

Two Types of Barriers for Movement*

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1. INTRODUCTION

Chomsky (1986) deals with two subtheories of government and bounding in GB theory and unifies the two concepts ('barrier' for government and 'bounding node') by a more natural notion *barrier*. It is reasonable to assume that certain maximal projections in certain structures are barriers for government and movement, and that the same maximal projections become barriers in both cases. Hence, the notion barrier is defined in such a way that government cannot cross one barrier and movement must not cross more than one barrier.

Barrier theory proposed by Chomsky (1986) has influenced most current theories of locality, and a number of recent works have developed new ways to the barrier-based approach to locality. These include Cinque (1990), Fukui (1991), Hasegawa (1986), Kuno and Takami (1993), Lasnik and Saito (1992), Manzini (1988, 1992), Müller and Sternfeld (1993), Nakajima (1987), and Takano (1988).

In this paper, I will focus on barriers for movement. I will demonstrate that although Chomsky (1986) contains many significant observations, his model is essentially untenable, and then I will advance an alternative model within the framework of the GB theory.

2. CHOMSKY'S (1986) MODEL

The notion barrier is defined in terms of blocking category (BC), which is in turn defined in terms of L-marking, as in the following:

(1) Barrier

γ is a barrier for β iff (a) or (b):

- a. γ immediately dominates δ , δ a BC for β ;
- b. γ is a BC for β , $\gamma \neq IP$

(2) Blocking Category (BC)

γ is a BC for β iff γ is not L-marked and γ dominates β

(3) L-marking

α L-marks β if α is a lexical category that θ -governs β

These definitions show that the notion barrier is defined in two ways. A maximal projection can be a barrier by inheritance if it immediately dominates a BC, and it can be an inherent barrier if it is not L-marked. It should be noted, however, that IP cannot be an inherent barrier, although it can be a barrier by inheritance and it can transmit its barrierhood to a maximal projection immediately dominating it.¹

Integrating the notion barrier with the locality condition on movement, the notion Subjacency is defined, and the Subjacency Condition is in turn defined, as in (4) and (5), respectively:²

(4) Subjacency

β is n-subjacent to α iff there are fewer than n+1 barriers for β that exclude α

(5) Subjacency Condition

- a. in a chain with a link (α_i, α_{i+1}) , α_{i+1} must be 1-subjacent to α_i
- b. 0-subjacency yields a more acceptable structure than 1-subjacency

Though the theory in (1)-(5) seems to give a unified account of various island violations, some problems still remain in this model, as pointed out elsewhere in the literature.³

Let us first consider simple *wh*-questions. An example like (6a) is assigned a structure like (6b) under Chomsky's analysis:

(6) a. who_i did you see t_i

b. $[_{CP} \text{who}_i \text{ did } [_{IP} \text{you } [_{VP} \text{see } t_i]]]$

BC	BC
#	# (# = barrier)

In (6b), VP is an inherent barrier since it is not L-marked, and IP is also a barrier by inheritance since it immediately dominates the BC VP. This yields a Subjacency violation, since *who*_i crosses two barriers. Hence, (6b) is incorrectly predicted to be ill-formed. To avoid this undesirable result, a principle of adjunction is proposed, as in (7):

(7) Adjunction is possible only to a maximal projection that is a nonargument

Following this principle, a *wh*-phrase can adjoin to VP, which is a nonargument. Thus, an example like (6a) is assigned a structure like (8), not (6b):

(8) [_{CP} *who*_i did [_{IP} you [_{VP} *t*'_i [_{VP} see *t*_i]]]]

In (8), the category VP consists of two segments of VPs. The first movement crosses not the category VP but only one segment of VP. In the second movement, VP is not a barrier for *t*'_i since the lower segment of VP does not dominate *t*'_i. IP, though it is a BC, is not an inherent barrier. Hence, the movement of *who*_i satisfies the Subjacency Condition, yielding the grammatical (6a).

The structure indicated in (8) shows that a *wh*-phrase must adjoin to VP to satisfy the Subjacency Condition. The operation of VP-adjunction, however, seems unnatural, because VP is never an available landing site for a *wh*-phrase like CP.⁴ This operation also seems to be incompatible with the notion of economy of derivation.

Let us next consider the Adjunct Condition. An example like (9a) is assigned a structure like (9b):

(9) a. **who*_i did you leave before meeting *t*_i
 b. [_{CP} *who*_i did [_{IP} you leave [_{PP} before meeting *t*_i]]]
 BC BC
 # #

In (9b), the adjunct PP is not L-marked and is therefore a BC and a barrier. Then, IP inherits barrierhood from PP. Thus, two barriers are crossed and sentence (9a) violates the Subjacency Condition. According to principle (7), however, since PP is a nonargument, *who*_i

can adjoin to it, yielding a structure like (10):

- (10) $[_{CP} \text{ who}_{i_1} \text{ did } [_{IP} \text{ you leave } [_{PP} t'_1 [_{PP} \text{ before meeting } t_i]]]]]$

In (10), PP is not a barrier for the same reason as VP in (8). This derivation voids the Adjunct Condition effect, and the sentence is predicted to be grammatical. This prediction, however, is not empirically borne out.⁵

The same problem arises in the relative clause case of the Complex Noun Phrase Constraint (CNPC), because a relative clause is a nonargument, to which adjunction is possible. Consider the following:

- (11) a. *what_i did you meet a child who read t_i
- b. $[_{CP} \text{ what}_{i_1} \text{ did } [_{IP} \text{ you } [_{VP} t'_1 [_{VP} \text{ meet } [_{NP} \text{ a child } [_{CP} \text{ who read } t_i]]]]]]]$

	BC
#	#
- c. $[_{CP} \text{ what}_{i_1} \text{ did } [_{IP} \text{ you } [_{VP} t''_1 [_{VP} \text{ meet } [_{NP} \text{ a child } [_{CP} t'_1 [_{CP} \dots t_i]]]]]]]]]$

A typical example like (11a) is assigned a structure like (11b) under Chomsky's model. In (11b), CP is a BC and a barrier, and NP, though not a BC because it is L-marked, inherits barrierhood from CP. Hence, two barriers are crossed, and a Subjacency violation results. As (11c) shows, however, the operation of CP-adjunction to *what*_i makes (11a) grammatical. This is surely not the correct result.

For the noun-complement case of the CNPC, an example like (12a) is assigned a structure like (12b):

- (12) a. *what_i do you believe the claim that John saw t_i
- b. $[_{CP} \text{ what}_{i_1} \text{ do } [_{IP} \dots [_{NP} \text{ the claim } [_{CP} t'_1 [_{C'} \text{ that } [_{IP} \text{ John saw } t_i]]]]]]]$

According to this model, there are no barriers in (12b): CP is L-marked; hence, it is not a BC and does not transfer barrierhood to NP, which is also not a BC because it is L-marked. The point to note here is that (12a) causes a weaker Subjacency violation than (11a) does. Hence, Chomsky suggests that although CP does not transfer barrierhood to NP, CP is an

inherent barrier since the noun *claim* assigns oblique Case to it.⁶ This suggestion, however, is problematic. It is not clear whether nouns assign oblique Case. It is also not clear why this Case-assignment constitutes an inherent barrier and why its barrierhood is not transmitted to the maximal projection immediately dominating it.

These observations show that there remain some serious problems with Chomsky's model. First, barriers by inheritance are redundant. Second, IP is treated as an exceptional category, in that it cannot be an inherent barrier.⁷ Third, and most importantly, principle (7) is too strong. It necessitates VP-adjunction in *wh*-movement and makes the wrong prediction about the unacceptability of the Adjunct Condition and the relative clause of the CNPC.

3. AN ALTERNATIVE MODEL

Having demonstrated that Chomsky's model does not provide a satisfactory account of the fundamental properties of *wh*-movement, I will now proceed to advance an alternative model. The notion barrier that I will propose is defined in terms of the notion H-marking, as in (13) and (14), respectively:⁸

(13) Barrier

γ is a *functional* barrier for β if

- a. γ is a maximal projection,
- b. γ dominates β , and
- c. γ is not H-marked

(14) H-marking

α H-marks β iff β is a complement of α

In (13), a maximal projection can be a barrier if it is not H-marked. I call it a *functional* barrier since the notion barrier is defined solely in terms of H-marking. Thus, the definition of barrier is simplified by eliminating barriers by inheritance. It should be noted that IP and VP are never barriers since they are H-marked by C and I, respectively. Hence, the operation of VP-adjunction becomes unnecessary. Furthermore, the exceptional status of IP need not be stated with respect to barrierhood.

The elimination of barriers by inheritance leads to the simplification of the Subjacency Condition. This means that crossing only one barrier rather than two barriers causes a Subjacency violation, as in (15):

(15) Subjacency Condition

β is subjacent to α iff there is no *functional* barrier for β that exclude α

With this much as background, let us now consider simple *wh*-questions. The proposed theory assigns an example like (16a) a structure like (16b):

- (16) a. who_i did you see t_i
b. $[_{CP} \text{ who}_i \text{ did } [_{IP} \text{ you } [_{VP} \text{ see } t_i]]]$

In (16b), IP and VP are H-marked and no functional barriers are crossed, satisfying the Subjacency Condition. It is remarkable that (16b) need not use VP-adjunction like (8) to be well-formed. Hence, economy of derivation is respected.

Let us now turn to some standard island violations. Consider first the Subject Condition and the Sentential Subject Condition. Typical examples are (17a) and (18a), which have structures like (17b) and (18b), respectively:

- (17) a. * who_i did pictures of t_i please John
b. $[_{CP} \text{ who}_i \text{ did } [_{IP} [_{NP} \text{ pictures of } t_i] \text{ please John}]]$
#

- (18) a. * what_i did that John saw t_i surprise you
b. $[_{CP} \text{ what}_i \text{ did } [_{IP} [_{CP} t'_i [_{C'} \text{ that } [_{IP} \text{ John saw } t_i]]] \text{ surprise you}]]$
#

Since NP in (17b) and CP in (18b) are not H-marked, they are functional barriers. This violates the Subjacency Condition, and the ungrammaticality of (17a) and (18a) is correctly predicted.

Similar considerations apply in the Adjunct Condition. A relevant example is (19a), and

its structure in (19b):

- (19) a. * who_i did you leave before you met t_i
 b. [_{CP} who_i did [_{IP} you leave [_{PP} before you met t_i]]]
 #

Here, the adjunct PP is generated as a sister of I'. In (19b), PP is not H-marked and is a functional barrier, thus yielding a Subjacency violation. It is noted that PP is still a functional barrier even if it is a sister of V'. Hence, the proposed theory can account for the Adjunct Condition, regardless of the position of adjunct clauses. According to principle (7), however, PP-adjunction is possible in (19b) since it is a nonargument:

- (20) [_{CP} who_i did [_{IP} you leave [_{PP} t'_i [_{PP} before you met t_i]]]]]

In (20), movement to the position of t'_i does not cross the category PP, and the same is true of movement to the Specifier position of CP (the CP Spec) from the adjoined position of t'_i . Hence, no barriers are crossed, voiding the Adjunct Condition effect. To avoid this undesirable result, therefore, the principle of Adjunction should be reformulated, as in (21):

- (21) Adjunction is allowed iff it creates a landing site for movement

According to (21), PP-adjunction in (20) is prohibited since the adjoined position is not a landing site for *who*. Furthermore, this principle limits the operation of adjunction to cases such as topicalization, extraposition, and heavy NP shift. Thus, the proposed theory in conjunction with principle (21) predicts that an example like (19a) is ungrammatical, whose structure is (19b), not (20).

Now consider the following examples of relative clause case of the CNPC:

- (22) a. * what_i did you meet a child who read t_i
 b. [_{CP} what_i did [_{IP} you [_{VP} meet [_{NP} a child [_{CP} who read t_i]]]]]
 #

In (22b), CP is a functional barrier since it is not H-marked. Since one barrier is crossed, a Subjacency violation results. Hence, (22b) is predicted to be ill-formed and yields the ungrammatical (22a).

With respect to the noun-complement case of the CNPC, consider next an example like (23a), and its structure in (23b):

- (23) a. **what_i* do you believe the claim that John saw *t_i*
 b. [_{CP} *what_i* do [_{IP} ... [_{NP} the claim [_{CP} *t_i* [_{C'} that [_{IP} John saw *t_i*]]]]]]]]

In (23b), the movement of *what_i* does not cross any barriers, since IP, CP, NP, and VP are H-marked and hence not barriers. Thus, the theory based on functional barriers incorrectly predicts that examples like (23a) should be grammatical.

This consideration shows that extraction is predicted to be possible so long as it takes place through H-marked positions, as pointed out by Hasegawa (1986). Though there is some truth in this prediction, it cannot apply to the unacceptable status of examples like (23a).

The contrast in grammaticality between (24a) and (24b) may lead to a solution to the prohibition against extraction of an element from a noun-complement clause:

- (24) a. *who_i* do you think [_{CP} (that) Mary saw *t_i*]
 b. **who_i* do you murmur [_{CP} that Mary hit *t_i*]

As shown in (24), bridge verbs such as *believe*, *know*, *say*, and *think* permit extraction of an element from their complement clauses, whereas non-bridge verbs such as *complain*, *grumble*, *murmur*, and *whisper* do not. It is also a well-known fact that bridge verbs permit syntactic deletion of the complementizer *that*, whereas non-bridge verbs do not, as illustrated in the following:

- (25) a. John claimed [_{CP} (that) Mary stole a diamond]
 b. John whispered [_{CP} *(that) Mary stole a diamond]

The behavior of non-bridge verbs in (24b) and (25b) is quite similar to that of the noun-

complement case of the CNPC.⁹ For instance, compare examples like (24b) and (25b) with those like (26a-b), respectively:

- (26) a. *who_i do you believe the rumor [CP that John likes t_i]
 b. I believe the rumor [CP *(that) John likes Mary]

In (26), noun-complement clauses permit neither extraction of an element from them nor the syntactic *that* deletion.

Now that functional barriers do not make sense with respect to the behavior of examples like (23b), (24b), (25b), and (26a-b), I propose a second type of barrier, *structural* barriers, which are solely based on structures themselves. I have attributed the unacceptability of these examples to the assumption that a structural barrier is generated under such a syntactic configuration as (27):

- (27) in the structure ...H [CP [C' that [IP ...]]] , if *that* is undeletable, CP is a *structural* barrier for an element in it

According to (27), an example like (23a) is assigned a structure like (28):

- (28) = (23b) [CP what_i do [IP ... [NP the claim [CP t'_i [C' that [IP John saw t_i]]]]]]
 #

In (28), CP becomes a structural barrier, and the movement crosses one structural barrier. This structure will cause a Subjacency violation if the notion of a structural barrier is incorporated into the Subjacency Condition in (15):

- (29) Subjacency Condition (revised)

β is subjacent to α iff there is no *functional* or *structural* barrier for β that excludes α

It follows that examples like (24b), (25b), and (26a-b) are all ungrammatical, violating the Subjacency Condition in (29). Thus, the proposed analysis in terms of structural barriers can account for the noun-complement case of the CNPC as well as non-bridge verbs, which

Chomsky's model cannot.

Let us finally consider the *Wh*-Island Constraint, with examples like (30a-b):

(30) a. ? which man_i do you wonder when_j to meet t_i t_j

b. ? *which man_i do you wonder when_j John will meet t_i t_j

(Haegeman 1991:492)

It is noted that examples like (30b) are less acceptable than those like (30a). Under the proposed theory, however, examples like (30a-b) are both assigned a rough structure like (31):

(31) which man_i do you wonder [CP when_j [IP ... t_i t_j]]

In (31), there are no functional barriers since both IP and CP are H-marked. Furthermore, structural barriers like (27) are not crossed. Thus, structure (31) is incorrectly predicted to be well-formed. To overcome this wrong result, it is necessary to assume that another structural barrier works in a structure like (31):

(32) in the structure ...H [CP wh [IP ... α ...]] , CP is a *structural* barrier for α , and if IP is tensed, IP is also a *structural* barrier for α

According to this structural barrier, examples like (30a-b) are assigned structures like (33a-b), respectively:

(33) a. [CP which man_i do [IP you [VP wonder [CP when_j [IP PRO to meet t_i t_j]]]]]]
#

b. [CP which man_i do [IP you [VP wonder [CP when_j [IP John will meet t_i t_j]]]]]]
#

In (33a), CP is a structural barrier, and it is predicted to be ill-formed. In (33b), IP, which is tensed, is also a structural barrier in addition to CP. It is also predicted to be ill-formed. It follows that examples like (30a-b) both contain Subjacency violations. Since (33b)

involves the crossing of two barriers, (30b) is a degraded sentence when compared to (30a). Thus, structural barriers like (32) lead to the *Wh*-Island Constraint effect.

Given the preceding arguments, the proposed theory on the basis of functional and structural barriers improves in several respects as compared to Chomsky's model, and it correctly covers a range of phenomena to be accounted for by the Subjacency Condition, although a few problems may remain.¹⁰

4. CONCLUSION

To summarize, I have given a critical examination of Chomsky's barriers model, pointing out that his analysis is not adequate in that it gives rise to a number of empirical problems. In this paper, I have advanced an alternative barriers model, formulating two types of barriers in terms of H-marking and structures. It has been indicated that the suggested approach can account for the relevant wide range of Subjacency violations. The proposed analysis has also been shown to be applicable to other examples unexplained by Chomsky's model such as extraction phenomenon involving non-bridge verbs. Together these considerations constitute strong support for the present theory, thus eliminating a number of stipulations in Chomsky's model and capturing significant generalization.

If the preceding discussion is correct, it follows that there are two types of barriers and that the barriers model should be revised along the lines suggested in this paper to account for the relevant range of data in *wh*-movement, including Island violations.

NOTES

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1. It is not clear at present whether IP is a defective category. For example, Cinque (1990), Lasnik and Saito (1992), Manzini (1992), and Takano (1988) treat IP in the same way as other maximal projections.

2. The theory in (1)-(5) is based on a number of notions, as in the following:

(i) a. dominance

α is dominated by β only if it is dominated by every segment of β

b. exclusion

α excludes β if no segment of α dominates β

c. segment

in the structure [_{σ} α [_{σ} ...]] , β consists of two segments

d. θ -government

α θ -governs β iff α is a zero-level category that θ -marks β , and α , β are sisters

e. government

α governs β iff α m-commands β and there is no γ , γ a barrier for β , such that γ excludes α

f. m-command

α m-commands β iff α does not dominate β and every γ , γ a maximal projection, that dominates α dominates β

3. See Hasegawa (1986), Fukui (1991), Lasnik and Saito (1992), Manzini (1992), and Kuno and Takami (1993) for relevant discussion.

4. According to Lasnik and Saito (1992), the operation of VP-adjunction is not necessary. They assume that VP is never θ -governed and hence L-marking is irrelevant for it. Since the notion of barrier is defined in terms of L-marking, VP can never be a barrier. It is not clear, however, that VP is not θ -governed since Chomsky (1986) assumes that VP is θ -marked by I.

5. Even if the adjunct PP is attached under VP, the same result holds. See Hasegawa (1986) and Manzini (1992) for relevant discussion.

6. Lasnik and Saito (1992) also adopts this assumption to explain the effect of the CNPC of the noun-complement type.

7. With respect to adjunction, IP is also exceptional. Though it is a nonargument, Chomsky (1986:5, 32) assumes that a *wh*-phrase may not adjoin to IP.

8. Takano (1988) proposes the notion of obstructing category in terms of H-marking, as in (i):

(i) Obstructing Category (OC)

α^{MAX} is an OC for β iff α^{MAX} is an H-marked BC for β and immediately dominates γ^{MAX} , which is H-marked but not L-marked and does not dominate β

He also defines the notion of barrier in terms of both BC and OC, as in (ii):

(ii) Barrier

α^{MAX} is a barrier for β iff (a), (b), (c) or (d):

- (a) α^{MAX} is a non-H-marked BC for β ;
- (b) α^{MAX} is an H-marked BC for β and immediately dominates another H-marked BC for β ;
- (c) α^{MAX} immediately dominates an OC for β ;
- (d) α^{MAX} immediately dominates a barrier defined by (a), (b) or (c)

In (iia), α^{MAX} is an inherent barrier, whereas in (iia-d), α^{MAX} is a barrier by inheritance. This barriers model is more complicated than Chomsky's, not to mention the proposed model. See also Takano (1988) for relevant discussion.

Manzini (1992) also proposes similar notion of H-marking, *G-marking*, as in (i):

(i) β g-marks α iff β is a head and

- a. β is a sister to α or
- b. β is a sister to a category that agrees with α

See also Manzini (1988, 1992) for her approach to locality theory for movement.

9. Most current theories of extraction face difficulties with respect to the behavior of non-bridge verbs. For instance, Cinque (1990) assumes that the notion of barrier is different for bounding and government theory, as in (i):

(i) a. Barrier for Binding / Bounding

every maximal projection that fails to be (*directly or indirectly*) selected in the *canonical direction* by a category nondistinct from [+V] is a barrier for binding

b. Barrier for Government

every maximal projection that fails to be *directly selected* by a category
nondistinct from [+V] is a barrier for government

According to (ia-b), however, CPs in (24b) and (25b) are not barriers for bounding and government since they are directly selected by verbs, [+V] elements. Thus, this model is inapplicable to examples like (24a) and (25a).

10. Consider first examples of preposition-stranding, as in (i):

- (i) a. what_{t₁} did the gang open the safe [_{PP} with t₁]
- b. what day_{t₁} did she arrive [_{PP} on t₁]
- c. which park_{t₁} did you find the rabbit [_{PP} in t₁]

(Takami 1988:302, 305)

In (i), PPs are all adjuncts and hence not H-marked. Thus, extraction of a *wh*-phrase from these PPs is prohibited because of crossing a functional barrier. It follows that examples like (ia-c) are not grammatical, which is untrue. See also Chomsky (1981, 1986), Hornstein and Weinberg (1981), Manzini (1992), and Takami (1988, 1992) for their analyses of preposition-stranding.

Examples such as (iia-b) are also problematic:

- (ii) a. *who_{t₁} did you see the picture [_{PP} of t₁]
- b. *who_{t₁} did you see John's picture [_{PP} of t₁]

According to the proposed theory, however, examples like (iia-b) should be grammatical. The ungrammaticality of these examples may be accounted for by the Specificity Condition, which states that extraction from specific NPs is not possible. See also Manzini (1992) and Diesing (1992) for their own approach to the unacceptable status of examples like (iia-b).

These considerations will render the present analysis inadequate with respect to the phenomena of the preposition-stranding and the Specificity Condition. I will leave these problems open in this paper.

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Eiji KAJIWARA

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