ON LABELING IN FREE RELATIVE CLAUSES IN ENGLISH

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We propose that a *wh*-element and -*ever* in free relative clauses (FRCs) with -*ever* are syntactically independent elements and the *wh*-element moves to -*ever* to derive the complex form *wh-ever*. If the *wh*-element projects, we get the FRC headed by the *wh*-element. On the other hand, if -*ever* projects, we get the concessive clause. We also argue that the notion of phase plays an important role in label determination. Based on this argument, we show that even a phrasal category such as a *wh*-phrase can project at the landing site as long as it is a phase and contains no specifier.*

**Keywords:** free relative clause, concessive clause, label, minimal search, phase

1. Introduction

Labeling is one of the major concerns of generative syntax. Since Donati (2006), it has been assumed that even a moved element can become the label at the landing site if it is a lexical head. Donati argues that free relative clauses (FRCs) are derived by the movement and projection of a lexical *wh*-element. This is shown in (1).

(1) [DP what [CP …t...]]

The lexical item *what* moves and projects, deriving the FRC headed

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by what. If a wh-element is phrasal, it cannot project at the landing site. Consider (2).

(2) *I shall visit [what town] you will visit t. (cf. Donati (2006: 32))

In (2), what town is phrasal and therefore, it cannot project at the landing site. Thus, the FRC reading in (2) is impossible. Donati also deals with comparative clauses, arguing that only the lexical wh-element can move and project in comparative clauses. Observe the behavior of Romanian comparative clauses in (3a, b).

(3) a. Maria e cu mult mai deșteaptă decât Mari is with much more clever than-how-much is
Zamfira t de frumoasă. Zamfira of beautiful
‘Maria is far cleverer than Zamfire is beautiful.’
b. *Maria e cu mult mai deșteaptă decât de
Mari is with much more clever than-how-much of
frumoasă e Zamfira t. beautiful is Zamfira (cf. Grosu (1994: 207))

In (3a), the wh-element cit ‘how much’ undergoes movement, leaving behind its complement de frumoasă ‘of beautiful.’ This is grammatical. However, it cannot pied-pipe its complement as in (3b). Thus, the contrast between (3a) and (3b) indicates that the moved wh-element must be lexical. The facts in (2) and (3a, b) lead Donati to conclude that only lexical heads can move and project at the landing site. Although it sounds convincing, there are counter examples to Donati’s argument that only a lexical element can project at the landing site. First, FRCs are grammatical if the NP in what NP is plural, as illustrated in (4a, b).

(4) a. Give me what books you have on the subject.
   b. *Give me what book you have on the subject.

(cf. Declerck (1991: 546))

(4a) shows that FRCs allow for the phrasal wh-constituent. Second, Hungarian comparative clauses use an overt wh-phrase as in (5).

(5) a. János magas-abb mint [amilyen magas Mari valaha is volt]. János tall-er than how tall Mari ever also was
   ‘János is taller than Mari ever was.’
b. János olyan magas mint [amilyen magas Mari lesz]. János as tall as how tall Mari will-be
   ‘János is as tall as Mari will be.’ (Grosu (1994: 205))

In (5a, b), the wh-element amilyen magas ‘how tall’ is phrasal. Furthermore, comparative clauses in an English dialect also have an overt wh-
phrase. Observe (6).

(6) John bought more books than how many magazines Bill bought.

(Fults (2005: 47))

In (6), *how many magazines* is a phrasal category.

These facts undermine Donati’s argument that only a lexical item can project at the landing site. Therefore, we need to develop the labeling algorithm so that it can handle the facts shown in (4a), (5a, b), and (6). In this paper, we deal with FRCs, arguing that FRCs with *-ever* are derived by movement of *what* to *-ever* and projection of either *what* or *-ever*, as shown in (7), accounting for two kinds of interpretation, namely a nominal interpretation and a concessive interpretation. If the former projects, the nominal FRC (8a) is derived. If the latter projects, the concessive clause (8b) is derived.

(7) \[
\begin{array}{c}
\text{DP or EverP} \\
\text{EverP} \\
\text{what} \\
\text{-ever} \\
\text{CP} \\
\end{array}
\]

(8) a. Stop [DP whatever you are doing].

b. We will love you [Concessive Clause whatever you do].

We will also argue that assuming that the notion of phase plays a crucial role in label determination, even a phrasal element can project as long as it is a phase and has no specifier.

This paper is organized as follows. Section 2 presents the theoretical framework assumed in this paper. Section 3 proposes the internal structure of FRCs with *-ever*. Section 4 addresses predictions that occur from our proposal. Section 5 discusses consequences of our proposal. Section 6 is an interim summary. Section 7 deals with FRCs without *-ever*. Section 8 is the conclusion.

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1 Ott (2011) also refutes Donati’s generalization, arguing that the *wh*-element in FRCs can be phrasal. See Ott (2011) for details. I thank an anonymous reviewer for bringing Ott’s work to my attention.
2. Theoretical Framework

2.1. Phase-Impenetrability Condition

First, we adopt the Phase-Impenetrability Condition (PIC) of Chomsky (2000). This is formulated in (9).

\[(9) \quad \text{Phase-Impenetrability Condition} \]

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

The PIC dictates that the complement of a phase head is inaccessible to syntactic operations from outside the phase \( \alpha \) while the phase head and its edge remain accessible. Consider (10).

\[(10) \quad [X_P \ldots X_\alpha Y_P H Z_P] \]

The outer probe \( X \) cannot access the phase complement \( Z_P \) due to the PIC. Only the phase edge \( Y_P \) and the phase head \( H \) can be accessible to \( X \).

2.2. Chomsky’s (2008, 2013) Labeling Algorithm

Next, we adopt Chomsky’s (2008, 2013) labeling algorithm, which is reviewed in this section. Chomsky (2013) assumes that the assignment of labels of constituents is based on minimal search, which is a third factor principle. Consider (11).

\[(11) \quad \text{Minimal Search} \quad H \quad X_P \quad H \]

Given that the syntactic object (SO) consisting of \( H \) and \( X_P \) is interpreted at the interfaces, the label of the SO needs to be assigned. Therefore, minimal search of the lexical item takes place. It locates the lexical item \( H \), so that \( H \) rather than \( X_P \) is selected as the label of the constituent. In pursuing the minimal-search based label determination, we adopt Chomsky’s (2008) labeling algorithm in (12), which is consistent with minimal search.

\[(12) \quad \text{In} \{H, \alpha\}, H \text{ an LI, } H \text{ is the label.} \quad \text{(Chomsky (2008: 145))} \]

(12) states that if \( H \) is a lexical item, the label of the constituent formed by \( H \) and \( \alpha \) is \( H \).\(^2\) Thus, in (11) \( H \) becomes the label of the SO in accordance with (12) since it is a lexical item. Then, let us turn to the case of

\(^2\) Chomsky’s (2008) labeling algorithm in (12) is based on the insight of Donati (2006).
the merger of two phrasal elements. Chomsky (2013) takes up the case of \{XP, YP\}, where neither XP nor YP is a head. In the structure \([α \text{XP YP}]\), the label of the SO is ambiguous between X and Y since the heads (X and Y) are located by minimal search. This leads to label indeterminacy, which must be avoided. Here, Chomsky (2013) proposes two ways for the SO to be labeled. They are shown in (13a, b).

(13) a. The SO is modified so that only one head can be visible to labeling.
   b. The prominent features that XP and YP share become the label.

First, consider the case of (13a). Movement of either XP or YP makes only one head visible to labeling. If XP undergoes movement, the label of \{XP, YP\} is Y as shown in (14) (for the purpose of exposition, we use the notation “YP” to represent the label of \{XP, YP\}).

(14) \[XP_1 [YP \text{XP}_1 YP]\]

The copy left by movement of XP does not count for labeling. Then, only Y is visible to labeling, so that the label of \{XP, YP\} is Y.

Next, let us consider the case of (13b). One example is the merger of DP and TP as in (15).

(15) \[[φP [DP [D φ]] [TP [T φ] […]]]\]

In (15), DP and TP share the prominent features, φ-features. Thus, the label of \{DP, TP\} is φ.

2.3. Transfer

As we have seen in 2.2, there are two ways for \{XP, YP\} to be labeled: the movement option and the sharing option. In addition to these two ways, we assume (16).

(16) Labeling obeys the locality condition imposed by the PIC.

From (16), we see that the complement of a phase head is invisible for the computation of label determination. Then, a moved element can project at the landing site even if it is a phrasal category. Let me explain this in more detail with the help of the tree diagram in (17).
The phase HP (a phrasal category) moves to XP. The phase complement ZP is transferred to the interfaces and it is invisible to further syntactic computation. Then, the ZP in the set \{H, ZP\} constituting the HP should also be invisible to the computation of the label determination. That is, it is only the lexical item H in the set \{H, ZP\} that is accessible to the label determination. In this sense, we can regard HP as a singleton set \{H\}. Therefore, HP is taken to be H in the computation of the label determination.\(^3\) Consequently, HP becomes the label in conformity with (12). Specifically, minimal search locates H, and HP becomes the label of the SO.\(^4\)\(^5\) Here, let me mention a problem raised by anonymous reviewers. The problem occurs when we consider the case where the subject DP moves to TP, which is not a phase. Consider (18).

(18) \[\text{DP [DP the man] [TP [\_t read the book]]}\]

The subject DP moves and merges with TP. Then, the label of \{DP, TP\} should be DP since the DP is regarded as D by Transfer of the complement of D. However, this does not seem correct. We suggest that the derived structure is ruled out due to some semantic reason. Consider the structure in (19).

(19) \[\text{CP [DP [DP the man] [TP [\_t read the book]]]}\]

Although it may be possible that the subject DP projects at the landing site, the DP cannot be the complement of C. That is, the CP-DP-TP-\_tP structure

\(^3\) The argument that the phase HP is regarded as H after Transfer reminds us of Narita’s (2011) H-α schema theory. Actually, our theoretical framework incorporates Narita’s insight that XP is reduced to X by Transfer. However, we depart from Narita (2011) in that only the complement of a phase head undergoes Transfer. See Narita (2011) for details.

\(^4\) Note that we need to assume that Transfer could apply to HP before the determination of the label of \{HP, XP\}. More specifically, Transfer of ZP could occur at the trace position of HP. In this case, the label of \{HP, XP\} is HP as shown in (17). On the other hand, Transfer of ZP could occur after the determination of the label of \{HP, XP\}. In this case, the label of \{HP, XP\} is determined by the movement option or the sharing option as we discussed in section 2.2 since HP is a phrasal category at the point of the determination of the label of \{HP, XP\}. We leave open the question of whether or not the assumption that Transfer could apply to HP after the determination of the label of \{HP, XP\} is valid. I thank an anonymous reviewer for bringing this matter to my attention.

\(^5\) Actually, Chomsky (2013: 44, fn. 34) notes: “The labeling algorithm has to be designed so that search into a singleton set is minimal […]” Given that ZP is invisible for further computation, we can take \{H, ZP\} as \{H\}, that is, a singleton set. Therefore, search into H rather than XP is minimal since XP consists of the two-member set \{X, YP\}. Thus, HP becomes the label of the SO.
ture is not properly interpreted at the C-I interface. Therefore, the projection of D is impossible. Then, the sharing option in (13b) is chosen, so that the label of \{DP, TP\} is \(\phi\). See section 2.2 for details. Note that the Transfer-based labeling algorithm faces the problem of overgeneration. We leave this problem open. Although the Transfer-based labeling algorithm has this problem, Chomsky’s (2013) labeling algorithm and the Transfer-based one are not mutually exclusive.

Let us return to (17). Note that HP in (17) has no specifier and it is regarded as H since the phase complement ZP is transferred. If HP contains a specifier, things change. Consider (20).

\[
\begin{align*}
\text{(20)} & \quad \ast \text{HP} \\
& \quad \text{HP}_i = \{\text{ZP, H}\}_i \quad \text{XP} \\
& \quad \text{ZP} \quad \text{H (Phase)} \quad t_i
\end{align*}
\]

The specifier ZP is accessible to further syntactic operations since it is in the phase edge. Then, the ZP in the set \{ZP, H\} is accessible, so that both ZP and H are visible to the computation of the label determination. Therefore, HP is a two-member set, being a phrasal category.\(^6\) Thus, (12) prevents HP from projecting at the landing site. From the discussion so far, we can formulate a theoretical hypothesis as in (21).

\[
\begin{align*}
\text{(21)} & \quad \text{A phrasal category can project as long as it is a phase and has no specifier.}
\end{align*}
\]

As long as (21) is on the right track, the possibility arises that either a moved element or the target of movement can project. Consider the case where a phase HP with no specifier moves to a phase XP with no specifier.

\[
\begin{align*}
\text{(22)} & \quad \text{HP or XP} \\
& \quad \text{HP}_i = \{\text{H, ZP}\}_i \quad \text{XP} = \{\text{X, YP}\} \\
& \quad \text{H (phase)} \quad \text{ZP} \quad \text{X (phase)} \quad \text{YP} \quad \text{Transfer} \\
& \quad \ldots t_i \ldots
\end{align*}
\]

As we have discussed above, the moved element HP can project at the landing site. On the other hand, given (21) the target XP can also proj-

\(^6\) We assume that search into a two-member set is not minimal and therefore HP cannot be the label of the SO. See footnote 5.
ect. More specifically, the phase complement YP is transferred and only X in the set \{X, YP\} is accessible to labeling. Then, XP is regarded as a lexical item X for the computation of the label determination. Consequently, (12) permits the projection of XP. In this way, there is a case where either a moved element or the target of movement can project. With this theoretical framework in mind, we will analyze FRCs with -ever and FRCs without -ever in the following sections.\(^7\)

3. A Proposal

We propose that FRCs with -ever have the structure in (23).

\[
\begin{align*}
\text{(23)} & \quad \text{WhP or EverP} \\
& \quad \text{Wh}_i \quad \text{EverP} = \{-\text{ever}, \text{CP}\} \\
& \quad \text{Transfer} \\
& \quad \text{-ever} \quad \text{CP} \\
& \quad t_i \quad \text{C'} \\
& \quad \text{C} \quad \text{TP} \\
& \quad [\text{edge}] \quad \text{...} \quad t_i \quad \text{...} \\
\end{align*}
\]

In the structure above, \textit{wh} and -ever of \textit{wh-ever} are syntactically distinct

\(^7\) In our framework, there are three ways for \{XP, YP\} to be labeled: the sharing option, the movement option, and the Transfer option. Then, as an anonymous reviewer points out, there arises the question of which option (between movement and Transfer) is chosen in the label determination. At the moment, we cannot present a principled way in which one option is chosen. A speculative suggestion is that either option is possible in principle. In fact, which option is chosen depends on the syntactic context. For example, consider the raising context in (i).

(i) a. The problem seems to be of great importance.
   b. [[[DP the problem], [VP seems [TP \(t_i\) to be \(t_i\) of great importance]]]]

In (ib), DP the problem moves from the base-generated position to embedded TP. Here, the label of \{DP, TP\} must be determined. It could be DP since the complement of D is transferred (note that Transfer applies to DP before DP moves to TP). However, this derivation is not allowed since DP does not meet the selectional requirement of the verb seem: seem selects TP. Therefore, the movement option is chosen, so that the label of \{DP, TP\} is TP (note that Transfer applies to DP after DP moves to the matrix subject position). Next, as for the choice between the sharing option and the Transfer option, we suggest that either option is possible. See section 7.1 and footnote 26 below.
elements. The word -ever, being a phase and a universal quantifier, is the head of the FRC. The edge-feature of C attracts the wh-element to its specifier. Then, the bound morpheme -ever attracts the wh-element to form the combined form wh-ever. As a result, the wh-element is universally quantified. In conformity with (12), the wh-element can project since it is a lexical item. As a result, the wh-element becomes the label of the whole FRC. On the other hand, given (21), the target -ever can also project. Specifically, Transfer of CP makes only -ever accessible to labeling. Thus, EverP is regarded as a lexical item, so that (12) allows the projection of EverP. Here, let us assume that -ever is an adverb; the whole FRC becomes an adverbial clause with the projection of -ever. We take the adverbial clause to be a concessive clause (we will discuss why below). In this way, two kinds of FRCs can be derived according to (12). Under this analysis, the structures of FRCs in (8a, b) (repeated here as (24a, b)).

8 Kayne (1994) suggests that -ever in FRCs is a determiner taking CP as its complement as shown in (i).

(i) \[ DP \text{-ever} [ CP \text{which seat [TP you offer us t}] ] \]
(cf. Kayne (1994: 154, fn. 13))
The wh-element which left-joins to -ever, deriving the FRC. Our analysis is different from Kayne's analysis in that -ever is an adverb rather than a determiner as we will see below (also see Tozawa (2007a, 2007b, 2009)). Furthermore, there is an empirical problem with Kayne's analysis. The analysis incorrectly predicts that whosever FRCs are possible. Consider (ii).

(ii) a. *I sold whosever it was.
   b. I sold \[ DP \text{whose} [ s \text{-ever} [ CP \text{t it was} \text{t} ] ] \]
Under Kayne’s analysis, whose would move to -ever by way of [Spec,CP], deriving the whosever FRC. There is no problem with this derivation. Therefore, (iia) would be grammatical. Thus, Kayne’s analysis cannot account for the ungrammaticality of (iia). We will show in section 4.3 that our analysis can correctly rule out (iia). I thank an anonymous reviewer for suggesting the difference between our analysis and Kayne’s.

9 In Middle English, -ever and an overt complementizer can occur together. This is illustrated in (ii).

(i) Whateuer þinges þat now loueþ beste,
   whatever things that now love best
   Continuely a werre schulde þey make.
   continually a war should they make
   ‘Whatever creatures love greatest advantage, they should continually make war.’
(Middle English Dictionary)

(i) shows that euer ‘-ever’ in whateuer ‘whatever’ and the complementizer þat ‘that’ can co-occur. This can be a piece of evidence that -ever is outside CP. See section 4.2 for the FRCs introduced by whatever NP. I thank Ryoichi Kondo for bringing the facts of the FRCs in Middle English to my attention.

10 Henceforth, in order to make the discussion clear, we resort to (21), which follows from the labeling algorithm in (12) and the assumption in (16).
b)) are (25a, b), respectively.

\begin{align*}
(24) & \quad \text{a. Stop } [\text{DP whatever you are doing}]. \\
& \quad \text{b. We will love you } [\text{Concessive Clause whatever you do}]. \\
(25) & \quad \text{a. Stop } [\text{DP what}_i [\text{EverP -ever } [\text{CP } t_i \text{ you are doing } t_i]]] \\
& \quad \text{b. We will love you } [\text{EverP what}_i [\text{EverP -ever } [\text{CP } t_i \text{ you do } t_i]]]
\end{align*}

In (25a), what moves to -ever by way of [Spec,CP], forming the word whatever. According to (12), what can project and a nominal FRC is derived.\footnote{The semantic status of wh-ever FRCs is controversial. According to Bresnan and Grimshaw (1978) and Larson (1987), wh-ever FRCs are universals. Jacobson (1995) and Dayal (1997) argue that wh-ever FRCs are definite. Since the universal quantifier -ever is the head of the FRC under our analysis, our analysis may be in line with Bresnan and Grimshaw (1978) and Larson (1987). We will not go into the semantics of wh-ever FRCs any further. See Dayal (1997) and von Fintel (2000) for the semantic discussion of -ever.} On the other hand, in (25b), when what undergoes movement to -ever, (21) allows -ever to project. As a result, a concessive clause is derived.

Now, let us discuss why the projection of -ever yields the concessive meaning. We argue that the free choice meaning of -ever gives rise to the concessive reading. Observe that whatever is paraphrased as anything, as illustrated in (26a, b).

\begin{align*}
(26) & \quad \text{a. You can order whatever you like.} \\
& \quad \text{b. You can order anything you like.}
\end{align*}

Whatever in (26a) can be rephrased as anything in (26b). Given that what corresponds to thing in anything and -ever corresponds to any in anything, we take -ever to be a universal free choice item.\footnote{Adopting the views of Carlson (1981), we assume that free choice any is universal.} We argue that the free choice meaning gives rise to the concessive interpretation. For example, consider the sentences in (27a, b).

\begin{align*}
(27) & \quad \text{a. Whether you pay in cash or in credit, it makes no difference.} \\
& \quad \text{b. She looks pretty, whatever she wears.}
\end{align*}

The whether-clause in (27a) has the concessive meaning. The interpretation is derived by the free choice meaning that either paying in cash or paying in credit is fine. Similarly, in (27b) what with the universal quantifier -ever can have the concessive interpretation because it has the free choice meaning that anything in the set of the clothes that she wears is fine. Thus, the concessive meaning is derived from the free choice meaning.
4. Moved Elements

In the previous section, we have shown that the moved wh-element can project at the landing site. Here, let us discuss the moved elements being phases. They are divided into four types: (i) the one without specifier and complement, (ii) the one with complement alone, (iii) the one with specifier alone, and (iv) the one with both specifier and complement. This is shown in (28).

(28) Moved elements Projection at the landing site

| Move  | Projection at the landing site |
|-------|--------------------------------|
| (i) H alone | √ |
| (ii) HP with complement alone | √ |
| (iii) HP with specifier alone | * |
| (iv) HP with both specifier and complement | * |

As we have discussed in section 2.3, HP with a specifier cannot project at the landing site, reaching the hypothesis in (21), repeated here as (29).

(29) A phrasal category can project as long as it is a phase and has no specifier.

Then, we predict that only specifier-less elements can project at the landing site. That is, the first two types of moved elements (type (i) and type (ii)) can become the label at the landing site, while the others (type (iii) and type (iv)) cannot. In the following sections, we will show that our predictions concerning projection in (28) are correct.

4.1. Movement of H: Wh-ever FRCs

Let us begin with type (i) in (28): movement of H. As we have seen in section 3, wh-ever FRCs belong to type (i). The wh-ever FRCs in type (i) are introduced by whatever, whoever, whichever, whenever, wherever, and so on. Consider (30).

(30) [DP or EverP what, [EverP -ever [CP t₁ [TP t₁ ... tₙ ...]]]]

For example, the wh-element what is a lexical item and therefore it can project at the landing site by (12), deriving an FRC like (24a). Thus, the wh-ever FRC in (24a) is a case in which a lexical item H moves and projects. In addition, (29) permits EverP to project. The projection of EverP derives a concessive clause like (24b). Here, note that (30) shows structural ambiguity: the label of the whole FRC is DP or EverP. Then, we predict that there is an ambiguous sentence, depending on whether the wh-element becomes the label or -ever becomes the label. This is borne out
by the FRC introduced by *wherever*.

(31) Wherever you live, you can keep a horse.

(Quirk et al. (1985: 1102))

(32) a. You can keep a horse at any place where you may live.

(locative reading)

b. It doesn’t matter where you live, you can keep a horse (and the horse need not be in the same place as you live).

(concessive reading)

(cf. Quirk et al. (1985: 1102))

The FRC in (31) is ambiguous between a locative reading in (32a) and a concessive reading in (32b). The ambiguity depends on whether *where* or -ever projects. The structure of the FRC in (31) is as in (33).

(33) AdvP or EverP

\[
\begin{array}{c}
\text{AdvP} \\
\text{where} \\
-\text{ever} \\
\text{Transfer} \\
\text{CP} \\
you \text{ live } t_i
\end{array}
\]

In (33), *where* moves to -ever, forming the word *wherever*. At this stage, *where* or -ever may project. If the former projects, we get the locative reading; if the latter projects, we get the concessive reading.

Next, recall that *what* moves to -ever, getting a universal interpretation, as shown in (34).

(34) DP

\[
\begin{array}{c}
\text{DP} \\
\text{what}_i \\
-\text{ever} \\
\text{CP} \\
... \ t_i \ ...
\end{array}
\]

strong NP

not strong NP

The wh-element in situ is not a universally quantified NP, namely, not a strong NP since it is not combined yet with a universal quantifier -ever in the CP cycle. However, it becomes a strong NP by forming a complex word with -ever. Given that a strong NP cannot appear in the postcopular position in the existential construction, it is predicted that while the strong NP
whatever cannot follow the copula in the existential construction, what in the embedded CP can follow the copula since it is not a strong NP in the embedded CP cycle. This is borne out by the contrast between (35a) and (35b).

(35)  a. *There was whatever Mary bought on the table.  
      (Tredinnick (2005: 78))
  b. Whatever there was in his room must have been scary.  
      (cf. Grosu (1995: 141))

The FRC cannot occur in the postcopular position in the existential construction as in (35a). However, when the wh-element is moved from the postcopular position, the sentence is grammatical as in (35b). Under the present analysis, the structures of (35a, b) are as in (36a, b), respectively.

(36)  a. There was [DP whati [EverP -ever [CP ti [TP Mary bought ti]]]] on the table
  b. [DP whati [EverP -ever [CP ti [TP there was ti in his room]]]] must have been scary

In (36a), what moves to -ever, becoming a strong NP. This NP cannot follow the copula in the existential construction, as in (35a). On the other hand, in (36b) what is not a strong NP in the embedded CP cycle since it is not combined yet with a universal quantifier -ever in this cycle. As a result, it is possible for the wh-element to follow the copula in the base position. Thus, the proposed derivation can account for the contrast between (35a) and (35b) in terms of the Definiteness Effect (Milsark (1977)).

4.2. Movement of HP with Complement Alone: Wh-ever NP FRCs

Next, we discuss type (ii) in (28): movement of HP with complement alone. Suppose that what/which NP has the structure in (37).

(37)    
      DP    
      D     Transfer
      NP what/which

The wh-element (what/which) is a phase head D selecting NP as its complement. Thus, what/which NP belongs to type (ii). Given that DP in (37) is a phase and contains no specifier, we predict that there is a case in which the what/which NP can project at the landing site although it is a phrasal category. This prediction is borne out by wh-ever NP FRCs, as in (38).

(38)  a. We ate [DP whatever food we could find].
  b. Finally, [EverP whatever machine you are using], do read the manufacturer’s instructions thoroughly and abide by their recommendations.
The *wh-ever NP* FRCs exhibit nominal behavior as in (38a) and adverbial behavior as in (38b). We argue that *wh-ever NP* FRCs have the same structure as *wh-ever* FRCs. This is shown in (39).

(39)  
\[
\begin{array}{c}
\text{DP or EverP} \\
\text{DP}_i \\
\text{D} \\
\text{what} \\
\text{NP} \\
\text{-ever} \\
\text{CP} \\
\text{ti} \\
\text{C'} \\
\text{C} \\
\text{TP} \\
\text{...ti...}
\end{array}
\]

In (39), *what NP* moves to *-ever* through \([\text{Spec,CP}]\). At this point, *what NP* can project at the landing site since it is a phase and has no specifier.\(^{13}\) The projection of *what NP* derives the nominal FRC in (38a). What is important is that (38a) is a typical example of type (ii). Next, let us turn our attention to *-ever*. It can also project as usual. In this case, the concessive clause in (38b) is derived. Thus, the structures of the FRCs in (38a, b) are (40a, b), respectively.

(40)  
\[
\begin{array}{c}
a. \left[\text{DP} [\text{DP what food}]_i [\text{EverP -ever [CP ti [TP we could find ti]]}]\right] \\
b. \left[\text{EverP [DP what machine]}_i [\text{EverP -ever [CP ti [TP you are using ti]]}]\right]
\end{array}
\]

In (40a), *what food* moves from \([\text{Spec,CP}]\) to *-ever* and projects, deriving the nominal FRC. In (40b), *what machine* moves from \([\text{Spec,CP}]\) to *-ever* and the target *-ever* projects, deriving the concessive clause. Next, let us discuss the word order in *wh-ever NP* FRCs. An anonymous reviewer wonders how the appropriate word order is derived in *wh-ever NP* FRCs. For example, the structure in (40a) would yield the word order

\[^{13}\text{We suggest that the movement option for the labeling of \{DP, EverP\} may be unavailable for a syntactic reason. In (39), movement of the *wh*-phrase would induce an adjunct island violation since an adjunct clause (EverP) is derived by movement of the *wh*-phrase. The movement option may also be unavailable for a phonological reason. The bound morpheme *-ever* needs to attach to its host on the left. If the *wh*-phrase was moved, *-ever* would be stranded. Therefore, movement of the *wh*-phrase may not be permitted for the labeling of \{DP, EverP\}. Note that given that DP and EverP do not share any prominent features, the sharing option is unavailable. Thus, the Transfer option is chosen.}\]
what food ever rather than whatever food. We argue that -ever is a second position clitic and must attach to a sentence-initial word: a wh-word.\textsuperscript{14} We agree with Bošković (2001) that a lower copy of a moved element can be pronounced to meet the second position requirement, which is a requirement at PF. Let us digress briefly to discuss a Serbo-Croatian clitic. Consider (41).

(41) a. Juče su oni zaspali.
   yesterday are they fallen-asleep
   ‘Yesterday they fell asleep.’
   b. Juče oni su oni zaspali.

(Bošković (2001: 134–135))

In (41a), su ‘are’ is an auxiliary clitic and it must be in the second position, which is a PF requirement. According to Bošković (2001), the pronunciation of the lower copy of the subject oni ‘they’ is involved in (41a), which is shown in (41b) (the unpronounced copy is represented by strike-through). The pronunciation of the lower copy is permitted due to the second position requirement, so that the sentence in (41a) is derived. Now, let us return to wh-ever NP FRCs. We suggest that the lower copy of the NP in wh-ever NP FRCs is pronounced so that -ever can be in the second position. Consider (42).

(42) [DP [DP what food]i [EVER -ever [CP [DP what food]i [TP ...]]]]

In (42), -ever must be in the second position. To meet the PF requirement, the lower copy of food is pronounced. As a result, we get the appropriate word order whatever food rather than what food ever.

An anonymous reviewer wonders whether there is any evidence that -ever is a bound morpheme. We suggest that the analysis of -ever as a bound morpheme (specifically a second position clitic) has validity, given that there are some other cases in which -ever forms a complex word with an element other than a wh-element. The complex words never, forever, and so-ever are cases in point. According to the Online Etymology Dictionary, the word never is næfre in Old English, which is a compound of ne ‘not, no’ and æfre ‘ever.’ Also, forever is a compound of for and ever, and soever is a compound of so and ever. Therefore, we suggest that the adverb ever is divided into a bound morpheme and a free morpheme (exemplified in Have you ever seen a koala?).

\textsuperscript{14} I thank Nobuhiro Miyoshi for suggesting the possibility that -ever is a second position clitic.
4.2.1. Matching Effects in *Wh-ever NP* FRCs

The present analysis allows us to predict a variety of syntactic behaviors of *wh-ever NP* FRCs. First, our argument is that movement and projection of the *wh*-phrase are involved in the derivation of *wh-ever NP* FRCs. Then, we predict that matching effects are observed in *wh-ever NP* FRCs. This prediction is correct.

(43) a. John will be [AP [AP however tall] his father was].
   (cf. Bresnan and Grimshaw (1978: 335))
   b. Please sing [DP [DP whatever song] you like].

For example, in (43a) the category of *however tall* is AP and the category of the whole FRC is also AP. This is called matching effects. We argue that the *however AP* FRC is a kind of *wh-ever NP* FRC. Before presenting the structure of the FRC in (43a), let us consider the internal structure of adjective phrases. Following Abney (1987), Corver (1991), and Kennedy (1999), we assume that adjectives have a functional projection headed by Degree and *how* is the Deg head as indicated in (44).

\[(44)\]
\[
\begin{array}{c}
\text{DegP} \\
\text{Deg} \\
\text{DegPi} \text{EverP}
\end{array}
\]

Furthermore, we follow den Dikken’s (2002) suggestion that DegP is a phase. Then, the complement AP of the phase head Deg is transferred. With this in mind, let us discuss the structure of the FRC in (43a). This is shown in (45).

\[(45)\]
\[
\begin{array}{c}
\text{DegP} \\
\text{DegP_i} \\
\text{Deg} \\
\text{DegA -ever CP}
\end{array}
\]

DegP *how tall* moves to -ever and can project at the landing site since it is a phase and has no specifier. Therefore, the whole FRC behaves as an adjective phrase. In this way, matching effects in *wh-ever NP* FRCs are accounted for in a principled way.

4.2.2. Idioms in *Wh-ever NP* FRCs

Consider the case in which a moved element is a part of the idiom as in (46).
The moved element Z forms a constituent with the other part of the idiom X at the base position, so that the idiomatic interpretation is obtained.\textsuperscript{15} With this in mind, let us turn to our analysis. We argue that what NP moves to -ever through [Spec,CP] as in (47).

\begin{equation}
[[\text{DP what NP}],[\text{EverP -ever [CP [DP what NP], [TP ...[DP what NP]]]}]]
\end{equation}

Given that NP occurs at the base position, we predict that the NP in whatever NP FRCs can be a part of the idiom in the FRC. This prediction is borne out.

\begin{equation}
\text{John heard about whatever headway Mary made.}
\end{equation}

In (48), the idiomatic interpretation of make headway is available. The FRC in (48) has the structure in (49).

\begin{equation}
[[\text{DP what headway}],[\text{EverP -ever [CP [DP what headway], [TP Mary had made [DP what headway]]]}]]
\end{equation}

The FRC is derived by movement and projection of DP what headway. Headway forms an idiom with made at the base position. Therefore, we get the idiomatic interpretation.

\section*{4.3. Movement of HP with Specifier Alone: Whosever FRCs}

Let us move on to type (iii) in (28). We argue that movement of whose belongs to this type. Consider the structure of whose in (50a).

\begin{equation}
a. \text{ Whose is this camera?}
b. \text{ DP}
\end{equation}

\begin{equation}
\begin{array}{c}
\text{who} \\
\text{D} \\
\text{'}s
\end{array}
\end{equation}

We assume that who occupies the specifier position of the D head 's as shown in (50b).\textsuperscript{16} Therefore, movement of whose should be a kind of type (iii) in (28). Given that HP with specifier cannot project at the landing site, our prediction is that whose cannot become the label at the landing site.

\textsuperscript{15} Idiom chunks receive an idiomatic interpretation if they form a constituent at some stage of the derivation. See Chomsky (1993).

\textsuperscript{16} Chomsky (1995) assumes that who in whose book occupies [Spec,DP], the possessive element 's is the D head, and the NP book is the complement of D. We assume that whose in (50a) has the same structure as whose in whose NP. See section 4.4 for whose NP.
This prediction is borne out by *whosever* FRCs in (51).

(51)  
- a. *Whosever it is is better than mine.
- b. *I throw away whosever it is.

The ungrammaticality of (51a, b) shows that *whose* cannot be the head of the FRC. The *whosever* FRC in (51) has the structure in (52).

(52)  
\[
\begin{array}{c}
*\text{DP} \\
\text{DP}_i \\
\text{who} \\
\text{'s} \\
\end{array}
\begin{array}{c}
\text{EverP} \\
\text{D} \\
\text{-ever} \\
\text{CP} \\
\text{Transfer} \\
\text{it is } t_i \\
\end{array}
\]

DP is a phrasal category having a specifier. Therefore, when the DP undergoes movement to -ever, the projection of DP is prohibited, which accounts for the ungrammaticality of (51a, b). Thus, we emphasize that *whosever* FRCs belong to type (iii) in (28). Next, let us pay attention to EverP. Note that EverP can project since it is a phase and has no specifier. Thus, we predict that *whosever* FRCs have the concessive reading. This prediction is correct.

(53)  
- a. Whosever it was, it is now mine.  
  \((\text{Kenkyusha’s English-Japanese Dictionary for the General Reader})\)
- b. Well, whosever it is, it isn’t mine.  
  \((\text{Iwanami’s Comprehensive English-Japanese Dictionary})\)

The structure of the concessive clause is (54).

(54)  
\[
\begin{array}{c}
\text{EverP} \\
\text{DP}_i \\
\text{D} \\
\text{D} \\
\text{who} \\
\text{'s} \\
\end{array}
\begin{array}{c}
\text{EverP} \\
\text{-ever} \\
\text{CP} \\
\text{Transfer} \\
\text{it is } t_i \\
\end{array}
\]

DP moves to -ever and -ever projects. There is no problem with this derivation. Therefore, (53a, b) are grammatical.

4.4. Movement of HP with both Specifier and Complement: *Whosever NP* FRCs

Movement of *whose NP* falls into type (iv) in (28) since it has both specifier and complement as in (55).
We assume with Chomsky (1995) that *whose book has the structure in (55). Given that the DP contains a specifier, it is predicted that *whose NP cannot project at the landing site. This prediction is confirmed by (56).

(56) *You can write down [whosoever idea it is].

The FRC cannot be headed by DP *whose idea. The structure of the FRC is (57).

(57) *DP

Although the complement of the phase head D is transferred, DP contains a specifier and therefore, it remains a phrasal category. Thus, it cannot project at the landing site, resulting in the ungrammaticality of (56). Here, what is crucial is that whosoever NP FRCs fall into type (iv). Now, EverP should project as usual. Thus, we predict that the concessive reading of

\[ DP \]

\[ \text{who} \]

\[ D' \]

\[ 's \]

\[ \text{book} \]

17 The whosoever/whoever's NP FRCs allow the reading where whoever is the head of the FRC. Consider (i).

(i) a. Return the package to whosoever address is on it.
   b. ?Whoever's beer I stole can have it back. (Jacobson (1995: 462))

For example, the sentence in (ia) shows that whoever, rather than the NP address, is the semantic head of the FRC. That is, (ia) is rephrased as (ii).

(ii) Return the package to anyone whose address is on it.

One might wonder how this meaning is obtained. We suggest that who of whose address moves from [Spec,CP] to -ever and it projects at the landing site. That is, the structure of the FRC in (ia) is (iii).

(iii) [DP who\_j [Ever -ever [CP [DP t\_j [D 's] [N address]], [TP t\_i is on it]]]]

Whose address moves to [Spec,CP] and then who moves from [Spec,CP] to -ever and it projects at the landing site. Consequently, who becomes the head of the FRC. However, movement of who violates the Left Branch Condition. At the moment, we cannot solve this problem, which we leave for future research.
whosever NP FRCs is permitted. This prediction is borne out.

(58) Whosever wagon this is, get it out of here.

(Shogakukan Random House English-Japanese Dictionary)

The whosever NP FRC allows the concessive reading. The concessive clause has the structure in (59).

(59) 
\begin{center}
\[\text{EverP}
\begin{array}{c}
\text{DP}_i \\
\text{who}
\end{array}
\begin{array}{c}
\text{EverP}
\begin{array}{c}
\text{D'}
\begin{array}{c}
\text{-ever}
\end{array}
\begin{array}{c}
\text{Transfer}
\end{array}
\begin{array}{c}
\text{CP}
\begin{array}{c}
\text{this is } t_i
\end{array}
\end{array}
\end{array}
\begin{array}{c}
\text{N}
\end{array}
\begin{array}{c}
\text{wagon}
\end{array}
\end{array}
\end{array}
\end{center}

Whose wagon moves to -ever and -ever becomes the label. This derivation is legitimate. Thus, (58) is grammatical.

5. Other Consequences

5.1. However AP FRCs

As we have seen in section 4.2.1, however AP FRCs are derived by movement and projection of how AP. Let us reconsider the structure of the however AP FRC in (43a) (repeated here as (60a)). The structure is (60b).

(60) a. John will be \([\text{AP [AP however tall]} \text{his father was}].\]

(cf. Bresnan and Grimshaw (1978: 335))

b. \([\text{DegP [DegP how tall]} \text{[EverP -ever [CP } t_i \text{ [TP his father was } t_i]]}]\]

The phase DegP moves to -ever through [Spec,CP] and it projects, deriving the FRC headed by DegP. As usual, EverP can also project. In this case, the concessive clause is derived as illustrated in (61a).

(61) a. However tired she is, she always smiles.

b. 
\begin{center}
\[\text{EverP}
\begin{array}{c}
\text{DegP}_i \\
\text{Deg how}
\end{array}
\begin{array}{c}
\text{A}
\begin{array}{c}
\text{-ever}
\end{array}
\begin{array}{c}
\text{Transfer}
\end{array}
\begin{array}{c}
\text{CP}
\begin{array}{c}
\text{she is } t_i
\end{array}
\end{array}
\end{array}
\begin{array}{c}
\text{tired}
\end{array}
\end{array}
\end{center}

In the structure (61b), how tired moves to -ever and -ever projects, deriving the concessive clause. Now, we are in a position to discuss cases in which how AP occurs inside DP as illustrated in (62).
(62) You’ll never know \([_{\text{CP}} [_{\text{DP}} \text{how fine a song}], \text{that is } t_i]_i\].

In (62), degree inversion takes place inside the DP: *how fine* moves to the left edge of the DP. The structure of the DP is shown in (63).

(63)

```
    DP
     /\     \\
   DegP_i /  \ Deg   A D NP
     \    /   /    \   /  \\
      how fine a  | t_i song
```

We suppose that DegP moves from within NP to \([\text{Spec},\text{DP}]\). Thus, the degree-inverted DP contains a specifier and a complement. Then, we predict that the DP cannot project at the landing site since it has a specifier. This prediction is correct.

(64) a. *He answered however difficult a question she pointed out.

b. *DP

```
    DP_i
     /\       EverP
   DegP_j /  \ Transfer
     \    /   /   \\
      how difficult D NP she pointed out t_i
          \    /  \\
           a  | t_i question
```

The ungrammaticality of (64a) shows that the FRC cannot be headed by the degree-inverted DP. The FRC in (64a) has the structure in (64b). In (64b), degree inversion takes place inside the DP. That is, DegP *how difficult* moves from within NP to \([\text{Spec},\text{DP}]\). This degree-inverted DP moves to *ever*. At this point, the DP cannot project since it has a specifier. Thus, the FRC cannot be headed by the DP, resulting in the ungrammaticality of (64a). Here, we predict that the concessive clause can be derived since the projection of *ever* is allowed. This prediction is borne out.

(65) a. To neglect them shows a writer, however good a logician he may be, to be no linguist …

(Henry Watson Fowler and Francis George Fowler, *The King’s English* (3rd ed.), Clarendon Press, (1931), p. 170)
b.  

In (65a), the clause introduced by *however good a logician* is a concessive clause. The structure of the concessive clause is (65b). In (65b), *how good* is moved to [Spec,DP] by degree inversion. When the degree-inverted DP moves to -ever, the projection of the target -ever is permitted. Therefore, we get the concessive clause in (65a).

5.2. The Ban on Pied-Piping in FRCs

Our argument is that H and specifier-less HP can project at the landing site as shown in (66a, b).

(66) a.  

In (66a), the lexical item *what* projects at the landing site. Recall that in (66b) the complement of D is transferred and therefore, only the D head becomes accessible to labeling. Thus, DP is regarded as a kind of lexical item. Consequently, it can project at the landing site in accordance to (12). In this way, specifier-less HP can project even if it is a phrasal category. Here, consider movement of specifier-less HP, which is not a phase.
In (67), the complement YP of X is not transferred and YP is accessible to further computation. Thus, XP is a constituent consisting of X and YP, which are visible for labeling. In other words, XP is a phrasal category rather than a lexical category. Therefore, it cannot project at the landing site. In this way, non-phase XP cannot project at the landing site even if it is a specifier-less phrasal category. With this discussion in mind, let us consider pied-piping of prepositions in FRCs. This is shown in (68).

We assume with Abels (2003) that PP is not a phase in English. Then, we predict that when a wh-element in FRCs pied-pipes a preposition, it cannot project at the landing site since it is a phrasal category as shown in (68). This is borne out by the contrast in (69a) and (69b).

18 As an anonymous reviewer points out, it is controversial whether PPs are phases. In fact, Bošković (2014) argues that all lexical categories containing PPs are phases. See footnote 19 below for the phasehood of PPs.
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(71) a. \([\text{PP} [\text{PP to what group}], [\text{EverP -ever} [\text{CP} \ t_i [\text{TP you’re willing to speak to } t_i]]]]\)
b. \([\text{DP} [\text{DP what group}], [\text{EverP -ever} [\text{CP} \ t_i [\text{TP you’re willing to speak to } t_i]]]]\)

In (71a), the PP to what group moves to -ever and projects, which is not allowed since it is phrasal. Consequently, (69a) is ungrammatical. On the other hand, in (71b), DP what group moves to -ever and it can project since it is a phase and contains no specifier. Therefore, (69b) is grammatical. The same account is given to the contrast between (70a) and (70b).

In this way, our analysis can account for the ban on pied-piping in FRCs. Here, note that when PP moves to -ever, -ever can project as shown in (72).

(72)

\[\text{PP}
\]
\[
\text{EverP}
\]
\[
\text{P (non-phase) wh -ever}
\]
\[
\text{EverP}
\]
\[
\text{Transfer CP}
\]
\[
\ldots t_i \ldots
\]

Thus, we predict that the wh-element in the concessive clause allows pied-piping of prepositions. This prediction is correct.

(73) a. … seamen, [to whatever class they may belong], are false to themselves …
b. So, [for whoever that was], here you go …

(BNC)

The wh-element in concessive clauses can pied-pipe the preposition, as indicated in (73a, b). Under the present analysis, the concessive clause in (73a) has the structure in (74).

(74) \([\text{EverP} [\text{PP to what class}], [\text{EverP -ever} [\text{CP} \ t_i [\text{TP they may belong to } t_i]]]]\)

In (74), the PP to what class moves to [Spec,CP] and then moves to -ever. At this point, -ever projects, deriving the concessive clause. Nothing is wrong with this derivation.

Therefore, (73a) is grammatical, as is (73b).

19 The wh-element in FRCs can pied-pipe a locative preposition.

(i) I’ll work in whatever town you live. (Bresnan and Grimshaw (1978: 354))

We suggest that PPs might be divided into phases and non-phases and the locative PPs belong to the former. Thus, the locative PP in (i) might project at the landing site since it has no specifier as shown in (ii).

(ii) I’ll work [PP [in what town]]: [EverP -ever [CP \ t_i [TP you live to } t_i]]]

We will not pursue this issue any further.

20 One might wonder whether -ever in (73) is in the second position in the concessive clause. Note that most prepositions in Serbo-Croatian are not accented and cannot
In this way, our analysis can account for the grammaticality of (73a, b).

6. Interim Summary

We have argued that the wh-element and -ever in FRCs are syntactically independent elements and the wh-element moves to -ever in order to form the complex word wh-ever. At this point, if the former projects, we get an FRC headed by the wh-element. If the latter projects, we get a concessive clause. We have also shown that based on the assumption that labeling is subject to the PIC, even phrasal categories can project at the landing site, as long as they are phases and have no specifier. Whether moved elements can project at the landing site or not is summarized in (75).

(75)

| Moved elements                                      | Projection |
|-----------------------------------------------------|------------|
| (i) H alone (where, what, who, which, when, and so on) | ✓          |
| (ii) HP with complement alone (what NP, which NP, how AP) | ✓          |
| (iii) HP with specifier alone (whose)                 | *          |
| (iv) HP with both specifier and complement (whose NP, how AP a NP) | *          |

Type (i) is movement of H alone. We have shown that what in the whatever FRCs moves and projects. Type (ii) is movement of a phrasal category HP with the complement alone, and movement of what NP belongs to this type. We have demonstrated that the what NP in whatever NP FRCs projects at the landing site. Type (iii) is movement of a phrasal category HP with a specifier alone. Movement of whose is a case in point. We have shown that whose in whosever FRCs cannot project at the landing site since it has a specifier. Type (iv) is movement of HP with both specifier and complement. Movement of whose NP and degree-inverted DP (how AP a NP) falls into this type. We have shown that these elements cannot project at the landing site in whosever NP FRCs and however AP a NP FRCs. Furthermore, we have demonstrated that the target -ever can project in the FRCs observed in each type (i)–(iv), deriving a concessive clause.
7. FRCs without -ever

There is another kind of FRC, namely, an FRC without -ever. We call this type of FRC a simple FRC. One example of this type is given in (76).

(76) I gave her [what she needed].

As for the analysis of simple FRCs, we basically follow Donati (2006) and Chomsky (2008). Let us review Chomsky’s analysis, which incorporates Donati’s (2006) insight that a head can project at the landing site. Chomsky focuses on the case where the lexical item what moves to CP as in (77).

(77) what [C [you wrote t]]

If the target C projects, then (77) is an interrogative clause; for example, what you wrote in I wonder what you wrote.\(^{21}\) Note that the lexical item what can also project. If it projects, we get a simple FRC; for example, what you wrote in I read what you wrote. When the moved wh-element is phrasal as in (78), it cannot project and therefore, FRC interpretation is impossible.

(78) what book you wrote

One key point of Chomsky’s analysis is that the simple FRC is derived from the interrogative clause. This analysis is warranted, given that it is suggested that FRCs are similar to interrogatives (see Horvath and Grosu (1987)). In particular, Prince (1989) argues that the facts of Yiddish show that FRCs are more similar to indirect questions than relative clauses. Consider (79a–c).

(79) a. der yid velkher/*ver ligt dortn (iz mayn khaver).
   the guy who/*who lies there (is my friend)
   ‘The guy who lies there is my friend.’

b. ver/*velkher es ligt dortn (iz mayn khaver).
   who/*who it lies there (is my friend)
   ‘The one who lies there is my friend.’

c. (ikh vil visn) ver/*velkher es ligt dortn.
   (I want know) who/*who it lies there
   ‘I want to know who lies there.’ (cf. Prince (1989: 406))

\(^{21}\) Chomsky (2008) proposes the principle (i) concerning labeling.

(i) \(\text{If } \alpha \text{ is internally merged to } \beta, \text{ forming } \{\alpha, \beta\} \text{ then the label of } \beta \text{ is the label of } \{\alpha, \beta\}. \)

\(\text{(Chomsky (2008: 145))}\)

(i) allows the target of movement to project.
The *wh*-element in the relative clause in (79a) is *velkher* ‘who’ rather than *ver* ‘who.’ In contrast, the *wh*-elements in the FRC in (79b) and the indirect question in (79c) are *ver* ‘who’ rather than *velkher* ‘who.’ In this way, (79a–c) show that FRCs are closer to indirect questions than relative clauses (see Prince (1989) for other similarities between FRCs and indirect questions). Furthermore, Chomsky’s analysis has many consequences. Let me note one of them. The analysis allows the possibility of treating the adverbial *when*-clause exemplified by (80) as a simple FCR.22

(80) We had these [Adverbial Clause *when I was a boy*].

In (80), the *when*-clause behaves as an adverbial clause. Geis (1970) argues that *when*-clauses are relative clauses whose antecedent is *at the time*. For example, the *when*-clause in (80) has the structure in (81) (I update the terminology here, using PP, CP, and trace).

(81) $\text{PP}$

$\text{PP}$

$\text{CP}$

$\text{at the time}$

$\text{when I was a boy}$

The *when*-clause is a relative clause whose antecedent is the PP, functioning as an adjunct clause. Deletion is applied to *at the time*, so that the *when*-clause is derived. Based on Geis’s insight that the *when*-clause is a relative clause, we argue that the *when*-clause is a simple FRC and it can be derived by the movement and projection of the adverb *when*. The adverbial *when*-clause in (80) has the structure in (82).

(82) $[\text{AdvP when, [CP C [TP I was a boy $t_i$]]}]$

In (82), *when* moves to interrogative CP. Here, given that the adverb *when* is a lexical item, it can project at the landing site, deriving the adverbial *when*-clause in (80). In this way, the adverbial *when*-clause is one type of simple FRC. One might wonder whether movement of *when* takes place in the *when*-clause. We note that there is a piece of evidence that movement of *when* is involved in the derivation of adverbial *when*-clauses. Consider the semantic contrast between (83a) and (83b).

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22 I thank Yoshiaki Kaneko for bringing this possibility to my attention.
(83)  a. John arrived when Harry told Mary that she should leave.
    b. John arrived when Harry told Mary about his desire that she should leave.  
    (Geis (1970: 77))

(83a) is ambiguous between the interpretation in which *when* modifies the verb *tell* and the one in which *when* modifies the verb *leave*. The former interpretation is that John arrived when the “telling” event took place. The latter interpretation is that John arrived at the time of Mary’s departure. On the other hand, (83b) has only the former interpretation. This semantic contrast is accounted for if movement of *when* is involved in the derivation of *when*-clauses. The derivations of *when*-clauses in (83a, b) are (84a, b), respectively.

(84)  a.  
    \[ \text{[when}_i \text{ Harry [VP } t_i [VP \text{ told Mary [CP } t_i \text{ that she should [VP } t_i [VP \text{ leave}]]]]] } \]
    l.  
    \[ \text{[when}_i \text{ Harry [VP } t_i [VP \text{ told Mary about [NP his desire [CP } t_i \text{ that she should [VP } t_i [VP \text{ leave}]]]]] } \]

In (84a), *when* adjoins to the embedded VP at its base-position, moving successive-cyclically to the clause-initial position. Since it adjoins to both embedded and matrix VP, we get the interpretation in which *when* modifies the verb *tell* and the one in which *when* modifies the verb *leave*. On the other hand, in (84b), *when* is moved from the embedded clause to the matrix clause, which violates the Complex NP Constraint. Therefore, this derivation is not allowed, so that (83b) does not have the interpretation in which *when* modifies the verb *leave*.

Returning to the derivation of *when*-clauses, notice that when *when* moves to CP, the target CP can also project. In this case, the interrogative *when*-clause is derived. For example, the interrogative *when*-clause in (85a) has the structure in (85b).

(85)  a. I don’t know [when Tom will leave Japan].
    b.  
    \[ \text{[CP when}_i \text{ C [TP Tom will leave Japan } t_i] } \]

In (85b) the target CP projects, deriving the interrogative clause in (85a).\textsuperscript{23}

\textsuperscript{23} An anonymous reviewer points out that the C head in the interrogative *when*-clause in (85a) has a Q-feature, while the C head in the adverbial *when*-clause in (80) does not have a Q-feature. Therefore, in a strict sense, the interrogative *when*-clause and the adverbial *when*-clause are not derived from the same underlying structure. Actually, Ott (2011) distinguishes the C head in FRCs from the C head in interrogative clauses by analyzing the former as C\textsubscript{FR} and the latter as C\textsubscript{Q}. Although it may seem that the C head in the adverbial *when*-clause in (80) is not interrogative from an interpretive point of view, FRCs bear a similarity to indirect questions, as we have seen in (79a–c). Given this, it
Although it may be convincing, there is a problem with Chomsky’s analysis. Chomsky argues that if the \textit{wh}-element is phrasal as in (78), the FRC reading is impossible. However, as we have seen in (4a, b), which are repeated here as (86a, b), if the NP in \textit{what NP} is plural rather than singular, the clause introduced by the \textit{wh}-phrase has FRC interpretation.

\[(86)\]
\begin{enumerate}
\item a. Give me what books you have on the subject.
\item b. *Give me what book you have on the subject.
\end{enumerate}

(cf. Declerck (1991: 546))

(86a) means “Give me all books you have on the subject.” Under Chomsky’s analysis, (86a) should have no FRC interpretation since the moved \textit{wh}-phrase is a phrase rather than a head and therefore, it cannot project. Consequently, we incorrectly predict that the sentence in (86a) is ungrammatical. In light of the data in (86a), Chomsky’s analysis requires a slight revision.\footnote{Other examples of FRCs introduced by \textit{what NP} are illustrated in (ia, b).}

In the next section, we propose the internal structure of \textit{what NP} FRCs.

7.1. The Internal Structure of \textit{What NP} FRCs

We propose that the internal structure of \textit{what NP} FRCs is (87).

\[(87)\]
\[
\begin{tikzpicture}[baseline=(current bounding box.center),
    every label/.style={anchor=east},
    every edge/.append style={->}
]
\node (CP) at (0,0) {CP};
\node (What) at (-1,-1) {what};
\node (NP) at (0,-1) {NP};
\node (C) at (1,-1) {C};
\node (Q) at (1,0) [label=above:][Q];
\node (Transfer) at (2,-1) {Transfer};
\node (TP) at (3,-1) {TP};
\node (D) at (-1,-2) {D};
\node (DP) at (-2,-2) {DP};
\node (DPs) at (-3,-2) {DP\textsubscript{1}};
\draw (What) edge (NP);
\draw (NP) edge (C);
\draw (C) edge (Q);
\draw (Q) edge (Transfer);
\draw (Transfer) edge (TP);
\draw (TP) edge (D);
\draw (D) edge (DPs);
\draw (DPs) edge (DP);
\end{tikzpicture}
\]

\textit{What NP} moves from within TP to CP. Here, \textit{what NP} is allowed to project since it is a phase and has no specifier. As a result, the nominal FRC is derived. On the other hand, CP can project since it is also a phase and contains no specifier. If CP projects, the interrogative clause is derived.

\footnote{Other examples of FRCs introduced by \textit{what NP} are illustrated in (ia, b).}

(i) a. I’ll lend you what books you need.
   b. Bring what parcels you can carry.

The sentences in (ia, b) show that if the NP in \textit{what NP} is plural, FRC interpretation is possible. Furthermore, when the NP in \textit{what NP} FRCs is an uncountable noun, FRC interpretation is also allowed, as illustrated in (ii).

(ii) He collected what information he could find.

Chomsky’s analysis incorrectly predicts that (i) and (ii) have no FRC reading.
For example, the FRC and the interrogative clause in (88a, b) have the structures in (89a, b).

(88) a. You can take [what tapes you like].
   b. He will ask you [what tapes you like].

(89) a. 
   \[ \begin{array}{c}
   \text{DP} \\
   \text{DP}_i \\
   \text{D} \\
   \text{what} \\
   \text{tapes} \\
   \end{array} \]
   \[ \begin{array}{c}
   \text{CP} \\
   \text{Transfer} \\
   \text{D} \\
   \text{N} \\
   \text{C} \\
   \end{array} \]
   \[ \begin{array}{c}
   \text{[Q]} \\
   \text{you like } t_i \\
   \end{array} \]

b. 
   \[ \begin{array}{c}
   \text{CP} \\
   \text{Transfer} \\
   \text{D} \\
   \text{N} \\
   \text{C} \\
   \end{array} \]
   \[ \begin{array}{c}
   \text{[Q]} \\
   \text{you like } t_i \\
   \end{array} \]

In (89a), what tapes moves to CP and projects, so that the FRC headed by DP is derived.\(^{25}\) On the other hand, in (89b), when what tapes moves to

\(^{25}\)An anonymous reviewer wonders why FRC interpretation is impossible in (86b), where the NP in what NP is singular. We cannot provide a plausible account of this but let me suggest two possibilities as to why the NP in what NP FRCs must be plural. One possibility is that the implication of what NP FRCs may induce a plural interpretation of NP. Note that what NP FRCs include the implication that the number of NP is few. For example, consider (i).

(i) What relatives she has live abroad.

The what NP FRC in (i) includes the implication that the number of relatives is few. That is, the sentence in (i) means that all relatives that she has live abroad, although they are few in number. The implication that the number of NP is few might yield a plural interpretation of the NP in what NP FRCs. However, one might wonder where this implication comes from. We leave this issue for future research. Another possibility is that plural interpretation of the NP in what NP FRCs may be accounted for in a similar way to that in amount relatives. Observe (ii).

(ii) *{That, The, What} man there was in Austria likes Bob.  (Carlson (1977: 526))

One of the properties of amount relatives is that the singular noun cannot be the head noun of the amount relative clause. Carlson (1977) analyzes what NP FRCs as amount relatives. Given that what NP FRCs are derived from interrogative clauses under our analysis, we cannot analyze what NP FRCs as amount relatives. However, we suggest that plural interpretation of the NP in what NP FRCs may be accounted for in a similar way to that in amount relatives.
CP, CP projects, so that the interrogative clause is derived.\textsuperscript{26}

Note that the what NP FRCs have a universal reading. For example, the sentence in (88a) means that you can take all tapes that you like. Following Jacobson (1995), we argue that what triggers maximality, which yields the universal reading of what NP FRCs. We refer the reader to Jacobson (1995) for details about maximality. Here, we explain the notion of maximality briefly. For example, consider the what NP FRC in (90).

(90) I have read what books I have.

Suppose that I have three books: Aspects of the Theory of Syntax, Barriers, and Current Issues in Linguistic Theory. In this situation, what does the plural noun books in books I have denote? The plural noun denotes the set of all non-atomic sums of objects. Thus, the denotation of books is the set \{a+b, a+c, b+c, a+b+c\}, which is the set of the plural objects. Now we are in a position to discuss the semantic function of what in what books I have. What is a function mapping a set of entities to the singleton set containing the maximal entity. In the current situation, what takes a set of plural entities and picks up the singleton set containing the maximal plural entity. That is, it takes the set \{a+b, a+c, b+c, a+b+c\} and picks up the maximal sum of books: \{a+b+c\}. This semantic function is maximality. Note that maximality yields the universal reading of what NP FRCs. In (90), the denotation of what books I have is \{a+b+c\}. The denotation equals all books that I have. Therefore, the what NP FRC in (90) is paraphrased as “all books that I have.”\textsuperscript{27} In this way, the universal reading of what NP FRCs comes from maximality rather than universal quantification.\textsuperscript{28}

\textsuperscript{26} Given that DP and C share the Q feature, the interrogative clause may also be derived by the sharing option. Thus, there may be redundancy in our system in that the interrogative clause is derived by either option (the sharing option and the Transfer option). We leave this problem open.

\textsuperscript{27} Given that maximality is involved in what NP FRCs, it must also be involved in the wh-interrogative clause such as (88b). We agree with Rullmann (1995) that the wh-interrogative clauses involve maximality. Space limitations prevent us from discussing maximality in wh-interrogative clauses. See Rullmann (1995) for details.

\textsuperscript{28} We claim that the wh-word in FRCs with -ever triggers maximality just like the wh-word in FRCs without -ever. Note that according to Jacobson (1995), the wh-word in FRCs is definite. Even so, the account of the grammaticality of (35b) is still tenable. Let us consider (36b) (repeated here as (i)) again.

(i) [dp what, [\textit{Every} -ever [\textit{CP} t_i [\textit{TP} there was t_i in his room]]]] must have been scary

Let us focus on the embedded CP cycle. Given that what is an operator, it remains in [Spec,CP] at LF. Then, the LF representation of the embedded CP is shown in (ii).
7.2. Properties of *What NP* FRCs

In this section, we show that the present analysis can predict two properties of *what NP* FRCs: idioms in *what NP* FRCs and the ban on pied-piping.

7.2.1. Idioms in *What NP* FRCs

We argue that *what NP* undergoes movement to CP as shown in (91).

(91) \[
\text{[DP what NP]\textsubscript{i} [CP C [TP …[DP what NP]…]]}
\]

The copy of *what NP* is left in the original position. Then, we predict that the NP in *what NP* can be a part of the idiom. This prediction is correct.

(92) John heard about what little headway Mary had made.

In (92), the idiomatic construal is possible in the FRC. The FRC has the structure in (93).

(93) \[
\text{[DP [DP what little headway]\textsubscript{i} [CP C [TP Mary had made [DP what little headway]\textsubscript{i}]]]}
\]

The DP moves and projects, deriving the FRC. Here, *headway* is a part of the idiom at the base position. Therefore, the idiomatic interpretation is available in the *what NP* FRC.

7.2.2. The Ban on Pied-Piping in *What NP* FRCs

As mentioned above, if specifier-less XP is not a phase, it cannot project at the landing site. Furthermore, recall that we assumed that PP is not a phase. Then, when a *wh*-element pied-pipes a preposition, the moved element PP cannot project at the landing site since it is not a phase and therefore it is a phrasal category, as shown in (94).

(94) \[
\text{*PP}
\]

\[
\text{PP\textsubscript{i} \quad CP \quad Transfer}
\]

\[
P \quad \text{DP} \quad C \quad \text{TP}
\]

\[
\quad \text{what NP} \quad \text{[Q]} \quad \ldots t_i \ldots
\]

(ii) \[
\text{[CP what [TP there was what in his room]]}
\]

In (ii), the definite element *what* in the postcopic position is deleted. Therefore, it does not trigger the Definiteness Effect. Or if we follow the suggestion of Chomsky (1977) that *what* is *wh*-thing, *thing* is reconstructed into the base position due to the preference principle of Chomsky (1995). This is shown in (iii).

(iii) \[
\text{[CP wh-thing [TP there was wh-thing in his room]]}
\]

In (iii), the *wh*-operator, which is definite and triggers maximality, remains in [Spec,CP]. Then, its copy in the postcopular position is deleted, which nullifies the Definiteness Effect. In this way, whichever option we adopt, we can avoid the Definiteness Effect.
Then, it is predicted that the *wh*-phrase in *what NP* FRCs cannot pied-pipe a preposition. This prediction is borne out by the contrast between (95a) and (95b).

(95)  
   a. *I spoke to what few people you spoke to.*  
   b. I spoke to what few people you spoke.  

In (95a), the *wh*-phrase undergoes movement, leaving the preposition behind. This is grammatical. On the other hand, in (95b) the *wh*-phrase pied-pipes the preposition and the sentence is ungrammatical. The structures of the FRCs in (95a, b) are (96a, b), respectively.

(96)  
   a. I spoke to [DP [DP what few people] [CP C [TP you spoke to ti]]]  
   b. I spoke [PP [PP to what few people] [CP C [TP you spoke ti]]]  

In (96a), *what few people* moves from the base-generated position to CP, leaving the preposition *to*. Then, it can project at the landing site since DP is a phase and has no specifier. Therefore, (95a) is grammatical. On the other hand, in (96b), the PP *to what few people* moves to CP and it projects. This derivation is illegitimate since the non-phase PP is phrasal and it cannot project. Therefore, (95b) is ungrammatical.

Here, notice that when PP moves to CP, the projection of CP is allowed. This is because CP is a phase and contains no specifier. Thus, we correctly predict that the *wh*-phrase can pied-pipe the preposition in the interrogative clause in (97).

(97) I wonder to what people you spoke.

The structure of the interrogative clause is (98).

(98) I wonder [CP [PP to what people] C [TP you spoke ti]]  

The PP moves to CP and CP projects, deriving the interrogative clause in (97). In this way, our analysis correctly predicts the fact that pied-piping of a preposition is prohibited in *what NP* FRCs while it is allowed in inter-

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29 The same fact is observed in simple FRCs.  
(i)  
   a. I spoke to who you spoke to.  
   b.*I spoke to who you spoke.*  

Exactly the same account is available for the contrast.  

30 According to my informant, the interrogative sentence is unacceptable when the *wh*-phrase is *to what few people* rather than *to what people*, as illustrated in (i).  
(i) *I wonder to what few people you spoke.*  

Our analysis incorrectly predicts (i) to be good. We suggest that the unacceptability of (i) is due to an extra-syntactic reason. As an anonymous reviewer suggests, *few* in *to what few people* may make the FRC reading salient. In fact, the clause introduced by *what few NP* cannot occur as an interrogative complement.  

(ii) *I wonder what few books you need.*  

We suggest that (i) and (ii) are unacceptable since *few* triggers the FRC reading for some reason. I thank an anonymous reviewer for the suggestion.
rogative clauses.

8. Conclusion

In this paper, we have argued that what moves to -ever, deriving a complex word whatever. When what moves to -ever, either what or -ever may project. If the former projects, a nominal FRC is derived; if the latter projects, a concessive clause is derived. Regarding whatever NP FRCs, we have argued that the same analysis holds for them: what NP moves to -ever and either what NP or -ever can project. The projection of -ever derives the concessive clause. On the other hand, the projection of what NP derives the nominal FRC. The projection of what NP is allowed although it is a phrasal category. This is because the NP complement is transferred, so that only D becomes accessible to labeling. In this sense, what NP is regarded as a lexical item. Therefore, the labeling algorithm allows what NP to become the label of the SO. The view that the PIC is involved in labeling also allows us to predict that a phrasal element with a specifier cannot become the label at the landing site. We have shown that this prediction is confirmed by whichever FRCs, whoever NP FRCs, and however AP a NP FRCs, which prevent the wh-phrase from becoming the head of the FRCs. If our analysis is on the right track, it has several theoretical implications. First, the present analysis supports Chomsky’s (2013) argument that labeling is based on minimal search just like Agree. Second, our analysis supports Chomsky’s (2000) phase-theoretic syntax in the sense that the notion of phase plays an important role in labeling. Third, the current analysis supports the view of Donati (2006) and Chomsky (2008) that a moved element can project at the landing site.

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