CIRCUMSTANTIAL PREDICATES,
PRO, AND D-STRUCTURE ADJUNCTION

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This paper shows that so-called circumstantial predicates have PRO as their subjects. More specifically, we point out that circumstantial predicates and PRO form a small clause (SC), arguing that three types of secondary predicates, namely circumstantial, depictive, and resultative predicates, are affiliated to different positions in VP. We claim, from a theoretical viewpoint, that the SC formed by a circumstantial predicate and PRO is adjoined to VP at D-Structure. Furthermore, we argue that the segment of VP which inherits barrierhood from the SC blocks wh-extraction of circumstantial predicates.*

1. Introduction

This paper offers an analysis of the three types of secondary predicates (especially, so-called circumstantial predicates) that are illustrated in (1), following Roberts' (1988a) classification of predicative APs:1

(1) a. John left the room angry. (circumstantial predicate)
    b. John ate the meat, rare. (depictive predicate)

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1 We use the term "circumstantial" instead of "subject-oriented" to name the predicates in (1a), such as angry, happy, naked, drunk, sober, etc., because they can be predicated of an object NP as well as a subject NP. As we will see below, we claim that even if angry is predicated of an object NP, like depictive predicates, it exhibits the same syntactic behavior as a subject-predicated AP.
c. John hammered the metal, flat. (resultative predicate)

In this paper, we will argue that unlike depictive and resultative predicates, circumstantial predicates like (1a) are not directly predicated of their host NPs; rather, they are in a predication relation with PRO. Furthermore, we will deal with the *wh*-extraction of the three types of secondary predicates. *Wh*-extraction is possible with depictive and resultative predicates, but not with circumstantial predicates:

\[
(2) \quad \begin{align*}
&\text{a. } *\text{How angry did John leave the room t?} \\
&\text{b. How rare did John eat the meat t?} \\
&\text{c. How flat did John hammer the metal t?}
\end{align*}
\]

We will account for this contrast in a subsequent section.

This paper is organized as follows. In section 2, we provide some empirical evidence for our proposal that circumstantial predicates and PRO constitute a small clause, and we discuss the syntactic position of the three types of secondary predicates in phrase structure according to the lines of X-bar theory, assuming, following Andrew (1982) and Roberts (1988a), that secondary predicates are all in VP. In particular, we propose that the small clause formed by a circumstantial predicate and PRO is base-generated by adjunction at D-Structure. These proposals are shown to be well-motivated from a theoretical viewpoint on the assumption that the secondary predication relation requires that secondary predicates mutually

\[\text{Rizzi (1990: 48) observes that although the *wh*-extraction of resultative predicates is possible, circumstantial and depictive predicates cannot be *wh*-questioned. Consider the following sentences noted by Rizzi (1990):}\]

\[
(i) \quad \begin{align*}
&\text{a. } *\text{How angry did you telephone?} \\
&\text{b. } *\text{How raw did you eat the meat?} \\
&\text{c. How flat did she hammer the metal?}
\end{align*}
\]

Rizzi argues that the above contrast can be accounted for in terms of the Empty Category Principle (ECP). However, as I argued in Hoshi (1991a, 1991b), the unextractability of depictive predicates like (ib) is due not to an ECP violation but to some semantic factors. In other words, the sequence of *How* and raw seems to be incompatible because the adjective raw is not semantically gradable:

\[
(ii) \quad \text{raw } -*\text{rawe}r - *\text{rawe}st
\]

Thus, (ib) is ungrammatical in the same way as (iiiib):

\[
(iii) \quad \begin{align*}
&\text{a. The meat was raw.} \\
&\text{b. } *\text{How raw was the meat?}
\end{align*}
\]

Therefore, depictive predicates can be *wh*-questioned basically if there is no semantic incompatibility involved.

\[\text{See Nakajima (1991) for an argument that circumstantial predicates (subject-oriented predicates) are affiliated to IP. Williams (1980) and Rothstein (1983) also assume that subject-oriented predicates are attached to IP.}\]
m-command their host NPs at some level of grammar. In section 3, we attempt to explain the ungrammaticality of the wh-extraction of circumstantial predicates, adopting the barriers-system proposed in Belletti and Rizzi (1988), which is a slightly revised version of Chomsky's (1986b) definition of barrier. Some concluding remarks are made in section 4.

2. Three Types of Secondary Predicates

2.1. Evidence for PRO in Circumstantial Predicates

In this subsection, we will point out that circumstantial predicates have control possibilities parallel with those of rationale clauses. We will provide four pieces of evidence for our proposal that circumstantial predicates have PRO as subject and are in a predication relation with PRO.

First of all, consider the following sentence:

(3) John met Mary angry.

(3) is ambiguous; the circumstantial predicate angry is predicated of either the subject NP John or the object NP Mary.

Notice here that, as I argued in Hoshi (1991), in (3) the predicate angry as predicated of the object NP is not a depictive one. It remains a circumstantial predicate even if it is predicated of the object NP Mary. There is some syntactic evidence for this view.

First, manner adverbs cannot intervene between depictive predicates and their host NPs:

(4) *John ate the meat greedily rare.

However, this does not hold of circumstantial predicates regardless of whether they modify subject NPs or object NPs:

(5) Johni met Maryj hurriedly angryi/j.

Next, there is a difference in the grammaticality of wh-extraction. If the angry which is predicated of the object NP were really a depictive predicate, its wh-extraction would be fully grammatical. But actually it is

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4 The notion of m-command and domination are defined as follows (Chomsky (1986b: 8)):

(i) m-command:

\[ \alpha \text{ m-commands } \beta \text{ iff } \alpha \text{ does not dominate } \beta \text{ and every maximal projection } \]

\[ \text{that dominates } \alpha \text{ dominates } \beta. \]

(ii) domination:

\[ \alpha \text{ is dominated by } \beta \text{ only if it is dominated by every segment of } \beta. \]

5 We will not pursue the problem of the level at which the secondary predication relation is satisfied.
totally ungrammatical:

(6) a. *How angry did John meet Mary?
b. How rare did John eat the meat?

Finally, consider the following examples of extraposition discussed by Nakajima (1991: 277-279):

(7) a. *John drove [the car t] happy [which was presented to him by his parents].
b. John ate [the fish t] raw [which he bought at Legal Seafoods].

In (7a), extraposition out of the object over the circumstantial predicate happy is impossible. On the other hand, extraposition from the object over the depictive predicate raw in (7b) is possible. If this observation is correct, we are now in a position to make a prediction with respect to the grammaticality of extraposition from the object NP over circumstantial predicates: namely, we expect that in (3), extraposition from the object NP over angry is impossible even if it is predicated of the object NP, because angry remains a circumstantial predicate, as we have claimed. This prediction is borne out:

(8) *John met [the man t] angry [who was wearing a funny hat].

Thus, we can say that the angry in (3) is an example of a circumstantial predicate regardless of whether it is predicated of the subject NP or the object NP.

Let us return to sentence (3). The fact that the understood subject of circumstantial predicates is interpreted ambiguously appears to be problematic for our analysis. If the predication relation requires that predicates mutually m-command their host NPs, we cannot capture the ambiguity on the assumption that secondary predicates are all affiliated to VP, because the m-command domain of secondary predicates is VP. Thus, circum-

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6 Nakajima originally uses these examples of extraposition as one piece of evidence for his proposal that circumstantial predicates (subject-oriented predicates) are affiliated to IP. For detailed discussion, see Nakajima (1991). In section 3, we will deal with the problem of why extraposition from an object NP over circumstantial predicates is impossible.

7 (8) seems to be problematic for Nakajima (1991). According to his analysis, secondary predicates modifying an object NP (object-predicates) must be generated within VP like depictive predicates because of the mutual m-command restriction on predication. Thus, his analysis incorrectly predicts that a sentence like (8) is grammatical.
stantial predicates and an NP in subject position cannot m-command each other. This means that the restriction on predication cannot be satisfied in the case where circumstantial predicates modify subject NPs. To overcome this problem, we claim that the ambiguity of the interpretation in (3) is due to the fact that circumstantial predicates and PRO constitute a small clause.\(^8\) The abstract representation of (3) is as follows:

(9) John met Mary \([SC\ PRO\ angry]\).

Here SC stands for small clause. A question arises here concerning the categorical nature of SC. Following Hornstein and Lightfoot (1987), we assume that a SC is IP (although they use the category S in their notation). Thus, it follows that a SC is transparent to government. Consider the following sentence:

(10) Mary considered \([SC\ him\ intelligent]\).

In (10) \textit{him} is governed by the matrix verb as long as objective case is assigned under government. From the above fact, we can predict that no SC involving PRO can occur in governed positions such as in (10) because of the PRO Theorem, which states that PRO is ungoverned:

(11) *Mary considered \([SC\ PRO\ angry]\).

For the sake of convenience, however, we will use SC for the category.

In the case of (9), PRO can be controlled by either \textit{John} or \textit{Mary}. PRO and the predicate \textit{angry} are then in a predication relation, satisfying the mutual m-command restriction on predication.\(^9\)

The “PRO analysis” for (3) is empirically motivated by its parallelism in interpretation with cases of rationale clauses with PRO as subject.

First, consider the following sentences which involve rationale clauses:

(12) a. John trained Mary \([PRO\ to\ make\ a\ living]\).
    b. The teacher sent the students to the office \([PRO\ to\ annoy\ the\ principal]\).

In (12a), the subject of the rationale clause \textit{to make a living} can be

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\(^8\) Contrary to Roberts' (1988a) analysis, we do not assume the “VP-internal subject hypothesis” (see Fukui and Speas (1988), Koopman and Sportiche (1988)). See Hasegawa (1991), who also assumes this hypothesis.

Our analysis can properly account for the ambiguity of the understood subject of a circumstantial predicate without recourse to the hypothesis, that is, irrespective of whether it is plausible or not.

\(^9\) The problem of how the controller for PRO is determined is beyond the scope of this paper.
interpreted ambiguously. The subject PRO in the rationale clause is regarded as either John or Mary. Likewise, PRO in (12b) is controlled by either the teacher or the students. The same control relation as that observed in (12) should be obtained by replacing the rational clauses with circumstantial predicates. Consider the following sentences:

(13) a. John trained Mary [PRO angryi].
    b. The teacher sent the student to the office [PRO happyi].

This confirms that circumstantial predicates have PRO as subject and are in a predication relation with PRO.

Second, consider the following sentence, in which the circumstantial predicate angry is preposed to the sentence-initial position:

(14) Angry, John met Mary.

Interestingly enough, in (14) only the subject NP John can be modified by the circumstantial predicate angry; otherwise, the sentence would be ungrammatical. This fact is shown by the following S-structure representations of (14):

(15) a. [PRO angry], John met Mary.
    b. *[PRO angry], John met Mary.

If our proposal is correct, we can expect that the same is true of rationale clauses as they appear in sentence-initial position. Consider the following sentence:

(16) To make a living, John trained Mary.

As in the case of (15), PRO in (16) can be controlled only by the subject NP John. Consider the S-structures of (16):

(17) a. [PRO To make a living], John trained Mary.
    b. *[PRO To make a living], John trained Mary.

Thus it follows that circumstantial predicates are parallel with rationale clauses. Again, this supports our position that circumstantial predicates have PRO as subject.

The third piece of evidence comes from the fact that rationale clauses cannot choose an experiencer NP as a controller for PRO. Consider the following sentences noted by Napoli (1989: 131):

(18) a. I ran the vacuum cleaner [PRO to upset Dad].
    b. *I understood French [PRO to upset Dad].

In (18a), the subject NP is an agent, while in (18b), the subject NP is an experiencer. Thus, the ungrammaticality of (18b) can be explained by the fact that the experiencer NP cannot be a controller for PRO in the rationale clause. The same applies to constructions with circumstantial predicates as
well. Consider the following sentences:

(19)  
   a. I ran the vacuum cleaner [PRO happy].  
   b. *I understood French [PRO happy].

In (19a), PRO is controlled by the agentive subject NP. In (19b), on the other hand, the experiencer NP purports to control PRO; hence the ungrammaticality of (19b), for the same reason as for (18b). Thus, we can conclude that circumstantial predicates are similar to rationale clauses in terms of control behavior, which indicates that circumstantial predicates and PRO form a constituent.

Fourthly, Roeper (1987: 297) argues that PRO can be controlled by an "implicit argument" (implicit agent) in rationale clauses. He points out that this phenomenon can also be seen in constructions with circumstantial predicates. Consider the following sentences:

(20)  
   a. The game was played [PRO to prove a point].  
   b. The game was played [PRO naked/sober/happy/angry].

This observation of Roeper’s is consistent with our proposal that circumstantial predicates have PRO as subject. He further remarks that implicit benefactives can also control PRO in circumstantial predicates. Observe the following sentences:

(21)  
   a. It’s fun drunk.  
   b. It’s nice sober.  
   c. It’s odd nude.

According to Roeper, the abstract representation of (21a) is as follows:

(22)  
     It’s fun (for someone) [PRO drunk].

Therefore, our proposal is confirmed by Roeper’s (1987) conclusion that an “implicit argument” can be a controller for PRO in both rationale clauses and circumstantial predicates.

To summarize, we have argued in this subsection that PRO is involved in constructions with circumstantial predicates. Our arguments are based on the observation that circumstantial predicates are parallel with rationale clauses with respect to the possible interpretation of their understood subjects. In the next subsection, we will discuss the syntactic position of the three types of secondary predicates, providing some syntactic tests for determining their position in phrase structure.¹⁰

¹⁰ We assume that depictive and resultative predicates do not have PRO as subject for a theoretical reason; namely, the PRO Theorem, which says that PRO is ungoverned. If
2.2. D-Structure Adjoining of Circumstantial Predicates

In this subsection we will discuss the precise position of the three types of secondary predicates, arguing that they are all in VP. We will show, in particular, that circumstantial predicates, which have PRO as subject, are adjoined to VP at D-Structure.

First of all, consider the following sentences, discussed by Roberts (1988a: 705), which involve VP-preposing:

(23) circumstantial:
   a. John wanted to leave the room happy, and [leave the room happy] he did.
   b. *John wanted to leave the room happy, and [leave the room] he did happy.

(24) depictive:
   a. John wanted to eat the fish raw, and [eat the fish raw] he did.
   b. *John wanted to eat the fish raw, and [eat the fish] he did raw.

(25) resultative:
   a. John wanted to hammer the metal flat, and [hammer the metal flat] he did.
   b. *John wanted to hammer the metal flat, and [hammer the metal] he did flat.

It is a well-known fact that the operation of VP-preposing moves the whole sequence of VP to the sentence-initial position. However, as shown in the (b) examples of (23)–(25), no part of VP may be stranded in the original position. Thus the grammaticality of the (a) examples of (23)–(25) indicates that the whole sequence of V-NP-AP constitutes VP in constructions with the three types of secondary predicates. This means that they are all attached to VP.\(^\text{11}\)

Now let us discuss the precise position of the three types of secondary predicates. Here, we encounter the question of whether the three types of

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\(^{11}\) For more arguments concerning the VP-constituency of secondary predicates, see Andrew (1982) and Roberts (1988a). They use other VP-constituency tests, such as though-movement and pseudo-clefting.
secondary predicates occur in the same position in VP or not. As argued in Hoshi (1991a), a unique position exists for each secondary predicate and each predicate is affiliated to a different position in VP. Consider the following sentence, in which the three types of secondary predicates cooccur (flat is a resulative and hot is a depictive predicate). The data is noted by McNulty (1988: 38):

(26) John hammered the metal flat hot angry.

From the grammaticality of (26), we may say that a unique position exists for each type of secondary predicate and that these positions are different in phrase structure.

Notice here that the only available word order for the three types of secondary predicates is as in (26); that is, only the order of resulative (flat)-depictive (hot)-circumstantial (angry) can be found. Consider the following sentences:

(27) a. *John hammered the metal flat angry hot.
   b. *John hammered the metal hot flat angry.
   c. *John hammered the metal hot angry flat.
   d. *John hammered the metal angry flat hot.
   e. *John hammered the metal angry hot flat.

We will see that the ungrammaticality of the sentences in (27) can be accounted for straightforwardly in terms of the phrase structure for secondary predicates to be proposed below.

First, let us examine the position of resultative predicates. The *do-so test discussed by Jackendoff (1977) makes clear the following contrast:

(28) a. John left the room angry, and Tom did so happy.
   b. John ate meat raw, and Tom did so rare.
   c. *John painted a house red, and then Tom did so blue.

Jackendoff argues that *do so may be substituted for a constituent of V'. Thus the ungrammaticality of (28c) suggests that resultative predicates are a part of V'. The same phenomenon can be found in a sentence involving

12 Though Nakajima (1991) and Hasegawa (1991) regard sentences like (28b) as ungrammatical, the informants with whom I have consulted find (28b) grammatical. However, my informants judge the following sentence as unacceptable:

(i) *John ate the meat raw, and Tom did so rare.

Note that the ungrammaticality of (i) is due to the fact that the meat cannot be eaten raw and rare simultaneously. Thus the ungrammaticality of (i) can be attributed to a pragmatic anomaly. This is not incompatible with our argument here.
the argumental prepositional phrase (PP) selected by verbs like put:

(29)  
   a. John bought a book on Friday, and Tom did so on Saturday.  
   b. *John put a book on the table, and Tom did so on the chair.  

In (29a), the adjunct PPs on Friday and on Saturday are outside V', while in (29b) both on the table and on the chair are selected by the verb put, so that they are included in V'. Thus we can say that (28c) is ungrammatical, as is (29b). The position of resultative predicates is then as follows:

(30)  
   VP  
      /   \  
     V   NP  AP  

The structure in (30) indicates that resultative predicates are closely related to a given verb in the same way as selected PPs. This is, in fact, true. Consider the following sentences in which morphologically complex words are formed with resultative predicates:

(31)  
   a. John hammered-flat the metal.  
   b. John painted-blue the house.  
   c. John boiled-red the lobsters.  

The grammaticality of the sentences in (31) (though (31b, c) are slightly deviant for an unclear reason) shows that resultative predicates and verbs are closely related. Rothstein (1983: 37), giving the following data from Icelandic, claims that the ability to form a compound of verbs and resultative predicates suggests that the relation between them is strong syntactically and semantically:

(32)  
   Eg hvit-proði þúting  
   I white-washed the clothes  
   ‘I washed the clothes white.’

In contrast, it is totally impossible to form complex words with depictive predicates:

(33)  
   a. *John ate-rav the fish.  
   b. *John ate-rare the meat.  
   c. *John drank-flat the beer.  

Therefore, we can confirm that resultative predicates are closely related to a given verb and that their position in phrase structure is in V', as represented schematically in (30).

Next, let us turn to the position of circumstantial and depictive predicates. As we saw earlier, do-so replacement provides the same results
in grammaticality for circumstantial and depictive predicates, which indicates that these lie outside V':

(34) a. John left the room angry, and Tom did so happy.
    b. John ate meat raw, and Tom did so rare.

However, consider the following sentence, in which the adverb *yesterday* and the circumstantial predicate cooccur even though the adverb intervenes between the predicate and its host NP as in (35):

(35) John left the room yesterday angry.

In contrast, depictive predicates cannot cooccur with the adverb *yesterday* if the latter intervenes between the predicate and its host NP:

(36) *John ate the fish yesterday raw.

From the fact that circumstantial predicates can occur across VP-adverbs, we assume that circumstantial predicates occur in base-generated VP-adjunction structures. This is analogous with extraposition out of an object NP across the VP-adverb, which syntactically undergoes VP-adjunction:

    b. John saw [NP a picture] yesterday [PP of George Bush]

Recall that circumstantial predicates and PRO constitute a SC, as we saw in section 2.1. Because of the PRO Theorem, the SC must be adjoined to VP at D-Structure. It forces the SC to appear in a position ungoverned by a governor, V.14 Thus the position of circumstantial predicates is represented as in (38):15

13 Furthermore, we assume that adjunction of the SC does not take place at S-Structure, for if it adjoines to VP at S-Structure, the fact that the three types of secondary predicates can cooccur remains to be explained, because at D-Structure, there can be no appropriate source position for the SC within VP. Thus, the assumption that the SC occurs in a base-generated VP-adjunction structure becomes more plausible, regardless of whether circumstantial predicates appear with other predicates or not.

14 Hornstein and Lightfoot (1987) argue that the government of PRO is permitted. They claim that governed PRO behaves like an anaphor. For detailed discussion, see Hornstein and Lightfoot (1987).

15 We assume that the VP-adjoined position is not governed, because this position is not dominated by every segment of VP. Moreover, if V governed the VP-adjoined position, postverbal subjects in Italian, which are adjoined to VP at S-Structure, would be incorrectly assigned accusative Case by V. Of course, we assume that INFL does not govern the VP-adjoined position because the segment of VP is a barrier for a reason to be discussed below in the text. This suggests that nominative Case is assigned to the postverbal subject by "transmission" as in expletive-argument pairs like There is a man in the room. This position is inconsistent with Belletti’s (1988) proposal. See Belletti (1988) for details. We will not pursue the matter here.
On the other hand, the position of depictive predicates is shown in the following, assuming that depictive predicates do not include PRO:

(39) $\begin{array}{c}
\text{VP} \\
\text{VP} \quad \text{SC} \\
\text{V'} \quad \text{PRO} \quad \text{AP} \\
\text{V} \quad \text{NP} \\
\end{array}$

In (39), depictive predicates, which are sisters of $V'$, can be directly related to their host NPs; hence they mutually m-command their host NPs.

Taking into account the position of each type of secondary predicate, we see that the structure in which the three types predicates cooccur is as follows:

(40) a. John hammered the metal flat hot angry.
    b. *John hammered the metal flat angry hot.
    c. *John hammered the metal hot flat angry.
    d. *John hammered the metal hot angry flat.
    e. *John hammered the metal angry flat hot.
    f. *John hammered the metal angry hot flat.

(41) $\begin{array}{c}
\text{VP} \\
\text{VP} \quad \text{SC} \\
\text{V'} \quad \text{AP} \quad \text{PRO} \quad \text{AP} \\
\text{V} \quad \text{NP} \quad \text{AP} \quad \text{hot} \quad \text{angry} \\
\text{flat} \\
\end{array}$

Since the position for each type of secondary predicate is fixed in phrase structure as shown in (41), all the sequences except (40a) are excluded.

To recapitulate, in this subsection we have argued, on the basis of syntactic tests, that the three types of secondary predicates are generated in
different positions in phrase structure. Circumstantial predicates, which constitute a SC with PRO, are adjoined to VP at D-Structure, avoiding a violation of the PRO Theorem. Depictive predicates are sisters of V', and resultative predicates, which are closely related to verbs, are dominated by V'.

3. Wh-Extraction of Secondary Predicates

In this section we will discuss the fact that the wh-extraction of circumstantial predicates is prohibited on the basis of the configuration we have proposed in section 2. We will further claim that extraposition from an object NP is prohibited with circumstantial predicates as a consequence of the D-structure Adjunction of circumstantial predicates.

3.1. The Barrierhood of VP

In this subsection, we will attempt to explain the contrast shown in (2), repeated here as (42):

(42) a. *How angry did John leave the room t?
    b.  How rare did John eat the meat t?
    c.  How flat did John hammer the metal t?

We will attribute the ungrammaticality of (42a) to a violation of the Empty Category Principle (ECP). We assume the disjunctive formulation of the ECP (cf. Chomsky (1986b) and Lasnik and Saito (1984, 1987)):

(43) ECP:
A nonpronominal empty category must be antecedent-governed or \( \theta \)-governed.\(^{16}\)

We will define government as follows (Chomsky (1986b: 9)):

(44) \( \alpha \) governs \( \beta \) iff \( \alpha \) m-commands \( \beta \) and there is no \( \gamma \) (a maximal projection), \( \gamma \) a barrier for \( \beta \), such that \( \gamma \) excludes \( \alpha \).\(^{17}\)

The definition of exclusion is as follows (Chomsky (1986b: 9)):

(45) \( \alpha \) excludes \( \beta \) if no segment of \( \alpha \) dominates \( \beta \).

The notion of barrier is defined as follows (Chomsky (1986b: 14)):

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\(^{16}\) \( \theta \)-government is defined as follows (Chomsky (1986b: 15)):

\( \alpha \) \( \theta \)-governs \( \beta \) iff \( \alpha \) is a zero-level category that \( \theta \)-marks \( \beta \), and \( \alpha \), \( \beta \) are sisters.

\(^{17}\) See note 3 for the definition of m-command.
(46) $\gamma$ is a barrier for $\beta$ iff (a) or (b):
   a. $\gamma$ immediately dominates $\delta$, $\delta$ a Blocking Category (BC) for $\beta$;
   b. $\gamma$ is a BC for $\beta$, $\gamma \neq IP$.

The BC is defined as follows (Chomsky (1986b: 14)):

(47) $\gamma$ is a BC for $\beta$ iff $\gamma$ is not L-marked and $\gamma$ dominates $\beta$.\(^{18}\)

Notice that in this system, a maximal projection (except for the "defective" category IP) counts as a barrier for government if it is not L-marked. In addition, a maximal projection (including IP) immediately dominating a BC inherits barrierhood.

Let us return to the contrast in (42). The traces left by wh-movement in these sentences are not $\theta$-governed, because they are traces of predicates. If we assume that the ungrammaticality of (42a) is due to the violation of the ECP, it follows that the trace in (42a) is not antecedent-governed. On the other hand, the grammaticality of (42b, c) suggests that the traces in these examples are antecedent-governed in the same way as the traces of adjuncts like *how* and *why*:

(48) a. How did John fix the car t?
   b. Why did John fix the car t?

Therefore, if the extraction of depictive and resultative predicates takes place in the context where antecedent-government is blocked, ungrammatical sentences must result. This is correct, in fact. Consider the following sentences involving the *wh*-extraction of depictive and resultative predicates out of a *wh*-island:

(49) a. *How rare do you wonder whether John ate the meat t?
    b. *How flat do you wonder whether John hammered the metal t?

The extraction of adjuncts like *how* and *why* out of a *wh*-island is also impossible:

(50) a. *How do you wonder whether John fixed the car t?
    b. *Why do you wonder whether John fixed the car t?

Now, let us examine the case of the *wh*-extraction of circumstantial predicates. Consider the following configuration of the S-Structure of (42a):

\(^{18}\) L-marking is defined as follows (Chomsky (1986b: 15)):

\[ \alpha \text{ L-marks } \beta \text{ iff } \alpha \text{ is a lexical category that } \theta \text{-governs } \beta. \]
The ungrammaticality of (42a) indicates that the wh-extraction of circumstantial predicates involves some effect similar to the wh-islands in (49) and (50), which block the antecedent-government relation. The most likely candidate for the barrier for antecedent-government in (51) appears to be the SC adjoined to VP. However, according to the above definition of barrier, the SC in (51) is not a barrier. Since the SC is IP, which by our assumption is a “defective” category, it does not become a barrier itself unless it dominates a BC. What then blocks the wh-extraction in (51)?

Another possible maximal projection bearing barrierhood is VP. However, in Chomsky’s barriers-system, neither VP in (51) can be regarded as a barrier because every segment of these VPs does not immediately dominate the SC. Thus, if we assume Chomsky’s barriers-system, we would incorrectly predict that the wh-extraction of circumstantial predicates was possible. To overcome this difficulty, we assume, following Belletti and Rizzi (1988), that segments can inherit barrierhood. This assumption causes the VP segment to be a barrier because it immediately dominates the SC, a BC. Thus, we assume the definition of barrier in (52)

19 Chomsky (1986b:83) notes that the ungrammaticality of the wh-extraction of circumstantial predicates can be reduced to a requirement of lexical government by V. Chomsky argues that the trace of a circumstantial predicate cannot be governed by the verb, assuming that it is dominated by IP.
(Belletti and Rizzi (1988: 328)):

\[(52) \gamma \text{ is a barrier for } \beta \text{ iff (a) or (b):}\]
\[\quad \text{a. } \gamma \text{ is (a segment of) a maximal projection and } \gamma \text{ immediately}\]
\[\quad \text{dominates } \delta, \delta \text{ a BC for } \beta.\]
\[\quad \text{b. } \gamma \text{ is a BC for } \beta, \gamma, \neq IP.\]

Therefore, in terms of this definition, the segment of VP in (51) is a barrier and blocks the antecedent-government of the trace left behind by the wh-movement of circumstantial predicates.\(^{20}\)

3.2. A Consequence of D-Structure Adjunction

In this subsection, we will explain why extraposition from an object NP over circumstantial predicates is always impossible.

Consider again sentences (7a) and (8), which are repeated here for ease

\(^{20}\) Belletti and Rizzi (1988: 327-328) explain the following fact from Italian concerning extraction out of a postverbal subject NP which is adjoined to VP at S-Structure:

\[(i) \text{ ?? Il diplomatico di cui ti ha telefonato la segretaria.}\]
\[\text{the diplomat of whom called you the secretary}\]

They assume the following structure for (i):

\[(ii)\]
\[\text{VP}\]
\[\text{VP NP (postverbal subject)}\]
\[\text{V'}\]
\[\text{V NP}\]

In (ii), the top segment of the VP is a barrier because it inherits barrierhood from the postverbal subject NP. The extraction out of the adjoined NP therefore crosses two barriers, producing a Subjacency violation, even if it is assumed that the empty category left by extraction is properly governed within the post-verbal subject NP.

The structure of the postverbal subject in (ii) is parallel to that of circumstantial predicates except for the fact that (ii) is generated at S-Structure. This is consistent with our proposal for the base-generated adjunction structure for circumstantial predicates.

As for the deviant grammaticality of (i), Belletti and Rizzi suggest that the segment becomes a weak barrier; otherwise, crossing two barriers would result in a severe violation of Subjacency. Compare the following sentence involving extraction out of a preverbal subject NP, where extraction crosses two barriers, the preverbal subject NP and IP:

\[(iii) \text{ *Il diplomatico di cui la segretaria ti ha telefonata.}\]
\[\text{the diplomat of whom the secretary called you}\]

However, this point does not directly concern the present discussion. What is important here is the fact that the VP segment becomes a barrier, whether a weak one or not. We assume that the weak barrier suffices to block the antecedent-government of the trace of an adjunct AP. For further discussion, see Belletti and Rizzi (1988).
of reference:

(53) a. *John drove [NP the car t] happy [which was presented to him by his parents].
    b. *John \(i\) met [NP the man \(j\) t] angry \(j\) [who was wearing a funny hat] (cf. John ate [NP the fish t] raw [which he bought at Legal Seafoods].)

We attribute the ungrammaticality of (53a, b) to the prohibition on double adjunction. Consider the following sentence discussed by Johnson (1985: 96), where it involves iterative adjunction to VP:

(54) *Sam [VP [VP* [VP gave [NP a book ti] t\(j\) yesterday] [PP about black holes]] \(i\)] [PP to Mary] \(j\)].

In the first derivation, PP about black holes has moved from the object NP and adjoined to VP, where the node VP* is newly created. Further movement has then applied, adjoining the PP to Mary to VP*, resulting in the ungrammatical sentence (54). Of course, the converse derivation is also blocked.

If we extend the above idea to extraposition from an object NP over circumstantial predicates, the sentences in (53) are correctly ruled out, as indicated in (55):

(55) a. *John [VP [VP* [VP drove [NP the car ti] t\(j\)] happy] [which was presented to him by his parents]]\(i\)].
    b. *John \(i\) [VP [VP* [VP met [NP the man \(j\) t\(k\)] angry \(j\)] [who was wearing a funny hat] \(k\)].

Given that circumstantial predicates with PRO as subject are adjoined to VP at D-Structure, the additional adjunction to VP* by the extraposition is also prohibited as in the case of (54). Thus, it is natural to assume that the SC involving PRO and circumstantial predicates is adjoined to VP at D-Structure.21

21 An anonymous reviewer has asked how the following sentence can be derived if iterative adjunction to VP* is prohibited:

(i) Who \(j\) did John \(i\) [VP [VP meet \(t\)] \(j\)] [PRO \(i,j\) angry]?

Contrary to Chomsky (1986b), we assume, following Fiengo, Huang, Lasnik and Reinhart (1988) and Lasnik and Saito (1987), that VP is not only \(\theta\)-marked (=\(\theta\)-governed), but L-marked by \(I^0\), which we assume to be a lexical head non-distinct from [+V] categories (cf. Cinque (1990)). The fact that VP is \(\theta\)-marked is illustrated by the following sentence, where VP-movement across a wh-island produces only weak Subjacency effects:

(ii) Fix the car, I wonder whether he will. (Chomsky (1986b: 20))

Assuming that in (i) the lower VP is L-marked by \(I^0\) (although \(I^0\) and the lower VP are
4. Conclusion

In this paper, we have proposed that circumstantial predicates and PRO form a SC. More specifically, we have shown that circumstantial predicates and rationale clauses behave analogously with respect to control possibilities, which clearly indicates that PRO is involved with circumstantial predicates. Moreover, on the basis of the distributional property of PRO, we have claimed that a SC with PRO as subject has a base-generated adjunction structure at D-Structure. Furthermore, we have argued that the unextractability of circumstantial predicates can be ascribed to the fact that the segment of VP in an adjunction structure can be a barrier.

REFERENCES

Hasegawa, Hiroshi (1991) “Secondary Predicates, VP-Internal Subjects, and not in a sister relation) and it does not become an inherent barrier, the VP-segment created by D-Structure adjunction cannot inherit barrierhood from the lower VP. Thus Who in (i) can move to the SPEC of CP at one swoop without recourse to adjunction to VP.


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