

Bach-Peters Paradox in the Interpretation of Null VP

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O. Introduction

This paper is concerned with the syntax of so-called antecedent-contained VP deletions (henceforth ACD) in English, an example of which is displayed in (1).

(1) Dulles suspected everyone that Angleton did.

Although this sentence seems to be one of the VP-deletion sentences (henceforth VPD), its syntactic behavior and properties are rather different from the simple VPDs. It is argued that indirect binding that Haïk (1984) assumes is sufficient for the identification of the null VP in ACD. Thus a primary focus of attention is the identification system of null VPs.

In section 1, I will briefly review the previous analyses and point out the problem. I will argue that the LF-reconstruction is problematic, hence should be avoided.

In section 2, I will propose an alternative analysis mainly based on Haïk (1984). The notion of indirect binding is defined as binding of $Y_{2/1}$ by $X_{1(2)}$, while direct binding is defined as binding of $Y_{2/1}$ by $X_{2/1}$, or binding of $Y_{1(2)}$ by $X_{1(2)}$.

Section 3 will be a summary of the preceding discussion.

1. Previous analysis and its problems

1.1. Reconstruction at LF

May (1985) interprets the null VP in (2) by reconstructing at LF.

(2) Dulles suspected everyone who Angleton did.

(3) [_{IP} [_{NP1} everyone who Angleton did] [_{IP} Dulles suspected t₁]]

(4) [_{IP} [_{NP1} everyone who Angleton suspected t₁] [_{IP} Dulles suspected t₁]]

The quantified NP *everyone who Angleton did* is adjoined to IP at LF by QR in (2). As a result, in (3) the antecedent VP does not dominate (=contain) the null VP.

Fiengo and May (1991) give further evidence that supports the analysis by May (1985):

(5) a. Mary introduced John to everyone that she did.

b. *Mary introduced John to everyone that he did.

Pronouns in both (5a) and (5b) satisfy the Binding Condition (B) if we assume that the Binding Condition is applied at S-Structure.

(6) Binding Condition

(A) An anaphor must be bound in its governing category.

(B) A pronominal must be free in its governing category.

(C) An R-expression must be free.

Hence we cannot account for the ungrammaticality of (5b) as it stands.

By contrast if we assume that the Binding Condition is applied at LF, the ungrammaticality of (5b) follows. (7) are the LF representations of (5).

(7) a. [everyone that she_j [_{VP}introduced John to e_i]]_i [Mary [_{VP}introduced John to e_i]]]

b. *[everyone that he_j [_{VP}introduce John_j to e_i]]_i [Mary [_{VP}introduced John_j to e_i]]]

In (7b) *John_j* within the reconstructed VP by copying is c-commanded by *he_j*. Hence this is a violation of the Binding Condition (C). Thus if we assume that the Binding Condition is applied at LF, QR and reconstruction of the null VP will be necessary, hence justified by examples like (7).

Similarly the grammaticality and the ungrammaticality of (8) can be accounted for.

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- (8) a. John introduced her to everyone that Mary wanted him to.
 b.*John introduced her to everyone that he wanted Mary to.
- (9) a. [everyone that Mary_j [_{VP} wanted him to introduce her_j to e_i]]
 [John introduced her_j to e_i]
 b.*[everyone that he [_{VP} wanted Mary_j to introduce her_j to e_i]]_i
 [John introduced her_j to e_i]

(9) is the LF representations of (8). In (9b) *her_j* in the raised NP is bound by *Mary_j* in its governing category, thus violates the Binding Condition (B) of (6).

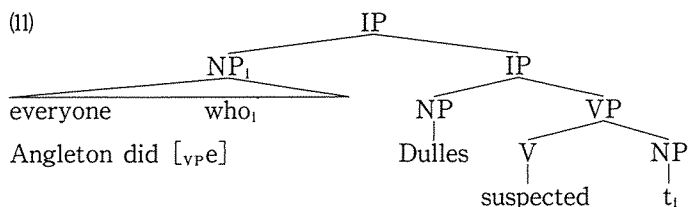
May argues that the grammatical asymmetry in (7) and (8) cannot be explained without assuming QR, Reconstruction, and Binding at LF. This leads May to the conclusion that the level of LF is necessary for grammar as well as the operation of QR.

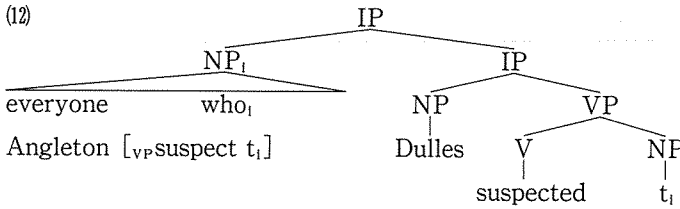
Here I will point out four problems involved in the analysis by May (1985). First, the effect of LF-binding just indicated in (5) and (8) can be replaced by the condition of Haik (1987) to be reviewed in 1.2., based on the theory of Predication. Thus a set of LF operation May assumes are not needed. I deal with the matter in 1.2. Second, the mechanism of QR and Reconstruction.

Consider (10).

- (10) Dulles suspected everyone who Angleton did.

The LF representation of (10) is given by adjoining the object NP to IP, as in (11), and reconstructing the null VP by copying, as in (12):





In (12) the NP-trace t_i is the trace left by QR. May claims that in (12) who_i binds t_i . But is it really a proper A'-chain? Who_i that moves from the object position in the relative clause should bind its own trace, not the trace created by QR. Although t_i happens to bear the same index, t_i is the trace left by QR at LF in the antecedent VP. Even if we admit this A'-chain, NP_i adjoined to IP by QR dominates its own trace created by QR, which violates the *i-within-i condition* or yields another infinite regress.

(13) The *i-within-i* condition

* [_{X₁}... Y₁...]

Third, this is pointed out by Lappin (1991).

(14) a. John read everything which Bill believes he did.

b. *John read everything which Bill believes the claim that he did.

(Lappin 1991 : p.316)

As the contrast of (14a) with (14b) shows, ACD is sensitive to Subjacency. This fact is problematic for May (1985), since A'-chain in relative clause is not formed until the null VP is reconstructed at LF under May's analysis. If we assume that Subjacency is applied at S-Structure, it follows that A'-chain must exist at S-Structure. So this fact should be puzzling for May (1985). However May (1991) assumes that Subjacency is applied at LF, following May (1977), Longobardi (1991), Nishigauchi (1986), Pesetsky (1987) and Reinhart (1991) without arguing any particular reason to do so. Even if we assume that Subjacency is applied at LF, the A'-chain is not licit as mentioned before.

Finally, not all ACDs involve quantified NPs:

- (15) Bill hit the man who asked to.

As (15) indicates, there are cases in which the head of relatives is a non-quantified NP. It is totally unclear how cases like (15) are accounted for under May's analysis.

1. 2. Reindexing at LF'

Based on the facts in (14) in 1.1., Haïk (1987) claims that A'-chain exists at S-Structure, and assumes that vacuous quantification should not be allowed at all levels.

- (16) a. I know which book John read and Mary didn't.
 b. I know which book John read and which book Mary didn't read.
 c. ?I know which book John read and which book Mary didn't.

(Lappin (1991))

The fact that (16c) is degraded in comparison with (16a) and (16b) is accounted for if we assume that a vacuous operator should not exist at any level. In (16a) and (16b), *which book* binds its variable, while in (16c) *which book* in the second conjunct is vacuous operator at S-Structure; thus degraded.

Therefore because of the "no vacuous quantification principle" and the necessity of A'-chain at S-Structure, Haïk (1987) came to the conclusion that empty operator O_i tentatively binds the null VP at S-Structure, as in (17).

- (17) John talked to everyone O_i that Peter did [_{VP} e]_i

Consider (18):

- (18) a. ? Mary talked about Peter more often than she did Bill.
 b. Mary talked about Peter more often than she did about Bill.

As (18) indicates, if there is a construction that allows the preposition *about* to be overt, (19), in which the object is relativized, should be well-formed. But this is not the case:

- (19) *Mary talked about everyone that Peter did about.

Thus the sentence (20) has a flat null VP, not a structured VP, as is (21):

(20) Mary talked about everyone that Peter did [_{VP} e]

(21) [_{VP} [_V e] [_{PP} [_P about] [_{NP} e]]]

Hence Haïk (1987) argues for a structure like (17), in which the null VP is bound by the empty operator, and assumes that QR at LF and Reconstruction and Re-indexing at LF' yields the representation (22) as the LF representation of (17):

(22) [everyone O_i that Peter [_{VP} talked to t_i]] [John talked to t_i]

Haïk (1987), however, cannot account for the facts in (23), so that she finally adopts the argument based on Predication of Williams (1987), and assumes the condition (24), abstracting away the arguments of binding of a null VP by an operator.

(23) a. *Mary_i promised John_j PRO_i to visit everyone who wanted him_j to.

b. Mary_i promised John_j PRO_i to visit everyone who wanted her_i to.

c. Mary_i forced John_j PRO_j to visit everyone who wanted him_j to.

d. *Mary_i forced John_j PRO_j to visit everyone who wanted her_i to.

Haïk changes her arguments and assumes finally that the empty operator does not bind the null VP, but that the subject binds the null VP at S-Structure, following Williams.

(24) Condition on Binding

If A is bound by B without being in a chain with it, then all occurrences of A must be bound by some occurrence of B.

(24) requires that the binding relation between subjects and VPs also hold in the case of the null VP and its subject. The condition (24) correctly predicts the ungrammatical (23a) and (23d), but it is so strong that it wrongly predicts that examples like (25) are ungrammatical:

(25) I read everything that you did.

In the matrix clause, *I* and *read everything that you did* are in predication relation, while in the relative clause *you* and *read everything...* are in predication relation. This violates the condition (24). Hence (24) wrongly

predicts that (25) is ungrammatical. Thus the condition (24) lacks adequacy and may make incorrect predictions.

As for (5) and (8) in the arguments in section 1.1. developed in May (1985), the ungrammatical (5b) and (8b) are accounted for by the condition (24). In (5b) the subject of the null VP is *he*, while the subject of the antecedent VP is *Mary*. In (8b) the subject of the null VP is *Mary*, while the subject of the antecedent VP is *John*. Thus (5) and (8) do not motivate May's assumption that the Binding Condition is applied at LF.

As mentioned earlier, the condition (24) is too strong to assume, and the analysis in Haïk (1987) is almost the same as May (1985) in assuming QR and Reconstruction at LF. Thus it has the same problem that May (1985) has. Moreover, Haïk has to stipulate the base-generated A'-chain and Re-indexing, hence problematic.

In the next section, I propose an alternative analysis based on the arguments just reviewed here.

2. Bound VP

I argue in this section that a null VP in an ACD sentence is a bound variable just as the case of *it* in (26), which is called Donkey-Sentence. The core of the analysis is based on arguments of Haïk (1984), which has shown that the syntactic properties of Bach-Peters sentences¹ (crossing co-reference sentences) are explained in a straightforward way if we view them in terms of Indirect Binding.

(26) Everyone who owns a donkey_i likes it_i.

2. 1. Indirect binding

It is argued in Haïk (1984) that crossing co-reference sentences like (27), which may lead to an infinite regress of the type suggested by the famous Bach-Peters Paradox, can be accounted for without yielding a reconstructive regress.

(27) Every pilot who shot at it hit some MIG that chased him.

(28) Everyone who owns a donkey_i likes it_i.

In the Donkey-Sentence (28) the pronoun *it* behaves just like a variable bound by *a donkey*, though in fact *a donkey* does not c-command *it*. This fact including crossing co-reference will be explained by using the conditions and the conventions (29),(30),(31) and (32).

(29) Scope Indexing

- a. If NP_i is to be interpreted as in the scope of NP_j, then append */j* to the index of NP_i: that is, a structure containing NP_{i/j} is unambiguously interpreted with NP_i as in the scope of NP_{j-1/j} is a referential index.
- b. Scope is transitive; therefore, if NP_i is construed as in the scope of NP_j (NP_{i/j}) and NP_j as in the scope of NP_k (NP_{j/k}), then NP_{i/j/k}.

(30) $NP_i \rightarrow NP_{i(j)}$ iff NP_i has scope over NP_j

(31) Condition on Variables

Pro_{i/j} must be c-commanded either by NP_{i/j} or by NP_{i(j)}

(32) For NP_i to be an indirect binder of NP_j, NP_i must c-command NP_j at S-Structure.

The parentheses in (30) indicate that *j* is to be taken visible not for direct binding, but for indirect binding. Hence the principle of Disjoint Reference does not apply between NP_{i(j)} and NP_j, nor do the principles of the binding theory.

Here the ill-formedness of (33) and the well-formedness of (34) follow from the conditions above.^{2,3}

(33) *Everyone who owns a donkey_i came, and Mary bought it_i.

(34) Everyone who owns a donkey likes it.

(35) *_{[NP1 (2) everyone [who [_S t₁₍₂₎ owns [_{NP2/1} a donkey]]]]}
came, and Mary bought it_{2/1}

(36) _{[NP1 (2) everyone [who [_S t₁₍₂₎ owns [_{NP2/1} a donkey]]]]}
likes it_{2/1}

(35) and (36) are the S-Structure representations of (33) and (34), respectively. In (36) the pronoun *it* is indirectly bound by *everyone who owns a donkey*, whereby the antecedent of *it* can be *a donkey* that is within the scope of *Everyone*, while in (35) neither *a donkey* (the antecedent of *it*) nor NP₁ c-commands⁴ *it*, which is a violation of (31) and makes this sentence ungrammatical.

As for (27), we will have (37) as the S-Structure representation.

(27) Every pilot who shot at it hit some MIG that chased him.

(37) [Every pilot [who [_{t₁₍₂₎} shot at it_{2/1}]]]_{1 (2)} hit
[some MIG [that [_{t_{2/1}} chased him₁₍₂₎]]]_{2/1}

((29)-(37) : Haïk (1984))

In (37) the wh-trace t_1 indirectly binds $it_{2/1}$ in the relative clause, and the pronoun *him* is directly bound by NP₁ *Every pilot who shot at it*. Therefore the two pronouns that have slash index meet the condition (31).

To sum up, Bach-Peters sentences like (37) as well as Donkey-Sentences like (34) can be construed in terms of indirect binding without yielding an infinite regress. Then the question is whether the same explanation holds for ACDs. Before discussing the matter, let us briefly review the parallelism between a null VP and a pronoun that independently motivates the analysis developed in 2.3.

2. 2. Null VP as a proform

The parallelism between a null VP in VPD constructions and a pronoun has been discussed in the literature:

- (38) a. Although Mary could have [_{VP} e], John decided to open the door.
(could have decided / could have opened)
- b. John decided to open the door, although Mary could have.
- (39) a. John didn't hit a home run, but I know a woman who did.
- b. That Besty won the batting crown is not surprising, but that Peter didn't know she did is indeed surprising.

c. Peter never hit a home run, but Besty did and she was very happy about it.

- (40) John was going to write a letter and Sue was going to send flowers, but one of them didn't./ both of them forgot to.

((38)-(40) : Napoli 1985)

The examples given here show the parallelism straightforwardly.

The points at issue can be summarized in the following way:

- (a) Ambiguity: The null VP in (38) is ambiguous in two ways: it allows the interpretation of both *could have decided* and *could have opened*.
 (b) Bidirectionality: Backward in (38a) above, forward in (38b).
 (c) Violations of Ross's constraints: the CNPC in (39a), the SSC in (39b), and the CSC in (39c).
 (d) Split antecedents: *them* in (40) and the null VP in the second conjunct in (40).
 (e) Discourse control: (A) Did *John* leave?

(B) Yes, *he* did. (Williams 1977: 102)

The pronoun *he* in (B) and the anaphoric relation of the null VP in (B).

2. 3. A proposal

Notice that there are two linkings in the sentences that can be accounted for in terms of Indirect Binding. For example in (41) linkings are formed between $t_{1(2)}$ and a donkey $_{2/1}$, and [some people who kicked a donkey] $_{1(2)}$ and $it_{2/1}$. These two linkings are indispensable for Indirect Binding. The conditions (31) and (32) are the ones on each linking. These two independent linkings enable *it* to have an interpretation as bound variable in (41).

(41) [Some people [_S' who [_S $t_{1(2)}$ kicked [a donkey] $_{2/1}$]]] $_{1(2)}$ hated $it_{2/1}$.

Here let us call the linking between $t_{1(2)}$ and *a donkey* ANT-linking,

because this linking includes an antecedent for *it*, while we call the other linking between [*Some people who kicked a donkey*]₁₍₂₎ and *it*_{2/1} P-linking, because this linking includes a proform. That is to say, ANT-linking is the linking that includes an antecedent for a proform, while P-linking is the one that includes a proform. The two linkings for (41) are indicated below.

(41) [Some people [_S who [_S *t*₁₍₂₎ kicked [a donkey]_{2/1}]]]₁₍₂₎ hated *it*_{2/1}.

ANT(ecedent)-linking : *t*₁₍₂₎ indirectly binds *a donkey*_{2/1}

P(roform)-linking : Subject *NP*₁₍₂₎ indirectly binds

Object NP *it*_{2/1}

Furthermore we would like to unify the conditions (31) and (32).

These two conditions are virtually on ANT-linking and P-linking, respectively. Then I would like to propose (42)-(44) as a modification and unification of the conditions (31) and (32) proposed by Hařk (1984).

(42) δ -marking⁴

Indirect Binder β ₁₍₂₎ is assigned [+ δ] indelibly iff (a) and (b):

a. β ₁₍₂₎ c-commands α _{2/1} or α ₁₍₂₎.

b. β ₁₍₂₎ is not c-commanded by α _{2/1} or by α ₁₍₂₎.

(43) Such δ -marking takes place at S-Structure, and at LF via QR for an element that is not δ -marked at S-Structure.

(44) δ -checking (applying at LF)

*[- δ]

The condition (42) requires that an Indirect Binder bind its bindee (directly or indirectly), and (42b) prohibits an Indirect Binder from being c-commanded by its bindee. If an Indirect Binder meets both (42a) and (42b), it will be assigned [+ δ]. As (42) indicates, δ -marking takes place at S-Structure, and only the non- δ -marked element is sensitive to QR. If the non- δ -marked element meets both (42a) and (42b) at LF after QR, it will be assigned [+ δ]. As a result, an element which has the feature [- δ] is ultimately ruled out at LF by (44).

Then let us examine how δ -marking works in the sentences in question.

(45) a. Some people who kicked a donkey₂ hated it₂.

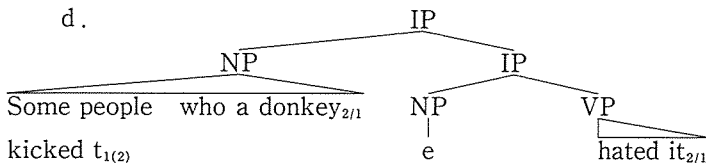
b. [Some people [_S' who [_S t₁₍₂₎ kicked [a donkey]_{2/1}]]]₁₍₂₎ hated it_{2/1}.

In (45) ANT-linking will be formed between t₁₍₂₎ and a donkey_{2/1}. t₁₍₂₎ in ANT-linking c-commands a donkey_{2/1} at S-Structure, while a donkey_{2/1} does not c-command t₁₍₂₎. Thus t₁₍₂₎ is δ -marked at S-Structure. P-linking in (45) will be formed between [Some people [_S' who [_S t₁₍₂₎ kicked [a donkey]_{2/1}]]]₁₍₂₎ and it_{2/1}, in which the subject NP₁₍₂₎ c-commands it_{2/1} while the reverse does not hold. Thus the subject NP₁₍₂₎ is δ -marked at S-Structure. Both t₁₍₂₎ and the subject NP₁₍₂₎ are δ -marked at S-Structure. Therefore QR does not occur at LF. Since in each linking the Indirect Binder is δ -marked, we will predict that (45) is grammatical, which is compatible with the fact.

In (46) the Indirect Binder t₁₍₂₎ in ANT-linking does not c-command a donkey_{2/1} at S-Structure, so that it cannot be δ -marked at S-Structure. Furthermore even in the LF representation (46d), t₁₍₂₎ is not δ -marked at LF, either. Hence this sentence is ruled out by (44). On the other hand the Indirect Binder NP₁₍₂₎ in P-linking c-commands it_{2/1} at S-Structure, and is not c-commanded by it_{2/1}. Therefore it is δ -marked at S-Structure. But since ANT-linking is not δ -marked, (45) is ruled out by (44).

(46) a. ?*Some people who a donkey₂ kicked hated it₂.

b. ?*[Some people [_S' who [_S [a donkey]_{2/1} kicked t₁₍₂₎]]]₁₍₂₎ hated it_{2/1}.

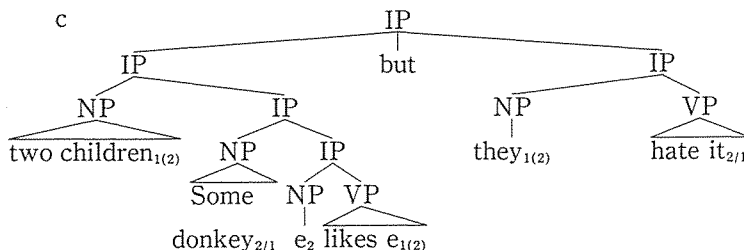


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In (47) the Indirect Binder in ANT-linking is *two children*.

*Two children*₁₍₂₎ does not c-command *some donkey*_{2/1} at S-Structure, so QR is applied to (47). (47c) is the LF representation of (47). In (47c) while *two children*₁₍₂₎ c-commands *some donkey*_{2/1}, *some donkey*_{2/1} also c-commands *two children*₁₍₂₎. This representation satisfies only (42a), but not (42b). Hence (47) is excluded by (44).

(47) ?* [Some donkey]_{2/1} likes [two children]₁₍₂₎, but they₁₍₂₎ hate it_{2/1}.



(48) Two children₁₍₂₎ like some donkey_{2/1}, but they₁₍₂₎ are afraid of it_{2/1}.

(49) is a summary of each analysis discussed so far. This chart clearly shows that an approach by Indirect Binding can be replaced by the alternative analysis in terms of δ -marking. In the next section, I would like to apply this analysis to ACDs.

(49)

	(45)	(46)	(47)	(48)
I.B.	OK	*	*	OK
Facts	OK	?*	?*	OK
δ -marking	OK	*	*	OK

2. 4. ACD sentences ⁵

As I argued in 1.2., Haïk (1987) observes the wh-traces in relative clauses of ACD structures like (50) are constrained by Subjacency.

(50) a. John read everything which Bill believes he did.

b. *John read everything which Bill believes the claim that he did.

This fact provides motivation for positing a trace bound by a wh-trace (or an empty operator) in the empty VP of the relative clause in (50)

In May's analysis discussed in 1.1., the VP of the relative clause in (50) is empty at S-Structure, and the wh-phrase binds a trace produced by the movement of the object NP only after VP copying has applied to the LF representation. If we assume that Subjacency Condition is sensitive to movement at overt syntax, the analysis proposed by May will confront difficulties. But if we assume that there exists an A'-chain at S-Structure, we will not confront such problems.

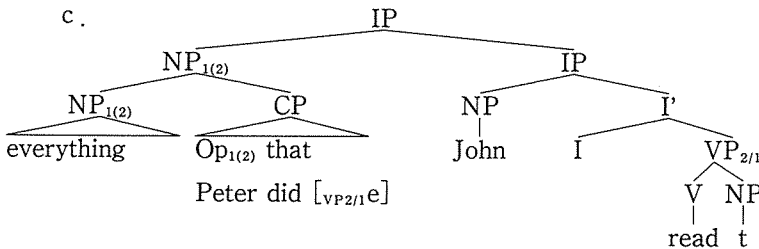
I assume here that the A'-chain consists of wh-phrase (or an empty operator) and its trace in the object position at S-Structure. At the same time there also exists a linking between the wh-phrase and the null VP. That is, we assume (51) to apply the analysis developed so far to ACD sentences, based on the arguments in 2.2.

- (51) In $XP_{i/j}$, X can be N or V.

Following the definition of ANT-linking and P-linking, as indicated in (52), we will assume the structure in (53) for ACD.

- (52) $[_{NP1(2)} \text{everyone} [_{\text{who}} [_{t_{1(2)}} \text{owns} [_{NP2/1} \text{a donkey}]]]]$
likes $it_{2/1}$

- (53) a. John read everything that Peter did.
b. John $[_{VP2/1} \text{read} [_{NP1(2)} \text{everything} \text{Op}_{1(2)} \text{that Peter did} [_{VP2/1} e]]]$



The empty operator indirectly binding null $VP_{2/1}$ in (53c) is necessary for the reasons just discussed above.

The idea that in ACD sentences the empty operator binds a null VP in terms of Indirect Binding seems to be far better than the approach in Haik (1987)^{6,7}. She proposes that the operator in the relative clause of an ACD structure binds the empty VP as a variable. This corresponds to Direct Binding, not Indirect Binding in our terms, because, as (54) shows, *who* and VP_1 make a “genuine” A'-chain, while in my proposal the genuine A'-chain is formed by the *wh*-phrase and the *wh*-trace in the null VP. *Who* indirectly binds the null VP by making use of scope indexing system. Thus Haik (1987) is different from the present approach.

(54) Dulles suspected [_{NP} everyone [_{CP} who [_{IP} Angleton did [_{VP1}e]]]]
 Furthermore Haik (1987) has to stipulate that Subjacency applies to A'-chain at S-Structure, even when they do not arise through movement. Then Haik assumes that QR adjoins the object NP in (54) to the matrix IP, and argues that parallel to May (1985) the antecedent VP is copied into the null VP at LF. This is not the end of “reconstruction.” Haik further stipulates that the operator of the relative clause is re-indexed, so that it binds the object NP trace of QR in the copied VP. To sum up, first, an operator binds a null VP at S-Structure. Second, QR and copying at LF. Finally, reindexing of operator at post-LF structure(=LF'):

- (55) a. [_{IP}[_{NP2} everyone who₁ Angleton did [_{VP1} e]] [_{IP} Dulles suspected t₂]
 b. [_{IP}[_{NP2} everyone who₁ Angleton [_{VP1} suspected t₂]] [_{IP} Dulles suspected t₂]
 c. [_{IP}[_{NP2} everyone who₂ Angleton [_{VP1} suspected t₂]] [_{IP} Dulles suspected t₂]

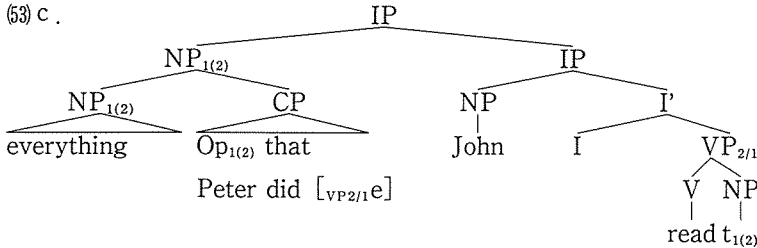
If we assume that the operator in ACD structures binds the null VP through Indirect Binding, such problems that Haik (1987) must confront do not arise:

(53) a. John read everything that Peter did.

b. John $[_{VP_{2/1}}$ read $[_{NP_{1(2)}}]$ everything $Op_{1(2)}$ that Peter did $[_{VP_{2/1}}$ e]].

(53b) is the S-Structure representation of (53a). In (53b), the Indirect Binder in ANT-linking $NP_{1(2)}$ *everything that Peter did* does not c-command $[_{VP_{2/1}}$ e], hence not δ -marked. Then, following (42), QR is applied to (53b) at LF. This yields the LF representation (53c):

(53) c.



In (53c) the QRed $NP_{1(2)}$ in ANT-linking c-commands $VP_{2/1}$, while $VP_{2/1}$ does not c-command $NP_{1(2)}$. Thus ANT-linking satisfies both clauses of (42), hence, δ -marked. On the other hand, the empty $Op_{1(2)}$ in P-linking c-commands $VP_{2/1}$ at S-Structure. And $VP_{2/1}$ does not c-command $Op_{1(2)}$ in P-linking. Therefore $Op_{1(2)}$ is δ -marked at S-Structure. Then each Indirect Binder is δ -marked, thus the connection between the antecedent VP and the null VP is guaranteed.

3. Summary

I argued in this paper that a null VP in ACD constructions is bound by the relative operator in the sense of Indirect Binding of Haïk (1984). Haïk (1984) assume that in the sentence (26), when wh-trace in the relative clause has scope over *a donkey*_{2/1}, $t_{1(2)}$ indirectly binds *a donkey*_{2/1}. At the same time [*everyone who owns a donkey*]₁₍₂₎ indirectly binds $it_{2/1}$. This is why it behaves like a variable bound by *a donkey*. That is both $it_{2/1}$ and *a donkey*_{2/1} are bound by elements which has the same index of 1 (2), respectively. On the basis of this argument, I applied Haïk (1984) to ACD sentences by modifying it as δ -marking. Indirect Binding which Haïk proposed virtually

includes two distinct linkings indispensable to the connection between an antecedent and a proform. For example in (48), when *two children* has scope over *some donkey*, Haïk assumes that *two children*₁₍₂₎ indirectly binds *some donkey*_{2/1}, and I call this linking ANT-linking. Similarly *they* and *it* has each scope index following the scope indexing of the first conjunct. *They*₁₍₂₎ indirectly binds *it*_{2/1}. I call this linking P-linking.

(48) Two children_{1 (2)} likes some donkey_{2/1}, but they_{1 (2)} are afraid of it_{2/1}.

The conditions Haïk proposed as in (31) and (32) are in fact the conditions on these two linkings. Thus I unified the two as in (42)-(44). On the basis of the parallelism between null VPs by VP-deletion and pronouns, I applied the analysis of Indirect Binding to ACD sentences. Under Haïk's approach wh-trace bears scope index in general, but the wh-trace in ACD constructions is not qualified as scope-index bearer, since it is not licensed: it is not properly head-governed. Hence the operator bears the scope index in ACD sentences⁸.

By applying Indirect Binding to ACD sentences, I demonstrated that both two linkings are δ -marked by LF, thus the antecedent VP and the null VP are connected by one and the same device whereby we construed Bach-Peters sentences without infinite regress.

Notes

1. See Bach (1970).
2. Such index proposed here as slash index or parenthesized index is added to the original index. Thus an element X_i automatically becomes $X_{i(j)}$ if Y_i becomes $Y_{i(j)}$.
3. For the fact that wh-trace, not wh-word itself is relevant to scope indexing, see Haïk (1984: 196) and discussion in Oteki (1992).
4. The idea and the notation used in (42)-(44) closely look like γ -marking

proposed by Lasnik and Saito (1984), so that I named my analysis after their familiar work.

In the sentence (i) either of the QPs can have wide scope.

(i) Someone loves everyone.

The analysis proposed here (hence δ -marking) does not wrongly predict this fact. δ -marking is needed when the sentence has two linkings: P-linking and ANT-linking.

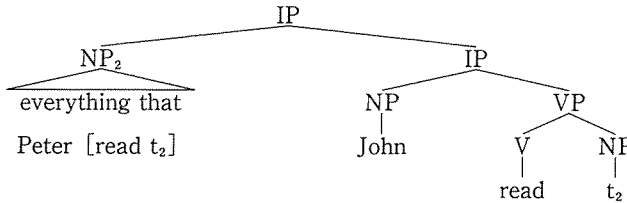
5. This paper does not deal with a type of ACDs that do not involve quantified NP as in (i). See Higginbotham and May (1980) for the details.

(i) John hit the man who asked him to.

6. If we follow the approach in May (1985), the sentences (i) will have the LF representation (ii).

(i) John read everything that Peter did.

(ii)



The object NP in (i) is adjoined to IP by QR at LF, and the null VP will be reconstructed by copying the antecedent VP.

As is indicated by (ii), NP_2 adjoined to IP by QR yields another infinite regress, since the trace t_2 in the object position in raised NP_2 is contained within its antecedent NP_2 . Thus our approach that identifies null VPs by Indirect Binding provided in this paper has advantages over May (1985) in the following points.

(iii) It is not necessary to reconstruct null VPs.

(iv) Our approach does not yield another infinite regress at LF.

7. Haïk (1987) does not use Indirect Binding. Rather, it argues with May (1985), adopting reconstruction at LF.

8. See Oteki (1992) for the details.

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Synopsis

Bach-Peters Paradox in the Interpretation of Null VP

By Yusaku Oteki

This paper is concerned with the syntax of so-called antecedent-contained VP deletions (ACD), as in (1).

- (1) Dulles suspected everyone that Angleton did.

I argue in this paper that the null VP in ACD constructions is bound by the relative operator in the sense of Indirect Binding of Haïk(1984). Haïk(1984) assumes that in the sentence (2), when the *wh*-trace in the relative clause has scope over *a donkey*, the *wh*-trace indirectly binds *a donkey*. At the same time, *everyone who owns a donkey* indirectly binds *it*.

- (2) Everyone who owns a donkey likes it.

On the basis of this argument, I apply Haïk(1984) to ACD sentences by modifying it as δ -marking. The application of indirect binding to ACDs are independently motivated by the parallelism between pronouns and the null VP in VP-deletions often discussed in the literature. The system of δ -marking that I propose in this paper enables us to account for the identification of proforms in Bach-Peters sentences like (3) and ACDs by one and the same device. (In this case I suppose that proforms mean null VPs and pronouns.)

- (3) Every pilot who shot at it hit some MIG that chased him.

By applying indirect binding to ACD sentences, I demonstrate that the two linkings that ACDs and Bach-Peters sentences involve are δ -marked at LF, and thus the antecedent VP and the null VP are connected without infinite regress in interpretation of proforms.