

Empty Categories and Identification\*

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0. Introduction.

It is one of the current concerns to show how the following paradigmatic data should be dealt with under the "principles-and-parameters" approach:

- (1) a. ??What<sub>i</sub> do you wonder [how<sub>j</sub> [John solved t<sub>i</sub> t<sub>j</sub>]]  
b. What<sub>i</sub> do you believe [t<sub>i</sub>' (that) [John solved t<sub>i</sub>]]
- (2) a. \*Who<sub>i</sub> do you wonder [how<sub>j</sub> [t<sub>i</sub> solved the problem t<sub>j</sub>]]  
b. Who<sub>i</sub> do you believe [t<sub>i</sub>' (\*that) [t<sub>i</sub> solved the problem]]
- (3) a. \*How<sub>i</sub> do you wonder [what<sub>j</sub> [John solved t<sub>j</sub> t<sub>i</sub>]]  
b. How<sub>i</sub> do you believe [t<sub>i</sub>' (that) [John solved the problem t<sub>i</sub>]]

Most proposals put forward to settle this issue have centered around the formulation of the ECP (Empty Category Principle) and, as a result, there are a number of competing hypotheses concerning the principle. This paper is another attempt to reconsider the proper formulation of the ECP, but from a standpoint rather different from the proposals offered in the literature. The main questions that I argue should be addressed by the ECP is the following:

- (4) a. From the viewpoint of the Principle of Full Interpretation, what should the ECP be like?
- b. What explains the typological variation found in ECP effects?
- c. Should the ECP be restricted to nonpronominal empty categories?
- d. What is the nature of the Proper Binding Condition, which is also a condition on empty categories?

In what follows I will consider these questions in turn, and in so doing I will touch on the issue concerning a general picture of the ECP component of the theory of grammar.

## 1. Identification of Empty Categories.

### 1.1. Two Types of Identification.

Empty categories (henceforce, ECs) lack both phonological and semantic contents. Thus from the point of view of the Principle of Full Interpretation put forth by Chomsky (1986a), it is necessary for ECs to be interpreted, or "identified", in two ways: the syntactic position of a gap must be identified and its semantic content must be identified; otherwise, their interpretation would fail. The former requirement I will call *G-identification*, and the latter *C-identification*. Given that the ECP is a licensing principle for ECs, it is natural for the ECP to consist of these two components.<sup>1</sup> What requirements, then, are imposed on the two types of identification? My contention is that "proper government" in the sense that will be defined below fulfills the role of G-identification, and that some form of chain condition is responsible for C-identification. In the remainder of this section I will develop the system of G-identification.

### 1.2. The System of G-identification.

Recently it has been suggested by Chomsky (1981, 1986a), who bases his suggestion on a proposal by Aoun (1979), that much of the content of the traditional Case Filter can be derived from the Theta Theory by recourse to the following Visibility Condition:

- (5) An element is "visible" for  $\theta$ -marking only if it is assigned Case.

Intuitively, this condition is a formal grammaticalization of the functional requirement that the semantic relationships of a

sentence be recoverable from its surface form.<sup>2</sup> It is obvious that Case-marking determines the surface form of (the core of) a sentence. Given that (the input of) the surface form is crucial for full interpretation at LF, it follows that Case plays an essential role in full interpretation.

Along these lines, let us pursue the idea that Case is crucial for the identification, namely, the full interpretation, of ECs as well. Suppose that for every EC there is some feature that determines its surface position in a sentence and thus makes possible the identification of its syntactic position, namely, G-identification. Let us refer to these features as *FI-features* for ECs. Then we can regard Case as an FI-feature for ECs in Case-marked positions, since it ensures their surface positions, making it possible to deduce the presence of gaps from the surface form. How, then, can the syntactic positions of ECs in non-Case-marked positions be deduced? Note that the fact that such ECs are not in Case-marked positions can be attributed to the property of their antecedents, namely, the property of requiring no Case. For example, it can be said that  $t_j$  in (3b) appears in a non-Case-marked position because its antecedent,  $\text{How}_j$ , has the property of being licensed without Case. The same is true of traces left by predicates and  $X^0$ -categories. If so, it seems to be reasonable to maintain that some local relation between ECs and their antecedents ensure their surface positions in such cases. Then it follows that FI-features for ECs in non-Case-marked positions are possessed by their antecedents.

On the assumption that G-identification is responsible for the licensing of ECs' syntactic positions, it seems to be fairly natural that these FI-features should constitute a necessary part of G-identification.

Keeping this in mind, let us define G-identification as follows:

- (6) EC  $\alpha$  is G-identified iff  $\alpha$  is properly governed.
- (7) EC  $\alpha$  is properly governed iff  $\alpha$  is canonically

governed by  $\beta$  that associates  $\alpha$  with an FI-feature for  $\alpha$ .

- (8)  $\alpha$  is canonically governed by  $\beta$  iff  $\alpha$  is governed by  $\beta$  from a canonical position of  $\beta$ .
- (9)  $\gamma$  is a canonical position of  $\beta$  iff (a) or (b):
  - a. if  $\beta$  is an antecedent-governor,  $\gamma$  is an "SP position";
  - b. if  $\beta$  is a head-governor,  $\gamma$  is a (right/left) head position.

By an "SP position" I mean a position for a structure-preserving operation, like the SPEC.<sup>3</sup> Let us assume with Kayne (1983) that the direction of canonical head-government in a language is determined by V. Recall that Case is an FI-feature for ECs in Case-marked positions, whereas an FI-feature for ECs in non-Case-marked positions is possessed by their antecedents. It then follows from the above definitions that in English traces of arguments must be governed by their Case-assigners from a left head position, and that the traces left behind by adjuncts, predicates and  $X^0$ -categories must be governed by their antecedents appearing in an SP position.

In effect, I am claiming that the ECP should involve the "relativized" requirement of proper government rather than the "disjunctive" or "conjunctive" requirement discussed in the literature. The disjunctive definition has been argued to be ugly on conceptual grounds. To the extent that the line of reasoning above is valid, on the other hand, the relativized definition seems to be well motivated at least on conceptual and theoretical grounds. Further, there is empirical evidence that it is superior to the conjunctive version as well as the disjunctive version. We will turn to this matter in section 2.

Now let us see how the proposed system works with the paradigmatic examples given at the outset. In (1) each trace of *What* is governed by its Case-assigner, V, from the left, and hence they are G-identified.<sup>4</sup> In (3), where the relevant traces are left by adjuncts, G-identification must be satisfied through

antecedent-government. Suppose that antecedent-government can be satisfied via links of a chain. It then follows that this relation obtains in (3b), since  $How_i$ , which occupies the SPEC of the matrix CP, governs the intermediate trace in the SPEC of the embedded CP and the latter governs  $t_i$ . In (3a), on the other hand, the intervention of a barrier between  $How_i$  and  $t_i$  blocks an antecedent-government relation, causing the ungrammaticality.<sup>5</sup>

In (2), where subject extraction takes place, the explanation is not so straightforward. Let us first look at (2b) with the zero-C option. In our treatment subject traces must be governed by INFL, their Case-assigner, from the left. In English this situation never arises at S-structure, since subjects appear to the left of INFL at that level. Suppose, essentially following Stowell (1981) and Pesetsky (1982a), that tense features in INFL must be licensed by C and that this requirement forces INFL to move to C at LF. Thus the subject trace in (2b) is G-identified after INFL-raising at LF.<sup>6</sup>

Why, then, are (2a) and (2b) with an overt C ungrammatical in spite of INFL-raising? Recalling that in (9b) canonical government is defined in terms of a head position, let us adopt another assumption about the notion "head":

- (10) Zero-level category  $\alpha$  counts as a "head" only if  $\alpha$  agrees with the topmost zero-level category.

Thus I argue that "head" be a relative notion. Now let us return to the relevant part of the LF-structure in (2b), where INFL adjoins to C for the interpretation of tense:

- (11) ... [<sub>CP</sub>  $t_i$ ' [<sub>C</sub>  $I_j$  C] [<sub>IP</sub>  $t_i$   $t_j$  ...]]

According to (10),  $I_j$  counts as a head only if it agrees with the topmost C.  $I_j$  agrees with its trace through an antecedent-trace relation, and  $t_j$  in turn SPEC-head-agrees with the original subject trace. This trace agrees with its antecedent

$t_i'$ , which in turn agrees with C through a SPEC-head relation. As a result,  $I_j$  agrees with C by transitivity, qualifying as a head. Hence the original trace in the SPEC/IP is G-identified.<sup>7</sup>

In (2a) and (2b) with an overt C, the same relation does not obtain between the raised INFL and the original trace: the raised INFL does not agree with C, because of the presence of *how<sub>j</sub>* in the SPEC/CP in the former case, and of the overt C in the latter case on the assumption that English *that* does not agree with the SPEC/CP, perhaps due to its inherent features (cf. Uriagereka (1988)). Therefore both examples do not satisfy G-identification, leading to an ECP violation.<sup>8</sup>

The system thus proposed constitutes our answer to the conceptual question in (4a): the ECP consists of two types of identification, G-identification and C-identification, and G-identification is defined in terms of FI-features such as Case, which motivates a relativized definition of proper government.

## 2. Empirical Justification.

The discussion in the previous section put much emphasis on the relevance of Case to the ECP. This claim seems to be supported on empirical grounds as well. I will provide three arguments relevant to the point in turn. First, let us consider examples where an adjunct occurs in a Case-marked position. I argue in Takano (to appear) that examples like the following include non-argumental "prepositional" subjects:

- (12) [In this manner] were preserved some of the more  
important historic sites in the country

This sentence is thematically equivalent to that in (13), where the relevant PP appears in an adjunct position:

- (13) Some of the more important historic sites were  
preserved [in this manner] in the country

Now consider the following sentences, where the relevant

PPs are topicalized:

- (14) a. [In this manner]<sub>i</sub>, I believe [t<sub>i</sub> to have been  
preserved some sites in the country]  
b. [In this manner]<sub>i</sub>, I believe [some sites to have  
been preserved t<sub>i</sub> in the country]

In (14b) the surface position of the trace left behind can only be determined by being linked to its antecedent, and hence the trace requires antecedent-government, just like the adjunct traces in (3). In (14a), on the other hand, (accusative) Case ensures the position of the trace and so it can count as an FI-feature for the trace in this case. Since the trace is canonically governed by its Case-assigner, our system predicts that it will behave like an object trace, despite the fact that it is an adjunct trace. This prediction seems to be borne out:

- (15) a. ??[In this manner]<sub>i</sub>, I wonder [whether you believe  
t<sub>i</sub> to have been preserved some sites in the  
country]  
b. \*[In this manner]<sub>i</sub>, I wonder [whether you believe  
some sites to have been preserved t<sub>i</sub> in the  
country]

Although the marked character of the construction makes the contrast subtle, it seems that (15a) is not as bad as (15b), which violates the ECP. The traditional assumption, adopted by both the disjunctive and the conjunctive versions of the ECP, that the argument/adjunct distinction is sufficient for the ECP can not capture this contrast.

Next let us turn to subject extraction. Lasnik and Saito (forthcoming) establish that adjunction by topicalization creates a barrier. If a sentence-initial adverbial phrase is also an instance of topicalization, then its presence will indicate that the IP to which it adjoins constitutes a barrier. This seems to be correct, given the following data:

- (16) a. I think [that [IP yesterday [IP John met Mary]]]  
 b. I think [that [IP yesterday [IP John treated Mary  
 like a child]]]
- (17) a. ??Who<sub>i</sub> do you think [that [yesterday [John met t<sub>i</sub>]]]  
 b. \*How<sub>i</sub> do you think [that [yesterday [John treated  
 Mary t<sub>i</sub>]]]

(17a) is a weak violation of Subjacency, and (17b) an ECP violation, both due to the presence of a barrier created by adjunction.

Note, however, that this barrier does not prevent INFL, raised to C for tense-interpretation at LF, from antecedent-governing its trace, considering the grammaticality of (16) and (17a) (and the far more acceptable status of examples like ??Would<sub>i</sub> [IP [CP for John to visit Mary]<sub>j</sub> [IP t<sub>j</sub> t<sub>i</sub> [VP bother Bill]]]) than ECP violations (see Stowell (1981) and Takano (to appear) for arguments in favor of the IP-adjunction analysis of sentential subjects)). Thus it seems that the barrier created by adjunction is different from other kinds of barrier in that its "freezing" effects vary depending upon the categorial types of elements affected by the barrier. Specifically, the barrier created by XP-adjunction does not affect X<sup>0</sup>-government. This claim is not unreasonable, given that only maximal categories are permitted to adjoin to XP and that X<sup>0</sup> has nothing to do with the XP-adjunction. Then this statement can naturally be generalized to cases involving head-government by the raised INFL, since it is also an instance of X<sup>0</sup>-government.

Recall now that our system does not require the subject trace to be antecedent-governed; rather, it must be head-governed by INFL from the left. Then it is predicted that a subject can be extracted even if the IP immediately dominating it constitutes an adjunction barrier.<sup>9</sup> The contrast below, which is noted by Pesetsky (1982b), confirms the prediction:

- (18) a. \*John, who<sub>i</sub> I'm sure [t<sub>i</sub>' that [in July [t<sub>i</sub> said



- something different from what he's saying now]]],  
is a big liar
- b. ?John, who<sub>i</sub> I'm sure [t<sub>i</sub>' C [in July [t<sub>i</sub> said  
something different from what he's saying now]]],  
is a big liar

In (18a) the overt complementizer prevents the subject trace from being governed by the raised INFL, leading to an ECP violation; in (18b), in contrast, the raised INFL counts as a head, and G-identifies the trace since the adjunction barrier does not block X<sup>0</sup>-government. Hence (18b) is grammatical (the marginality is again due to a weak violation of Subjacency). Again, any version of the ECP, disjunctive or conjunctive, that requires a subject trace to be antecedent-governed cannot account for the contrast in (18), because of the presence of an adjunction barrier, which blocks XP-government, hence preventing t<sub>i</sub>' from antecedent-governing t<sub>j</sub>.<sup>10</sup>

Our system also sheds new light on LF-movement of subjects. Recall that in the case of English, a subject trace Case-marked by INFL is G-identified only if this INFL, after incorporated to C, agrees with C. Given that agreement takes place at S-structure, it is predicted that a *Wh*-in-situ of a subject will not be permitted in tensed clauses, which is substantially correct:<sup>11</sup>

- (19) a. \*Who remembers [where [who bought the book]]  
b. \*It is unclear who thinks [(that) [who saw us]]  
(Chomsky (1981))

The examples in (19) contrast sharply with those in (20), where objects remain in situ, and in (21), where the relevant *Wh*-phrases are "exceptionally" Case-marked from the left:

- (20) a. Who remembers [where [John bought what]]  
b. It is unclear who thinks [(that) [we saw whom]]
- (21) a. I don't know who would be happy [for [whom to win

- the prize]]
- b. I don't remember who believes [whom [to have read  
the book]] (Chomsky (1981))

Now observe the following examples:

- (22) a. How<sub>i</sub> do you want [t<sub>i</sub>' C [whom to come t<sub>j</sub>]]  
b. How<sub>i</sub> did you arrange [t<sub>i</sub>' for [whom to meet  
Mary t<sub>j</sub>]]

The traditional approaches which require a subject trace to be antecedent-governed cannot account for their grammaticality, because of the obligatory presence of an intermediate trace of *How<sub>i</sub>* in the SPEC/CP (note that this trace cannot be deleted at LF for the reasons that have been familiar since Lasnik and Saito (1984)). Nor can Rizzi's (1989) approach, because his system of formal licensing also requires an intermediate trace of the subject to be in the SPEC/CP, in order to satisfy the ECP. Under the present hypothesis, in contrast, their grammaticality immediately follows, because the subject traces are canonically governed by C, or their Case-assigners; that is, they are G-identified, irrespective of what occupies in the SPEC/CP. Thus these considerations give us another empirical advantage over the other proposals put forward in the literature.<sup>12</sup>

The facts that we examined in this section all point to the same conclusion, which fits the proposed system: that Case is relevant for the licensing of ECs appearing in Case-marked positions.

### 3. INFL-Movement at LF.

Recall that we accounted for the ECP effects related to extraction of subjects out of tensed clauses by appealing to INFL-movement at LF. Stowell (1981) argues, on the basis of the interpretation of tense, that there is a close connection between C and INFL. In this section I will establish, on the basis of

syntactic facts, that the obligatory INFL-movement has good motivations independent of the phenomena involving extraction of tensed subjects.

As Chomsky (1987) notes, in English IP-preposing is impossible, in contrast to VP-preposing:

- (23) \*... [he will pass the test]<sub>i</sub>, I believe that t<sub>i</sub>  
 cf. ... [pass the test]<sub>i</sub>, I believe that he will t<sub>i</sub>

Given that it is not Case-marked, the trace of IP must be antecedent-governed, and this requirement can be met since there are no barriers between the trace and its antecedent in (23). However, if INFL moves at LF, we have another trace to be considered: the trace of the INFL. Consider the following potential LF-representations of (23):

- (23') a. [IP He t<sub>j</sub> VP]<sub>i</sub> [I believe [C+I<sub>j</sub> [t<sub>i</sub> ]]]  
 b. [C+I<sub>j</sub> [IP He t<sub>j</sub> VP]<sub>i</sub> [I believe [C [t<sub>i</sub> ]]]]

Suppose, as before, that the tense features of INFL must be licensed by C. In (23) there are two possible sites for the INFL in question to land on: the embedded C and the matrix C. If the former is chosen, as shown in (23'a), the result is an ECP violation, since the antecedent is too low to govern its trace (recall that X<sup>0</sup> movement must satisfy antecedent-government).

How about (23'b), where the matrix C is chosen as a landing site? The relevant question is whether the preposed IP is a barrier or not. It seems that the answer comes from the data below:

- (24) a. ??Which song<sub>j</sub> do you think that [singing t<sub>j</sub>  
 loudly]<sub>j</sub>, John likes t<sub>j</sub> very much  
 b. \*How<sub>i</sub> do you think that [singing the song t<sub>i</sub>]<sub>j</sub>,  
 John likes t<sub>j</sub> very much

The marginality of (24a) and the unacceptability of (24b) suggest that a preposed phrase constitutes a barrier. If this is a correct generalization, it will follow that (23) also violates the ECP, because the preposed IP is a barrier, blocking an antecedent-government relation between the raised INFL and its trace. Therefore we can provide a natural account of the fact that IP-preposing is impossible, by assuming that INFL obligatorily moves to C at LF.<sup>13</sup> This constitutes a motivation, independent of the facts concerning subject extraction, for the proposal for INFL-movement at LF.

This proposal has certain consequences for "raising" constructions as well. In raising constructions like (25), the embedded INFL must move to the matrix C at LF because of the absence of the embedded C:

- (25) a. [C [IP John<sub>i</sub> is likely [IP t<sub>i</sub> to leave]]]  
       b. [C [IP John<sub>i</sub> is believed [IP t<sub>i</sub> to be a genius]]]

The embedded INFL must reach the matrix C by way of the matrix V and INFL; otherwise, the movement would violate the ECP. This is possible in (25) because the matrix INFL, which amalgamates with V in Syntax, also moves to C for reasons related to tense-interpretation. Since the two INFLs are licensed by the same C, the fact noted by Stowell naturally follows: in raising constructions the interpretation of the embedded tense is dependent on that of the matrix tense.

Crucial in the above account is that the matrix INFL, amalgamated with V, must move to C at LF. If this does not take place, the embedded INFL must move to the matrix C in one fell swoop, which will result in an ECP violation (see Baker (1988: 2.2.5)). This situation arises when the raising predicates in (25) are replaced by their nominal counterparts:

- (26) a. \*[C [IP [DP John<sub>i</sub>'s likelihood [IP t<sub>i</sub> to leave]]  
           is ...]]]  
       b. \*[C [IP [DP John<sub>i</sub>'s belief [IP t<sub>i</sub> to be a genius]]]



cluding  $\theta$ -government. But such a move encounters the serious empirical problems discussed in section 2.

The present system, on the other hand, overcomes this difficulty. Note that an NP-trace is licensed only when it is linked to its antecedent, which is in a position to which Case is assigned. This is because an NP-trace and its antecedent form an A-chain and the  $\theta$ -Criterion can be regarded as a licensing condition for A-chains, according to Chomsky (1986a). In other words, the surface position of an NP-trace is determined through an A-chain containing it. Then it is reasonable to claim that an FI-feature for NP-traces is possessed by the heads of A-chains that contain them. If so, then it follows that NP-traces are G-identified only through antecedent-government, unlike *Wh*-traces, whose G-identification is performed by their Case-assigning heads. Under the present system, then, NP-traces and adjunct traces are grouped together in a well-motivated way. This is a fairly welcome result, given the traditional observation that they behave quite similarly with respect to the ECP.

#### 4.2. Extensions of Abstract Case.

From Case theoretic point of view, the cases that we have examined so far are not problematic to the system of G-identification. Now let us examine some problematic cases. As noted in the literature, some PPs and VPs can move across a *Wh*-island:

- (29) a. ??[On which table]<sub>i</sub> did you wonder [whether you  
should put the vase t<sub>i</sub>]  
b. ??[About what]<sub>i</sub> did you wonder [whether you should  
buy [a book t<sub>i</sub>]]  
c. ??[Of whose success]<sub>i</sub> do you wonder [whether John is  
sure t<sub>i</sub>]  
(30) ??... [fix the car]<sub>i</sub>, I wonder [whether he will t<sub>i</sub>]

(Chomsky (1986b))

Since antecedent-government does not obtain in the above examples, something must be said about the system of abstract Case if our system of G-identification is to be maintained. To be specific, it must be ensured that the traces in (29) and (30) are all Case-marked.

In the case of PPs, it seems to be possible to extend Case Theory, essentially along the lines of Oka (1986, 1988a). Thus it can be argued that the relevant traces in (29) are assigned some sort of Case by V, N and A, respectively. It can also be argued that VPs are Case-marked by INFL, given the work by Zagana (1982) and Fabb (1984).<sup>14</sup> Since these conclusions have far-reaching implications, I will leave further considerations to future research, merely noting their relevance to our system.

Let us turn to cases involving movement of predicate phrases. It is well known that predicates need not be Case-marked, since they are not assigned  $\theta$ -roles, which must be made visible by Case. But there is evidence indicating that this statement should be strengthened. Consider the following:

- (31) a. \*What<sub>i</sub> do you wonder [whether John was t<sub>i</sub> before]  
       a'. ??Which student<sub>i</sub> do you wonder [whether John is t<sub>i</sub>]  
       b. \*How<sub>i</sub> do you wonder [whether John has been t<sub>i</sub> these  
           days]  
       c. ?What<sub>i</sub> did John wonder [how to weigh t<sub>i</sub>]  
       d. \*Where<sub>i</sub> do you wonder [whether John is t<sub>i</sub> now]

(31a, b) are instances of predicate movement. According to Rizzi (1989), (31c) can be answered "apples", but not "200 lbs". I consider that the latter answer would result from some extended use of predicates *on a par with* (31d), *unlike Rizzi, who claims that the trace of What is  $\theta$ -marked by weigh*. If I am correct, (31c, d) also indicate that predicate movement across a *Wh*-island results in an ECP violation. From the point of view of the present system, this suggests that predicate phrases are not Case-marked by V, which in turn suggests that predicates are never Case-marked.

On the other hand, "identificational" phrases can be extracted from a *Wh*-island, as is clear from the sharp contrast between (31a') and the rest. This implies that identificational *be* Case-marks its complement.

Noun phrases occurring in "existential" constructions can also be extracted rather freely:

- (32) a. \*What<sub>i</sub> do you wonder [whether t<sub>j</sub> was on this table]  
 b. ??What<sub>i</sub> do you wonder [whether there was t<sub>j</sub> on this table]

The fact that (32b) is far better than (32a), which violates the ECP, leads us to claim that the trace left behind is assigned some sort of Case. Belletti's (1988) work is relevant to our point: she argues, on the basis of (in)definiteness effects seen in some languages, that existential *be* assigns "partitive" Case to its complement. Thus our claim is supported on other grounds in this case.

A few words about *by*-phrases occurring in passive constructions are also in order. They also behave in a way that suggests that they are Case-marked, contrasting sharply with those inside noun phrases:

- (33) a. ??[By whom]<sub>i</sub> do you wonder [whether John<sub>j</sub> was killed t<sub>j</sub> t<sub>i</sub>]  
 b. \*[By whom]<sub>i</sub> did you witness [{the destruction of the city t<sub>j</sub>/the city<sub>j</sub>'s destruction t<sub>j</sub> t<sub>i</sub>}]

Given the barrierhood of noun phrases discussed by Takano (1989) (see 4.3 below), (33b) shows that the relevant PP is an adjunct. But then, what is the difference between (33a) and (33b)? Baker (1988) and Baker, Johnson and Roberts (1989) claim that the passive morpheme *en*, which occupies INFL, is an argument, requiring a  $\theta$ -role and a Case, and that it gets the external  $\theta$ -role and Case from a passive verb. Noting that the object of a *by*-phrase semantically corresponds to the external



$\theta$ -role of a passive verb, Baker argues that the *by*-phrase "doubles" the  $\theta$ -role of the passive morpheme. Going a step further, we might claim that it doubles the Case of the passive morpheme as well. If so, it is reasonable to suppose that this Case is an FI-feature for the *by*-phrase. Then the fact in (33) immediately follows since the relevant trace is governed by INFL, which contains *en*, from the left, hence G-identified.

#### 4.3. Subject Extraction out of DP.

In Takano (1989) I discussed argument/adjunct asymmetries related to extraction out of noun phrases, as shown in (34), and I argued that those asymmetries are due to the intrinsic barrierhood of noun phrases, which I consider to be DPs:

- (34) a. [About what]<sub>i</sub> did you read [DP a book t<sub>i</sub>]  
 b. \*[On which shelf]<sub>i</sub> did you read [DP a book t<sub>i</sub>]

In case (34b) adjunction to DP is not permitted, since it is an argument (see Chomsky (1986b)), and hence extraction necessarily crosses a barrier. On the other hand, if the relevant DP is not an argument, movement will proceed via DP-adjunction, crossing no barriers. In fact, an interesting contrast can be observed:

- (35) a. \*This is the dress [in which]<sub>i</sub> I met [DP the prettiest girl t<sub>i</sub> at the party]  
 b. This is the dress [in which]<sub>i</sub> Mary was [DP the prettiest girl t<sub>i</sub> at the party]

In contrast, subject extraction out of DP does not show this sort of contrast: it is impossible irrespective of the syntactic status of the DP from which extraction originates:

- (36) a. \*Whose<sub>i</sub> did you see [DP t<sub>i</sub> picture]  
 b. \*Mary, whose<sub>i</sub> this is [DP t<sub>i</sub> most famous picture],

Thus subject extraction is more severely restricted than adjunct

extraction. The system of G-identification, together with the Revised DP Hypothesis put forth by Takano (1989), seems to provide a plausible account of this fact. The Revised DP Hypothesis states that the internal structure of a noun phrase is as follows:

(37) [DP D [IP John's I [NP picture of Mary]]]

The subject of DP receives genitive Case from nominal INFL. This entails that a subject trace must be head-governed by nominal INFL from the left. It is not clear whether nominal INFL moves to D at LF, because it does not have tense features, unlike verbal INFL. Even if it moves to D for some reasons, it must agree with D in order to be a head.<sup>15</sup> This is impossible, however: D has no agreement features, in contrast to C, and hence it does not agree with anything at all (see Takano (1989) for details).<sup>16</sup> In this way we obtain the desired results.

#### 4.4. A Note on IP-Adjunction.

Finally, let us consider the stipulation made by Chomsky (1986b) that adjunction to IP is not permitted. One reason why his system needs this stipulation is that it ensures that antecedent-government does not obtain in examples like (2a); if IP-adjunction were permitted, his system would rule in (2a). Since we do not appeal to antecedent-government in such cases, as seen above, we can dispense with the stipulation, a theoretical advantage of the proposed system. Once IP-adjunction is allowed, however, (3a) cannot be ruled out under Chomsky's system of barriers, which will then motivate a revision of his system. Such a problem does not arise under Rizzi's (1989) and Lasnik and Saito's (forthcoming) systems.

### 5. Parametric Variation.

#### 5.1. SVO Languages vs. SOV Languages.

Now let us address the second question given in (4): what explains the typological variation found in ECP effects?

Clearly, the answer to this question is related to the adequate system of parameters. First consider cases involving head-government. Recall that we defined G-identification in terms of canonical government, which invokes directionality in the case of head-government. We assumed, following the original proposal put forward by Kayne (1983), that the direction of canonical government is the direction in which V assigns Case. Our definition of G-identification then entails that the way of G-identification through head-government varies among languages, depending upon the relevant property of V, and that these differences in turn yield subject/object asymmetries in some languages but not others.

In the case of English, which is an SVO language, the canonical direction of head-government is in the left-to-right direction, and we obtain the subject/object asymmetries that we have so far discussed. The same sort of asymmetries can be found in French as well (see Koopman and Sportiche (1988) and Rizzi (1989)), as predicted by our system.<sup>17</sup>

In the case of SOV languages, our system predicts that different effects can be obtained. To take a few instances, let us consider German, Dutch and Japanese. Although there seem to be some dialectal variations, subject extraction in German and Dutch gives different results from that in English:<sup>18</sup>

- (38) a. ?Wen<sub>i</sub> sagt Johann, [dass [er t<sub>i</sub> sieht/sehe]]  
       "Who did Johann say that he saw?"  
       b. ?Wer<sub>i</sub> glaubst du, [dass [t<sub>i</sub> recht hat]]  
       "\*Who do you believe that is right?" (Reis (1986))
- (39) a. Was<sub>i</sub> hat [wer t<sub>i</sub> behauptet]  
       "\*What did who say?"  
       b. Es ist unklar [was<sub>i</sub> [wer t<sub>i</sub> gekauft hat]]  
       "\*It is unclear what who bought" (Haider (1989))
- (40) Wie<sub>i</sub> denk je [dat [t<sub>i</sub> ons gezien heeft]]  
       "\*Who do you think that saw us?" (Weerman (1989))

Neither German nor Dutch exhibits *that-t* effects, as shown in

(38) and (40), and no "superiority" effects can be found in German, as shown in (39).<sup>19</sup> These results are just what our system expects: in these languages the direction in which INFL Case-marks the subject is the same as the direction in which V Case-marks its object, that is, from right to left. On the assumption that INFL-movement at LF as I argued for it in section 3 is universal, that traces do not qualify as G-identifiers, and that G-identification takes place anywhere in a derivation of LF, this means that INFL can canonically head-govern, hence can G-identify a subject trace before it moves to C; hence no subject/object asymmetries.

The same account holds for Japanese, an SOV language that lacks syntactic *Wh*-movement. Thus Japanese exhibits no subject/object asymmetries, as pointed out by Lasnik and Saito (1984, forthcoming), among others:

- (41) a. Kimi-wa [John-ga nani-o katta to] omoimasu ka  
       "What do you think that John bought?"  
       b. Kimi-wa [dare-ga sore-o katta to] omoimasu ka  
       "\*Who do you think that bought it?"
- (42) a. ?Kimi-wa [John-ga nani-o katta kadooka] siritai no  
       "??What do you want to know whether John bought?"  
       b. ?Kimi-wa [dare-ga sore-o katta kadooka] siritai no  
       "\*Who do you want to know whether bought it?"

Since Huang (1982) it has been argued that in languages that lack syntactic *Wh*-movement, *Wh*-phrases move to operator positions at LF, with the trace that is left after this LF-movement conditioned by the ECP. Since Japanese INFL Case-marks to the left, in the same direction as V does, it canonically governs the subject trace left by LF-movement of a *Wh*-phrase, giving the same results as in German and Dutch.

There is evidence from a study of Germanic languages that these conclusions are substantially correct. According to Weerman (1989), there is a strong correlation between the lack of *that-t* effects and the order of V and its object: putting aside

a few exceptions that might be explained on other grounds, languages that permit *that-t* violations are OV languages, whereas those that do not have a VO order. The former type includes Dutch, German, Frisian and Old English, and the latter type English, Danish, Norwegian and Swedish. To the extent that his claim is maintained, the system of G-identification is supported on typological grounds.<sup>20</sup>

## 5.2. Romance Languages.

At this point, however, these conclusions immediately encounter a problem when we consider Romance languages. As is well known, Italian and Spanish, which are undoubtedly SVO languages, still exhibit no subject/object asymmetries that English and French do:

- (43) a. Che problema<sub>i</sub> credi [che [potremo risolvere t<sub>j</sub>]]  
 "Which problem do you think that we could solve?"  
 b. Che studente<sub>i</sub> credi [che [t<sub>i</sub> potrà risolvere il problema]]  
 "\*Which student do you think that could solve the problem?" (Rizzi (1989))
- (44) a. ?Che problema<sub>i</sub> non sai [come<sub>j</sub> [potremo risolvere t<sub>j</sub>]]  
 "??Which problem don't you know how we could solve?"  
 b. ?Che studente<sub>i</sub> non sai [come<sub>j</sub> [t<sub>i</sub> potrà risolvere il problema t<sub>j</sub>]]  
 "\*Which student don't you know how could solve the problem?" (Rizzi (1989))
- (45) a. Qué<sub>i</sub> dijiste [que [Mario compró t<sub>j</sub>]]  
 "What did you say that Mario bought?"  
 b. Quién<sub>i</sub> dijiste [que [t<sub>i</sub> salió temprano]]  
 "\*Who did you say that left early?" (Jaeggli (1985))
- (46) a. Qué<sub>i</sub> dices que no te explicas [por qué<sub>j</sub> [Juan se habrá comprado t<sub>i</sub> t<sub>j</sub>]]

- "??What do you say that you don't understand why John will have bought?"
- b. Quién<sub>i</sub> no sabes [cuánto [t<sub>j</sub> pesa]]
- "\*Who don't you know how much weighs?"
- (Torrego (1984))

Why should this be so?

Note that these languages allow free inversion of subjects:

- (47) a. Ha telefonato Gianni  
 "Gianni has telephoned" (Rizzi (1982))
- b. Contestó la pregunta Juan  
 "Juan answered the question" (Torrego (1984))

It has often been claimed that the availability of this process is responsible for the lack of subject/object asymmetries. This line of reasoning fits our proposal. Suppose, following Koopman and Sportiche (1988), that an "inverted" subject occupies the SPEC/IP, where it receives Case from INFL, as in (48):

- (48) a. [IP [I' I [vp Ha telefonato]] Gianni]  
 b. [IP [I' I [vp Contestó la pregunta] Juan]

In our terms, Italian and Spanish allow INFL to Case-mark not only leftward but also rightward. This then implies that long extraction of a subject can originate from the SPEC/IP that appears on the right side of INFL, with the subject trace G-identified by INFL in LF before it raises to C.

In fact, there is considerable empirical evidence that this line of approach is on the right track:

- (49) a. Qué<sub>i</sub> dijiste [que compró t<sub>j</sub> quién]  
 Lit. "What did you say that bought who?"
- b. \*Qué<sub>i</sub> dijiste [que quién compró t<sub>j</sub>]  
 "\*What did you say that who bought?"

In Spanish subject *Wh*-phrases can remain in situ in the inverted position, but not in the preverbal position. Jaeggli (1985) establishes on the basis of this contrast that long extraction of subjects must originate from the inverted position; if it originates from the preverbal position, as in (49b), then the familiar *that-t* effects result. Other pieces of evidence are presented by Rizzi (1982) for standard Italian, by Brandi and Cordin (1989) and Safir (1985a) for the Northern Italian dialects, by Raposo (1988) for European Portuguese and by Kenstowicz (1984) for the Bani Hassan Arabic dialect.<sup>21</sup> These works all point to the same conclusion: the lack of the well-known subject/object asymmetries in these languages is due to the parameter that makes extraction from the inverted position available.

### 5.3. Subject/Object Asymmetries in Spanish.

Our approach has interesting consequences for the surprising asymmetries in Spanish discussed by Torrego (1984) and Jaeggli (1985). In the context of obligatory subject inversion, subjects can be extracted out of indirect questions, whereas objects cannot, as exemplified in (50):

- (50) a. Quién no sabes qué compro  
           "\*Who don't you know what bought?"  
       b. \*Qué no sabes quién compró  
           "??What don't you know who bought?"

(Jaeggli (1985))

These asymmetries are rather surprising in that they show the situation exactly opposite to that found in English. Since the grammaticality of (50a) directly follows from the analysis presented in 5.2, what needs an explanation is (50b).

According to Torrego, the contexts in which the asymmetries arise involve obligatory inversion of subjects. Let us assume with Torrego and Jaeggli that in Spanish *V* obligatorily moves to *C* at *S*-structure when the *SPEC/CP* contains a *Wh*-phrases (or its

trace). Then the relevant part of the LF structure of (50b) is as follows:

- (51)  $Qué_i \dots [CP \text{ quién}_j [C \text{ compró}_k C] [IP t_j [VP t_k t_i]]]$

Recall that we assumed that traces do not function as G-identifiers. Thus in order to G-identify  $t_i$ , the lexical V in C must head-govern the trace. It follows from Baker's (1988) Government Transparency Corollary that *compró* governs  $t_i$ . But it does not head-govern the trace, since the V incorporated to C, which does not agree with C in any sense, does not count as a head. Hence (50b) is ruled out as an ECP violation. This case seems to lend additional support to the proposal for the relative notion of head.

At this point one might wonder why the following example of a simple question is grammatical:

- (52)  $Qué_i$  (le) dijo María  $t_i$  a Juan  
 "What did Maria tell Juan?" (Torrego (1984))

This example also involves the preposing of V to C at S-structure. But it is different from (50b) in that it also involves movement of the antecedent of the object trace to the same CP as the preposed V occupies. Suppose that the *Wh*-phrase moves to the SPEC/CP via adjunction to VP, as in (53):

- (53)  $[CP \text{ Qué}_i [C \text{ (le) dijo}_j C] [IP \text{ María} [VP t_j'] [VP t_j t_i \text{ a Juan}]]]$

Given the underlying assumption adopted by Kayne (1987) and Chomsky (1989) that agreement is contingent upon a government relation between an  $X^0$  with agreement features and an XP, it follows that  $t_j$  agrees with  $t_j'$  if we assume that V has agreement features. Given an antecedent-trace relation, this amounts to saying that *dijo* agrees with *Qué*. Since the latter agrees with C, the former agrees with C by transitivity and hence, as a



head, head-governs the object trace.

In the above account we appealed to agreement between V and a VP-adjoined position. This line of approach might be extended to agreement between INFL and an IP-adjoined position. The relevant case is the one where V moves to INFL and its object is extracted. If Pollock (1989) is correct, the following French sentence represents this case:

- (54) L'homme [ $Op_j$  que [ $I_e$  crois [ $Cp$   $t_i$ ']'] que [ $IP$   $t_i$ '] [ $IP$  Jean [ $I$  connaît $_j$   $Il$  [ $VP$   $t_i$ '] [ $VP$   $t_j$   $t_i$ ]]]]]  
 "The man that I believe that Jean knows"  
 (Rizzi (1989))

In (54) the object trace must be head-governed by the raised V. The question is whether the V raised to INFL counts as a head or not. If we take into account the intermediate trace adjoined to IP as well as the VP-adjoined one, our answer to this question will be positive:  $t_j$  agrees with  $t_j'$  and as a result, *connaît* agrees with  $t_j'$ , which in turn agrees with INFL. Hence the raised V agrees with INFL by transitivity and counts as a head. Note that if this line of reasoning can be maintained, adjunction to IP is not only an option but also a must (see 4.4).

#### 5.4. A Note on Yiddish.

Finally, let us consider Yiddish. The relevant paradigm, cited from Diesing (1990), is given below:

- (55) a. \* $Ver_j$  hot er moyre [ $az$  [ $t_j$  vet kumen]]  
 "Who is he afraid that will come?"  
 b.  $Ver_j$  hot er moyre [ $vet$  [ $t_j$  kumen]]  
 "Who is he afraid will come?"  
 c.  $Ver_j$  hot er nit gevolt [ $az$  [[ot di bikher] $_j$  zol  $t_i$  leynen  $t_j$ ]]  
 "Who did he not want that the books, should read?"

(a) and (b) show the presence of *that-t* effects in this language. Yiddish is an SVO language and so the subject trace must be head-governed by INFL from the left, which is impossible in (a) because of the presence of an overt complementizer. If the complementizer is absent, the finite verb moves to C in Syntax as in (55b), as is often the case with V2 languages, and the subject trace is G-identified by the raised INFL.

So far so good. Curiously enough, however, (55c) is grammatical despite the presence of overt C. Note that this sentence involves topicalization of the object in the embedded clause. Noting the fact that topicalization occurs quite freely, Diesing claims that in Yiddish the SPEC/IP functions either as a Case-marked A-position or as a Case-free operator position. Assuming the VP-internal subject hypothesis put forward in recent literature, she further argues that a subject is Case-marked in the SPEC/IP when topicalization does not take place, while it is Case-marked inside VP when some topicalized element occupies the SPEC/IP. This amounts to saying that INFL in Yiddish can Case-mark both rightward and leftward, just as INFL in Romance languages though the specific Case-positions are different (see 5.2).

It then follows that in case (55c), where the embedded object topicalizes, the subject trace is inside VP and is head-governed by INFL to its left in LF before INFL moves to C, that is, G-identified. Hence the grammaticality. Notice that the same derivation is not possible for (55a), where topicalization does not occur, since in such a case the SPEC/IP, which functions either as a Case-marked A-position or as an operator position, is necessarily a Case-marked A-position.

### 5.5. Extraction of Adjuncts.

So far we have considered exclusively the typological variation related to extraction of arguments. Now let us consider extraction of adjuncts. Are there any differences among languages in this case as well? Recall that in order to be G-identified, an EC must be governed by the category that as-

sociates it with an FI-feature for it from a canonical position of the category. In the case of traces in Case-marked positions, this position is defined as a (right/left) head position, whereas in the case of traces in non-Case-marked positions, this position is defined as an "SP position", which means the SPEC in the case of XP-movement. Then our proposed system predicts that facts concerning adjunct extraction will not vary in the same way as those concerning argument extraction. This prediction seems to be borne out. Observe the following data from Italian, Spanish and Japanese:

- (56) a. \*Come<sub>i</sub> non sai [che problema<sub>j</sub> [potremo risolvere t<sub>j</sub> t<sub>i</sub>]]  
 "\*How don't you know which problem we could solve?"  
 (Rizzi (1989))
- b. \*Porque<sub>i</sub> no sabes [cuando<sub>j</sub> salio<sub>k</sub> [Juan t<sub>k</sub> t<sub>j</sub> t<sub>i</sub>]]  
 "\*Why don't you know when Juan left?"  
 (Jaeggli (1985))
- c. \*Kimi-wa [John-ga naze sore-o katta kadooka] siritai no  
 "\*Why do you want to know whether John bought it?"  
 (Lasnik and Saito (forthcoming))

As we saw above, these languages do not exhibit the sort of subject/object asymmetries that English and French do; nevertheless, they do not allow an adjunct to be extracted out of a *Wh*-island, just like English and French.<sup>22</sup> These facts suggest that the line of approach that we adopt here is on the right track.<sup>23</sup>

These considerations might lead us to conclude that there are no variations among languages concerning adjunct extraction. Interestingly, however, there are cases in which adjunct extraction varies from language to language: those involving *Wh*-adjuncts left in situ. First consider the following well-known fact in English:

- (57) a. \*Who left why  
 b. [CP Who<sub>i</sub> why<sub>j</sub> [IP t<sub>i</sub> left t<sub>j</sub>]]

The subject trace is G-identified after INFL moves to C, as seen above. Under our system the adjunct trace must be governed by its antecedent from the SPEC. Suppose that in languages like English a *Wh*-phrase in situ moves to the *Wh*-phrase that occupies the SPEC/CP, as a process of "absorption" (cf. Higginbotham and May (1981)), so that the former can also be interpreted as a focus of question. In this case the landing site of LF-movement is not the SPEC but a position for absorption. Thus antecedent-government from a canonical position fails and the adjunct trace violates the ECP.

In contrast, *Wh*-adjuncts can be left in situ in German and in Japanese, as pointed out by Haider (1986):

- (58) a. Wer ist weshalb weggegangen  
       "\*Who left why?"  
 b. Dare-ga naze kita no  
       "\*Who came why?"

What is the difference between English and these languages? The difference is not whether there is syntactic *Wh*-movement or not, considering German, where a *Wh*-phrase must move to the SPEC/CP in Syntax if the position is available. It has often been pointed out that German and Japanese exhibit the so-called "scrambling" effects. I would like to suggest that the existence of scrambling in these languages is the key factor in distinguishing them from English. To be specific, let us propose that IP and VP in these languages have the property such that the position immediately dominated by the topmost segment is defined as the SPEC. Given Fukui's (1986) claim that the SPEC "closes off" the projection, we can say that IP-adjunction and VP-adjunction in these languages are adjunction to a projection that is not closed off, and that hence scrambling is possible.

Let us generalize this property of IP and VP to CP, as a

property of the system of category projection in these languages: if an operator adjoins to CP, the adjoined position counts as its SPEC. It then follows that the *Wh*-adjuncts in (58) move to the SPEC/CP at LF, G-identifying their traces, as shown in (59):<sup>24</sup>

- (59) [CP naze<sub>i</sub> [CP dare<sub>j</sub> [IP t<sub>j</sub> t<sub>i</sub> kita] no]]

This is impossible in English, however, whose system of category projection defines the SPEC as the position immediately dominated by the lowest maximal segment.

Note that more than one *Wh*-adjunct cannot be licensed even in Japanese:

- (60) a. Dare-ga nani-o naze katta no  
 "\*\*Who bought what why?"  
 b. Dare-ga nani-o dooyatte tukutta no  
 "\*\*Who made what how?"  
 c. \*Dare-ga {naze dooyatte/dooyatte naze} kita no  
 "\*\*Who came how why?"

Under the present analysis this fact directly follows: an XP has just one SPEC and so even in Japanese, only the topmost position is defined as the SPEC. Therefore there is just one position in CP where adjuncts can G-identify their traces.

Further, the picture appears more complex when one examines *Wh*-adjuncts in Japanese more closely. As pointed out by Maki (1990), the acceptability varies if the surface order of an argument and an adjunct is reversed:

- (61) a. Dare-ga naze kita no (= (58b))  
 "\*\*Who came why?"  
 b. ?\*Naze dare-ga kita no  
 (62) a. Dare-ga nani-o naze katta no  
 "\*\*Who bought what why?"  
 b. ??Dare-ga naze nani-o katta no

## c. \*Naze dare-ga nani-o katta no

On the assumption that LF-movement of a *Wh*-phrase originates from its S-structure position, our approach can predict this fact. In order to G-identify its trace, a *Wh*-adjunct must move to the SPEC/CP, which is the topmost adjoined position. In other words, it must move to the highest position inside CP. If a *Wh*-adjunct originates from a position higher than a *Wh*-argument, the resulting LF structure causes the "crossing" effects discussed by Pesetsky (1982, 1987). The most degraded status of (62c) is perhaps due to the double violations of the constraint caused by the presence of two *Wh*-arguments in positions lower than a *Wh*-adjunct.<sup>25</sup>

To summarize, as is obvious from the discussion in this section, the proposed system of G-identification is connected to the parameters that determine the surface form of a language: the direction of Case-marking and the position of the SPEC. This is our answer to the second question of (4). To the extent that such a parameter, whatever form it may take, is required by considerations independent of the ECP, this proposal seems to be well-motivated. Furthermore, given that both the direction of Case-marking and the position of the SPEC are determined by the properties of  $X^0$ -categories in a particular language, it satisfies the general requirement for the adequate theory of parameters: that parameters be associated only with the properties of Lexicon, not with those of the computational system, that are learnable from the surface form (see Borer (1984), Fukui (1988b) and Chomsky (1989)).

## 6. The System of C-Identification.

### 6.1. The Proper Binding Condition.

Now let us turn to the other component of the ECP: C-identification. Recall that C-identification is necessary to recover the semantic content of an EC. Here I claim that the ways that ECs are C-identified vary depending upon their syntactic status. That is, there are three types of C-identification

and their intuitive statements are given below:

- (63) a. A trace is C-identified by the proper linking of a chain.  
 b. pro is C-identified by a "rich" AGR or a discourse topic.  
 c. PRO is C-identified by its controller.

Note that our proposal for (63) is the answer to the third question of (4): the ECP covers not only nonpronominal but also pronominal ECs. Since (63c) falls under the adequate theory of Control, which is beyond the scope of this attempt, I will not address the matter here.

Let us consider (63a) first. Intuitively, if a trace is to be interpreted, it must be in a proper relation to its antecedent, which determines its semantic content. What kind of relation between a trace and its antecedent is considered proper? Given that the relation between them is a chain relation, let us impose the following chain-condition on this relation:

- (64) A chain is a proper chain iff all its links meet a binding relation.

Condition (64) is reminiscent of the Proper Binding Condition first proposed by Fiengo (1977). Lasnik and Saito (forthcoming), further extending the condition, propose the following Generalized Proper Binding Condition:

- (65) Traces must be bound throughout a derivation.

That this condition is necessary in addition to the ECP is shown by the following examples, which violate Subjacency (or the Subject Condition):

- (66) a. ?\*Who<sub>i</sub> did [pictures of t<sub>i</sub>] please you  
 b. ?\*Who<sub>i</sub> was [a picture of t<sub>i</sub>]<sub>j</sub> taken t<sub>j</sub>

Details aside, Lasnik and Saito remark that if extraction proceeds via VP-adjunction leaving no trace in the VP-adjoined position in (66a), no Subjacency violation should be expected in their system of barriers, contrary to fact. Neither the Proper Binding Condition of Fiengo nor the ECP can exclude this derivation, since both are conditions on representations and no offending trace is present at S-structure and at LF. Condition (65), on the other hand, correctly rules out such a derivation, since the initial trace is not bound at the stage after VP-adjunction:

(67) did [<sub>IP</sub> [pictures of <sub>t<sub>i</sub></sub>] [<sub>VP</sub> who<sub>j</sub> [<sub>VP</sub> please you]]]

A less theory-internal argument in favor of (65) can be given by considering (66b). As Toshifusa Oka (personal communication) has pointed out, without (65), there would be a potential Subjacency loophole in the derivation of (66b). Suppose that the *Wh*-phrase adjoins to VP first, next the DP containing its trace moves to the SPEC/IP, and then the *Wh*-phrase moves from the VP-adjoined position to the SPEC/CP. Note that this derivation meets the Principle of the Strict Cycle. Since the *Wh*-phrase is not extracted out of a subject in this derivation, (66b) should also meet Subjacency (or the Subject Condition), contrary to expectation. It is obvious that this derivation violates (65) at the stage after the second movement:

(68) [<sub>IP</sub> [a picture of <sub>t<sub>i</sub></sub>]<sub>j</sub> [<sub>VP</sub> Who<sub>j</sub> [<sub>VP</sub> taken <sub>t<sub>j</sub></sub>]]]

Note that the ECP cannot rule out the derivation for the same reasons as it can not in the case of (66a).

Is (65) a condition completely independent of the ECP? Considering that this condition refers exclusively to traces, it seems to be desirable to incorporate it into the ECP; specifically, into the definition of C-identification for traces in our terms. And this is the answer to the last question of (4): the



effects of the (Generalized) Proper Binding Condition are derived from the C-identification requirement for traces. Now C-identification for traces is defined in terms of the notion of "proper chain" defined in (64):

- (69) A trace is C-identified iff it is in a proper chain throughout a derivation.<sup>26</sup>

It then follows that the relevant traces in the hypothetical derivations in (67) and in (68), namely  $t_i$ 's, are not C-identified. Although they are G-identified by their Case-assigners, they are marked ungrammatical under the present system of the ECP: the conjunction of two components, namely, G-identification and C-identification.<sup>27</sup>

## 6.2. Licensing *pro*.

Recall that our answer to the question in (4c) was "no". The proposed system of the ECP covers all kinds of ECs: they all must be G-identified as a syntactic gap, and their semantic contents must be recovered by C-identification. This whole system has interesting consequences for the distribution of *pro*.<sup>28</sup>

In (63) I tentatively stated that *pro* is C-identified by a "rich" AGR or a discourse topic. Clearly, this statement reflects the recent work devoted to the study of the parametric variation with respect to the licensing of *pro*. For example, consider Italian, Spanish and Japanese. In order to account for the fact that these languages allow *pro* to occur, it has been argued that AGR in Italian and Spanish is sufficiently rich, and that Japanese, like Chinese, is a "topic prominent" language (see Huang (1984)). These properties provide C-identifiers of *pro* for the languages. Since English and French have neither of the C-identifiers, they cannot license *pro*.

Notice that our system of the ECP states that *pro* must also be licensed as a syntactic gap through G-identification, which is a system completely independent of that of C-identification. Thus *pro*'s in Italian, Spanish and Japanese must also be G-

identified. What is an FI-feature for pro? As argued in section 1, there are two types of FI-feature: one is possessed by Case-assigners, and the other by antecedents. Given that pro has no antecedent, its surface position is only ensured by Case-marking. It then follows that G-identification of pro is fulfilled by its Case-assigner governing it from the canonical head-position. Under our hypothesis, then, G-identification is met in Italian/Spanish only if pro appears in the "inverted" subject position, since they are SVO languages. This claim has a number of implications that I will not address here. On the other hand, pro can be G-identified in the "normal" subject position in Japanese since it has an SOV order. In this way our system of the ECP makes a strong claim that pro must be licensed not only through C-identification but through G-identification, where Case plays an essential role.

Note that the proposal for introducing Case into the licensing condition for pro is not new. Rizzi (1986), Oka (1988b), Authier (1989), and Jaeggli and Safir (1989), among others, explicitly argue for the relevance of Case to the distribution of pro. But an important point here is that the effects of the conditions traditionally proposed to account exclusively for the distribution of pro are derived, as a direct consequence, from the system of the ECP as developed above. Considering the fact that pro is an EC, this is a desirable consequence of the system.

Finally, this system predicts that expletive pro, which has no semantic content to be recovered, can occur even in languages that lack C-identifiers of pro so long as the requirement of G-identification is met. This prediction appears to be borne out for German and Dutch. Consider the following data:

- (70) a. dass (\*es) getantzt wurde  
Lit. "that (there) was danced" (Haider (1989))  
b. dat (het) blijkt dat hij aardig is  
Lit. "that (it) appears that he kind is"  
(Weerman (1989))

Putting aside the problem with the impossibility of having an expletive subject in embedded contexts in German, we understand that German and Dutch do allow expletive subjects to be null. Suppose that such cases involve the presence of expletive *pro* in the subject position, as Safir (1985b) argues for German. It then follows that German and Dutch allow expletive *pro* to occur as a subject of a tensed clause, while neither of them allows thematic *pro* to occur. Under our system of the ECP this apparently mysterious state of affairs can be correctly explained, since although C-identification of thematic *pro* can never be satisfied, because of the absence of rich AGR and a discourse topic, G-identification of subject ECs is trivially satisfied in SOV languages, as argued in 5.1.<sup>29</sup> Hence the presence of expletive *pro*.

This line of reasoning leads us to suspect that other OV languages have the same property. In fact, Weerman (1989) points out that Germanic OV languages, such as Dutch, German, Frisian and Old English, do have optional expletives in tensed clauses, whereas VO languages, such as English, Danish, Norwegian and Swedish, do not. The correlation between the OV order and the presence of expletive *pro* is reminiscent of the correlation, noted in 5.1, between the OV order and the absence of *that-t* effects. Weerman further suggests that the two kinds of phenomenon, namely, the presence of expletive *pro* (or the optional absence of expletives, in his terms) and the absence of *that-t* effects may be related to the single OV/VO parameter. Obviously, we obtain these results as an immediate consequence of the system of the ECP, which in turn gives the system an additional advantage.

Less straightforward and more interesting cases are found in French. French, like German and Dutch, does not have C-identifiers of *pro* (namely, rich AGR or a discourse topic), hence excluding thematic *pro*, as has been claimed in the literature; but it, unlike German and Dutch, cannot G-identify an EC in the subject position of a tensed clause, either, unless

its antecedent occupies the SPEC/CP, triggering agreement between C and its SPEC. This is because French is an SVO language and the canonical direction of head-government is from left to right, just as in English. Thus it also excludes expletive *pro* from the subject position of a tensed clause. Nevertheless, it allows this element to occur as a subject of a small clause, as discussed by Authier (1989):<sup>30</sup>

- (71) a. {*Ça*/\**pro*} ennuie Jean que Marie soit partie  
 " {It/\**pro*} annoys Jean that Marie left"  
 b. Jean trouve [{*ça*/*pro*} stupide] que Marie soit  
 partie  
 "Jean finds {it/\**pro*} stupid that Marie left"<sup>31</sup>

Under the present system this unexpected contrast directly follows. The subject position of a small clause is governed, hence Case-marked by the verb that takes the small clause as its complement. Since the canonical direction of head-government is from left to right in French, expletive *pro* appearing in the subject position of a small clause can be G-identified, in contrast to that appearing in the subject position of a tensed clause. This is an important difference between French and Italian/Spanish, where free inversion of subjects is possible and the subject of a tensed clause can be G-identified by INFL in the inverted position, which renders possible the occurrence of expletive *pro* there.

## 7. Conclusion.

In this paper I addressed the issue concerning the proper formulation of the ECP within the framework of principles-and-parameters approach. It was proposed that the ECP consist of two components, namely, G-identification, which licenses the syntactic position of a gap, and C-identification, which recovers its semantic content. The way of G-identification is determined by FI-features for ECs, where Case plays an essential role, whereas the way of C-identification varies depending upon

the syntactic status of ECs. It was shown that this model of the system of the ECP is tenable both conceptually and empirically, that it has an immediate impact on certain theoretical domains concerning movement and Case Theory, and that it has a number of interesting consequences for the typological variations found in the distribution of traces and pro.

#### NOTES

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<sup>1</sup> This line of reasoning is not new; Rizzi (1986, 1989), among others, explicitly differentiates between "formal licensing" and "identification", the former being the component for G-identification, and the latter the component for C-identification, in our terms. As will be clear, however, the specific details of the mechanism of G-identification that will be proposed below are quite different from those of Rizzi's formal licensing. Note also that Rizzi separates his identification component from the ECP. This is another difference between the two approaches.

<sup>2</sup> For relevant discussion, see Baker (1988: 3.4).

<sup>3</sup> In the case of  $X^0$ -movement, I will assume that the landing site of this movement is an SP position, following the proposal put forth by Rizzi and Roberts (1988) that  $X^0$ -movement (except for clitic-movement) is subsumed under substitution rather than adjunction.

<sup>4</sup> The fact that (1a) is more or less marginal is due to a (weak) violation of Subjacency. I will ignore considerations related to Subjacency throughout this paper.

<sup>5</sup> For Chomsky (1986b) *Wh*-Islands constitute barriers; for Rizzi (1989), on the other hand, they induce Relativized Minimality effects. The choice between the two types of approach is not relevant for our discussion here (but see 4.4). Following Lasnik and Saito (forthcoming), I assume throughout this paper that VP is not a barrier.

<sup>6</sup> I will discuss INFL-movement at LF in more detail later in section 3.

<sup>7</sup> Note that the alleged "head-head agreement" between C and  $t_j$  is ignored here. If selection between C and INFL were a result of agreement, as claimed in Takano (1989), the adjoined I would always agree with C and count as a head. This would lead to a loss of explanation of *that-t* effects, an undesirable situation. Here I claim instead that the selectional facts are not due to agreement but due to a checking of feature-matching applied after INFL-raising at LF.

<sup>8</sup> It should be kept in mind that the presence of the overt SPEC/CP or of the overt C does not block antecedent-government. Thus the raised INFL antecedent-governs its trace in spite of their presence; otherwise, tense-interpretation would be impossible in (1) and (3b). Recall that traces left by  $X^0$ -movement require antecedent-government rather than head-government, and that antecedent-government has nothing to do with the notion "head", which is defined in terms of agreement.

<sup>9</sup> I am indebted to Kazue Takeda (personal communication) for this point.

<sup>10</sup> The following examples, cited from Lasnik and Saito (forthcoming), are problematic to the present claim:

- (i) a. \*I wonder [ $who_j$  C [ $this\ book_j$  [ $t_j$  likes  $t_j$ ]]]
- b. \* $Who_j$  do you think [ $t_j$ ' C [ $this\ book_j$  [ $t_j$  likes  $t_j$ ]]]

Kroch (1989) also points out a similar example. I would like to suggest that the unacceptability might be due to the so-called "crossing" effects discussed by Pesetsky (1982a, 1987), in addition to a weak violation of Subjacency. Note that the topical-

ized phrase is an adjunct in (18b). So it might be that (18b) involves no movement of the topic, inducing no effects of cross-ing. I thank Masaharu Shimada (personal communication) for bringing Kroch's work to my attention.

11 Although Chomsky (1981), Kayne (1983) and Aoun et al. (1987) judge examples involving LF-extraction of subjects of tensed clauses as ungrammatical, Bresnan (1977), Lasnik and Saito (1984, forthcoming) and May (1985) consider similar examples as marginally acceptable. I suspect that the availability of what Pesetsky (1987) calls "D-linked" reading may affect the judgments in the latter works.

12 Under our system the so-called *for-t* effects, which arise when a *Wh*-phrase moves over the prepositional complementizer *for* in Syntax, are predicted to meet the ECP. This is inconsistent with the lines of much recent work, along which they are explained as ECP violations. On the other hand, considering the dialectal variations that these effects exhibit, as discussed in Chomsky and Lasnik (1977), it may be desirable to dissociate them from *that-t* effects and deal with them by means of a surface filter, along the same lines as Chomsky and Lasnik.

13 Here one should not confuse the barrierhood of a preposed phrase with the barrier created by adjunction discussed in section 2. This section discusses cases where the preposed phrase constitutes a barrier for an element inside the preposed phrase itself. Note that our claim that the preposed IP constitutes a barrier is incompatible with Lasnik and Saito's (forthcoming) claim that an A'-binder does not constitute a barrier. But our claim is consistent with the evidence presented by Oka (1988a) that a complement CP constitutes a barrier when moved rightward:

- (i) a. Why<sub>i</sub> did you believe [that John left t<sub>i</sub>]
- b. \*Why<sub>i</sub> did you believe t<sub>j</sub> at that time [that John  
         left t<sub>i</sub>]<sub>j</sub>

Note further that if we are correct on this point, it follows

that IP can be an intrinsic barrier, contrary to Chomsky's (1986b) claim.

14 I thank Koichi Takezawa (personal communication) for bringing Zagona's work to my attention.

15 In Takano (1989) I claimed that there is agreement between D and nominal INFL that is responsible for the selectional facts found between them. This claim can no longer be maintained here for obvious reasons, though. See note 7.

16 My argument in Takano (1989) that D has no SPEC-head agreement features was based on the fact that no element appears to the left of D. There is another possibility, however: that every referential DP has in its SPEC a null operator that is responsible for the reference of the whole DP, and that D always agrees with this null operator. Although they may have different consequences, the two approaches are equivalent for our present purposes.

17 Under the present context the so-called "que-qui conversion" in French can be considered to be a reflection of SPEC-head agreement in the projection of CP.

18 Haider (1985) and Hoeksema (1985) also judge as grammatical extraction in *that-t* contexts in German and in Dutch, respectively. For some dialectal differences related to subject extraction, see Fanselow (1987) and Rizzi (1989) for German and Maling and Zaenen (1978) for Dutch. At present I have no elaborate account of these facts concerning dialectal variations, but I suspect that they might have to do with the general difficulty with extraction out of tensed clauses that has been detected in the relevant dialects.

19 Haider (1989) observes that Dutch exhibits superiority effects, in contrast to German, and attempts to account for this discrepancy by invoking different Case-systems in these languages. Under our system, on the other hand, such a discrepancy remains a mystery, if his observation is correct.

20 Rizzi (1989) argues against the approach that relates the direction of Case-marking to the ECP, by noting the fact that adjectival specifiers cannot be extracted in German (and



Dutch):

- (i) a. [AP Wie lang]<sub>i</sub> ist es t<sub>i</sub>  
       "How long is it?"  
       b. \*Wie<sub>i</sub> ist es [AP t<sub>i</sub> lang]  
           Lit. "How is it long?"

Rizzi claims that (ib) should be grammatical under such a hypothesis, since the direction of Case-marking (by V) in German (and Dutch) is right to left and the relevant trace in (1b) can be governed from the right. But there seems to be another possibility to be explored here. Consider the following examples:

- (ii) a. [DP Was für Museen]<sub>i</sub> hast du in Italien t<sub>j</sub> besucht  
 "What sort of museums did you visit in Italy?"  
 b. Was<sub>i</sub> hast du in Italien [DP t<sub>j</sub> für Museen] besucht  
 Lit. "What did you visit sort of museums in Italy?"  
 (den Besten (1985))

The latter example shows that nominal specifiers can be extracted in German. The same effects are observed in Dutch as well (see den Besten (1985)). It can be claimed on the basis of these facts that adjectival specifiers resist extraction for some unknown reasons other than the ECP. If this claim is established, Rizzi's counterargument based on the facts like (i) will not be maintained.

21 For a summary of these works, see Rizzi (1989: 2.6). For an argument against Rizzi's (1982) approach, see Koopman and Sportiche (1988).

22 Fukui (1988a) claims that (LF-)extraction of *naze* in Japanese is less restricted than extraction of *why* in English. If this is the case, the facts concerning adjunct extraction in Japanese will not be so straightforward as I claim in the text. I leave this matter to future research.

<sup>23</sup> Rizzi (1989) also notes the dissociation concerning the typological variation between adjunct extraction and argument

extraction.

24 According to Haider (1989), if the order of the two Wh-phrases is reversed, the resulting structure is still grammatical:

- (i) Weshalb ist wer weggegangen  
 "Why did who leave?"

This fact poses a potential problem to our proposal in the text: why is it that the *Wh*-adjunct preposed in Syntax can G-identify its trace after the *Wh*-argument adjoins to CP, with the adjoined position regarded as the SPEC? Recall that in German syntactic *Wh*-movement is obligatory, just as in English. Thus German is like Japanese in a sense and is also like English in another sense. Here I would like to suggest that German invokes both Japanese and English strategies, and that in case (i) the "absorption" strategy is appealed to, as in English (recall that the subject trace can be trivially G-identified by INFL in SOV languages like German, in contrast to SVO languages like English).

25 In the case of *Wh*-arguments order change does not affect the acceptability, as predicted by our analysis:

- (i) {Dare-ga nani-o/Nani-o dare-ga} katta-no  
"Who bought what?"

26 Two problems remain at this point. First, NP-traces exhibit curious behavior with respect to G-identification and C-identification:

- (i) a. They all said that John was watched by the FBI, and  
[watched t<sub>i</sub> by the FBI]<sub>j</sub> he<sub>i</sub> was t<sub>j</sub>  
(Akmajian, Steele and Wasow (1979))  
b. [How likely t<sub>i</sub> to win]<sub>j</sub> is John<sub>i</sub> t<sub>j</sub> (Rizzi (1989))

In (i) the relevant NP-traces are neither G-identified nor C-identified, because of VP-preposing. Nevertheless, the examples

in (i) are grammatical. It might be that some sort of "chain-binding" is at work in the case of NP-traces. For another possibility, see Lasnik and Saito (forthcoming).

Second, if Chomsky (1989) is correct, some sentences in English involve the lowering of INFL in Syntax. In such a case, again, the trace of INFL fails to be G-identified or C-identified. Chomsky argues that the lowered INFL raise to its base-position at LF. If this is the case, it seems that the trace left at the base-position of INFL need not be present at LF. Then it will follow that the trace in question can be deleted, and the problem under consideration will disappear.

27 If the ECP is to function as a filter at the LF-output, we will need something like the system of  $\gamma$ -marking proposed by Lasnik and Saito (1984), since both G-identification and C-identification are sensitive to an intermediate stage of a derivation.

28 Again, I will not be concerned with the licensing of PRO. It is a matter of future research how PRO, which is never assigned Case, is G-identified in our system.

29 According to Maling and Zaenen (1978), the distribution of *er*, another expletive element in Dutch, exhibits dialectal variation. Maling and Zaenen argue that this dialectal variation is closely related to that found in subject extraction (see note 18).

30 Jaeggli and Safir (1989) also point out this fact in French. They attribute the occurrence of expletive *pro* in the subject position of a small clause to the fact that French has a full paradigm of object clitics.

31 English does not allow expletive *pro* to occur in the context where French does, as is obvious from the translation. This difference between French and English might be attributed to the difference concerning the phonetic realization of accusative Case; that is, accusative Case is not necessarily realized phonetically in French, while the phonetic realization of this Case is obligatory in English. For relevant discussion, see Authier (1989).

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