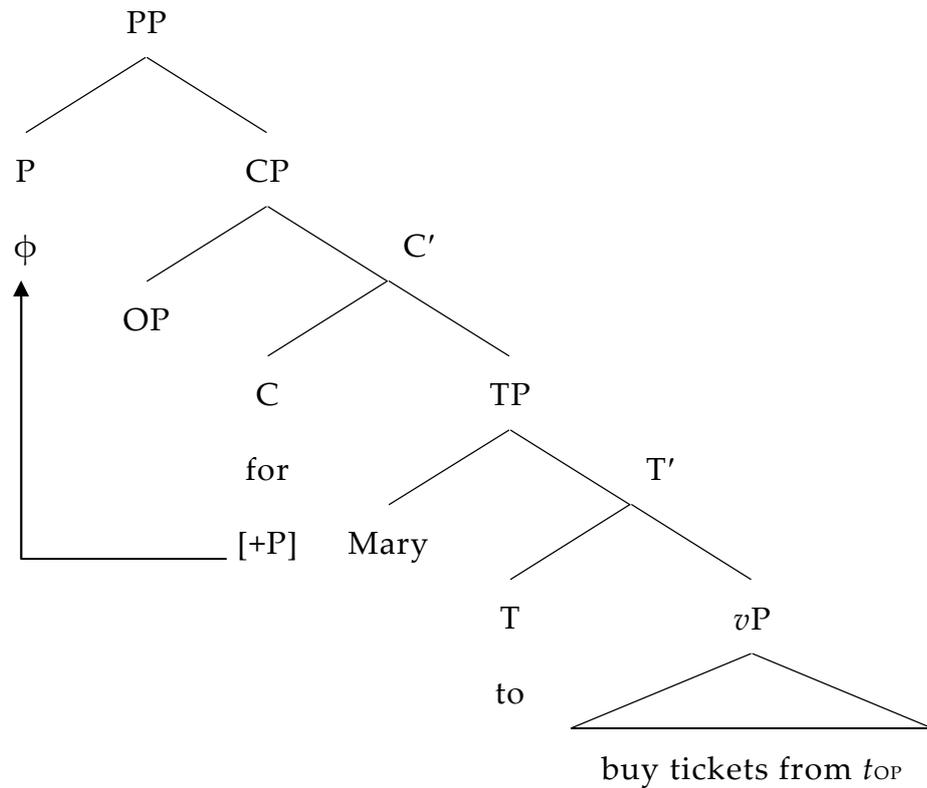
Given these assumptions, infinitival relative clauses which lack both an overt relative pronoun and an overt subject like (1a) are derived as in (7) (with the null head expressed by ϕ):

(7) I found an usher **to buy tickets from.** (= (1a))



When an overt subject is absent, the infinitival *to* contains a [+P] feature. The infinitival *to* base-generated on T moves to the null head P via C to check its [+P] feature, satisfying the requirement of (6b).³ Hasegawa (1998: 14) assumes that the T-to-C movement of the infinitival *to* is driven by the 'affixhood' of the null head C.⁴ On the other hand, infinitival relative clauses with an overt subject are derived as follows:

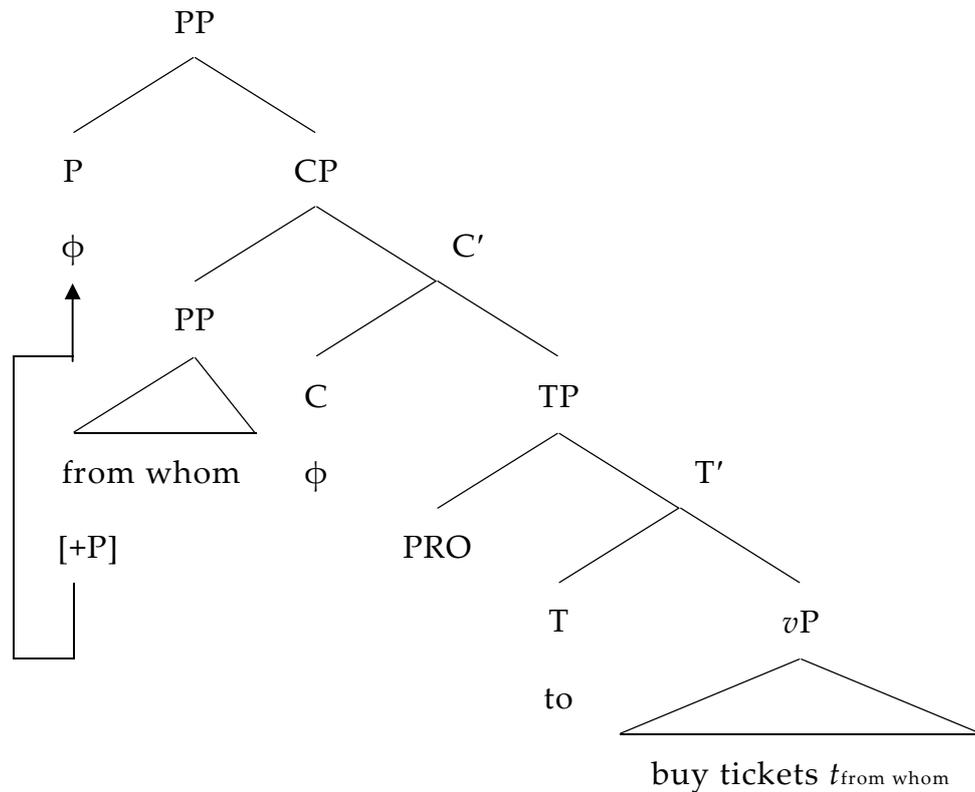
(8) I found an usher **for Mary to buy tickets from.** (= (2a))



In this case, it is not the infinitival *to* but the complementizer *for* that contains the [+P] feature. As a result, the [+P] feature of *for* moves from C to P to be checked, satisfying (6b).

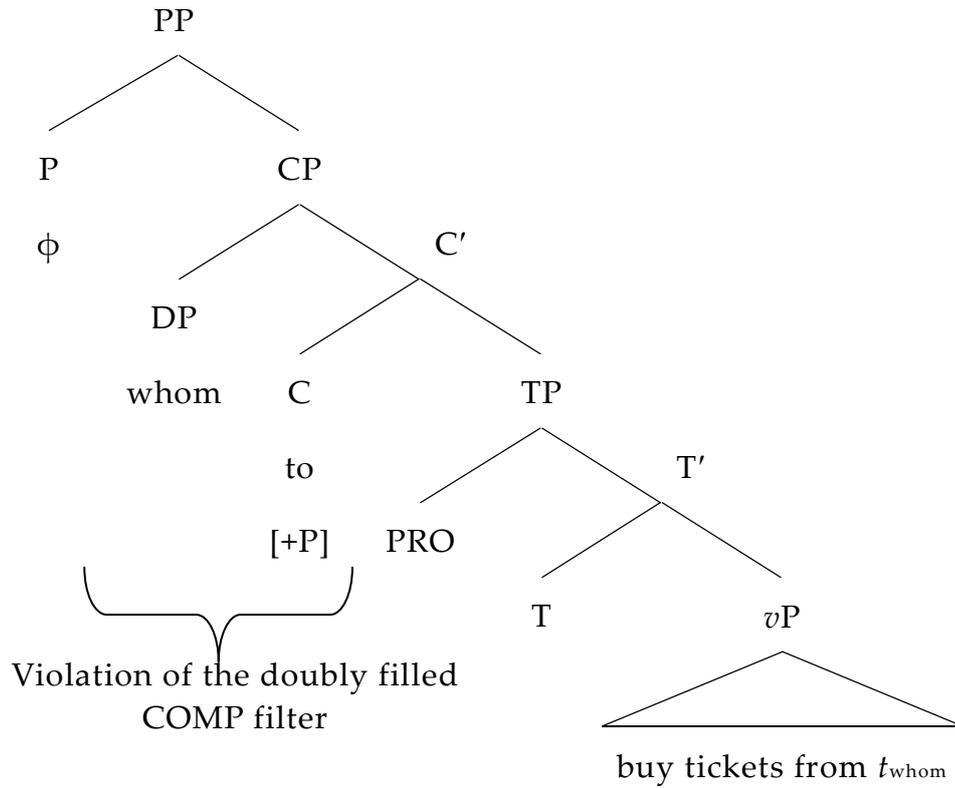
Now let us see the derivation of infinitival relative clauses when they contain the relative pronoun. First, in the absence of overt subjects, as shown in (1b), infinitival relative clauses permit a preposition to be pied-piped along with a relative pronoun, whose derivation is illustrated in (9):

(9) I found an usher **from whom to buy tickets.** (= (1b))

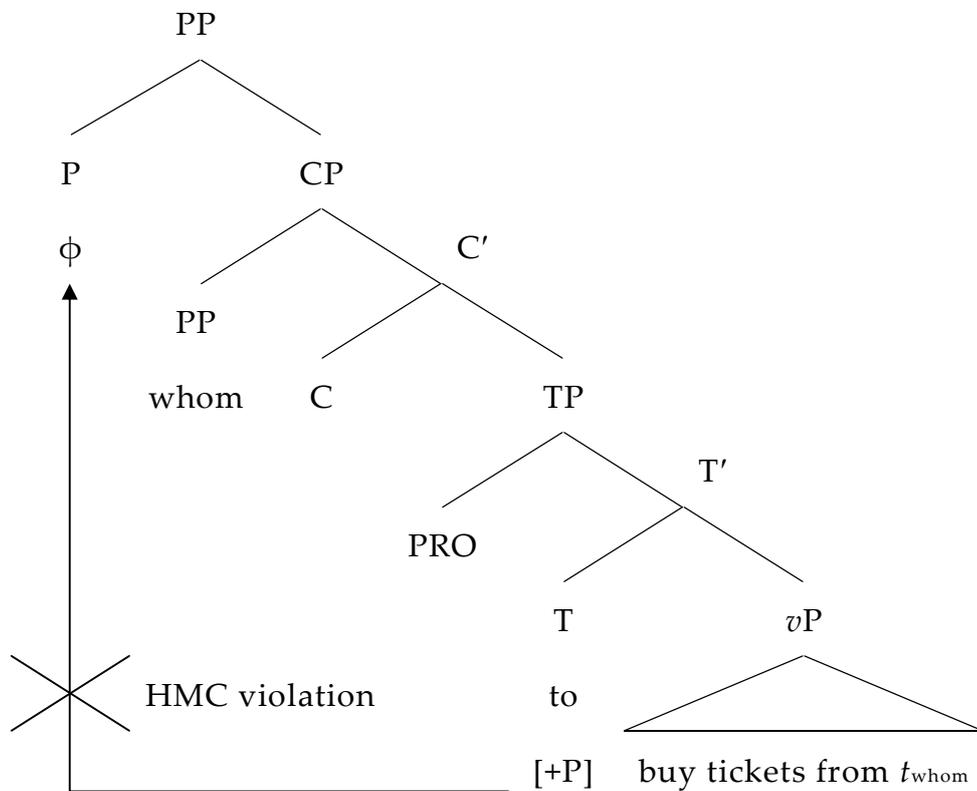


In infinitival relative clauses with the relative pronoun pied-piped, it is the [+P] feature of pied-piped PP *from whom* that moves to the null head P and satisfies (6b). According to Hasegawa (1998: 15), when the pied-piped PP has the [+P] feature, the infinitival *to* does not have it and so remains in situ.⁵ In contrast, infinitival relative clauses in which the overt relative pronoun appears by itself like (1c) are rejected in terms of the following structures:

(10)a. * I found an usher **whom to buy tickets from.** (= (1c))



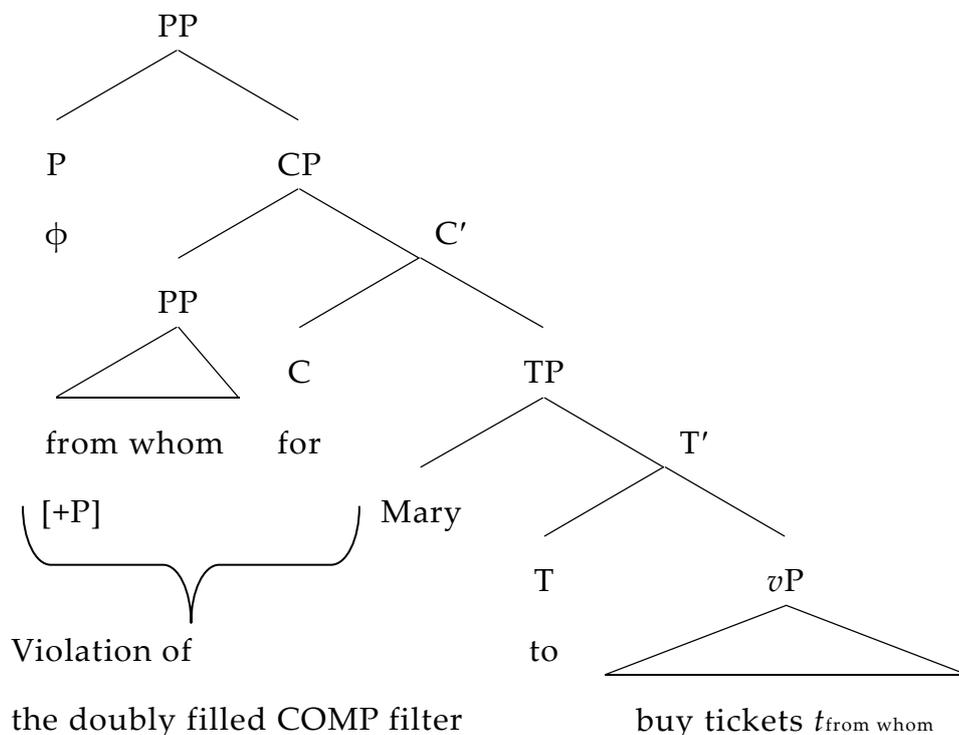
b. * I found an usher **whom to buy tickets from.** (= (1c))



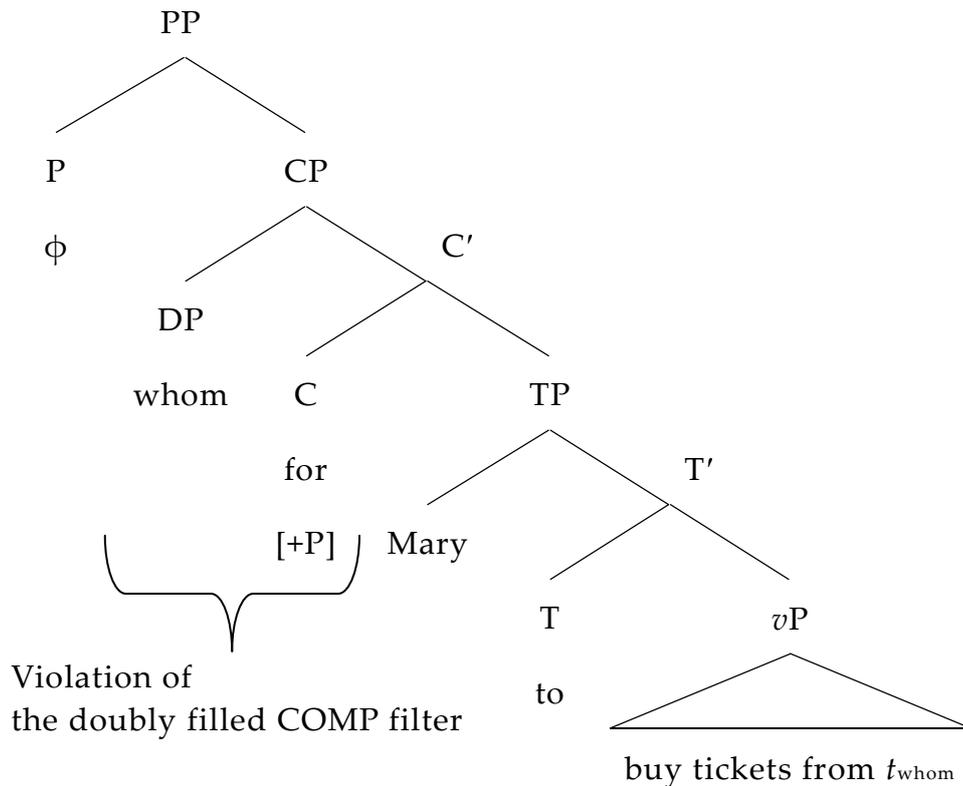
When the overt relative pronoun moves to [Spec, CP] stranding the preposition, the only candidate for the [+P] feature is the infinitival *to*. Suppose that the infinitival *to* with the [+P] feature overtly moves to C and then the [+P] feature undergoes covert movement to the null head P, as shown in (10a). It apparently causes the violation of the doubly-filled COMP filter with both the head and the specifier of CP occupied by lexical elements such as *to* and *whom*, respectively. Moreover, even if only the [+P] feature moves to the null head P with the infinitival *to* in situ, as shown in (10b), it violates the Head Movement Constraint (HMC) by skipping the intervening head C.

Next, the ungrammaticality of infinitives with overt subjects in (2b, c) is accounted for in terms of the following derivations:

- (11) a. * I found an usher **from whom for Mary to buy tickets.** (= (2b))



b. * I found an usher **whom for Mary to buy tickets from.** (= (2c))

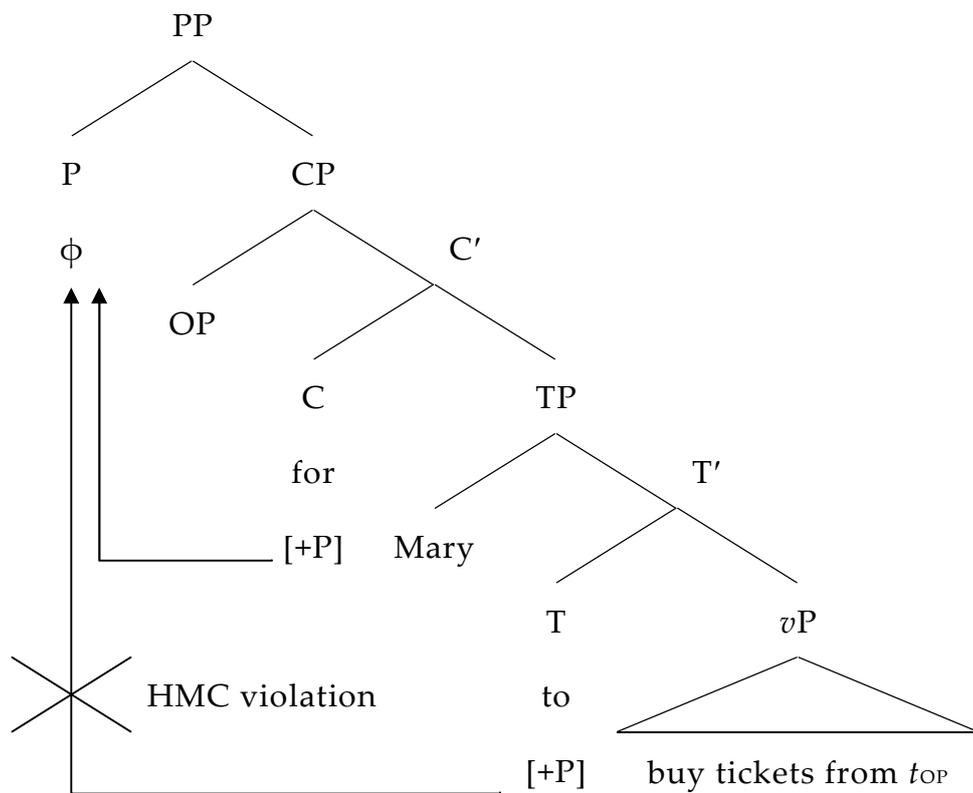


As shown in (11), regardless of pied-piping of a preposition, the overt relative pronoun to be rejected in infinitival relative clauses with overt subjects, s because of the violation of the doubly-filled COMP filter: both the head and the specifier of CP are filled by *for* and (*from*) *whom*, respectively.

Hasegawa (1998) appears to account successfully for peculiar properties of infinitival relative clauses in (1) and (2) by virtue of checking of the [+P] feature, assuming that infinitival relative clauses are PP with the null head P. However, his assumption about the [+P] feature in (6d) is dubious in that the [+P] feature is arbitrarily introduced to the infinitival *to*. More concretely, the presence of the [+P] feature hinges crucially on the grammaticality of the whole sentence. In fact, according to his analysis, in (8), the infinitival *to* does not bear the [+P] feature and thereby the derivation converges.

Suppose that the infinitival *to* also has the [+P] feature (in addition to the complementizer *for*) contrary to (8), the derivation would crash because the [+P] feature of *to* cannot move to P with *for* in C intervening between them, as illustrated in (12):

(12) I found an usher **for Mary to buy tickets from.** (cf. (8))



Although Hasegawa's (1998) analysis does not seem to be fully supported, his assumption that infinitival relative clauses are PP and the infinitival *to* has some prepositional feature is worth consideration. Therefore, in section 4.3, we will look closely at the prepositional status of infinitival relative clauses with empirical evidence, and develop a new analysis.

4.2.2. Pesetsky and Torrego (2001, 2004, 2006)

Since Chomsky (2000, 2001), it has been standardly assumed that when Internal Merge (i.e. Move) takes places, a probe-goal relation (i.e. Agree) must be established between two syntactic units. Pesetsky and Torrego (2006) extend this assumption to External Merge, proposing the following as a requirement on all instances of Merge:

(13) Vehicle Requirement on Merge (VRM)

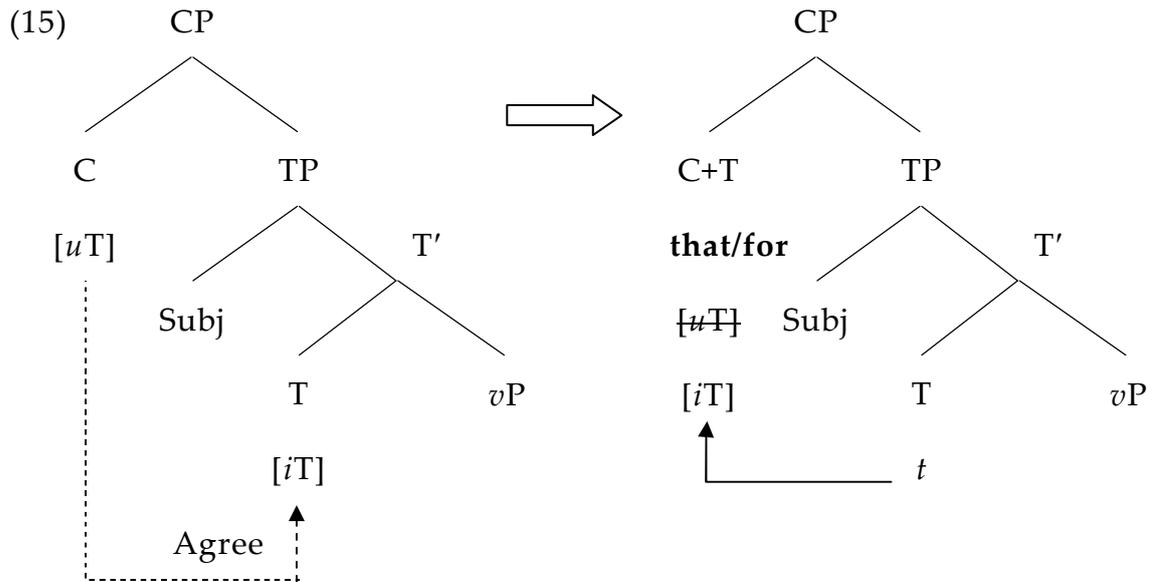
If α and β merge, some feature F of α must probe F on β .

(Pesetsky and Torrego (2006: 25))

According to (13), a probe-goal relation is required anytime Merge takes place.⁶ Based on (13) and their previous works (2001, 2004), Pesetsky and Torrego (2006) attempts to account for the different patterns of complementation between nouns and verbs and the clausal modification of nouns by relative clauses. The gist of their proposals in Pesetsky and Torrego (2001, 2004) is summarized as follows:

- (14) a. *That/for* in C and a preposition all bear interpretable T(ense) features ([iT]).
- b. Nouns (N/D) and C bear uninterpretable T features ([uT]).⁷

As for (14a), Pesetsky and Torrego assume that the clause-introducers *that* and *for* are not complementizers (as generally assumed), but lexical realization of [iT] which undergoes movement to C, as illustrated in (15):



As a consequence of Agree of $[uT]$ on C with $[iT]$ on T, $[iT]$ moves from T to C and is realized as *that* in finite clauses and *for* in infinitival clauses, resulting in deletion of $[uT]$.⁸ In addition to *that* and *for*, Pesetsky and Torrego assume that a preposition is also a bearer of T, based on the fact that *that*, *for* and a preposition all show “X-trace effects,” as shown in (16)-(18):

(16) “*That*-trace effect” (Perlmutter (1971))

[non-subject *wh* → optional *that*]

- a. What do you think [Mary read ___]?
- b. What do you think [that Mary read ___]?

[subject *wh* → no *that*]

- c. Who do you think [___ read the book]?
- d. * Who do you think [that ___ read the book]?

(Pesetsky and Torrego (2006: 30))

(17) “For-trace effect” (Chomsky and Lasnik (1977))

[non-subject *wh* → optional *for*]

- a. What do you want [us to read ___]?
- b. What do you want [for us to read ___]?

[subject *wh* → no *for*]

- c. Who do you want [___ to read the book]?
- d. * Who do you want [for ___ read the book]?

(Pesetsky and Torrego (2006: 30))

(18) “P-trace effect” (Kayne (1979))

[non-subject *wh* → P ok]

- a. How much headway did he anticipate [Mary making ___ on the issue]?
- b. How much headway did he anticipate [for Mary making ___ on the issue]?

[subject *wh* → P bad]

- c. How much headway did he anticipate [___ being made on the issue]?
- d. ??How much headway did he anticipate [about ___ being made on the issue]?

(Pesetsky and Torrego (2006: 30))

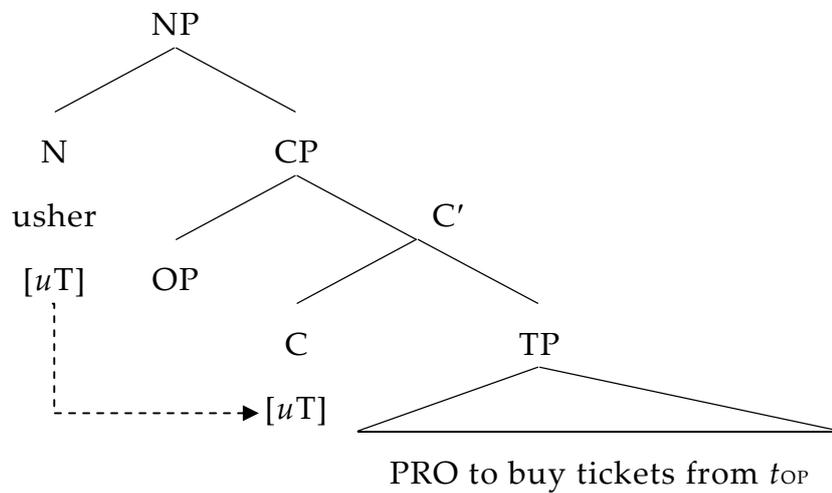
Pesetsky and Torrego argues that prepositions generally bear a T-feature whether their complement is clausal gerunds or (non-gerund) DPs. (We will return to details on X-trace effects based on the proposals in (14) in the next section, , but we focus attention here on how the T-feature on P interacts with VRM in analyzing infinitival relative clauses in (1) and (2).)

With the further assumption in (19), Pesetsky and Torrego (2006) attribute the (un)grammaticality of infinitival relative clauses in (1) and (2) to whether or not VRM is satisfied between a noun and the relative clause which modifies it. The examples in (1) are analyzed as in (20):

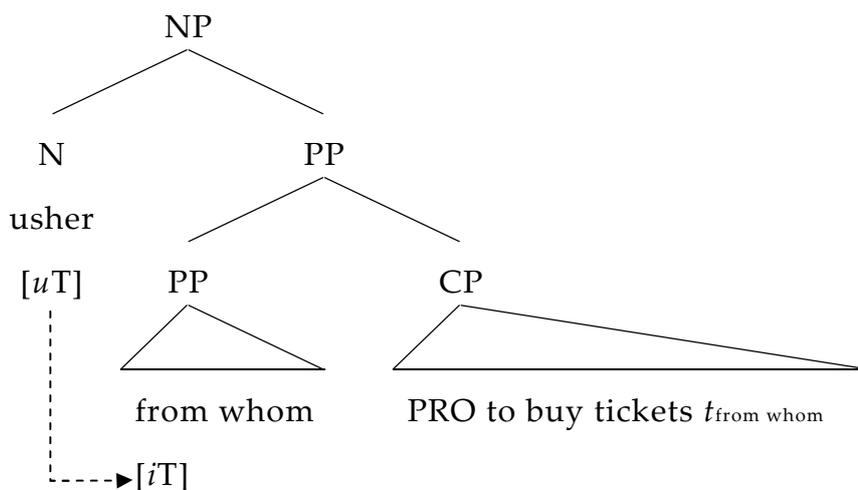
(19) the moved *wh* in a relative clause projects after movement.

(Pesetsky and Torrego (2006: 39))

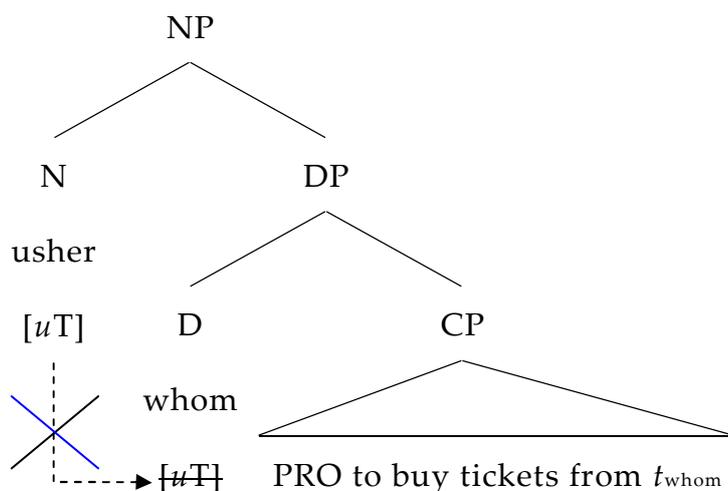
(20) a. I found an **usher to buy tickets from**. (= (1a))



b. I found an **usher from whom to buy tickets**. (= (1b))



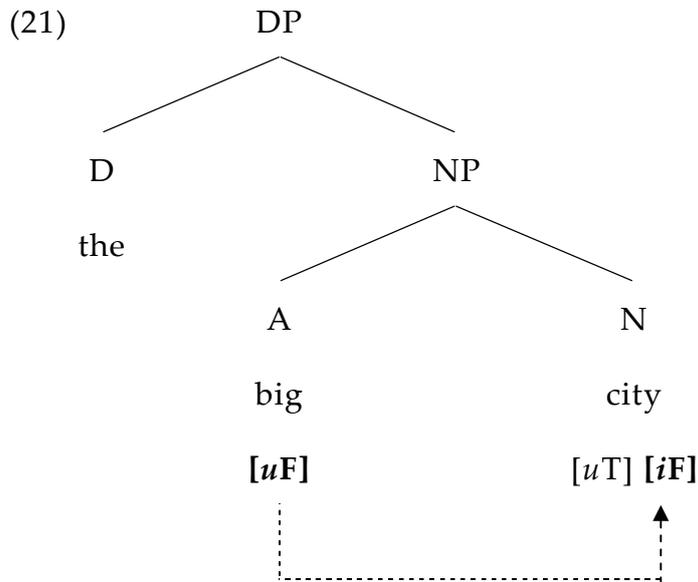
- c. * I found an **usher whom to buy tickets from**. (= (1c))



According to (13) and (14), a noun as a bearer of $[uT]$ can be merged with an element with T-feature ($[uT]$ or $[iT]$). In (20a), the noun *usher* can be merged with the infinitival relative CP, as Agree applies between $[uT]$ on the noun and $[uT]$ on C, thus satisfying VRM. It should be noted here that C can have $[uT]$ after the end of the CP-cycle (i.e. phase) in infinitive clauses whose subject is PRO (Pesetky and Torrego (2001: 400)). In (20b), on the other hand, the infinitival relative clause forms PP as the moved PP *from whom* projects, according to (19). In this case, VRM is satisfied under the Agree relation between $[uT]$ on the noun *usher* and $[iT]$ on P. In (20c), by contrast, the moved *wh*-word projects, and so the infinitival relative clause is interpreted as DP, not CP, according to (19). As $[uT]$ on D is deleted once the relative clause has been constructed, $[uT]$ on the noun *usher* cannot find $[uT]$ on the infinitival relative DP, which does not satisfy VRM.

Conceptually desirable as VRM may be in that even External Merge is a feature-driven operation as well as Internal Merge, it has both theoretical and empirical difficulties. A theoretical problem is that VRM forces us to come

up with brand new features. For example, if every Merge in a DP derivation like (21) is mediated by Agree, it is necessary to postulate another feature than T which mediates Merge of a noun and an adjective of its modifier:



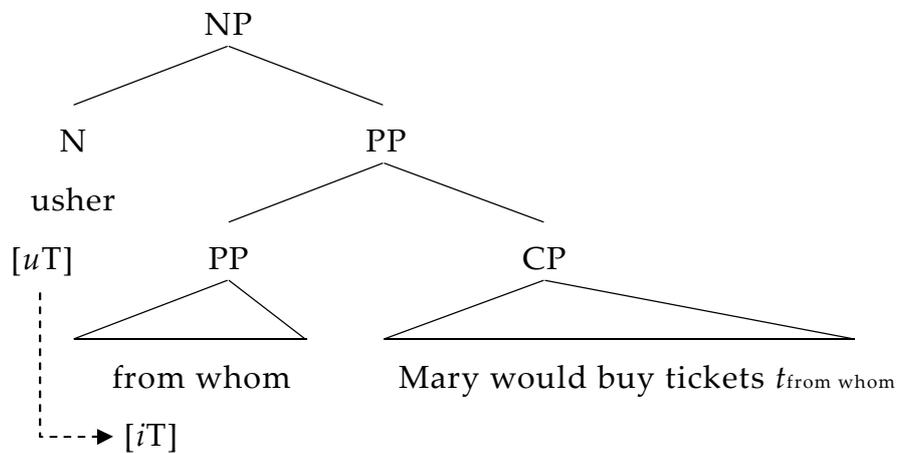
An empirical problem is that the analysis based on VRM cannot account for finite relative clauses like (3), repeated here as (22):

- (22) a. I found an usher from whom Mary can buy tickets. (cf. (20b))
 b. I found an usher who Mary can buy tickets from. (cf. (20c))

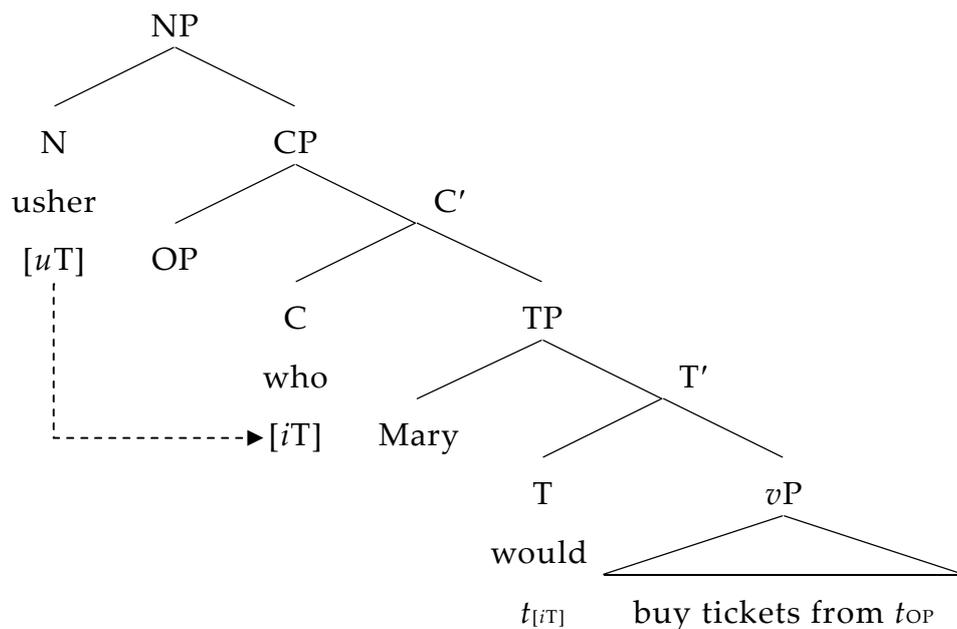
Unlike infinitival relative clauses, pied-piping does not affect the possibility of Merge between a finite relative clause and its head nominal. If finite relative clauses are derived in the same way as infinitival relative clauses, it is wrongly predicted that finite relative clauses without pied-piping like (22b) is ungrammatical by the same reasoning as (20c): improper Merge between N and DP caused by the absence of a T-feature on D. Pesetsky and

Torrego (2006: 42) tries to avoid this problem by assuming that “*who* and *which* in English finite relative clauses are not moved *wh*-phrases, but agreeing variants of relativizing *that*.” In other words, [*i*T] which undergoes movement to C can be lexically realized as *who* and *which* in English finite relative clauses (see (15)).⁹ Based on this assumption, the examples in (22) are analyzed as follows:

- (23) a. I found an **usher from whom Mary would buy tickets.** (= (22a))



- b. I found an **usher who Mary would buy tickets from.** (= (22b))



In (23a), the finite relative clause has the same structure as the infinitival counterpart in (20b). PP *from whom* undergoes *wh*-movement, and then Agree applies between [*u*T] on the noun *usher* and [*i*T] on P. In (23b), on the other hand, Agree applies between [*u*T] on the noun *usher* and [*i*T] on C which has moved from T and is realized as *who*, thus satisfying VRM. Unlike the infinitival relative clause, the finite ones are not a DP with no [*i*T], but a CP with [*i*T], so they do not suffer from improper Merge like (20c)

Pesetysky and Torrego (2006) manage to explain the grammatical contrast between finite and infinitival relative clauses. Still, it is merely an ad hoc rule to stipulate that *who* and *which* are not *wh*-phrases but variants of *that* only in English finite relative clauses. Furthermore, even with such a stipulation, it is not possible to account for finite relative clauses with possessive relative pronouns (e.g. *the person whose mother I met*), since such relative clauses show a clearly fronted DP (*whose mother*), confronted with the same problem as in (20c), as pointed out in Pesetky and Torrego (2006: 46). Therefore an analysis of relative clauses should not be based on VRM.

In the following section, we will reject the assumption that Agree applies between a noun and the relative clause modifying it, though employing some proposals by Pesetky and Torrego (2001, 2004). Moreover, we will present a new analysis of pied-piping in infinitival relative clauses, by reconsidering the structure of infinitival relative clauses.

4.3 Analysis

This section proposes a syntactic analysis of infinitival relative clauses and its interaction with pied-piping, especially focusing on their

prepositional nature. The whole discussion in this section is based on the following assumptions.

In this section, adopting the proposal in (13a) that a preposition bears [*i*T], we will make the following set of proposals:

- (24) a. Infinitival relative clauses are not CP, but *p*P.
b. For NP/DP appearing as a subject in infinitival relative clauses is PP, adjoined to the head noun or the matrix clause.

As for (24a), it is reasonable to think that the infinitival *to* in infinitival relative clauses does not belong to TP in the light of the distribution of expletive *there*. This follows from the contrast illustrated in (25):

- (25) a. I will arrange for *there* to be someone to meet the visitors at the airport. (Radford (2009: 309))
b. * He has some books for *there* to be in the library.
(cf. He has some books that *there* are in the library.)
(Berman (1974: 37))

There is a clear difference in the distribution of expletive *there* between the infinitival complement clause in (25a) and the infinitival relative clause in (25b). Given that expletive *there* is directly merged in [Spec, TP] to satisfy EPP requirement for T to project a nominal specifier (Chomsky (2001)), this contrast suffices to conclude that infinitival relative clauses lack TP. It is worth noting that bare infinitive clauses are generally assumed to lack TP and also disallow the occurrence of expletive *there*, as illustrated in (26):

(26) * We saw *there* be fewer complaints. (Safir (1993: 57))

If C always takes TP as its complement and if infinitival relative clauses lack TP, then they must lack CP as well. Hence, we may well regard infinitival relative clauses as a prepositional phrase, as proposed in Hasegawa (1998).¹⁰ In addition, considering the *wh*-movement within the prepositional phrase, it is reasonable to assume that infinitival relative clauses are *p*P rather than PP.

Since we conclude that infinitival relative clauses are *p*P and lack both CP and TP, *for*-phrases within those clauses cannot be a variant of complementizers. Some researchers suggest that *for* is not a complementizer but a preposition in infinitival relative clauses, contrary to infinitival complement clauses, leading to the proposal in (24b). First, consider sentences like (27):

- (27) a. John brought a book for himself to read
b. * John_i brought a book for him_i to read (Berman 1974: 38))

According to Berman (1974), although (27a) is not perfectly accepted by everyone, it is infinitely better than (27b) with correferential reading of *John* and *him*. On the assumption that infinitival relative clauses are CP, it is incorrectly predicted that (27a) violates Condition A of Binding Theory for lack of the antecedent to bind the anaphor *himself* within TP (i.e. binding domain), and that (27b) should be grammatical owing to Condition B in that the pronoun *him* is free (i.e. unbounded) within TP.¹¹ This suggests that *for NP/DP* belongs to the matrix TP. It is also confirmed by the behavior of

floating quantifiers, which shows a sharp contrast between and infinitival relative clauses and other types of infinitive clauses:

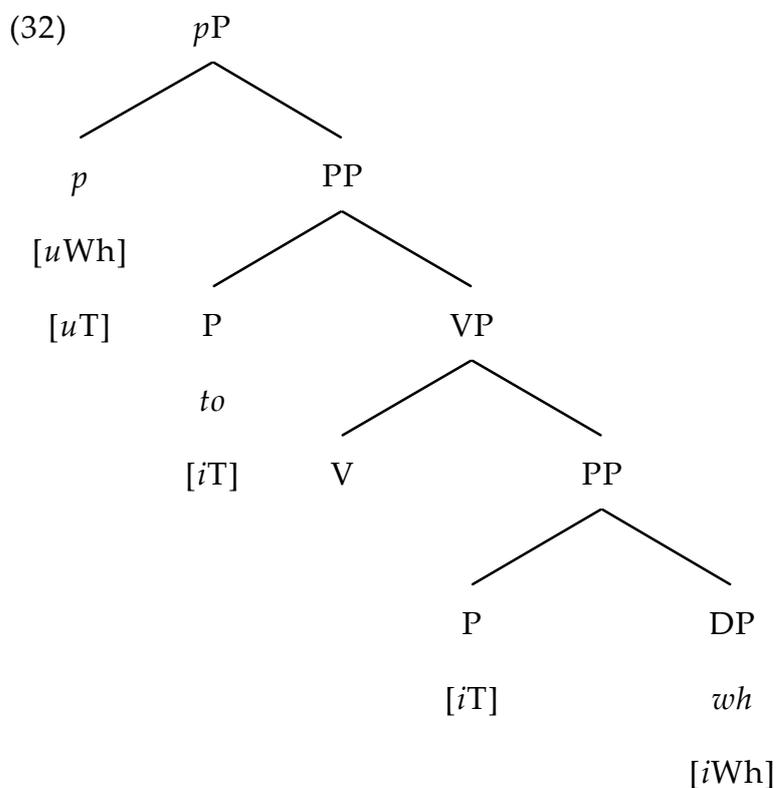
- (28) a. For *all* men to leave now should be a shame.
b. For men to *all* leave now should be a shame. (Berman 1974: 38)
- (29) a. I would prefer for *all* the men to leave.
b. I would prefer for the men to *all* leave. (Berman 1974: 39)
- (30) a. I bake a cake for *all* the children to eat.
b. * I bake a cake for the children to *all* eat. (Berman 1974: 39)

In infinitival subject clauses like (28) and infinitival complement clauses in (29), a quantifier like *all* can appear either on the left or the right to the subject which it modifies. By contrast, this is not the case in infinitival relative clauses like (30). Under Sportiche's (1988) account of floating quantifiers as stranded by movement of the associated nominal, the subject *men/the men* moves from [Spec, *v*P] to [Spec, TP] stranding the quantifier *all* in (28) and (29). On the other hand, such derivation is disallowed in infinitival relative clauses as in (30). Therefore, it follows that an understood subject of infinitival relative clauses is not generated as an external argument of the infinitival *to*, but included in PP headed by *for*. Furthermore, the following contrast strongly support the assumption that *for NP/DP* forms PP in infinitival relative clauses:

- (31) a. * For whom would you prefer *t_{for whom}* to leave?
b. For whom did you buy a book *t_{for whom}* to read?

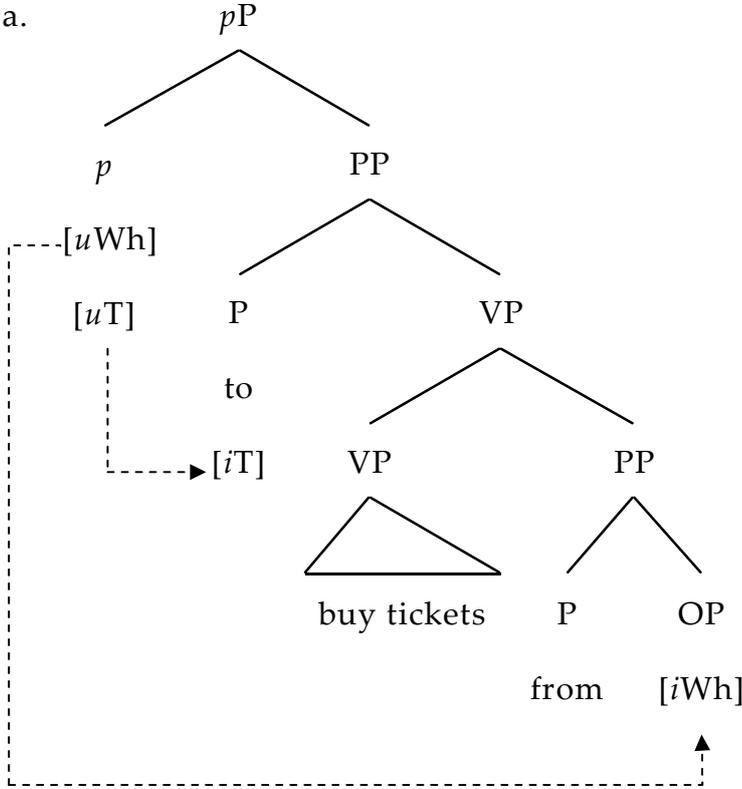
In infinitival complement clauses, it is impossible to front *for NP/DP* by *wh*-movement because a complementizer *for* and a subject in [Spec, TP] do not form a syntactic constituent. On the other hand, such *wh*-movement is possible in (31b), which means that *for NP/DP* is independent of infinitival relative clauses. Although it depends on context whether *for NP/DP* is adjoined to the head noun or the matrix clause, it is evident from examination of (27)-(31) that *for NP/DP* is PP lying outside of infinitival relative clauses.

Based on the discussion thus far, I propose that the structure of infinitival relative clauses is delineated as in (32):

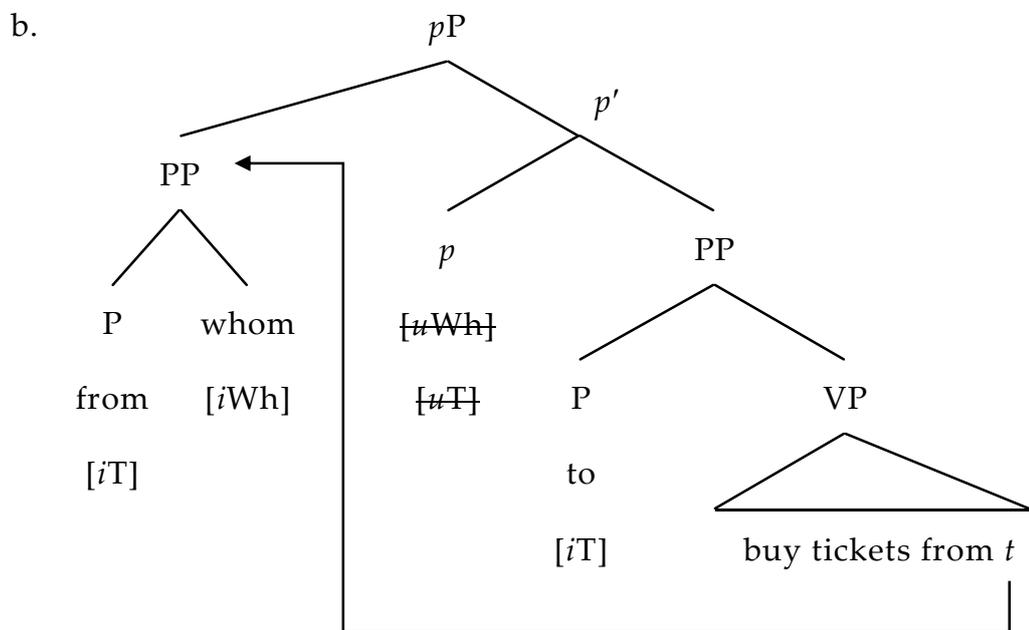
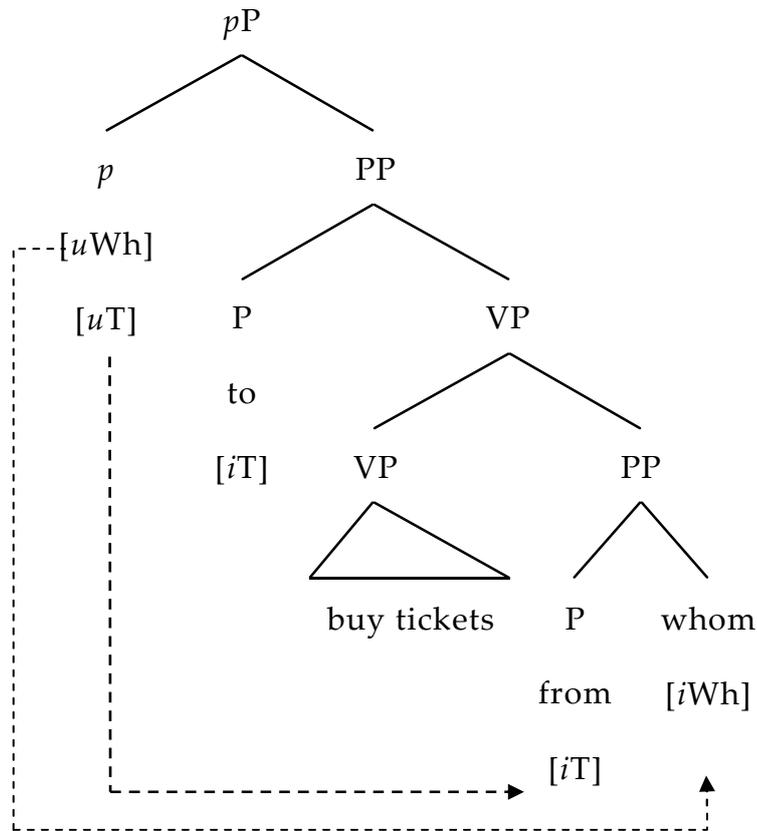


The head of infinitival *pP* has both [*uWh*] and [*uT*], which need to be deleted via Agree, just as that of CP does. With the structure in (32) in mind, we shall examine the derivations of infinitival relative clauses in (1) and (2) in turn. Consider first the derivation of infinitival relative clauses without overt subjects and relative pronouns in (1a), illustrated in (33):

(33) I found an usher **to buy tickets from**. (= (1a))



(34) a. I found an usher **from whom to buy tickets.** (= (1b))

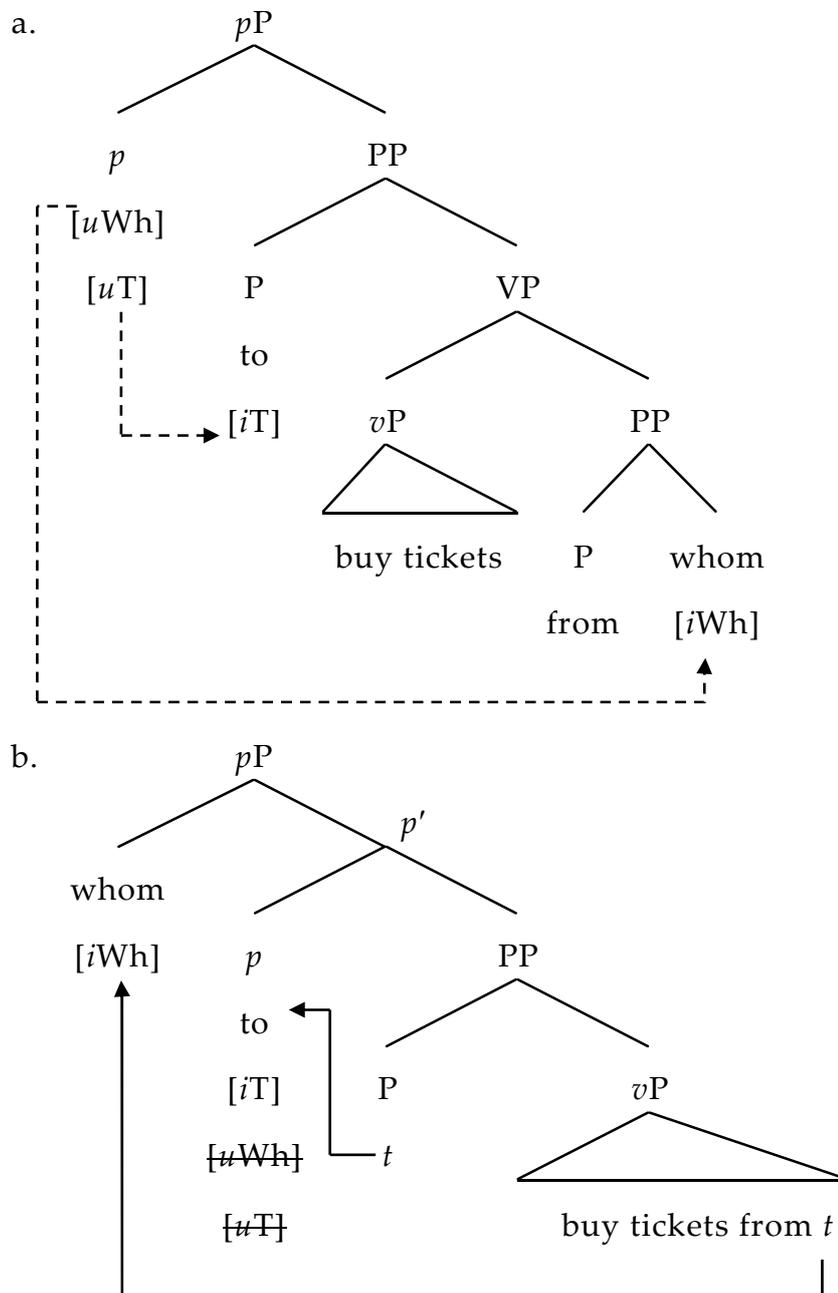


As in (34a), $[uWh]$ and $[uT]$ on *p* probe $[iWh]$ on *whom* in the complement of *P* *from* and $[iT]$ on *P* *from*, respectively; thus two types of Agree apply. Then,

the derivation converges by movement of PP *from whom* to [Spec, pP], with uninterpretable features ([uWh] and [uT]) deleted as in (34b).

We are in a position to consider how the impossibility of infinitival relative clauses without pied-piping like (1c) is derived. Along the line of the discussion of (33) and (34), the derivation of (1c) is represented as in (35):

(35) * I found an usher **whom to buy tickets from**. (= (1c))



As in (35a), [*uWh*] and [*uT*] on *p* probe [*iWh*] on *whom* in the complement of *from* and [*iT*] on *P to*, respectively; thus two types of Agree apply. Consequently, *whom* moves from the complement of *from* to [Spec, *pP*], and *to* with [*iT*] moves from *P* to *p*, with uninterpretable features ([*uWh*] and [*uT*]) deleted. However, this derivation is not permitted. What is crucial here is the difference in the number of movements between the derivations in (34) and (35). Two kinds of features (*Wh*-feature and *T*-feature) on *p* set up two Agree relations, but drive only one movement in (34), namely the movement of PP *from whom* to [Spec, *pP*], while the same Agree relations are followed by two movements in (35), namely the movement of *whom* to [Spec, *pP*] and the *P-to-p* head movement of *to*. It seems reasonably safe to conclude that the derivation in (34) is preferred over the one in (35) from a perspective of economy: other things being equal, the derivation with fewer operations is favored over the one with more operations.

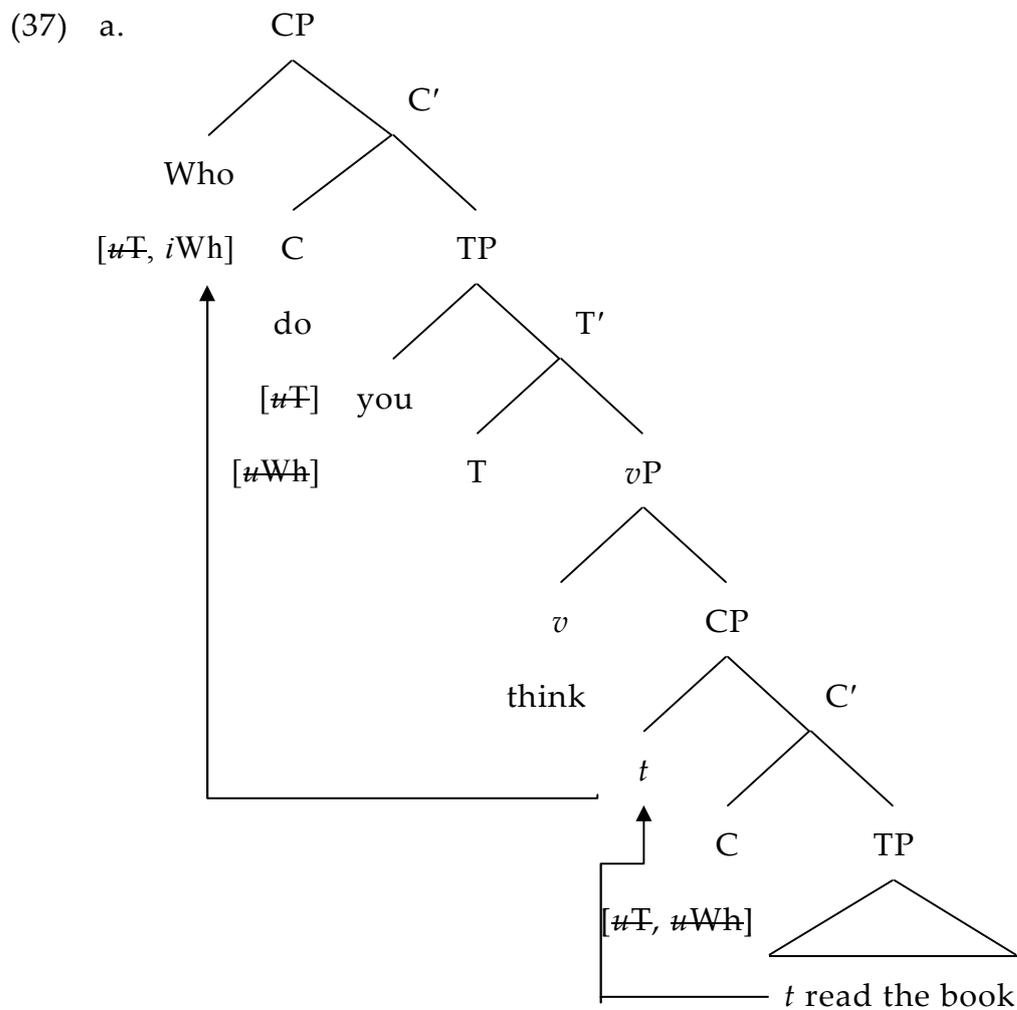
The concept of economy in a derivation of the same sort is also proposed by Pesetsky and Torrego (2001, 2004) in their discussion of X-trace effect that we have seen in (16)-(17) and the impossibility of *do*-support in *wh*-subject interrogative clauses. It is formulated as follows:

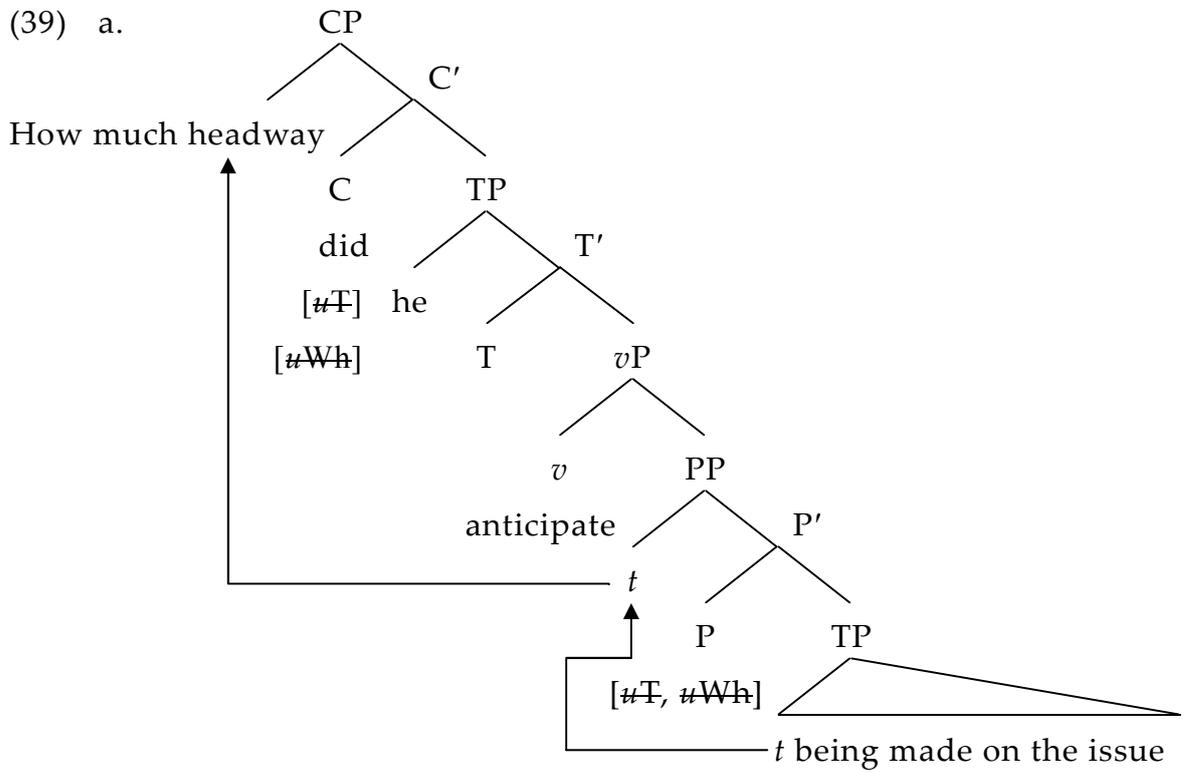
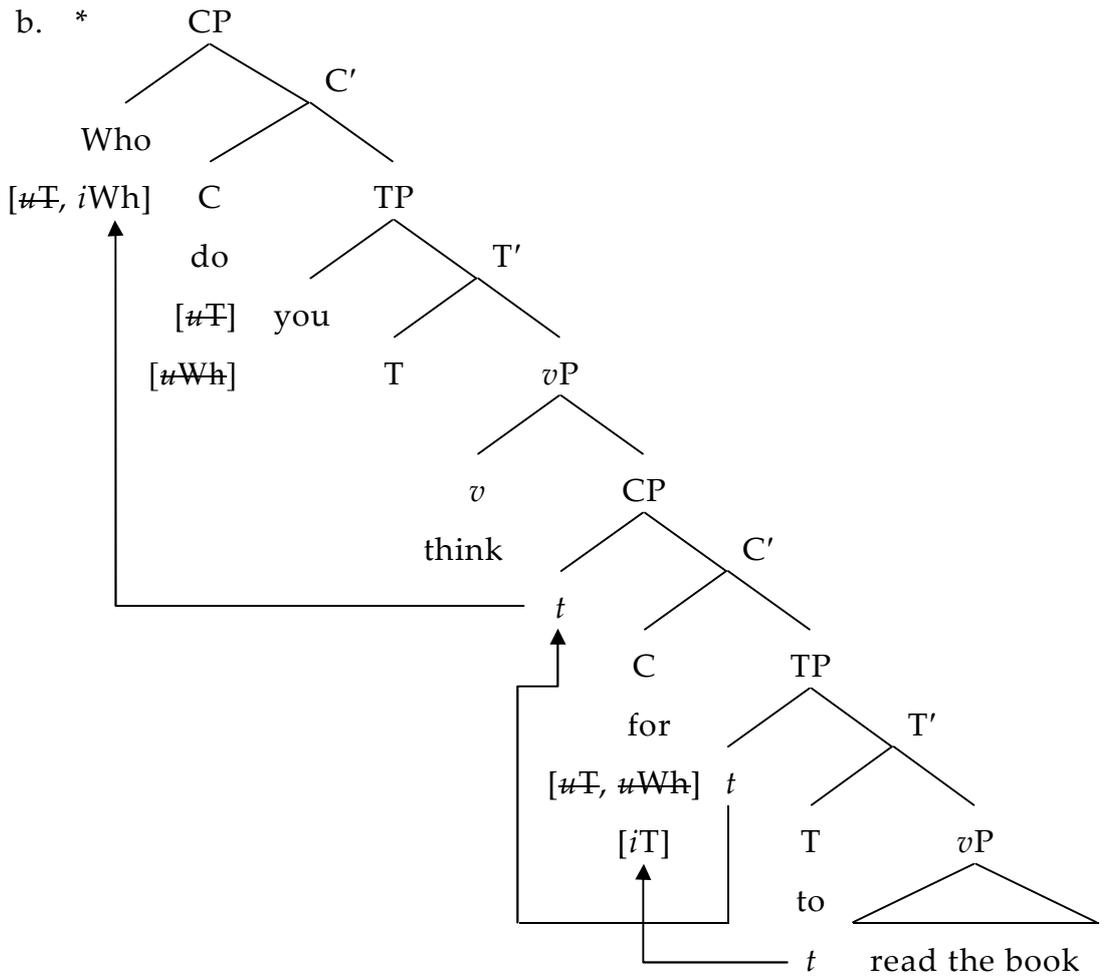
(36) Economy Condition

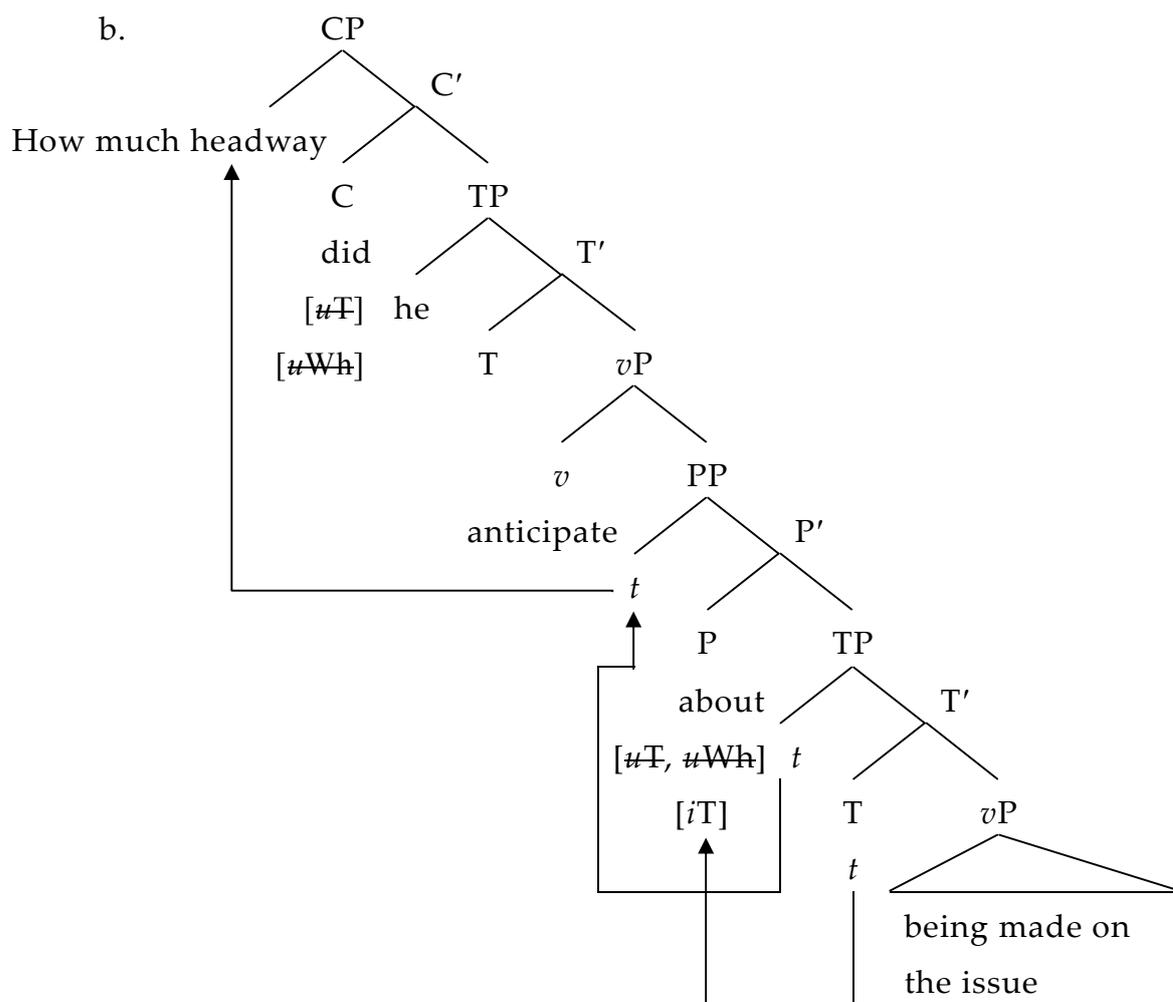
A head *H* triggers the minimum number of operations necessary to satisfy the properties (including EPP) of its uninterpretable features. (Pesetsky and Torrego (2001: 359))

In this context, what (36) suggests is that the EPP properties of

uninterpretable features ([*uT*] and [*uWh*]) on embedded C should be satisfied by the smallest possible number of movement operations (see note 8 for the status of EPP in Pesetsky and Torrego (2001, 2004)). With this in mind, first, let us consider X-trace effect. We have seen that subject extraction out of certain contexts is ungrammatical, that is, out of an embedded CP introduced by *that/for* and out of PP with a gerundive complement introduced by a preposition like *about*. The structures of the relevant examples in (16)-(17) are illustrated in (37)-(39):







In (37a), (38a) and (39a), [uT] and [uWh] on the embedded C/P are deleted by Agree with [uT] and [iWh] on the *wh*-subject *who/how much head way*, which results in the single movement of *who/how much head way* to embedded [Spec, CP/PP]. In (37b), (38b) and (39b), by contrast, Agree applies between [uT] on the embedded C/P and [iT] on the embedded T on the one hand, and between [uWh] on the embedded C/P and [iWh] on the *wh*-subject *who/how much head way* on the other. Consequently, two distinct instances of movement occur: [iT] moves to C/P (and is realized as *that/for/about*), and the *wh*-subject *who/how much head way* moves to [Spec, CP/PP]. In each of (37)-(39), the Economy Condition in (36) prefers the former derivation to the

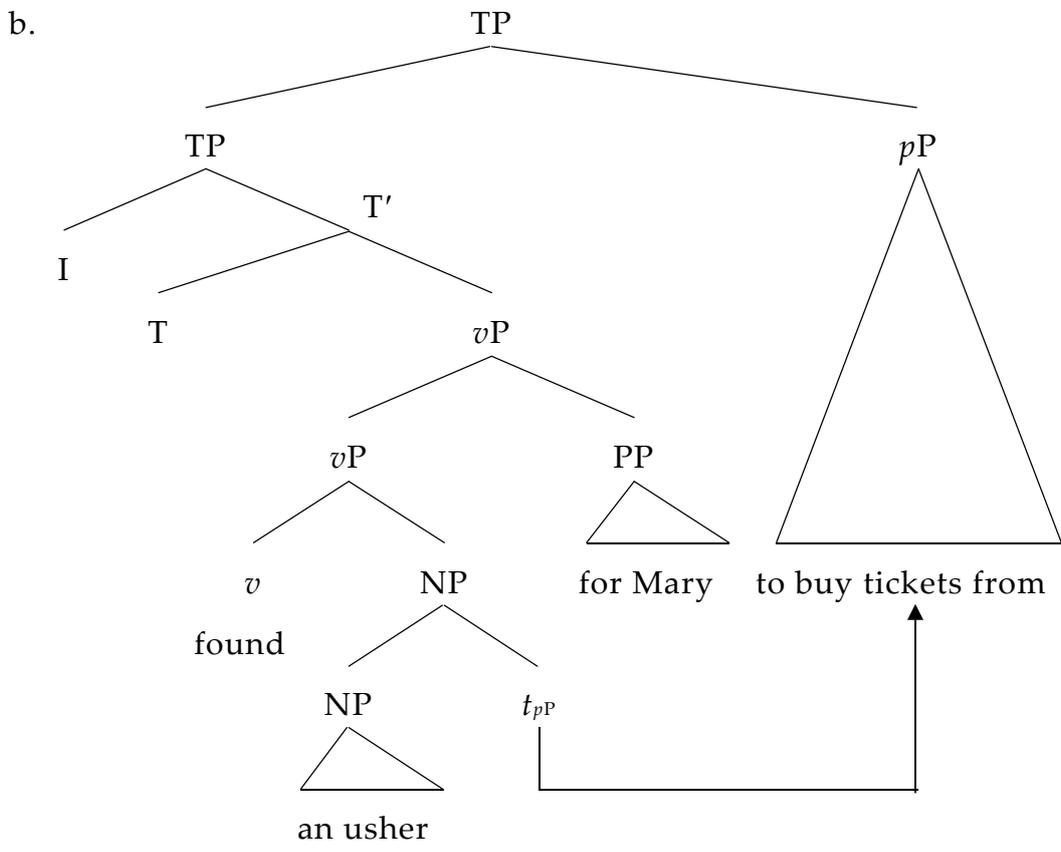
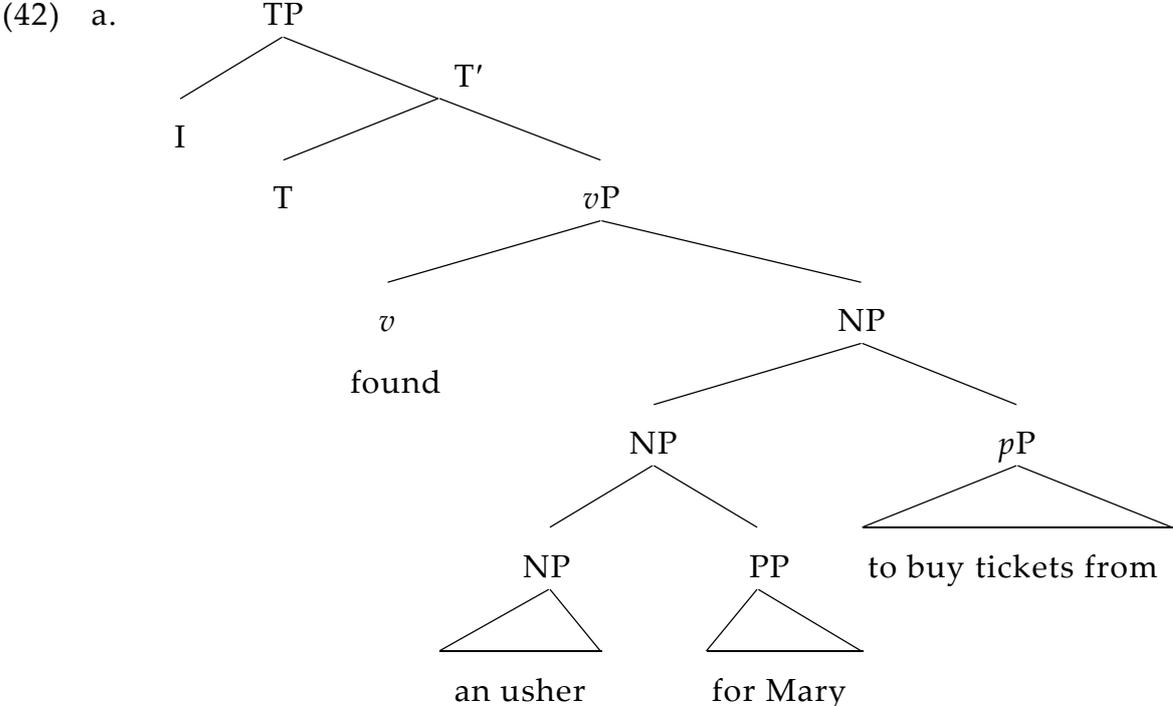
In (40a), [*u*T] and [*u*Wh] on C are deleted by Agree with [*u*T] and [*i*Wh] on the *wh*-subject *who*, which results in the single movement of *who* to [Spec, CP]. In (40b), by contrast, Agree applies between [*u*T] on C and [*i*T] on T on the one hand, and between [*u*Wh] on C and [*i*Wh] on *who* on the other. Accordingly, two distinct instances of movement take place: [*i*T] moves to C (and is realized as *did*), and *who* moves to [Spec, CP]. Again, the Economy Condition in (36) excludes (40b), which includes more movements than (40a) does. As observed above, Pesetsky and Torrego (2001, 2004) successfully deal with X-trace effect and the impossibility of *do*-support in *wh*-subject interrogative clauses equally.¹² If their analyses are correct, the concept of economy in derivation based on the number of operations will obtain the independent motivation, and correspondingly the analysis of infinitival relative clauses developed here, which also employs the concept of economy in derivation, will be supported.

Finally we will turn to infinitival relative clauses with overt subjects like (2), repeated here as (41):

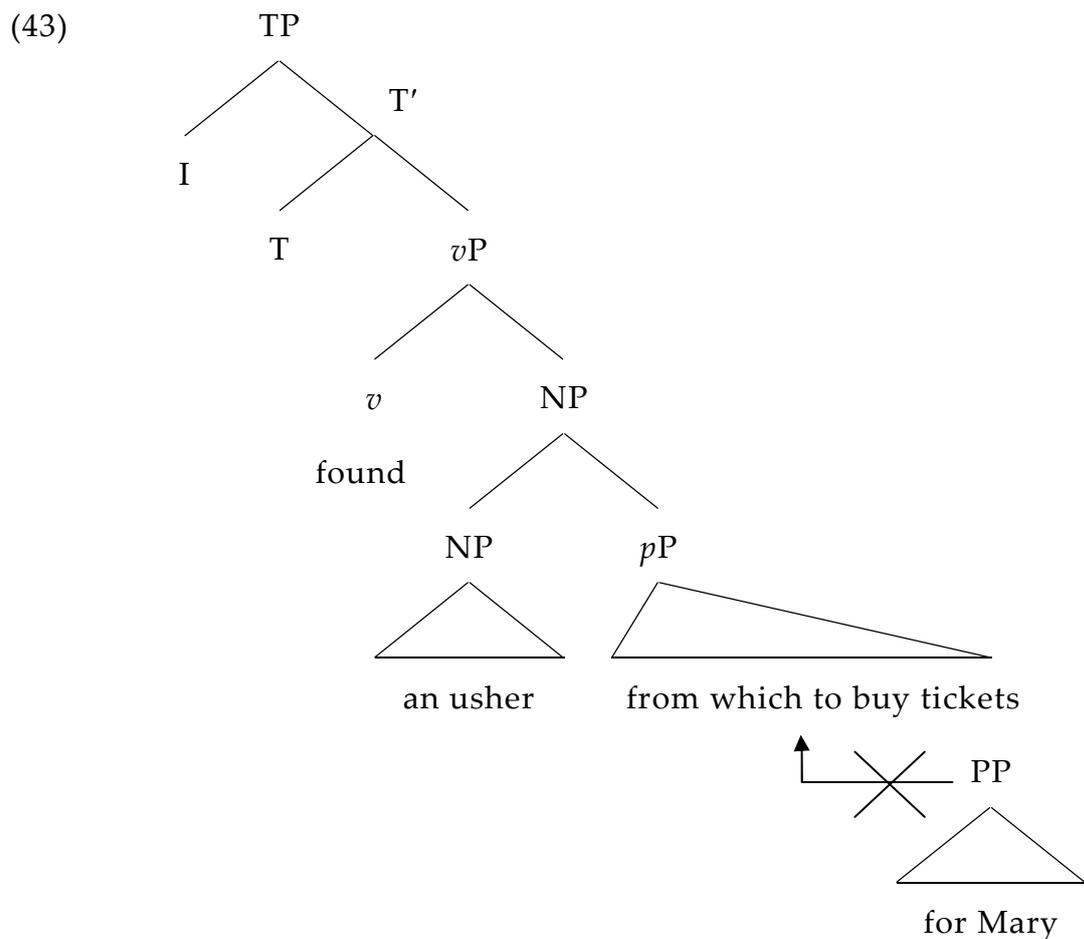
- (41) a. I found an usher for Mary to buy tickets from.
 b. * I found an usher from whom for Mary to buy tickets.
 c. * I found an usher whom for Mary to buy tickets from.

Unlike the general assumption, we cannot appeal to the violation of the doubly-filled COMP to account for the impossibility of (41b, c), since infinitival relative clauses are not CP, but a *p*P. So, a new explanation for (41b, c) is requisite. In the light of the proposals in (24) and the proposed

structure in (32), the only possible case (41a) has the following structures in (42), in which *for Mary* is adjoined to the head noun or the matrix clause:



If an infinitival relative is an adjunct to the matrix clause, the surface word order in (41a) is conceivably derived by the additional operation of extraposition, as illustrated in (42b). In addition, it is obvious from the structure in (43) that infinitival relative clauses with both overt subjects and relative pronouns like (41b, c) are unacceptable:



We have confirmed that *for NP/DP* lies outside of infinitival relative clauses from the examination of the facts in (27)-(31), so that it is impossible to derive the word order in (41b, c), where *for Mary* intervenes *from whom* and *to buy tickets*.¹³

The analysis proposed here can shed light on a previously unexplained

problem. Assuming that infinitival relative clauses are *pP* and that *for NP/DP* as a subject is adjoined to the head noun or the matrix clause makes it possible to account for the fact that the acceptability of infinitival relative clauses is affected by the choice of the matrix verb, as shown in the contrast between (44) and (45):

- (44) a. John bought a book for Mary to read.
b. I have a toy for you to play with.
c. She brought some pillows for us to sprawl on.

(Berman (1974: 38))

- (45) a. * John lost a book for Mary to read.
b. * Sam broke a toy for you to play with.
c. * She admired some pillows for us to sprawl on.

(Berman (1974: 38))

Under previous analyses in which only infinitival relative clauses belong to the head noun, it is quite difficult to give a syntactic explanation of the grammatical contrast between (44) and (45). However, assuming that *for NP/DP* is also adjoined to the matrix clause as in (24b), we can treat the illformedness of (45) in the same as that of (46):¹⁴

- (46) a. * John lost a book for Mary.
b. * Sam broke a toy for you.
c. * She admired some pillows for us.

(Berman (1974: 38))

Although we will not go into the exact reasons for the ill-formedness in (46), it is safe to say the examples in (46) are ruled out for extra-syntactic reasons.

4.4. Further Data

In this section, we will investigate two types of infinitival relative clauses, which are (at least marginally) accepted by most speakers. In both types, the pied-piped category is not DP but PP.

4.4.1. Pied-Piping of DP in Infinitival Relative Clauses

We have seen in chapter 3 that, in finite relative clauses, a *wh*-word can move on its own or with the preposition which takes it as complement:

- (47) a. He's the one who I bought it from.
b. He's the one [from whom] I bought it.

(cf. Huddleston and Pullum (2002:627-628))

Furthermore, when PP with a *wh*-complement is a complement of a noun, pied-piping of the whole DP is allowed:

- (48) a. Reports [the covers of which] the government prescribes the height of the lettering on almost always put me to sleep.

(Ross (1986: 121))

- b. She's just sat her final exam, [the result of which] we expect next week. (Huddleston and Pullum (2002: 1040))

Interestingly, for some speakers, pied-piping of DP like (48) is also acceptable in infinitival relative clauses:

(49) a. I bought a book [the cover of which] to decorate with crayons.

(Green (1973: 18))

b. (?)The carpenter is looking for a house [the roof of which] to fix.

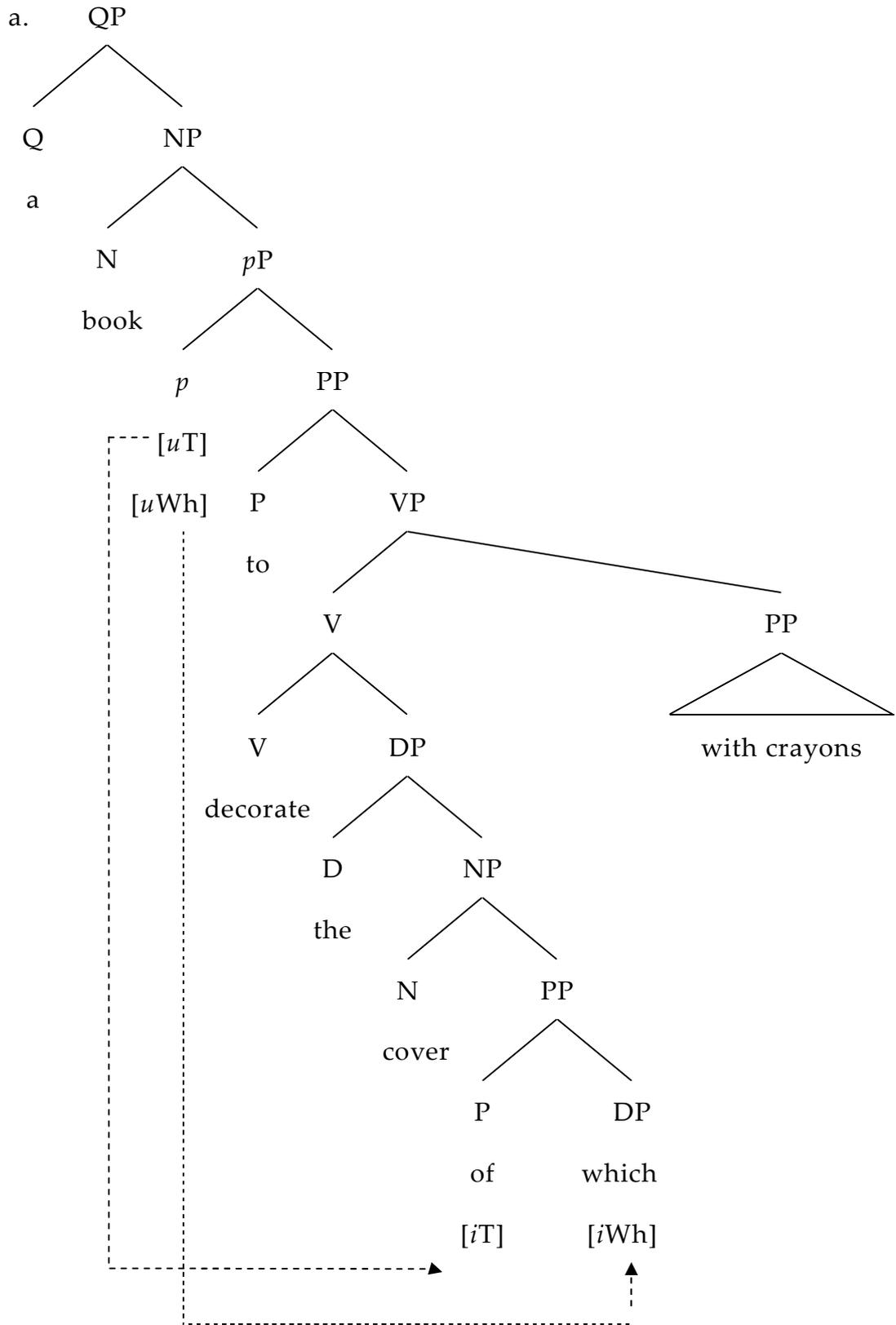
(Hasegawa (1998: 15))

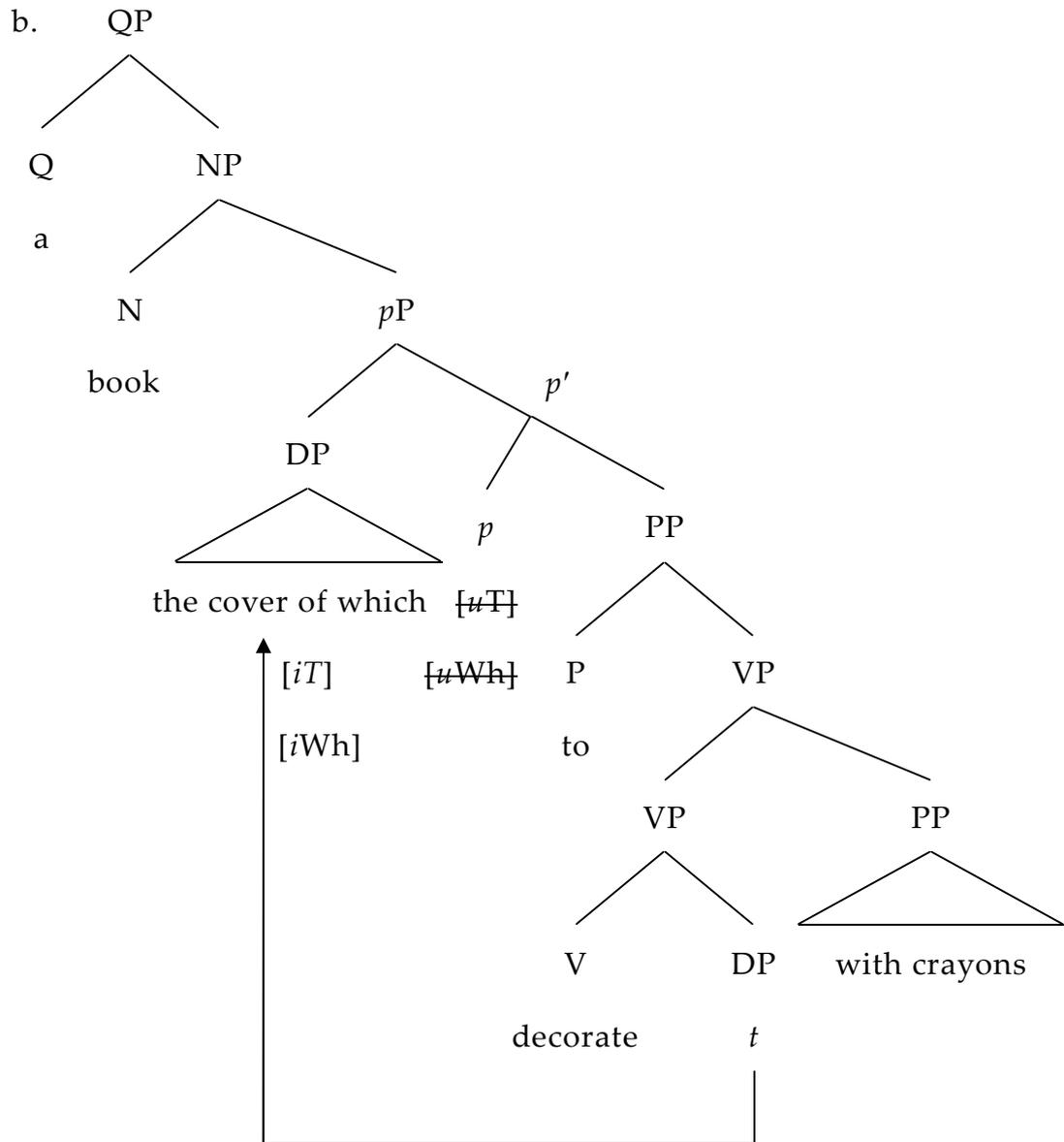
Infinitival relative clauses like (49) seem to be surprising, because they make a contrast with infinitival relative clauses with a bare *wh*-pronoun like (1c) repeated here as (50), which is ungrammatical:

(50) * I found an usher whom to buy tickets from. (cf. (49))

Considering that infinitival relative clauses like (50) become grammatical when a preposition is pied-piped along with a *wh*-pronoun (e.g. *I found an usher [from whom] to buy tickets*), it seems safe to predict that infinitival relative clauses like (49) are made possible by the existence of a preposition within the pied-piped DP. Then, infinitival relative clauses like (49) have the following structure.

(51) I bought a **book the cover of which to decorate with crayons.**





In the same manner of infinitival relative clauses with pied-piping of PP in (34), $[uWh]$ and $[uT]$ on p probe $[iWh]$ on *which* in the complement of *P of* and $[iT]$ on *P of*, respectively; thus two types of Agree apply, as in (51a). Then, the derivation converges by movement of DP *the cover of which* to $[\text{Spec}, pP]$, with uninterpretable features ($[uWh]$ and $[uT]$) deleted as in (51b).

In sum, it is possible to identify the derivation of infinitival relative clauses with pied-piped DP with that of infinitival relative clauses with

pied-piped PP. We will argue that the lower acceptability of pied-piping of DP like (49) comes from the difficulty of extraction from NP/DP (cf. Bach and Horn (1976), Chomsky (1977a, b))

4.4.2 Possessive Relative Pronouns in Infinitival Relative Clauses

According to McCawley (1988: 453-454), some speakers accept and spontaneously produce infinitival relative clauses in which the relative expression is introduced by the possessive relative pronoun *whose* like (52):

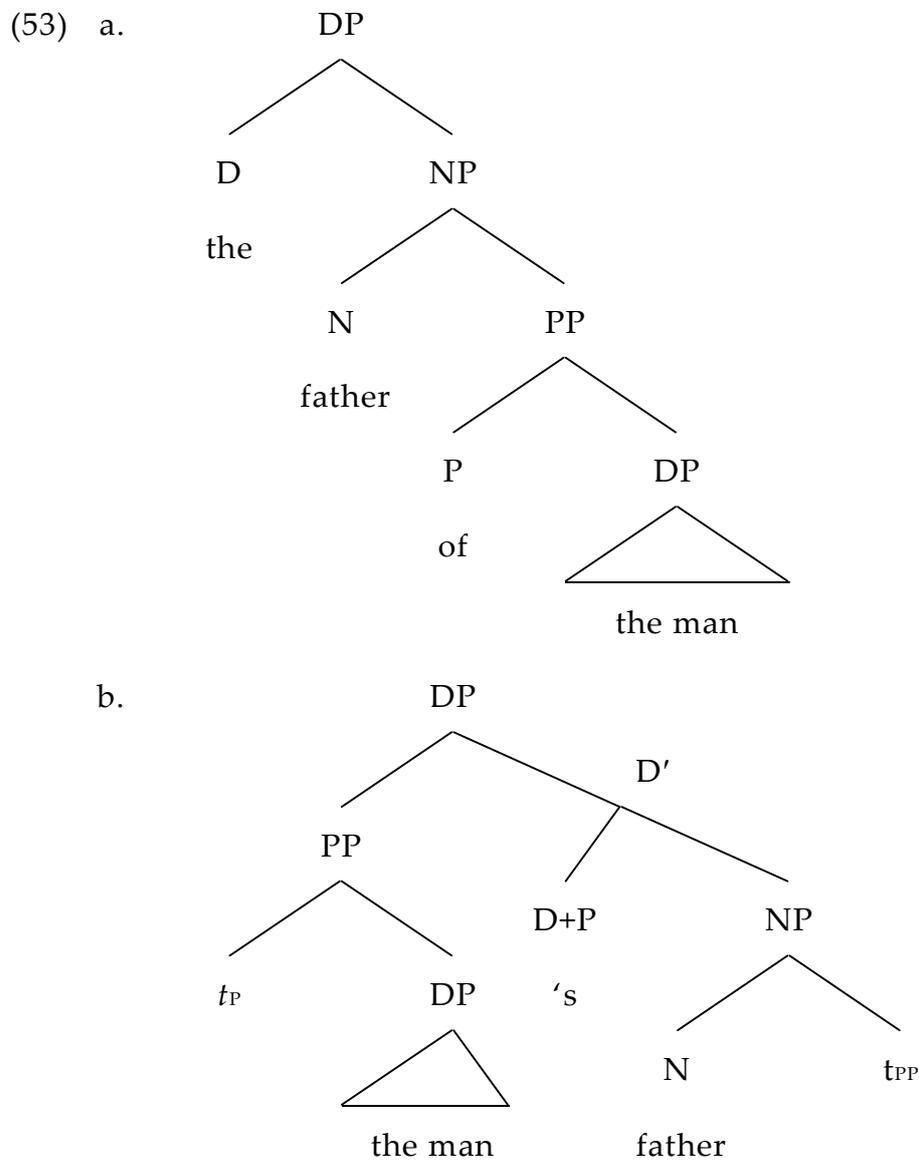
- (52) a. %Rudy is a good person *whose brain* to pick.
b. % Freudians aren't my idea of persons *whose word* to take about speech error.
c. %I can think of worse people *whose work* to rediscover.

(McCawley (1988: 454))

These examples also seem to be surprising, as infinitival relative clauses include overt relative pronouns without pied-piping of PP.

In the light of the fact that infinitival relative clauses with an overt relative pronoun are (marginally) accepted when the relative pronoun pied-pipes a preposition or with a DP including that PP (see (49)), it is conceivable that infinitival relative clauses with a possessive relative pronoun like (52) are also accepted by virtue of involving a preposition inherently. Following de Vries (2006), I assume that all genitive phrases are PP headed by an abstract preposition, which is realized as *of* as it stands, and base-generated as a complement of N. According to de Vries (2006), the

possessive pronoun constriction (e.g. *the man's father*) is derived from the prepositional genitive (e.g. *the father of the man*), which is sketched in (53):



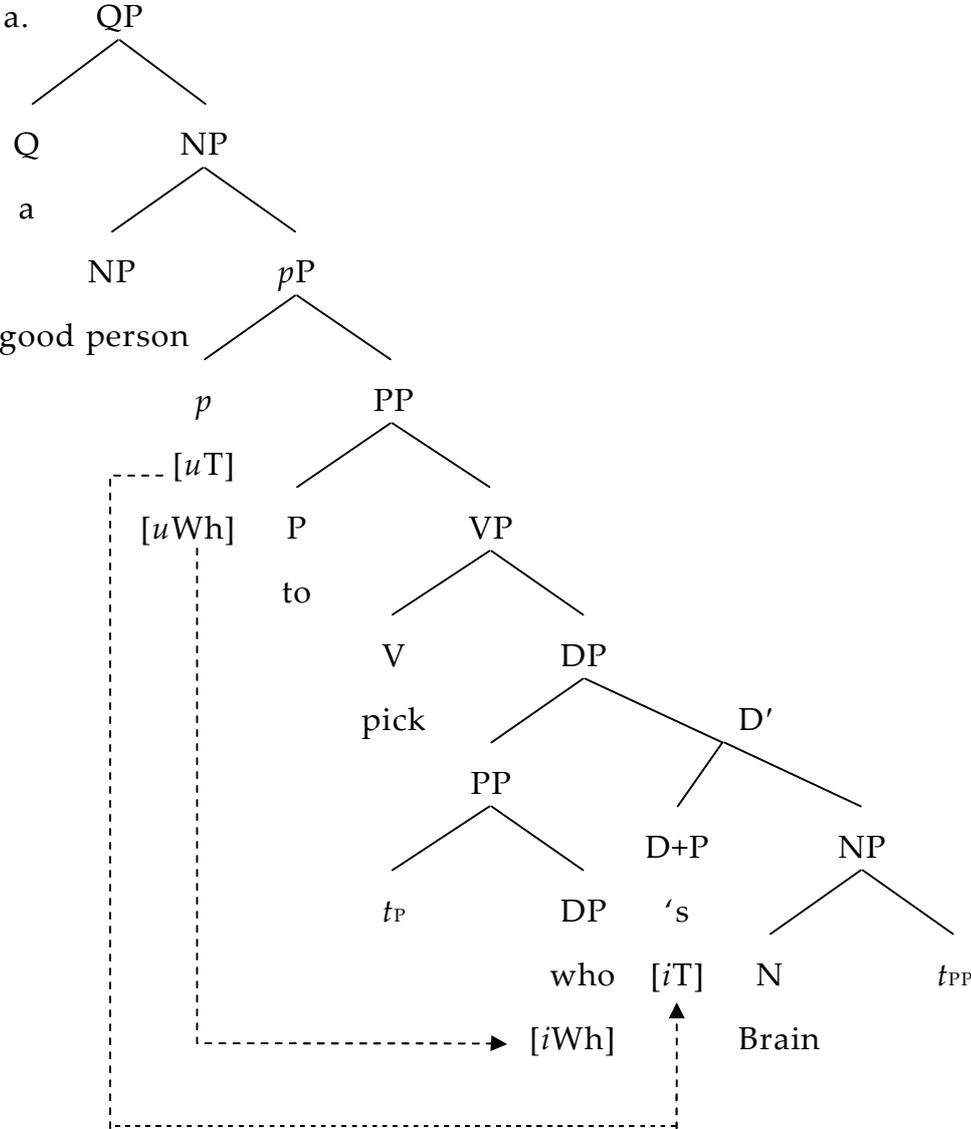
(cf. de Vries (2006: 24))

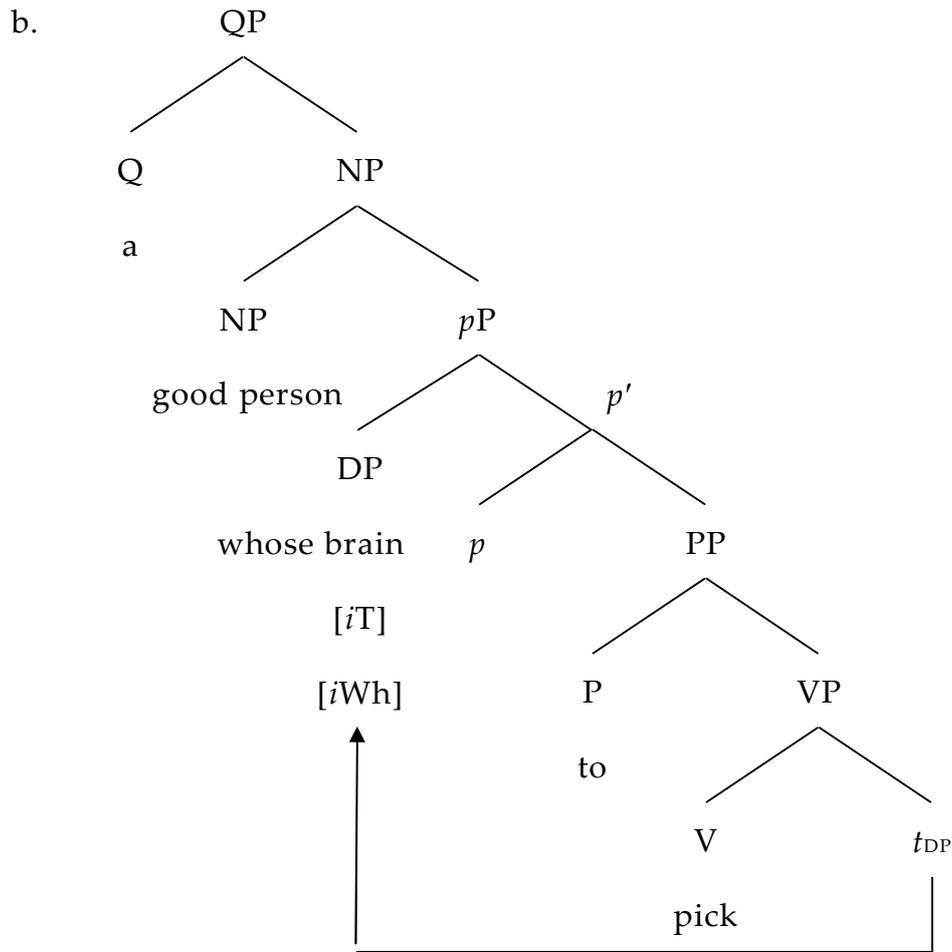
The abstract preposition is realized as *of* in situ as shown in (53a), while it is realized as *'s* after its head movement of D, which is followed by the movement of the complement of PP to [Spec, DP], as shown in (53b).

Given the derivation of the possessive pronoun illustrated in (53), it is

not unnatural to assume that the possessive relative pronoun *whose* bears [*i*T] of a preposition, and that infinitival relative clauses with the possessive relative pronoun *whose* are derived in the same way as those with PP-pied-piping in (34) and those with DP-pied-piping in (51), as sketched in (54) (taking (52a) as an example):

(54) %Rudy is a good person *whose brain to pick*.





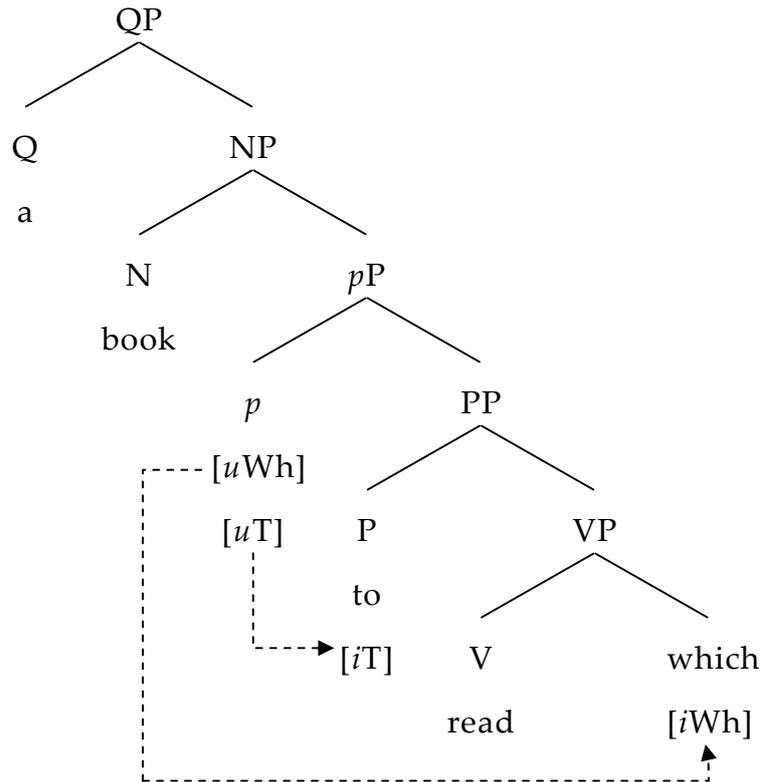
As shown in (54a), the *wh*-pronoun *who* is first generated within the complement of N *brain* headed by the abstract preposition, and amalgamated with the abstract preposition as the possessive relative pronoun *whose* after the movement of the abstract preposition to D and the subsequent movement of PP to [Spec, DP]. Then, [*uWh*] and [*uT*] on *p* probe [*iWh*] on *who* and [*iT*] on D+P 's, respectively; thus two types of Agree apply. It should be noted here that the sequence "*who*+*'s*" is spelled out as *whose* (cf. Corver (1990); de Vries (2006)). Consequently, the derivation converges by the movement of DP (*whose*) to [Spec, *pP*].

4.5. Concluding Remarks

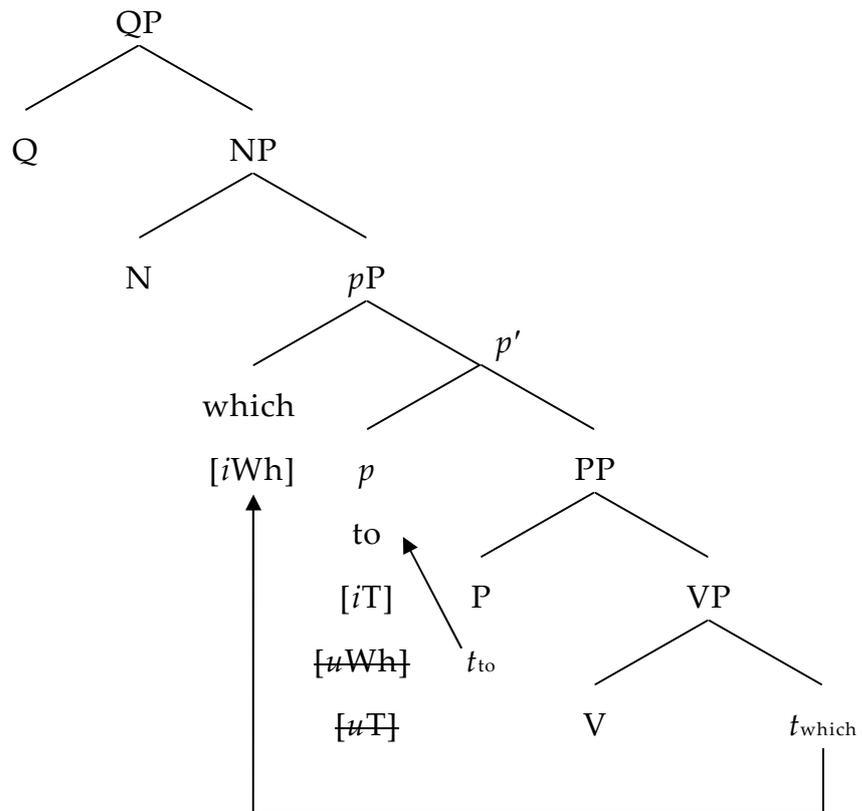
This chapter has explored pied-piping in infinitival relative clauses, claiming that infinitival relative clauses are *pP* and that the understood subject realized as *for NP/DP* is an adjunction to the head noun or the matrix clause. We have accounted for pied-piping in infinitival relatives in terms of economy in the derivation: the derivation of pied-piping is more economical and therefore more preferable than the derivation in which the relative pronoun itself is fronted, in that the former involves fewer operations (i.e. movements) than the latter does. Furthermore, it has shown that the analysis proposed here gains support from the analyses of X-trace effect and *do*-support in *wh*-subject interrogative clauses by Pesetsky and Torrego (2001, 2004). It has also shown that the analysis proposed here can account for infinitival relative clauses with apparently pied-piping of DP in the same manner of infinitival relative clauses with pied-piping of PP.

We will close this chapter by referring to a future issue. We have adopted the stance that pied-piping of PP is possible in infinitival relative clauses because it is economically preferable compared to preposition stranding. However, it is true that an overt *wh*-pronoun cannot appear in infinitival relative clauses even when it is not a prepositional complement but a verbal complement, e.g. **a book which to read*. The derivation is represented in (55):

(55) a.



b.



As shown in (55), there is only one way to delete the uninterpretable features

on *p*. Therefore, the derivation in (55) is predicted to be possible as it has nothing to do with economy. However, this derivation is not permitted. This could be accounted for by assuming that EPP properties of uninterpretable features on a phase head, at least *p*, always have to be satisfied by a single operation (i.e. movement). In fact, in (51) and (54), where also the relative DP is not a prepositional complement, the derivation converges by the single movement of the relative DP which had [*i*T] internally. I will leave the implementation of this possibility for future research.

Notes to Chapter 4

¹ Hasegawa's (1988) reasons for infinitival relative clauses as PP are fourfold. First, some prepositions takes clausal complements:

- (i) a. the day [before [she arrived]]
- b. He asked me [PP about [CP who to visit]]

Second, it is often claimed that an adjunct infinitival clause like (ii) is a PP:

- (ii) Bill bought the piano [PP (in order) (for Mary) to practice on it].

Third, since PP often appears as post-noun modifier as in (iii), it is not unnatural that an infinitival relative clause, which is a kind of post-noun modifier, be analyzed as PP:

- (iii) a. a book [PP for children]
- b. the key [PP to success] (Hasegawa (1998: 8))

Finally, there is a similarity of co-occurrence with a finite relative clause between PP and an infinitival relative clause:

- (iv) a. a man [PP with a scar] [who came to dinner]
- b. ?? a man [who came to dinner] [PP with a scar]

(Hasegawa (1998: 8))

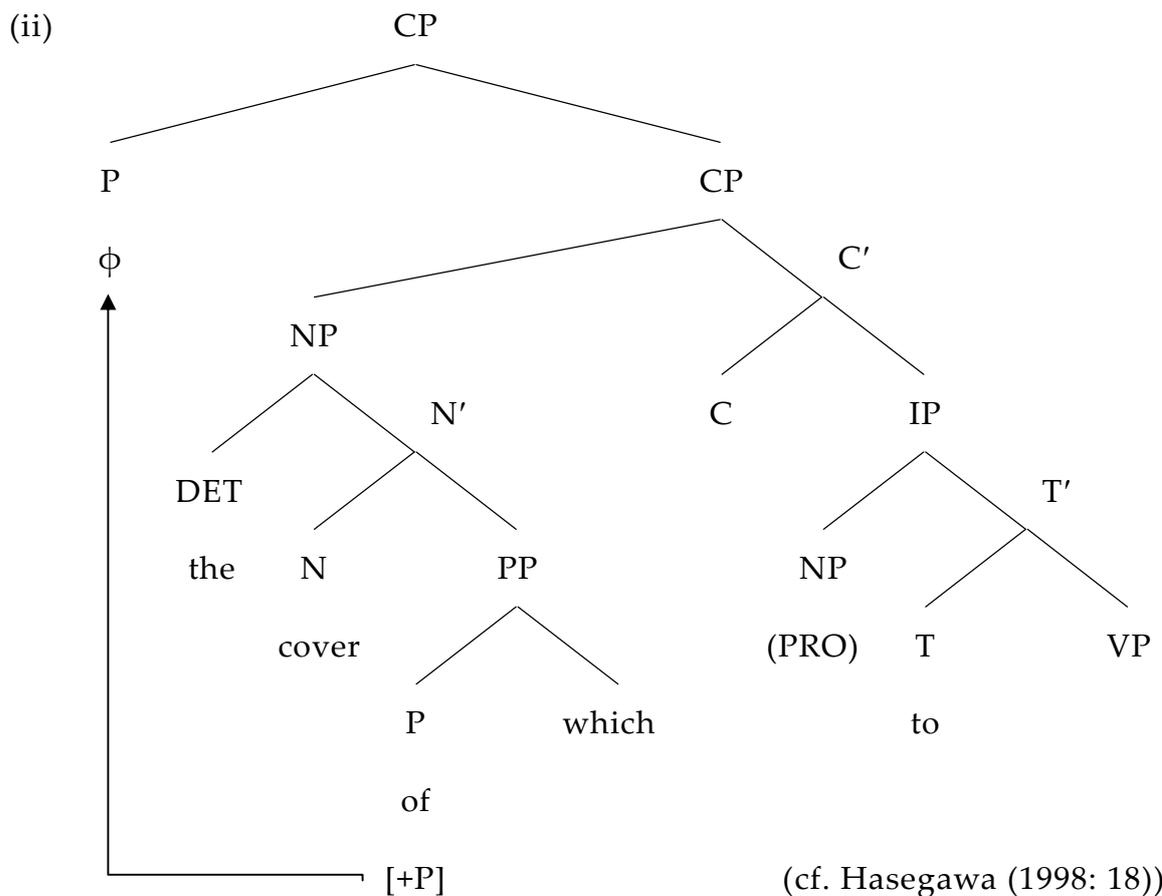
- (v) a. a pan [to fry omelets in] [that is stainless]
 b. * a pan [that is stainless] [to fry omelets in]

(Hasegawa (1998: 8))

² More specifically, the T-to-C movement of [+P] is overt (categorical) movement, while the movement of [+P] from C to the null head P is covert movement. Hasegawa (1998) confirms this by analyzing infinitival relative clauses in which the relative pronoun is inside DP like (i) below:

- (i) (?) I bought a book [[the cover of which]_i to decorate *t_i* with crayons].

(Hasegawa (1998: 17))



It is clear from (ii) that the proposition *of* does not move overtly, so that the movement from P to the null P is actually covert movement. Following Hasegawa (1998), we regard the example like (i) as acceptable, even though they are seen as ungrammatical in some studies (e.g. (Ishii (1985))

³ The infinitival *to* remains in T if it does not have the [+P] feature.

⁴ Hasegawa (1998) adapts Pesetsky's (1995) idea that a null complementizer is a null affix. Note that a null affix does not always induce the head movement for association (see (10a') and note 5).

⁵ Following Bobaljik (1994, 1995), Hasegawa (1998) claims that the null affix in C can be associated with the infinitival *to* not only by syntactic head movement as we saw in (7a) but also by phonetic adjacency. Therefore, in (10a'), the association of the null affix in C with *to* in T is implemented by virtue of being phonetically adjacent, so that there is no T-to-C head movement of *to*.

⁶ Pesetsky and Torrego (2006) have in view the "feature sharing" version of Agree, which is stated as follows:

(i) Agree (Feature sharing version)

- a. An unvalued feature *F* (a *probe*) on a head *H* at syntactic location α (F_α) scans its c-command domain for another instance of *F* (a *goal*) at location β (F_β) with which to agree.

- b. Replace F_α with F_β , so that the same feature is present in both locations. (Pesetsky and Torrego (2007: 268))

Given Agree as feature sharing, an unvalued feature (as well as a valued feature) can serve as a goal if it is the same type of feature as a probe. This is in contrast to the “assignment” version of Agree proposed by Chomsky (2000, 2001), in which Agree applies only between an unvalued (and uninterpretable) feature as a probe and its valued (and interpretable) counterpart as a goal. See also note 7 and 8 for other assumptions different from the standard ones employed by Chomsky (2000, 2001).

⁷ More precisely, it is unvalued (rather than uninterpretable) T-features on N/D and C that matter. The analysis proposed by Pesetsky and Torrego (2006) is based on the premise that valuation and interpretability of features are independent concept, which is formalized in Pesetsky and Torrego (2007). That being said, for the sake of brevity, we will not assume the independence of valuation and interpretability, as it does not make a difference in analyzing infinitival relative clauses.

⁸ Pesetsky and Torrego (2001: 359) regard EPP as a property of a feature of a head, not a property of a head itself. (EPP is originally an abbreviation for the *Extended Projection Principle* (Chomsky (1982: 10)), which posit that every T constituent must be extended into a TP projection which has a specifier, and in more recent works (Chomsky (2000, 2001)) it is regarded as a feature which T bears.) Therefore, what triggers T-to-C movement in (14) is the [μ T]

with EPP property.

⁹ On the assumption that C bears an additional Rel-feature with an EPP property, which triggers the raising of the head of the relative, Pesetsky and Torrego (2006: 42) argue that “*who* and *which* in relative clauses differ from relativizing *that* in one respect only: *who* and *which* agree in animacy with the goal probed by the Rel-feature.” Morphological variation of [*i*T] moved to C is summarized as follows:

(i) Morphology of English Tns+C

Tns moved to C is realized as:

- a. *who* if +Rel, +animate and not infinitival; otherwise;
 - b. *which* if +Rel, -animate and not infinitival; otherwise;
 - c. *that* otherwise
- (Pesetsky and Torrego (2006: 43))

¹⁰ Interestingly, there are many pieces of evidence for the prepositional status of the infinitival *to* in other infinitive clauses than infinitival relative clauses. Abe (1986), for instance, claims that there is a class of verbs whose *to*-infinitive complements are best analyzed as PP. He observes that *to*-infinitive complements of certain types of verbs do not behave as CP, with respect to the following properties:

(i) Finite CP complementation is impossible

- a. Jane tried to be a parachutist.
- b. * Jane tried that she was a parachutist. (Riddle (1975: 468))

- (ii) (*For*) NP/DP as subjects is impossible
- a. * He tried (for) Bill to do his home work.
 - b. * He condescended (for) Mary to resign. (Riddle (1975: 468))
 - c.* I challenged him for his wife to be better than she was.
 - d. * I forced him for his wife to come here.
- (Stockwell et al. (1973: 555))

- (iii) Passivization is impossible
- a. * To open the door was tried by Bill.
 - b. * To examine John was refused by the doctor. (Abe (1986: 82))

Abe (1986) also points out the semantic parallelism between *to*-infinitive complements of the verbs in (i)-(iii) and *to*-PP, which follows from the sentences (iv) and (v):

- (iv) a. John condescended *to speak to me*.
- b. The policeman forced the boys *to stop fighting*.
- c. Jane tried *to do it*.
- d. I challenged him *to be better than he was*. (Abe (1986: 87))
- (v) a. John ran *to his father*.
- b. John shouted *to his father*.
- c. John handed a stone *to his father*.
- d. John threw a stone *to his father*. (Abe (1986: 86))

The semantic roles of the italicized *to*-infinitive complements in (iv) can be regarded as GOAL, just like those of *to*-PP in (v) (see Gruber (1968), Fillmore

(1968), Jackendoff (1972) among others for typology of the semantic roles played by arguments in relation to their predicate). In this connection, the following pair of sentences is worth noting:

- (vi) a. These will help extend the 3D model beyond the description of individual objects and actions *to a description of the full spatial array.* (taken from Jackendoff (2010: 102))
- b. These axes, independently necessary to establish the form of the object, may be simply extended beyond the surface of the object *to determine regions that can be referred to by prepositional phrases such as ...* (taken from Jackendoff (2010: 103))

In these examples, an infinitival clause and a prepositional phrase (in italics) denote the same semantic role, namely GOAL, in relation to their predicate *extend*.

Moreover, from historical perspective, it is not unnatural to see the infinitival *to* as prepositional: in OE, the infinitival *to* assigned dative Case to the infinitival morpheme of the following verb, just as the prepositional *to* did to the following nominal, which was manifested as *-enne* or *-en*.

¹¹ Binding Theory is outlined as follows:

(i) Condition A: An anaphor must be bounded in a local domain.

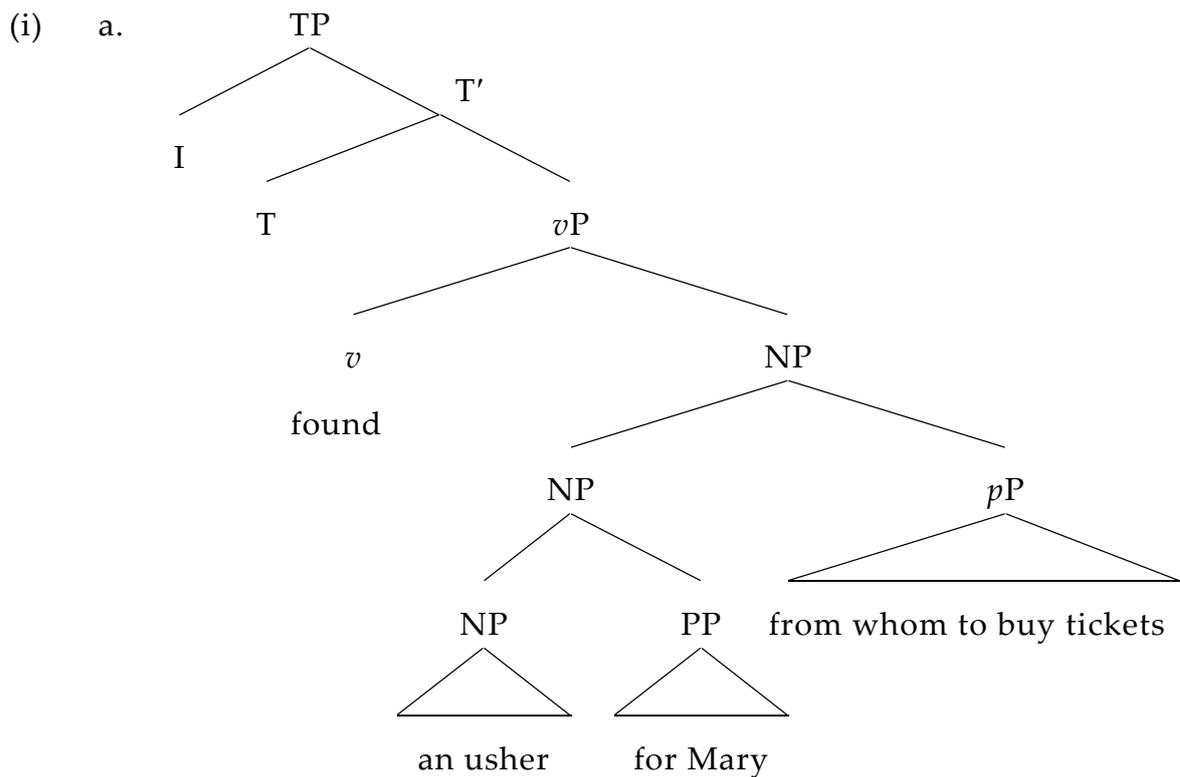
Condition B: A pronoun must be free in a local domain

Condition C: An r-expression must be free

(cf. Chomsky and Lasnik (1993))

¹² In fact, the impossibility of *do*-support in *wh*-subject interrogative clauses is regarded as X-trace effect of the same sort in the name of “*did*-trace effect” (Pesetsky and Torrego (2004) or “Tns-trace effect” (Pesetsky and Torrego (2006)).

¹³ The conceivable structures which can reconcile an overt subject to an overt relative pronoun would be the following ones in (i).



Chapter 5

Conclusion

Beginning with the observation that there are two alternatives, namely preposition stranding or pied-piping, when a prepositional complement is relativized or questioned in English, we have discussed the phenomena of preposition stranding and pied-piping in English. In this chapter, we summarize the discussion of each chapter.

In chapter 2, we discussed the historical development of preposition stranding in English. Preposition stranding was possible only with pronouns or in relative clauses introduced by the complementizer *þe* in Old English while its range of use was greatly expanded in the course of Middle English. Based on the model of cyclic linearization proposed by Fox and Pesetky (2003, 2005a), it has been argued that preposition stranding is possible as long as there is no ordering contradiction between a preposition and its complement. Because only preposition stranding with pronouns or in *þe* relative clauses does not yield an ordering contradiction, preposition stranding is allowed in restricted contexts. Furthermore, the cyclic linearization approach have shown that the change in preposition stranding that happened in Middle English is shown to be closely related to the loss of inherent Case assignment by prepositions. The loss of inherent Case

assignment led to the change of the categorial status of prepositional phrases, which in turn made possible preposition stranding in various contexts such as *wh*-relative clauses, *wh*-interrogative clauses, passive sentences, and topicalization constructions, without causing an ordering contradiction.

Chapter 3 investigated the mechanism of pied-piping in finite clauses. Focusing on the fact that relative clauses and interrogative clauses are different each other in their acceptability of pied-piping, we have differentiated pied-piping in relative clauses from pied-piping in interrogative clauses. Assuming that relativization is a kind of topicalization, we attributed the acceptability of pied-piping in relative clauses to the possibility for the head noun or the abstract NP to move to the specifier of pied-piped phrase. On the other hand, we have shown that pied-piping in interrogatives are triggered by feature percolation, which is restated in terms of feature sharing.

Chapter 4 discussed pied-piping in infinitival relative clauses. In infinitival relative clauses, an overt relative pronoun can appear only when it pied-pipes a preposition. We explained this fact by arguing that infinitival relative clauses are *pP* and the derivation of pied-piping is more economical and therefore more preferable than the derivation in which the relative pronoun itself is fronted, in that the former involves fewer operations (i.e. movements) than the latter does. This analysis is supported by the analyses of X-trace effect and *do*-support in *wh*-subject interrogative clauses by Pesetsky and Torrego (2001, 2004). It was also shown that the analysis proposed here can account for infinitival relative clauses with pied-piping of apparent DP (such as *the cover of which* or *whose brain*) in the same manner of

infinitival relative clauses with pied-piping of PP, for the reason that such DP inherently has a preposition.

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