Notes on wh-relative clauses

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Notes on *wh*-relative clauses*

Takayoshi Kurogi

1. Introduction

In this paper, I will discuss restrictive *wh*-relative clauses and some relative adverb clauses in English. There have been proposed two types of analysis for *wh*-relative clauses: Kayne's (1994) promotion analysis, as shown in (1b), and Chomsky's (1977) *wh*-movement analysis, which is illustrated in (1c). Comparing the two types of analysis, we will find that the *wh*-movement analysis is superior to the promotion analysis as a way to analyze restrictive *wh*-relative clauses.

(1) a. the man *whom* I met yesterday

b. $[_{DP}$ the $[_{NP}$ man$_j]$ $[_{CP}$ $[_{DP}$ *whom* $t_j]_i$ $[_{C'}$ $[_{TP}$ I met t_i yesterday]]]]

c. $[_{DP}$ the man $[_{CP}$ *whom*$_i$ $[_{TP}$ I met t_i yesterday]]]

There is, however, one problem for the *wh*-movement analysis: the co-referent character of the *wh*-relative clauses. In this paper I will argue that in the restrictive *wh*-relative clauses Chomsky's analysis is basically correct, and propose an alternative *wh*-movement analysis which overcomes that problem.

In what follows, I will discuss some characteristics of *wh*-relative clauses and compare the two types of analysis in chapter 2. In chapter 3, I will propose the structure and licensing mechanism of the *wh*-relative clauses based on Kurogi (2008). This structure and mechanism can be extended to some relative adverb

clauses, as will argue in chapter 4. Chapter 5 is the conclusion.

2. Two types of analysis and their problems

2.1 Two characteristics of the restrictive *wh*-relative clauses

Before discussing two types of analysis, let us discuss two characteristics which are essential for restrictive *wh*-relative clauses.

First, as Aoun and Li (2003) point out, the restrictive *wh*-relative clauses do not show reconstruction effects (I will call these effects "anti-reconstruction effects"):

(2) a. ?*[The picture of himself$_i$] which John$_i$ painted *t* in art class is impressive.
(Binding Condition A) (Aoun and Li (2003:111))

b. ?*[The picture of his$_i$ mother] which every student$_i$ painted *t* in art class is impressive. (bound pronoun) (Aoun and Li (2003:113))

In (2a, b), the reflexive pronoun and the bound pronoun in each relative head[1], *himself* and *his*, are not c-commanded by their suitable antecedents, *John* and *every student*, therefore these sentences are ungrammatical. If each relative head can be reconstructed to each trace position, which is shown as *t* within the relative clauses, then these sentences should be grammatical. In other words, this evidence implies that the copies of the head of the restrictive *wh*-relative clauses are not left in the trace positions of (2a, b).

Second, restrictive *wh*-relative clauses have co-referent characteristics.

(3) a. the woman who is a singer

b. the woman$_i$ who$_i$ is a singer

In (3b), the head of the relative clause *woman* has the same referent as the relative pronoun *who*, which is shown by using the co-indexation marker *i*. In other words, these two words refer to the same object. Note, however, that in the recent minimalist approaches the notion of the co-referent is no longer used because this

notion violates the Inclusiveness Condition:

(4) *Inclusiveness Condition*: (Chomsky (2000: 113))
No new features are introduced by C_{HL}.

Hence, I use co-indexation marker such as *i* for the sake of convenience when some words or phrases have the same referent.

On the basis of these two characteristics, let us now examine the two types of analysis in the following sections.

2.2 Promotion analysis

Kayne (1994) argues that the relative clauses in English can be derived by the raising of the relative head (*promotion analysis*). Specifically, Kayne argues that the restrictive *wh*-relative clauses such as (5a) are derived as follows:

(5) a. the picture which Bill saw

b. the $[_{CP}\ [_{DP}\ [_{D^0}$ which $[_{NP}$ picture$]]]_i$ C^0 $[_{TP}$ Bill saw $t_i]]$

c. the $[_{CP}\ [_{DP}\ [_{NP}$ picture$_j]$ $[_{D^0}$ which $[_{NP}$ $t_j]]]_i$ C^0 $[_{TP}$ Bill saw $t_i]]$

(cf. Kayne (1994:90))

At first, the DP *which picture* moves from its trace position to the Spec, CP position as shown in (5b). Then, only the NP *picture* moves to the Spec, DP position (5c).

Now, let us examine if this analysis can explain the two characteristics discussed in section 2.1.

We can clearly say that this analysis cannot explain the anti-reconstruction effect in (2). Note that the copies of the moved elements should be left at the trace positions if we adopt the Copy theory, which is proposed in the recent minimalist theories (cf. Chomsky (1993), Nunes (2004)). Based on (5b, c), (6a) should be analyzed as in (6b), and all the copies we should leave in the trace positions of (6b)

would be represented as in (6c).

(6) a. ?*[The picture of himself$_i$] which John$_i$ painted *t* in art class is impressive.
(= (2a))

b. The [$_{CP}$ [$_{DP}$ [$_{NP}$ picture of himself$_i$]$_k$ [$_{D^0}$ which [$_{NP}$ *t*]$_k$]]$_j$ C^0 [$_{TP}$ John$_i$ painted [$_{DP}$ *t*]$_j$ in art class]] is impressive.

c. The [$_{CP}$ [$_{DP}$ [$_{NP}$ picture of himself$_i$]$_k$ [$_{D^0}$ which [$_{NP}$ picture of himself$_i$]$_k$]]$_j$ C^0 [$_{TP}$ **John**$_i$ painted [$_{DP}$ which picture of **himself**$_i$]$_j$ in art class]] is impressive.

If this analysis is correct, then we would predict that the reflexive pronoun can feed the Binding Condition A within the *wh*-relative clauses, which is counterfactual to the data in (2a).

The promotion analysis also cannot explain co-referent characteristics. Note that only the NP *picture* can be extracted from the DP *which pictures* in Spec, CP in (5c). That is, the relative head *picture* does not have the same referent as the *wh*-relative pronoun *which*, although it has as t_j in (5c).

(5) c. the [$_{CP}$ [$_{DP}$ [$_{NP}$ picture$_j$] [$_{D^0}$ which [$_{NP}$ t_j]]]$_i$ C^0 [$_{TP}$ Bill saw t_i]]

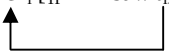
c'. the [$_{CP}$ [$_{DP}$ [$_{NP}$ **picture**$_j$] [$_{D^0}$ which [$_{NP}$ **picture**$_j$]]]$_i$ C^0 [$_{TP}$ Bill saw t_i]]

To summarize, neither of two characteristics can be satisfied by Kayne's promotion analysis. In the next section, we will examine if these characteristics can be satisfied by the *wh*-movement analysis.

2.3 the *wh*-movement analysis

Chomsky (1977) suggests that the *wh*-relative clause can be derived by *wh*-movement as illustrated in (7).

(7) the picture [$_{CP}$ which$_i$ [$_{TP}$ Bill saw t_i]



Chomsky (1977: 86) argues that the *wh*-movement has some general character such as (i) leaving a gap, (ii) allowing a violation of subjacency when there is a bridge verb and (iii) being sensitive to *wh*-island conditions etc. These characters are demonstrated in Aoun and Li's (2003) work, as shown in (8)

(8) a. *the boy$_i$ [who$_i$ I like the teacher [who has taught t_i]] (*wh*-island condition)
b. the boy$_i$ [who$_i$ Mary thinks [t_i is the smartest]] (bridge verb)

(8a, b) show that the *wh*-relative pronouns move from the trace positions (t_i in (8a, b)) to the positions next to their relative heads (Spec, CP positions). In (8a), the *wh*-relative pronoun *who*$_i$ cannot jump across the *wh*-word *who* within the embedded clause. In (8b), the *wh*-relative pronoun can move across the bridge verb without violating the subjacency condition.

Unlike Kayne's promotion analysis, the *wh*-movement analysis can explain the anti-reconstruction effect. Note that the word which is reconstructed within the relative clause is only the *wh*-relative pronoun. Therefore, all the copies of (9a) should be represented like (9b), if we adopt Chomsky's analysis.

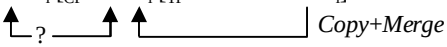
(9) a. ?*[The picture of himself$_i$] which John$_i$ painted *t* in art class is impressive. (=(2a))
b. ?*[The picture of **himself**$_i$] [$_{CP}$ [which]$_j$ [$_{TP}$ **John**$_i$ painted [which]$_j$ in art class] is impressive.

In (9b), since the only reconstructed element is the *wh*-relative pronoun *which*, the reflexive pronoun cannot be c-commanded by its antecedent. Therefore we can predict straightforwardly that (9a) violates the Binding Condition A.

Now, let us examine if this analysis explain the co-referent characteristic.

(10) a. the picture$_i$ [$_{CP}$ which$_i$ [$_{TP}$ Bill saw t_i] (=(7))

b. the picture$_i$ [$_{CP}$ which$_i$ [$_{TP}$ Bill saw which$_i$]



As (10b) shows, if we adopt the Copy theory, we can say that the trace position in (10a) and the *wh*-relative pronoun have the same referent since the relative pronoun in Spec, CP is the copy of the *wh*-phrase in the trace position. The co-referent relation between the relative head and the *wh*-relative pronoun, however, cannot be explained unless we assume another licensing mechanism since the relative head and the relative pronoun have no structural relation in this analysis.

To sum up, the *wh*-movement analysis can explain the anti-reconstruction effect, but the co-referent characteristic still remains unsolved.

2.4 Summary

To summarize the discussion so far, we will find that the *wh*-movement analysis is superior to the promotion analysis in that it can explain the anti-reconstruction effect. Therefore, I will adopt the *wh*-movement analysis in this paper. Both analyses, however, cannot explain the co-referent characteristic. Then, how can we account for this? Of course, we cannot simply introduce the co-indexation marker to explain this characteristic since the introduction of the co-indexation marker violates the Inclusiveness Condition. We need another way to explain the co-referent characteristic without violating the Inclusiveness Condition.

In the following sections, I will briefly introduce the argument proposed by Kurogi (2008), which proposes the mechanism of the co-referent character of the Parasitic Gaps (henceforth, PG) and extend this mechanism to the *wh*-relative clauses. This mechanism can be extended to the co-referent character of the *wh*-relative clauses.

3. Proposal

3.1 Kurogi (2008)

The PG constructions also have the co-referent property like *wh*-relative clauses. As the PG constructions in (11a) shows, the PG position within the adjunct clause (pg_i) has the same referent as the *wh*-phrase (*which book*$_i$) and its trace position (t_i).

(11) a. *Which book*$_i$ did John file t_i [$_{\text{Adjunct}}$ without reading pg_i]?

b. *Which book*$_i$ did John file t_i [*Op*$_j$ without reading pg_j]?

Chomsky (1986) argues that there is a null operator movement within the adjunct clause like (11b)[2]. In other words, there are two independent movements in one PG construction (the *wh*-movement in the main clause and the null operator movement in the adjunct clause) If so, we cannot explain why the PG position and the *wh*-phrase have the same referent unless we introduce another licensing mechanism.

Kurogi (2008) argues that the co-referent characteristic of the PG can be accounted for by Pesetsky and Torrego's (2004) Agree system and Reuland's (2005) argument for reflexive pronoun.

The definition of Pesetsky and Torrego's (2004) Agree system is as follows:

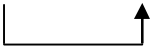
(12) *Agree* (Feature sharing version)

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 (2004: 4))

(13) a. *u*F(*unval*)……*i*F*val* → b. *u*F(*val*)[**3**]……*i*F*val*[**3**][3]



Pesetsky and Torrego (2004) assume that the unvalued feature becomes a probe, and

searches its goal. After the Agree operation, they share the value of the goal. For instance, the unvalued, uninterpretable feature *u*F(*unval*) probes and finds its valued, interpretable goal, *i*F*val* in its c-command domain as shown in (13a). They perform the operation Agree based on the definition in (12a). Then, the probe *u*F(*unval*) shares the value or feature of the goal *i*F*val*. Thus, the feature of the probe has the same value in the goal, represented as *u*F(*val*) in (13b). Numbers in square brackets shows that they share the same feature.

Reuland (2005) uses this Agree system to explain how the reflexive pronouns and their antecedents have the same referent. Reuland argues that the relation between the reflexive pronoun and its antecedent can be licensed by sharing the same value of ϕ-feature (the bundle of person, number and gender feature)[4] via T^0. In the following Dutch reflexive pronoun, for instance, *every professional* and *himself* have the same referent.

(14) *Idere professional* voelde [*zich* ann de kant geschoven].
Every professional felt *himself* to the side pushed
(Reuland (2005: 510))

Reuland assumes that the subject *every professional* is originally base-generated in the Spec, *v**P position and the reflexive pronoun *himself* is base-generated within VP, rising to the Spec, *v**P position due to EPP feature of *v**. Reuland also assumes that the features and values of *every professional*, *himself* and T^0 are like (15).

(15) *Every professional* =*i*ϕ*val* • *himself* = *i*ϕ(*unval*) • T^0 = *u*ϕ(*unval*)

Taking these assumptions into account, let us consider how the reflexive pronoun in (14) can be licensed:

(16) a. [$_{TP}$ [$_{T'}$ T^0 [$_{v*P}$ *himself* [$_{v*P}$ *every professional* [$_{v*'}$ *v** [$_{VP}$ felt

*u*ϕ(*unval*)[**6**] *i*ϕ(*unval*)[**6**] *i*ϕ*val*

*Agree*①

$t_{himself}$ to the side pushed]]]]]]

b. [$_{TP}$ [$_{T'}$ T^0 [$_{v*P}$ *himself* [$_{v*P}$ *every professional* [$_{v*'}$ *v** [$_{VP}$ felt

*u*ϕ(*unval*)[**6**] *i*ϕ(*unval*)[**6**] *i*ϕ*val*[**6**]

*Agree*②

$t_{himself}$ to the side pushed]]]]]]

c. [$_{TP}$ [$_{T'}$ T^0 [$_{v*P}$ *himself* [$_{v*P}$ *every professional* [$_{v*'}$ *v** [$_{VP}$ felt

*u*ϕ(*val*)[**6**] *i*ϕ(*val*)[**6**] *i*ϕ*val*[**6**]

Share the same value

$t_{himself}$ to the side pushed]]]]]]

According to Reuland (2005), the unvalued ϕ-feature on T^0 searches its goal and finds the unvalued ϕ-feature on the reflexive at first, as in (16a). They share the value of the goal, but they are still unvalued since the value of the goal is also unvalued. T^0 again probes the goal, and finds *every professional* in the Spec, *v**P as illustrated in (16b). Since the subject *every professional* has a valued feature, T^0 receives its value. Note that T^0 also made the Agree relation with the reflexive pronoun before T^0 agrees to the subject. As the result of Agree relation in (16a), when the Agree relation in (16b) occurs, the value of subject *every professional* is also reflected on the reflexive pronoun. Therefore, the subject *every professional* and the reflexive pronoun *himself* have the same value of ϕ-feature, and make the co-referent relation.

Kurogi (2008) extends Reuland's mechanism to the PG constructions. Kurogi argues that in the PG constructions the *wh*-phrase and the null operator (or its trace PG position) have the co-referent relation via *v**. Let us examine (11), repeated in (17).

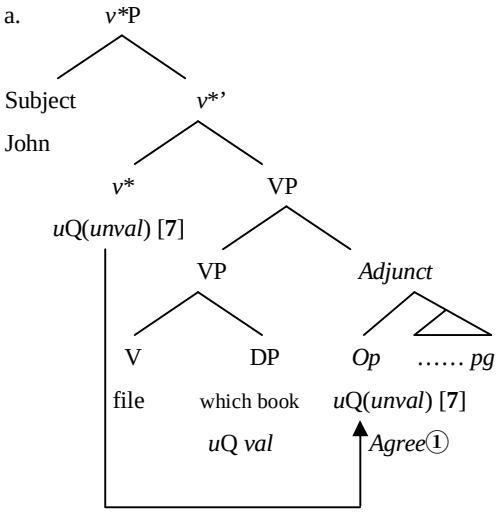
(17) *Which book* did John file *t* [*Op* without reading *pg*]?

In accordance with Pesetsky and Torrego, Kurogi also assumes that the value of the *wh*-phrase, the null operator and *v** in (17) can be represented as follows:

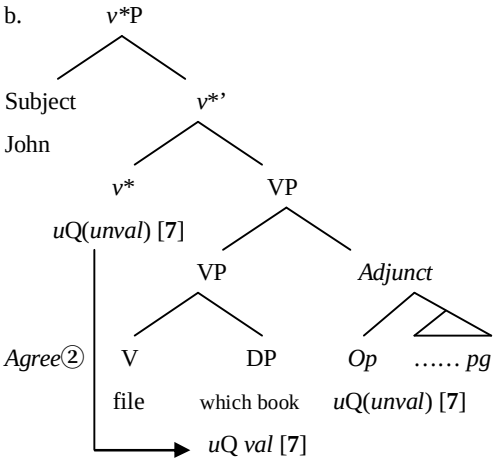
(18) *Which book* = *u*Q*val* • *Op* = *u*Q(*unval*) • *v** = *u*Q(*unval*)

Taking these assumptions into consideration, Kurogi (2008) proposes the following derivations for the PG constructions. (For convenience of space, I will indicate only the relevant structure for the PG licensing.)

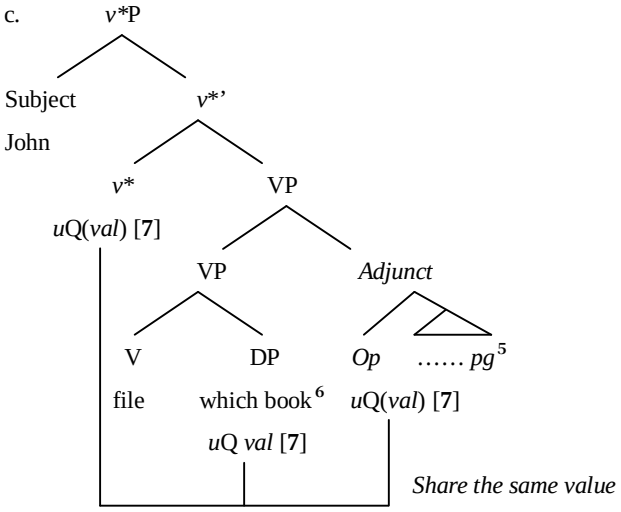
(19) a.



b.



c.



In (19a), the unvalued feature *u*Q(*unval*) of the *v** searches its c-command domain, and finds the null operator as its goal. Although they share the value of the goal, the shared value is still unvalued since the value of the goal is also unvalued. Therefore, *v** again searches its c-command domain and finds another goal *which book*, as shown in (19b). As a result of this Agree relation, the value of the *wh*-phrase is

shared with *v**. Since the feature of *which book* has values, the feature of *v** is also receive its value. At this point, *v** also agreed to the null operator before agreeing to the *wh*-phrase, therefore the value of the *wh*-phrase is also reflected on the null operator as illustrated in (19c). Like Reuland (2005), the co-referent characteristic can be explained by the Agree operations via mediation of *v**. I will call a series of these Agree operations "Indirect Agree."

3.2. What mediates and what is shared?

If this mechanism is on the right track, it may be extended to the co-referent character of *wh*-relative clauses. In other words, the values between relative head and the *wh*-relative pronoun are shared by Indirect Agree. There arise, however, two questions. What mediates between the head of the *wh*-relative clause and the *wh*-relative pronoun and what is shared by Indirect Agree?

As for sharing elements, the N-features including the "substantive feature" would be relevant. The substantive features are, for example, [+human], [+thing] and [+place] features, which normally occur in N. Aoun and Li (2003: 242: fn. 5) argue that the relative head and the *wh*-relative pronoun must agree to all interpretable features including substantive features. In this paper, however, I will modify this notion and consider the substantive features as values of the category N (in other words, what are shared by Indirect Agree are the N-features and their values).

Then, what mediates the N-features and their values? Before answering this question, let us briefly discuss the structure of DP and Head-movement.

As for the derivation of DP, I will adopt "NP-shell" analysis proposed by Radford (2000). Radford argues that the DP structure such as (20a) is derived through the derivation from (20b) to (20e):

(20) a. the return of the president from Cincinnati

b. [$_{NP}$ of the president [$_{N}{}^{0}$ return] from Cincinnati]

c. [$_{nP}$ n^{0} [$_{NP}$ of the president [$_{N}{}^{0}$ return] from Cincinnati]]

d. $[_{nP}\ [n^0 + [_N{}^0$ return]] $[_{NP}$ of the president [t_{return}] from Cincinnati]]

e. $[_{DP}\ [_D$ the] $[_{nP}\ [n^0 + [_N{}^0$ return]] $[_{NP}$ of the president [t_{return}] from Cincinnati]]

(20b) is a base-structure of (20a). First of all, n^0 is merged to (20b), forming (20c). After the merging of n^0, N^0 *return* moves, and adjoins to n^0 by Head-movement, creating nP structure as (20d) shows. Finally, the determiner *the* merges with nP, as in (20e).

In this paper, I will also adopt Matushansky's (2006) analysis of Head-movement. Matushansky argues that Head-movement is the same as ordinal phrasal movement.

What distinguishes Head movement from ordinal phrasal movement is that in the case of Head-movement, the categorical selection (C-selection) and the morphological merger (m-merger) occur. According to Matushansky (2006), the C-selection corresponds to the Agree operation, which is needed for ordinal phrasal movement:

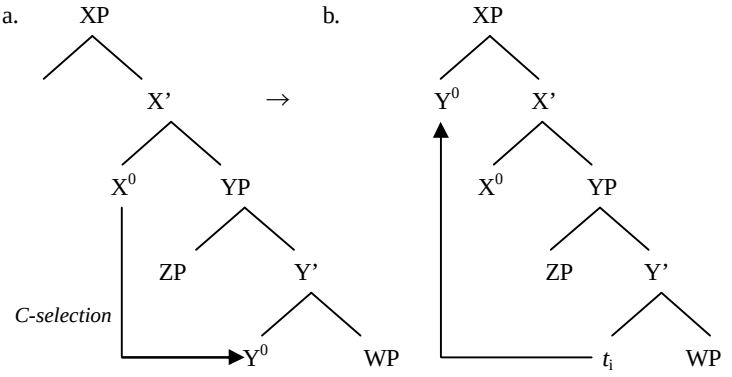
(21) *C-selection*

A head may select the syntactic category (and the lexical content) of the head of its complement.

The m-merger is the operation by which two adjacent heads join together at the morphological component.

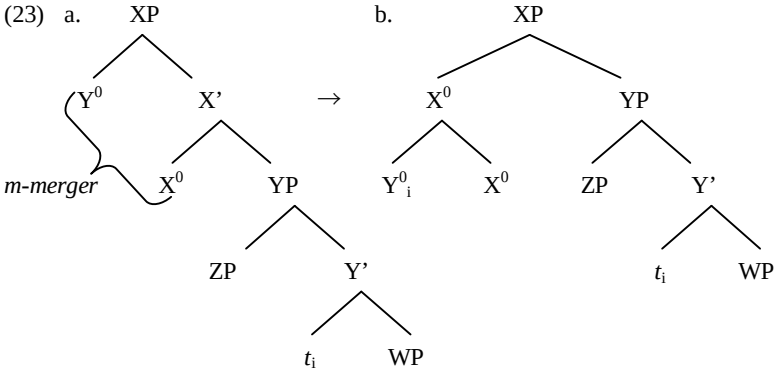
Let us consider how Head-movement is derived by these two mechanisms.

(22) a. b.



In (22a), the head X^0 c-selects the head of its complement (Y^0) in accordance with (21). Matushansky (2006) argues that after the C-selection operation, Y^0 moves to the Spec, XP by EPP-feature as shown in (22b). This type of movement is the same as ordinal phrasal movement. By the application of the m-merger at the morphological component, the Y^0 and X^0 in (22b) join together and make one big head, as illustrated in (23a, b).

(23) a. b.



Moreover, Matushansky (2006) assumes that the element which derives C-selection is the categorical feature (c-feature) such as N-feature or V-feature.

Matushansky argues that an uninterpretable c-feature derives C-selection, searches its complement and finds an interpretable corresponding c-feature. For example, if a head X has an uninterpretable V-feature ([*u*V]), X searches for and finds a head Y, which has an interpretable V-feature ([*i*V]) at its complement. This searching and finding mechanism is the C-selection.

Taking this C-selection system into consideration, let us examine the case of N^0-to-n^0 Head-movement repeated in (24), for example. According to Matushansky, the Noun head has an interpretable N-feature ([*i*N]). Moreover, I will assume that n^0 has an uninterpretable N-feature ([*u*N]).

(24) a. the return of the president from Cincinnati (=(16a))

b. [$_{NP}$ of the president [$_{N}$ return] from Cincinnati]

[*i*N]

c. [$_{nP}$ n^0 [$_{NP}$ of the president [$_{N}$ return] from Cincinnati]]

[*u*N] [EPP] [*i*N]

C-selection

d. [$_{nP}$ [$_{N}$ return] n^0 [$_{NP}$ of the president [$_{N}$ *t*] from Cincinnati]]

[*i*N] ~~[*u*N]~~ ~~[EPP]~~

Phrasal movement

e. [$_{DP}$ [$_{D}$ the] [$_{nP}$ [[$_{N}$ return] + n^0] [$_{NP}$ of the president [$_{N}$ *t*] from Cincinnati]]

m-merger

The base-structure of (24a) is (24b). When the n^0 merges to NP, C-selection occurs since n^0 has an uninterpretable c-feature [*u*N]. This [*u*N] feature searches its complement and finds N^0 which has an interpretable c-feature [*i*N], as shown in (24c). After the C-selection, N^0 moves to the Spec, nP in order to check the EPP-feature of n^0, as illustrated in (24d). At the morphological component, n^0 and N^0 join together by the application of m-merger like (24e).

Here, I will propose that the co-referent character between the relative head and the *wh*-relative pronoun is licensed by taking a free ride on N^0-to-n^0 movement. In

other words, the C-selection of n^0 mediates the co-referent relation between the relative head and the *wh*-relative pronoun. Note that Matushansky (2006) argues that the C-selection corresponds to Agree operation. If this assumption is on the right track, it is natural to think that the C-selection also takes place feature sharing, which is proposed by Pesetsky and Torrego (2004).

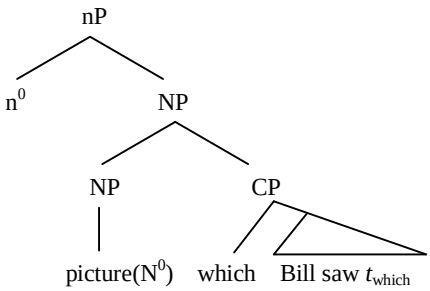
3.3 Proposal for restrictive *wh*-relative clauses

In the previous section, I argued that the co-referent relation between the relative head and the *wh*-relative pronoun is licensed by taking a free ride on N^0-to-n^0 movement. In that section, I also argued that what are shared are the N-features and their values, such as [+human], [+thing] and [+place]. On the basis of these assumptions, I will propose the structure and mechanism of restrictive *wh*-relative clauses. Let us examine, for instance, the *wh*-relative clause illustrated below:

(25) the picture which Bill saw (=(5a))

Assuming that the relative CP *which Bill saw* adjoins to nP, the structure before N^0-to-n^0 movement would be indicated like (26).

(26)

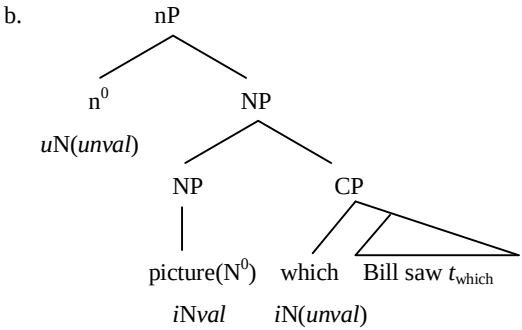


As discussed above, n^0 has an uninterpretable N-feature and N^0 has an interpretable N-feature. As for the values of each head, I will assume that the value of N^0 is specified (for instance, the N^0 *picture* has [+thing] value) but n^0 is not (since

n^0 does not have lexical content). Meanwhile, I will assume that the *wh*-relative pronoun also has an interpretable N-feature but its value is not specified (since the form of the *wh*-relative pronoun can be specified depending on the kinds of the relative head). Therefore, the N-feature of n^0, *picture*(N^0) and *which* in (26) and its structure can be represented as in (27a, b).

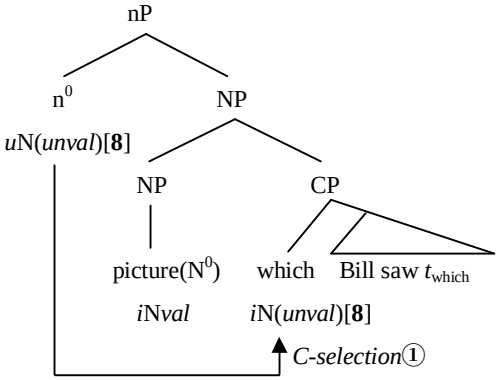
(27) a. n^0 = *u*N(*unval*) • *picture*(N^0) = *i*N*val* • *which* = *i*N(*unval*)

b.

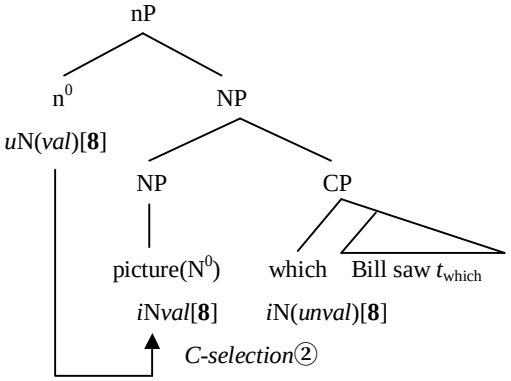


When the N^0-to-n^0 movement occurs in (27a), the n^0 searches its c-command domain and finds the *wh*-relative pronoun *which* for the sake of the C-selection, as shown in (28a). This C-selection, however, would fail because the *wh*-relative pronoun has an unvalued feature. As the result of C-selection, n^0 and the *wh*-relative pronoun share the same unvalued feature. Therefore, n^0 again searches its c-command domain and finds N^0, which has an appropriate value as (28b) shows. The value of N^0 is shared with n^0. Since the C-selection relation is also made between n^0 and the *wh*-relative pronoun, the value which is shared by N^0 is also reflected on the *wh*-relative as illustrated in (28c).

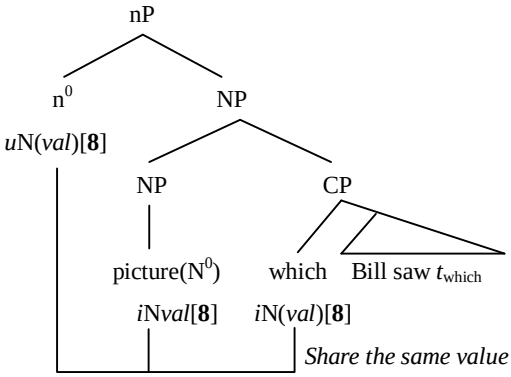
(28) a.


nP
n0
NP
uN(unval)[8]
NP
CP
picture(N0)
which
Bill saw twhich
iNval
iN(unval)[8]
C-selection①

b.


nP
n0
NP
uN(val)[8]
NP
CP
picture(N0)
which
Bill saw twhich
iNval[8]
iN(unval)[8]
C-selection②

c.


nP
n0
NP
uN(val)[8]
NP
CP
picture(N0)
which
Bill saw twhich
iNval[8]
iN(val)[8]
Share the same value

In (28c), these three elements share the same N-features and their values in accordance with the C-selection, which corresponds to Agree operation. Since they shares the same [+thing] value, they are interpreted as the same thing.

4. Relative adverb clauses

If this analysis is on the right track, we can extend it to some relative adverb clauses.

Caponigro and Pearl (2009) argue that that in a free relative adverb clause such as (29), the relative adverb *where* and its trace position are NPs. Note that the overt preposition *past* is left as the head selecting the trace position in (29).

(29) Jack disliked [$_{FR}$ *where* we just ran [$_{PP}$[$_{P}$ **past**][t_{where}]]] — it smelled funny.

(cf. Caponigro and Pearl (2009: 157))

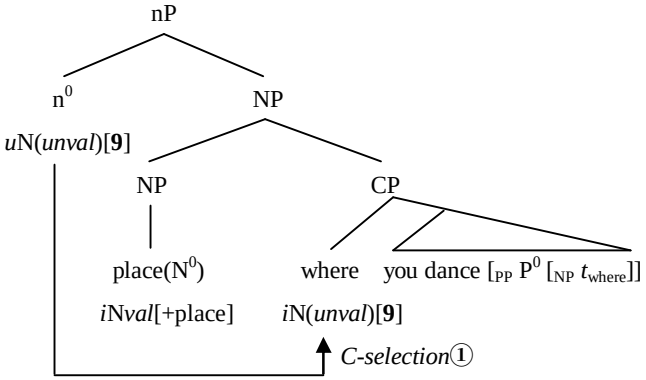
As Caponigro and Pearl (2009) argue, if the relative adverb is truly an NP, we may extend the mechanism of the *wh*-relative clause to the *wh*-relative adverb clause. For instance, let us examine an ordinal *wh*-relative adverb clause like (30a). In this sentence, I will also assume that there exists a null preposition as the head selecting the trace of *where*, as illustrated in (30b)

(30) a. the place where you dance

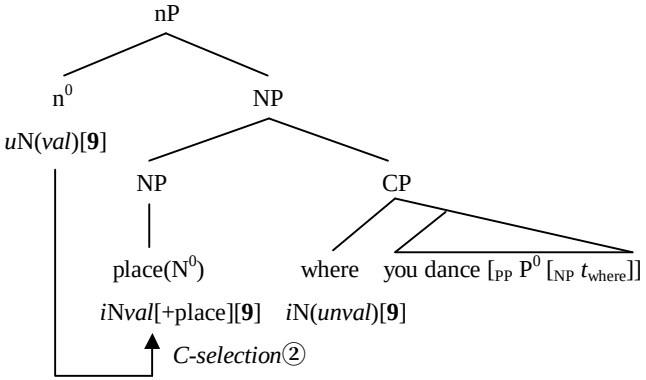
b. the place [$_{CP}$ where [$_{TP}$ you dance [$_{PP}$ P^0 [$_{NP}$ t_{where}]]]]

The co-referent character can be explained by the C-selection and feature sharing as discussed in 3.3. Assuming that the shared value is [+place] in the N-feature, the structure in (30) can be illustrated as following:

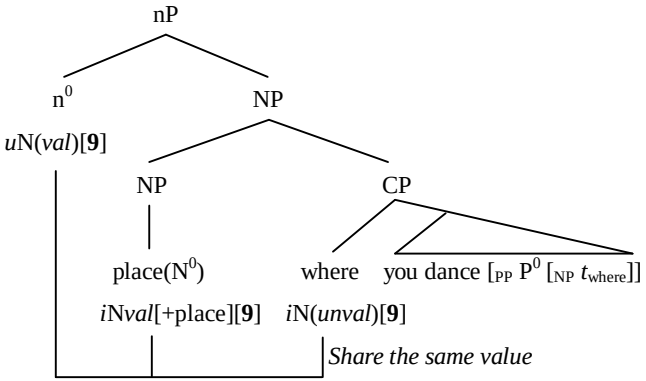
(31) a.


nP
n0
NP
uN(unval)[9]
NP
CP
place(N0)
where
you dance [PP P0 [NP twhere]]
iNval[+place]
iN(unval)[9]
C-selection①

b.


nP
n0
NP
uN(val)[9]
NP
CP
place(N0)
where
you dance [PP P0 [NP twhere]]
iNval[+place][9]
iN(unval)[9]
C-selection②

c.


nP
n0
NP
uN(val)[9]
NP
CP
place(N0)
where
you dance [PP P0 [NP twhere]]
iNval[+place][9]
iN(unval)[9]
Share the same value

In (31a), n^0 searches for the sake of the C-selection, and finds the *wh*-relative adverb *where* within its c-command domain. They share, however, the unvalued N-feature. Therefore, n^0 again searches its c-command domain, and finds the N^0 *place*. After the C-selection and feature sharing, they share the same value of N^0 as illustrated in (31b). Since n^0 also made the C-selection relation between n^0 and *where* before the derivation of (31b), the value of N^0 is also reflected on *where*. Thus, the value of N^0 is shared with the *wh*-relative adverb. These elements are interpreted as the same place.

Recall that I assumed the existence of the null preposition in (30a). You may wonder if this null preposition truly exists. As for this problem, the example in (32) may support our assumption.

(32) Jack disliked the place where we just ran [$_{PP}$ past [$_{NP}$ t_{where}]].

In (32), the relative head exists compared to the free relative adverb clause in (29). This evidence shows that even in the ordinal *wh*-relative adverb clause, the overt preposition can exist.

5. Conclusion

In this paper, we discuss the structure and mechanism of *wh*-relative clauses and some *wh*-relative adverb clauses with respect to the co-referent character. By comparing the promotion analysis with *wh*-movement analysis, we have argued that Chomsky's *wh*-movement analysis is superior to the promotion analysis, but neither analysis can explain the co-referent character of *wh*-relative clauses. However, this problem can be solved if we adopt Pesetsky and Torrego's (2004) Agree system and take a closer look at the structure of DP. As for *wh*-relative adverb clauses, the same explanation can be extended in terms of Caponigro and Pearl's (2009) argument.

Notes

[*] This is a paper based on my presentation at the 62nd General Meeting of the Kyushu branch of the English Literary Society of Japan, held at Miyazaki University in 2009. I thank all the audience at the conference for their comments and suggestions. I'm particularly grateful to Nobuaki Nishioka for valuable comments and suggestions. I also would like to express my gratitude to Carey Benom for stylistic improvements. Remaining inadequacies are my own.

[1] In this paper, we use the word "relative head" or "head of the relative clauses" when indicating the antecedent of the relative clause, for the sake of distinguishing it from Head, such as T-head (T^0).

[2] As for the evidence that there is a null operator movement within the adjunct clause when the PG occurs, see Nissenbaum (2000).

[3] The meaning of each notation is represented as following table:

*i*F*val* (interpretable, valued feature)	*i*F(*unval*)(interpretable, unvalued feature)
*u*F*val* (uninterpretable, valued feature)	*u*F(*unval*)(uninterpretable, unvalued featue)

This notation is modified version of Pesetsky and Torrego's (2004) notation. For the sake of simple discussion, I will use these notations in this paper. However, the roles of these notations are the same as Pesetsky and Torrego's version.

[4] Reuland (2005) suggests that the sharing of the person feature of the ϕ-feature would be involved in the licensing of the reflexive pronoun.

[5] I will assume that the result of Agree relation among the *wh*-phrase, *v** and the null operator is also reflected on the PG position (*pg* in (19)), since the PG position is the copy of the null operator.

[6] Of course, the *wh*-phrase *which book* in (19) moves to the higher specifier in order to check its uninterpretable Q-feature after this Agree relation.

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