DP/PP Asymmetry in English Infinitival Relative Clauses*

Yangsoon Kim

(Hanbat National University)

Kim, Yangsoon. (2017). DP/PP asymmetry in English infinitival relative clauses. *The Linguistic Association of Korea Journal, 25*(2), 61-84. The purpose of this paper is to present the proper syntactic structures and analyses for finite and infinitival relative clauses and explain why there is a DP/PP asymmetry only in infinitival relative clauses in terms of preposition stranding and pied-piping of a *wh*-relative phrase and a preposition. In the infinitival relative clauses, the pied-piping of a preposition and a *wh*-relative pronoun is possible but preposition stranding is not possible. I propose the separate and different analyses for finite and infinitival relative clauses: the determiner complement hypothesis or the CP-adjunction hypothesis for finite relative clauses vs. the PP-adjunction hypothesis for infinitival relative clauses. The contrast in the DP/PP asymmetry relates specifically to the finite/non-finite structural distinction of relative clauses. In the proposed analysis of PP-adjunction to NP(N') with an obligatory head P-raising and a subsequent DP-raising for infinitival relative clauses, the DP/PP asymmetry can be easily and explicitly explained in a minimalist way.

Key Words: DP/PP asymmetry, infinitival relative clauses, PP-adjuncts, P-head raising, DP-raising

1. Introduction

It is an interesting property of English relative clauses that the DP/PP asymmetry shows up only in infinitival relative clauses. It is therefore natural to

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consider the proper syntactic analyses for both finite and infinitival relative clauses in terms of the distribution of DP and PP. When the complement of a preposition moves in relative clauses, the preposition is left behind (i.e., preposition stranding) or moves together with its complement (i.e., pied-piping). Specifically, finite relative clauses allow both DP- and PP-move, but infinitival relative clauses allow only the pied-piping of a *wh*-phrase and a preposition, causing a DP/PP asymmetry.[1] As Chomsky and Lasnik (1977) say, in the infinitival relative clauses, a *wh*-phrase occurs in the clause-initial position only if it is preceded by a preposition.

To discuss the syntactic variation of DP/PP asymmetry in infinitival relative clauses, this paper proposes the syntactic analyses based on the different syntactic structures of the finite and infinitival relative clauses.[2] By providing different syntactic structures for infinitival relative clauses, this study explains why there is a DP/PP asymmetry.

This paper starts from the hypothesis that the contrast of the DP/PP asymmetry in relative clauses relates specifically to the finite/non-finite structural distinction of these two different types of relative clauses. There are mainly two competing approaches to the syntax of relative clauses, i.e., adjunction hypothesis and complement hypothesis. I propose the separate and different analyses for finite and infinitival relative clauses: the determiner complement hypothesis or the CP-adjunction hypothesis is for finite relative clauses, but the PP-adjunction hypothesis is for infinitival relative clauses. The

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1) The relative clauses can be finite or non-finite. Specifically, the relative clauses can be finite, participial, or infinitival as in (ia-c) below. The non-finite relative clauses include participial relative clauses and infinitival relative clauses. Here, I consider finite and infinitival relative clauses, but not participial relative clauses.
  (i) a. finite: the book [which John reads]
      b. participial: the book [read by John]
      c. infinitival: the book [for John to read]
2) The relative clauses can be finite or non-finite. Specifically, the relative clauses can be finite, participial, or infinitival as in (ia-c). The non-finite relative clauses include participial relative clauses and infinitival relative clauses. Here, I consider finite and infinitival relative clauses, but not participial relative clauses.
  (i) a. finite: the book [which John reads]
      b. participial: the book [read by John]
      c. infinitival: the book [for John to read]

DP/PP asymmetry in infinitival relative clauses can be easily and naturally explained in the proposed PP-adjunction structure in which an obligatory head P-raising and a subsequent DP-raising occur.

2. Relative Clauses: Two Hypotheses

In this section, I examine the previous studies on two competing approaches to relative clauses, together with my proposed PP-adjunction structure.

2.1. Determiner Complement Hypothesis and Adjunction Hypothesis

Relative clauses need not be finite. They can also be infinitival. There are two competing hypotheses for relative clauses regardless of [±finite] feature of the clauses. In this paper, I propose different hypotheses for finite relative clauses and infinitival relative clauses as in (1).
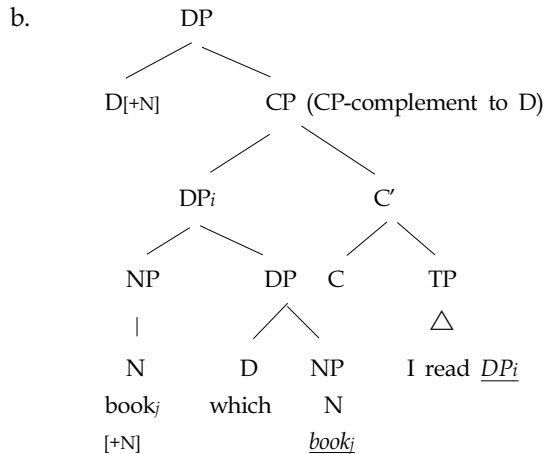
(1) (i) Determiner Complement Hypothesis: Finite Relative Clauses
    (ii) Adjunction Hypothesis:
        a. CP-adjunction to NP (N'): Finite Relative Clauses
        b. PP-adjunction to NP (N'): Infinitival Relative Clauses

2.2. Determiner Complement Hypothesis

Kayne (1994) discusses the approach to headed relative clauses in the framework of his antisymmetry theory. The restrictiveness of the antisymmetry theory is incompatible with CP-adjunction of NP. The relative clause CP can no longer be right-adjoined to NP. Kayne proposes that a relative clause CP is the complement of a determiner D. That is, the determiner c-selects CP as its complement. For example, in (2a, b), *book* is not base-generated, but it originates within the relative clause CP. In the determiner complement structure, a DP-raising to Spec-CP and a subsequent head N-raising within DP occur (i.e., raising analysis) as shown in (2b) (Kuroda, 1988; Vergnaud, 1974; Kayne, 1994).

(2) Determiner Complement Hypothesis:
     a. the book which I read

b.

```
                          DP
                 /                  \
         D[+N]              CP (CP-complement to D)
                         /                  \
                     DPi                      C'
                  /        \              /        \
               NP          DP    C           TP
               |          /   \                /\
               N        D     NP      I read DPi
             bookj    which    N
             [+N]            bookj
```

In Kayne(1994)'s structure in (2b), it may be necessary to explain what triggers
the overt raising of the relative head *book* within DP. Blanchi (2000) suggests
that there is a proper agreement relation or checking configuration between
book[+N] and *the*[+N]. The external D bears a categorial feature [+N] which must
be satisfied by the raised head N within DP. That is, this categorial feature [+N]
of D triggers another overt raising of NP within DP at Spec-CP.

     Schmitt (2000) also argues for the determiner complementation and a head
raising analysis since there is a tight relation between the definite determiner
and the relative clause CP. He presents the examples supporting for the
determiner complement analysis: in some constructions, nominals are
unacceptable with the definite article, but improve to full grammaticality when a
relative clause is added as in (3).

   (3) a. *I bought the type of bread.
       b. I bought the type of bread you like.
       c. *John made the headway.
       d. John made the headway Bill made.

In this paper, I suggest that the determiner complement hypothesis is appropriate for the syntax of finite relative clauses, but not for infinitival relative clauses.

2.3. Adjunction Hypothesis

An alternative approach to the determiner complement hypothesis is an adjunction hypothesis. The adjunction analysis rests on the assumption that the semantic distinction between a complement and a relative clause is encoded in the syntactic configuration, i.e., sisterhood to a head N (complement) or adjunction to NP(N′)(modifier relation).[3]   Therefore, the adjunction analyses may include several types of adjunction.

Here, I argue there are two major types of adjunction process: CP-adjunction to NP(N′) for restrictive finite relative clauses and PP-adjunction to NP(N′) for infinitival relative clauses. First, I will discuss the CP-adjunction to NP for finite relative clauses, and then my proposal of the PP-adjunction to NP for infinitival relative clauses.
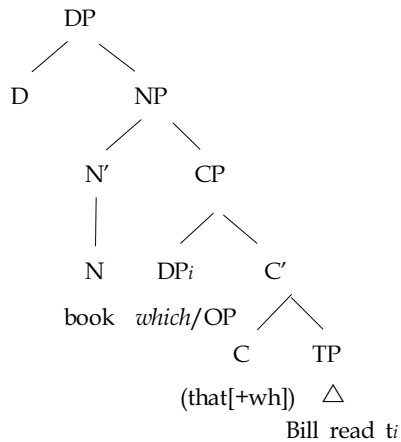
In previous studies (Chomsky, 1977; Safir, 1986; Browning, 1991), the standard analysis of relative clauses takes relative clauses to be CPs right-adjoined to a nominal constituent that they modify, that is, CP-adjunction to NP for a restrictive relative as in (4) and (5). Both analyses in (4) and (5) are CP-adjunction to NP with a slight difference in the base generation or raising of the head noun N, *book*.

    (4) Adjunction Hypothesis:
       (i) CP-Adjunction to NP (base-generated N)
          e.g. the book which Bill read

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3) There is no consensus about the adjunction site of relative clauses: N′, NP, D′, DP are all suggested in the literature (Browning 1991).

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                          DP
                        /     \
                    D           NP
                              /     \
                          N'          CP
                          |          /   \
                          N       DPi      C'
                        book   which/OP   /  \
                                        C      TP
                                   (that[+wh])   △
                                              Bill read ti
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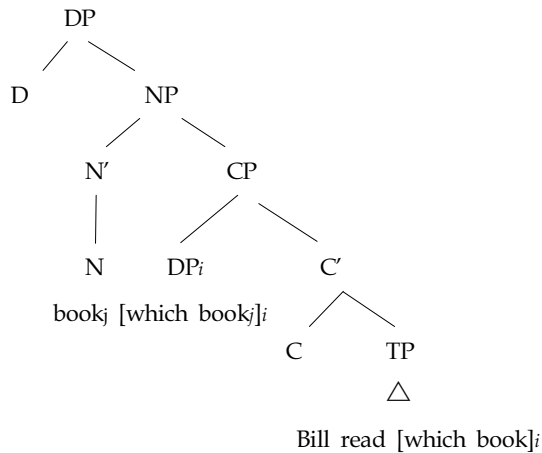
In this structure, N *book* is base-generated outside CP relative clause and a relativizer *which* or a null operator OP inside CP moves. The relative clause CP contains a relative DP operator, either overt *which* or a null OP, which raises to Spec CP, leaving a trace behind. This operator turns the CP into a predicative expression: the operator is linked to the head N by some sort of anaphoric or binding relation (Bianchi, 2000).

The structure in (5) is another alternative structure of the CP-adjunction to NP for restrictive finite relative clauses, in which the phrase *which book* is not base-generated, but raises to Spec-CP and then again N *book* raises to the head N position of NP.

(5) Adjunction Hypothesis:
    (ii) CP-Adjunction to NP (with N-raising)
        e.g. the book which Bill read

```
                    DP
                  /    \
                 D      NP
                      /    \
                    N′      CP
                     |     /   \
                     N   DPi    C′
                  bookj [which bookj]i  /  \
                                       C    TP
                                            △
                              Bill read [which book]i
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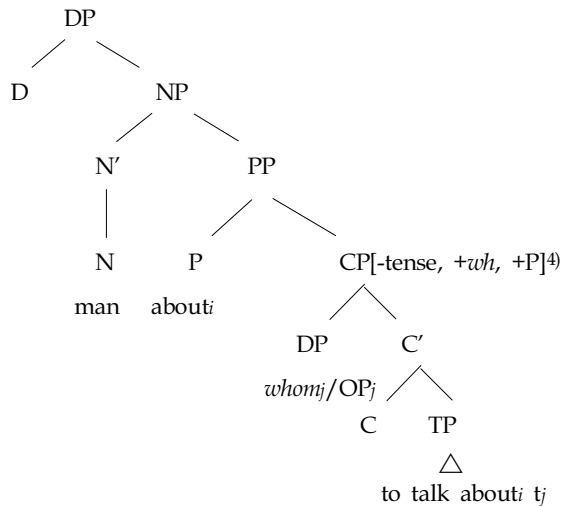
Whether a relative head is base-generated or raises, the above structures in (4) and (5) seem to be proper for restrictive finite relative clauses. However, the determiner complement analysis or the CP-adjunction analysis appears problematic for the infinitival relative clauses since there is no way to block the pied-piping of a *wh*-phrase and a preposition in these structures with Spec-CP position allowing both DP- and PP-movement (i.e., preposition stranding and pied-piping).

The final type of adjunction is the PP-adjunction to NP which I propose for the structure of infinitival relative clauses.

> (6) Adjunction Hypothesis:
>   (iii) PP-Adjunction to NP (P- and DP-raising)
>   e.g. the man about whom to talk

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                    DP
                  /    \
                 D      NP
                      /    \
                    N'      PP
                    |      /   \
                    N     P      CP[-tense, +wh, +P]4)
                                    /    \
                  man   abouti    DP      C'
                              whomj/OPj    /  \
                                          C    TP
                                               △
                                          to talk abouti tj
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Here, I propose a different structure from that of finite relative clauses, i.e., PP-adjunction to NP. The phrase structure of NP → N′, PP is a quite frequent complex noun phrase structure in English together with a PP complement rule as in NP → N, PP. In this structure, N *man* is base-generated outside CP relative clause and a relativizer *whom* or a null operator OP inside CP raises. The relative clause CP contains a relativizer DP, either as an overt *whom* or as a null OP, which raises to the Spec CP position. At the same time, a head P-raising must occur through T and C (i.e., P-T-C-P head move) together with a DP-raising to fill the head P-position of PP overtly. In order to explain the specific characteristics in infinitival relative clauses, I assume P-to-C feature inheritance. As in the extended feature inheritance of the C-T category (Chomsky 2005; Kim 2007) where T inherits its Agree, Tense and EPP features from C, I propose that the feature [-tense, +wh, +P] of P is inherited to C, and C[-tense, +wh, +P] in turn licenses a prepositional complementizer *for* instead of complementizer *that,* and its specifier *whom*/OP is licensed by the Spec-Head agreement in CP.

In the following sections, I will examine how the PP-adjunction analysis can cope with the DP/PP asymmetry, and show why the proposed analysis is more adequate and satisfactory for the syntax of infinitival relative clauses.

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4) Here the feature [+wh] includes interrogative and relative clause features.

3. Infinitival Relative Clauses

3.1. Overt Gaps in Finite and Infinitival Relative Clauses

In this section, I will take a look at overt gaps and resumptive pronouns in order to see what are the symmetries and asymmetries between finite and infinitival relative clauses. The relative clauses have an overt gap regardless of finite or infinitival clauses, and this gap cannot be replaced by a resumptive pronoun. There is a contrast between an overt gap and an optional resumptive pronoun between relative clauses and other purpose adjunct clauses as shown in (7).

(7) a. I brought some books [(for me) to read ___].
　　a'.*I brought some books [for me to read them].
　　b. I brought some books [that I could read ___].
　　c. I brought some books [in oder to read ____].
　　c'. I brought some books [in order to read them].

In (7a), *to read* is interpreted as a relative clause or a purpose adjunct ambiguously. In (7c') with a resumptive pronoun, this sentence cannot be used as a relative clause, but only as a purpose clause. Therefore, in a relative clause reading, the DP position cannot be marked by a resumptive pronoun as in (7a'). In contrast, in purpose adjunct clause, either a gap or a resumptive pronoun can be present as in (7c) and (7c'). Regardless of the presence of *wh*-relativisers, finite and infinitival relative clauses are marked by an overt gap for the unpronounced copy of the moved DP in infinitival relative clauses.[5] Analogously as in *wh*-interrogative sentences, relative clauses must have a gap regardless of finite or infinitival clauses.[6]

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5) In finite relative clauses with long-distance extraction as shown in (ia-b): a resumptive pronoun it occurs instead of have having an unpronounced copy in a lower position of the relative pronoun *which*.
(i) a. It was a background discussion [which [my understanding was [that [it would not appear anywhere]]]].
　　b. *It was a background discussion [which [my understanding was [that [___ would not appear anywhere]]]].

3.2. DP/PP Asymmetry Only in Infinitival Relative Clauses

In finite relative clauses, there is no asymmetry in the gaps left by DP- or PP-raising involving preposition stranding or pied-piping. However, in infinitival relative clauses, there is an evident DP/PP asymmetry. Emonds (1976) first points out a DP/PP asymmetry in infinitival relative clauses: a *wh*-phrase may occur in the clause-initial position of the relative clause only if it is preceded by a preposition as in (8) and (9) (Examples from Law, 2000).

    (8) a. The man <u>who(m)</u> I should talk about.
        b. The man <u>about whom</u> I should talk.
    (9) a. *The man <u>who(m)</u> to talk about.
        b. The man <u>about whom</u> to talk.

Preposition stranding involves a non-canonical word order, in which a preposition and its object noun phrase are not adjacent but stranded. In the infinitival relative clauses, pied-piping of a preposition and a *wh*-relative pronoun is possible, but preposition stranding is not allowed as in (9a).[7] The contrast between (8) and (9) seems to relate specifically to the structural differences due to the finite/infinitival distinction of the relative clauses since they are not exactly the same in meaning.

3.3. How to Explain the DP/PP Asymmetry: PP-adjunction

Riemsdijk (1978) observes that the most striking fact about preposition stranding in natural language is its rarity.[8] It appears to be in restricted contexts. The distribution of *wh*-phrases in the left peripheral position of finite and infinitival relative clauses is contrasted as in (10):

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6) Unlike *wh*-interrogatives which can get any XP moved, relative clauses restrictively can have gaps left by PP- and DP-Move.
7) Preposition stranding in English includes three subtypes of contructions: pseudo-passives, relative clauses and *wh*-constructions.
8) While preposition stranding is rather free in English and the Scandivanian languages, but it does not seem to be attested outside the Indo-European family.

(10)   Finite RC: PP/DP
        Infinitival RC: PP/*DP

In finite relative clauses, there is no asymmetry of DP and PP, but in infinitival relative clauses, there is an evident DP/PP asymmetry. The contrast like the one found only in infinitival relative clauses as in (10) cannot be captured in the determiner complement analysis or in the CP-adjunction hypothesis.

To the question what syntactic properties of relative clauses are related to this ban on DPs, Law (2000) suggests that the general asymmetry between DPs and PPs is related with adjunction under the purview of the constraint on landing sites. In contrast to PP, DP is constrained by Case Theory. He says that the categorial projection of the infinitival marker *to* is not TP, but VP, and the left-adjoined base position for DP can only be to TP. So, the structure preserving constraint, i.e., a constraint on landing sites, bans DP-adjunction to the projection of *to*, VP: DP may not be adjoined to VP. However, the problem of Law (2000)'s analysis is that it has to start from the VP hypothesis for the *to*-infinitival clause, which is not convincing since the infinitival marker *to* is generally assumed to be at T-position as an auxiliary in Present Day English (PDE).[9]

As an alternative to the analyses like Law's, I present a different, yet, quite attractive account for why the DP/PP asymmetry is found only in infinitival relative clauses. I propose that the DP/PP asymmetry is based on the structural difference between finite relative clauses and infinitival relative clauses: finite relative clauses are CP complements of D or CP-adjuncts to NP(N'), but infinitival relative clauses are PP-adjuncts to NP(N') as summarized in the table (11):

(11) a. Finite RCs: D-CP Complements//CP-adjuncts to NP
      b. Infinitival RCs : PP-Adjuncts to NP
(12) a. the man about whom to talk
      [the man [[$_{PP}$__[$_{CP}$ [$_{TP}$ to [$_{VP}$ talk [$_{PP}$ ~~about whom~~]]]]
      (P-to-C-to-P head move and DP-move)

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9) The ungrammaticality of the example, *John should to be here,* comes from the two modals at the T position.

   b.*the man whom to talk about
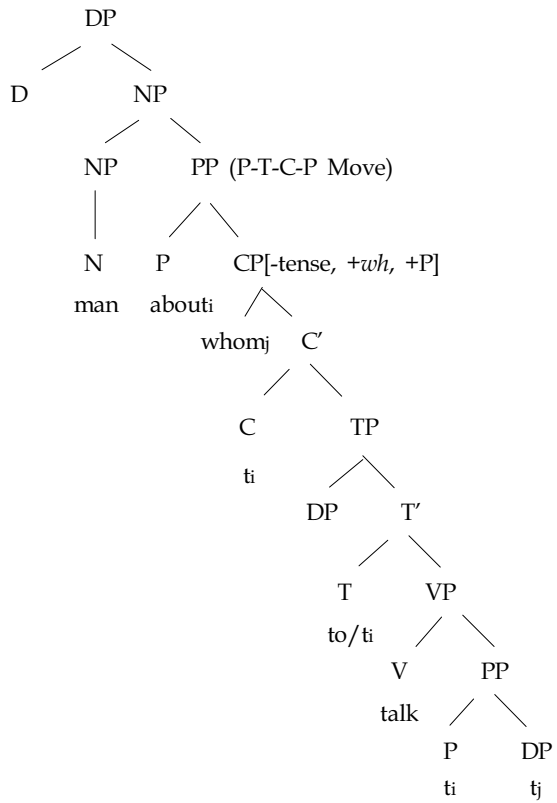   *[the man [CP_ [TP to [VP talk about] [PP about *whom*]]]]
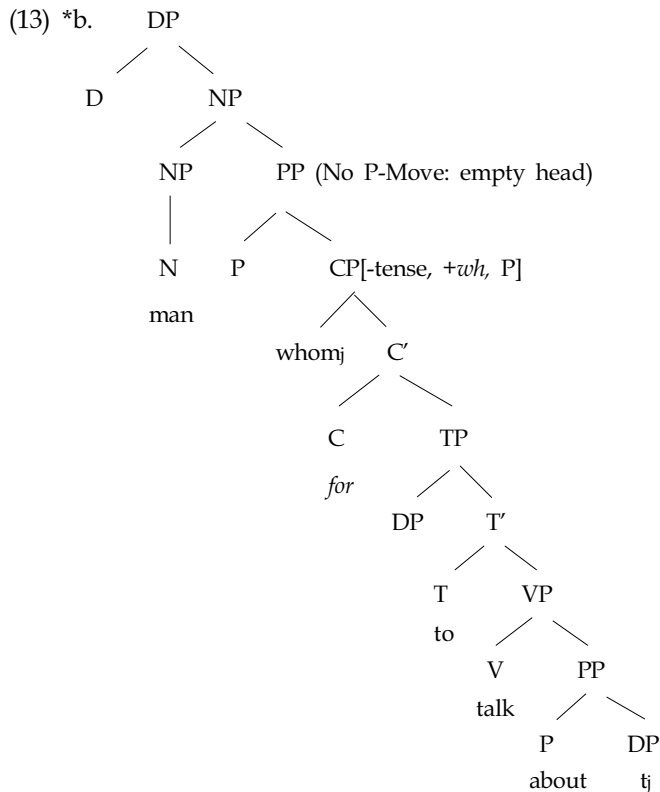   (Only DP-move without head P-move)

   In classic and minimalist proposals, the preposition stranding is an operation
that targets DPs and moves them into Spec CP positions, while pied-piping is an
operation that targets both a preposition and *wh*-relativisers. Unlike finite
relative clauses, when the infinitival relative clause is a PP-adjunct, the head
position P must be filled with an overt lexical element and a lexical P requires
its complement clause CP with features [+wh][-tense][+P] at C. The features of P
are inherited to C, and C in turn licenses its specifier by the Spec-Head
agreement. Therefore, in this structure, the subsequent P-T-C-P head raising of a
preposition occurs simultaneously with a relative pronoun DP-raising to Spec
CP, producing a PP constituent in the form of the pied-piping of a relative
pronoun and a preposition as shown in the structure of (13a).[10] If a head
P-movement does not occur overtly or only DP-raising occurs, the sentence will
turn out to be ungrammatical as in (13b). In this system, we are able to explain
the DP/PP asymmetry in infinitival relative clauses in a minimalist way.

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10) The simultaneous P- and DP-raising yields the pied-piping form as in PP-raising. I assume
    that the pied-piping is concerned with the form at Spell-Out instead of raising constituent
    category.

(13) a.

```
                        DP
                       /  \
                     D     NP
                          /  \
                        NP    PP (P-T-C-P Move)
                        |    /  \
                        N   P    CP[-tense, +wh, +P]
                       man about_i  / \
                              whom_j  C'
                                     /  \
                                    C    TP
                                    t_i  / \
                                       DP   T'
                                           /  \
                                          T    VP
                                        to/t_i / \
                                             V    PP
                                           talk  /  \
                                                P    DP
                                               t_i   t_j
```

(13) *b.

```
                    DP
                 /      \
               D          NP
                       /      \
                    NP         PP (No P-Move: empty head)
                     |        /    \
                     N       P      CP[-tense, +wh, P]
                    man             /    \
                              whomⱼ       C′
                                        /     \
                                       C        TP
                                      for      /    \
                                             DP      T′
                                                    /    \
                                                   T       VP
                                                  to      /   \
                                                         V      PP
                                                        talk   /   \
                                                              P      DP
                                                            about    tⱼ
```

The obligatory movement of both P and DP in infinitival relative clauses is parallel to the subsequent T-to-C head move and DP-move in the interrogative sentences as in *Which do you like*? (*Which you like?, *Do you like which?*). In addition, to fill the head position P overtly, the preposition should move to the upper P position through the C position with the feature [+*wh*, -tense, +P] in infinitival clauses. In this analysis, we can also explain why the complementizer *for* in the C[-tense, +P] position of the infinitival clauses is called as a prepositional complementizer[+P, +C].

To sum it up, the infinitival relative clauses are PP-adjuncts. The fact that the head position P of PP must be filled with an overt lexical element forces the pied-piping of a preposition and a *wh*-relative phrase, while prohibiting the preposition stranding of P.[11] As a result, the proposed PP-adjunction analysis provides more natural and minimal explanation for the DP/PP asymmetry in

infinitival relative clauses.

3.4. Non-existence of DP/PP Asymmetry: Null Pair vs. Overt Pair

The evident DP/PP asymmetry disappears when a relative pronoun is deleted even in infinitival relative clauses. It is allowed to have preposition-stranding in infinitival relative clauses with no overt relative pronouns. They are assumed to have a null operator as in (14) (Chomsky, 1982).

(14) a. a dress [which/Ø] we bought.
　　 b. a dress [*which/Ø] for Jane to wear.
(15) a. *the man [who(m) to talk about]
　　 b. the man　[about whom to talk]
　　 c. *the man [about __ to talk]
　　 d. the man　[ø/OP (for Jane) to talk about]
　　 e. a house　 [ø/OP (for us) to live in]

As shown in (14), finite relative clauses and infinitival relative clauses are different in the grammaticality with the deletion of relative pronoun. Then, why is there no asymmetry when *whom* is deleted as in (15d)? Without an overt P-movement, a relative pronoun must be deleted as in (15d-e). In this case, it is assumed to have a null relative operator (OP) in Spec CP for linking or binding between a head noun and a relative clause. In the case of null operator movement, it is allowed to have a preposition stranding even in infinitival relative clauses. Chomsky (1977, 1981) assumes that at LF there is null operator movement in relative clauses, with the operator moving to Spec CP in order to take scope over its object copy. As shown in (15c), the 'overt' preposition

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11) To provide further examples of the DP/PP asymmetry, the pied-piping of a relative pronoun with a preposition produces better acceptability, though not completely grammatical as in (i). In contrast, there is no asymmetry in finite relative clauses as in (ii). Consider the following sentences (from Cowan, 2013:426).
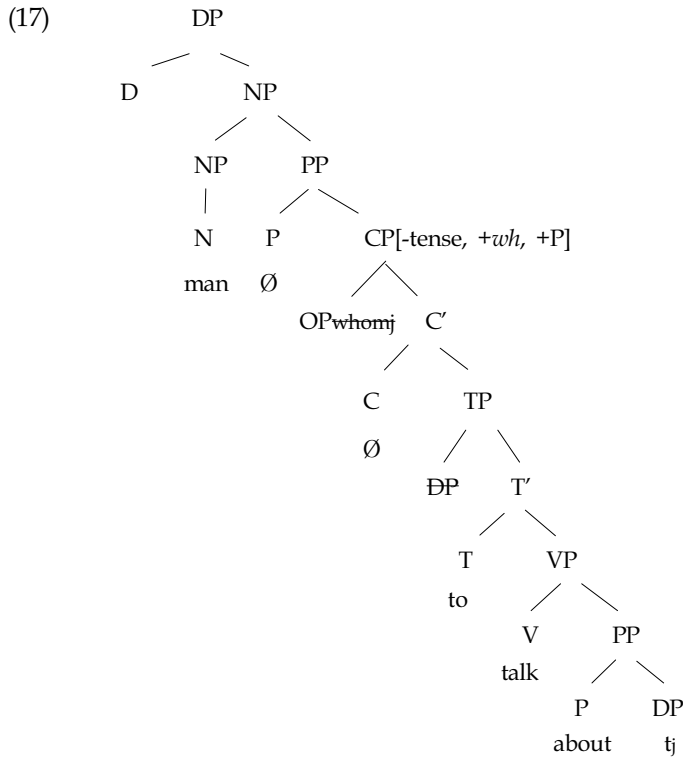　(i) a. *the person {whose mother/the mother of whom} to see
　　 b. the person {?to whose mother/??to the mother of whom} to speak
　(ii) a. The report [which the government prescribes the size of __] are boring.
　　 b. The reports [of which the government prescribes the size __] are boring.

requires the 'overt' *wh*-relative pronoun to make a PP constituent, but a 'null' preposition must require a 'null' *wh*-operator. At PF, the matching pair phenomena of P-DP is parallel to those of C-DP as given in (16).

(16) a. the man *for John* to talk about   (overt C - overt DP)

    b. *the man *for* __ to talk about   *(overt C - null D̶P̶)

    c. *the man __ *us* to talk about   *(null ∈̶ - overt DP)

    d. the man __ ___ to talk about   (null ∈̶ - null D̶P̶)

    e. the man *about whom* to talk   (overt P - overt DP)

    f. *the man *about* __ to talk   *(overt P - null D̶P̶)

    g. *the man __ *whom* to talk about   *(null P̶ - overt DP)

    h. the man __ __ for us to talk about   (null P̶ - null D̶P̶)

The grammaticality in (16a) and (16e) shows that the overt C or P head requires the overt DP, which I will call 'Overt Pair.' Similarly, the grammaticality in (16d) and (16h) shows that the null C or P head requires the null DP, which I will call 'Null Pair.' Except matching pairs, the others turn out to be ungrammatical. These 'Overt Pair' and 'Null Pair' indicate that either a preposition *about* or a relative pronoun *whom* cannot be moved alone. The overt P-raising requires a subsequent DP-movement, producing the pied-piping of a preposition and a relative pronoun, while without P-raising, only a null *wh*-operator can move as in a null pair (17) below.

(17)
```
                    DP
                  /    \
                D       NP
                      /    \
                   NP       PP
                   |       /   \
                   N      P     CP[-tense, +wh, +P]
                  man     Ø       /    \
                             OPwhomj   C'
                                      /   \
                                    C      TP
                                    Ø     /   \
                                        ĐP     T'
                                             /    \
                                            T      VP
                                            to    /   \
                                                 V     PP
                                                talk  /   \
                                                     P     DP
                                                   about    tj
```

Williams (1983) considers the reconstruction into infinitivals. He observes that an infinitival complement of *seem* allows reconstruction as in (18), in which neither pied-piping nor preposition stranding is allowed even in infinitival relative clauses.

(18) a. Three hotels *that we could stay at* seem to be pretty full.
   b. Three hotels *(for us) to stay at* seem to be pretty full.
   (=Three hotels OPwhich *(for us) to stay at* seem to be pretty full.)
   c.*Three hotels *which (for us) to stay at* seem to be pretty full.
   d.*Three hotels *at which (for us) to stay* seem to be pretty full.

The corresponding infinitival relative clauses to the finite relative clause suggest that the preposition stays in situ, and only an operator movement of a relative pronoun occurs for scope over its object copy as in (18b). From the examples

like (18), I suggest that in some constructions with reconstruction, 'Null Pair' overrides 'Overt Pair' in terms of Economy Principle. In addition, the grammaticality of the infinitival relative clause with a null operator OP~~which~~ in a 'Null Pair' may be explained by a 'Delete and Repair Operation' at PF. By the strategy of 'delete an offending constituent as a last resort' at PF, the sentence can be repaired. That is, the preposition-stranding can be repaired by ellipsis and is allowed in infinitival relative clauses with null operators.[12]

3.5. DP/PP Asymmetry and the Different Relativizers

The relativizers in infinitival relative clauses are more restricted than in finite relative clauses. To examine the different syntactic behaviors in the choice of relativizers in finite and infinitival relative clauses, consider the finite and infinitival relative clauses in (19) and (20).

(19) a. the woman about whom/*that/*Ø John talked
     b. the woman about whom/*that/*Ø to talk
(20) a. the woman whom/that/Ø John talked about
     b. the woman *whom/*that/Ø to talk about

In pied-piping, there is no difference between finite and infinitival relativizers: non-*wh*-relativizers such as *that* and Ø are not allowed as in (19), but in preposition-stranding, there is a difference between finite and infinitival relativizers as shown in (20). Unlike finite relative clauses which allow the deletion of relativiser *whom* or *that* optionally, in infinitival relative clauses the relativizer *whom* or *that* must be deleted. For expository convenience, consider

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12) Law (2000) tries to do away with null operators from the Occam's Razor point of view. If there are no null operators, then it must be that something else moves in infinitival relative clauses. On the view that movement may involve not only the whole category, but also (abstract) formal features as in Chomsky (1995). Law suggests that some formal feature like theta-feature of the verb or preposition moves. In his system, there is no need to assume an additional grammatical entity like the null operator. However, there is no reason for the already checked theta feature without an overt DP category to move in a syntactic tree. In that sense, the delete and repair operation is more adequate to explain the DP/PP asymmetry found in infinitival relative clauses.

the following corresponding internal structures of the sentences in (19) and (20).

(21) a. the woman [CP *whom* [TP John talked <u>about</u>]]
     b. the woman [CP (   ) *that* [TP John talked <u>about</u>]]
     c. the woman [CP (OP*whom*)(   )[TP John talked <u>about</u>]]
(22) *a. the woman [PP (   ) [CP *whom* for [TP John to talk <u>about</u>]]
    *b. the woman [PP (   ) [CP *that* for [TP John to talk <u>about</u>]]]
     c. the woman [PP (   ) [CP (OP*whom*) for [TP John to talk <u>about</u>]]]

How can we account for these different behaviors found in (21) and (22) syntactically? It is evident that there must be a syntactic difference in finite and infinitival relative clauses. If I am on the right track for the proposal of the infinitival relative clauses as PP-adjuncts to NP (N'), only overt lexical P can license the presence of a relativiser *whom* or *that*, so when there is no overt P as in (22a, b), it leads to the ungrammaticality. On the other hand, the ungrammaticality of (22b) can also be accounted for by the constraint of the Doubly-filled Comp Filter if a relativizer *that* is in the C-position.[13] On the other hand, the grammaticality of 'Null Pair' in (22c) results from the 'Delete and Repair Operation' at PF as explained above. That is, by the strategy of 'delete an offending constituent as a last resort' at PF, the sentence can be repaired and becomes grammatical.

Here, for better understanding of the proposed different syntactic structures in finite and infinitival relative clauses, it would be helpful to see the diachronic change in preposition stranding and pied-piping in relative clauses. In the course of their history, English *wh*-relatives are known to have undergone a syntactic change in their prepositional usage: having originally occurred only with pied-piped prepositions, they came to admit preposition stranding as an alternative pattern. A modest beginning of stranding occurred in Late Middle English, an increase in Early Modern English, and then a clear decrease in the

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13) I assume that the relativizer whom and that are in the different positions, respectively Spec CP and C-head position. The Doubly-Filled Comp Filter (DFCF) is a constraint which excludes the co-occurrence of a *wh*-phrase and a complementizer *that* in a COMP-position. (Chomsky and Lasnik 1977) I extend the DFCF of the type *[CP WH *that*] to the type *[C *that, for*]. The DFCF is essentially a PF-phenomenon.

written language of today, against a more liberal use in spoken English, standard as well as nonstandard. The drop in the incidence of stranding is thus not an expression of a genuine grammatical change but due to notions of correctness derived from the grammar of Latin and affecting written usage. From a diachronic point of view, the pied-piping has been an unmarked form except in current spoken expressions.[14) Then, it is quite reasonable why only pied-piping is allowed in infinitival relative clauses. Compared to finite relative clauses, infinitival relative clauses are later developed constructions diachronically, so they yet follow only the unmarked pied-piping form.

3.6. Infinitival Relative Clauses as PP-adjuncts

In this paper, infinitival relative clauses are argued to be PP-adjuncts. In the X-bar schema, PP-adjuncts to NP (N′) are generated by the adjunct rule as in (23).

(23) a. Adjunct rule: X′ → X′ (WP)
       b. N′ → N′ PP[15)
(24) a. Complement rule: X′ → X (WP)
       b. P′ → P CP

By the adjunct rule, PP-adjuncts to N′ are introduced, and by the complement rule, P c-selects CP within PP-adjuncts. In a similar way as in the C-selection of the verb, P c-selects its specific type of complement clause with [+*wh*][-tense][+P] features on its head C. PP-adjuncts are introduced by both adjunct and complement rules in the X-bar schema.

Consider the following examples with seemingly similar but different DP/PP asymmetry from that of infinitival relative clauses. (Examples (25-26) from Larson, 1987; Grosu, 1996)

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14) The preposition stranding is just frequently used form only in spoken English following the principle of Economy, but even in present day English, pied-piping is unmarked form in written expressions.

15) PP and CP are the possible adjuncts to N′ in English. The semantic similarity between PP and CP can be found in the examples of PP-adjunct to N′ and CP-adjunct to N′: *a student from England* vs *a student who is from England*

(25) a. I will <u>live</u> [PP in [CP whatever town you live (in)16)]]].

　　 b. *I will live [DP [CP whatever town you live in]].

(26) a. *John <u>loves</u> [PP in [CP whatever town you live]]].

　　 b. John loves [DP [CP whatever town [you live in]]].

While in ordinary relative clauses, prepositions may be pied-piped with relative pronouns, in free relative clauses this pied-piping is only possible if PP is required by c-selection of the main verb. Free relatives function as PP-adjuncts in (25) with an intransitive verb *live*, while free relatives function as DP, barring pied-piping of the preposition with a transitive verb *love* (complement) in (26).

In infinitival relative clauses, the PP-adjunct to NP (N′) has a c-selected CP since P takes a specific CP with [+*wh*][-tense][+P] features as shown in (27). The PP-adjunction analysis for infinitival relative clauses can be extended to other types of P-CP constructions as in (27), which indicates that PP-adjuncts are not unusual syntactic structures in English.
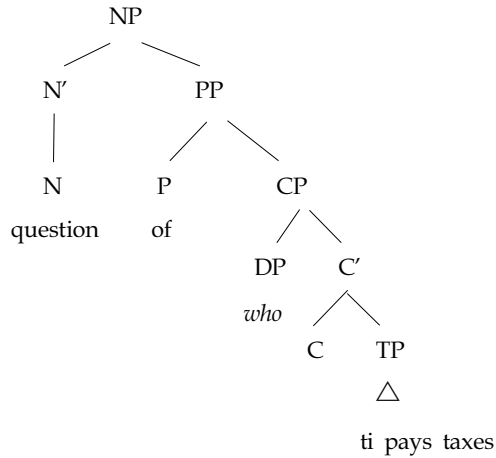
(27) a. It's the question of who pays taxes.

　　 b. I am interested in how many people come here.

　　 c. People are never satisfied with what they have.

　　 d. I don't know about how combinations of stimuli affect.

　　 e. I met the woman with whom to talk.

In finite free relatives, Grosu (1996) also supports the PP-adjuncts with P-CP structures as in (28) below.

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16) The preposition can be left at the original position optionally, which indirectly supports my proposal of P-raising since the copy can be overt in its original position.

(28)

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                    NP
                 /      \
              N'         PP
              |        /    \
              N       P      CP
          question    of   /    \
                         DP      C'
                        who     /   \
                               C     TP
                                     △
                              ti  pays  taxes
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4. Conclusion

In this paper, I have examined the syntactic structures and analyses for finite and infinitival relative clauses to explain why there is a DP/PP asymmetry only in infinitival relative clauses.

To account for the different distributions of DP and PP, I propose the separate and different analyses for finite and infinitival relative clauses: the determiner-complement or the CP-adjunction hypothesis for finite relative clauses vs the PP-adjunction hypothesis for infinitival relative clauses. The contrast in the DP/PP asymmetry relates specifically to the finite/non-finite structural distinction of relative clauses.

I have proposed that infinitival relative clauses are PP adjuncts to NP (N'), and the fact that the head position P of PP must be filled with a lexical element forces the simultaneous P-raising and DP-raising, producing the pied-piping form of PP, while prohibiting the preposition stranding of P. In the proposed analysis, the possibility of preposition stranding in infinitival relative clauses with null *wh*-operators can be easily accounted for by Overt/Null Pair which I call: the overt P head requires the overt DP (i.e., Overt Pairs produce pied-piping), and the null P head requires the null DP (i.e., Null Pairs produce null *wh*-operators).

In the proposed analysis of infinitival relative clauses as PP-adjuncts to NP (N'), the DP/PP asymmetry can be easily and explicitly explained in a minimalist way.

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Yangsoon Kim
Dept. of English Language and Literature
College of Humanities and Social Sciences
Hanbat National University
Email: yskim@hanbat.ac.kr