First published in: Proceedings of the First Cornell Conference on Government and Binding Theory, 109-126, 1983.

2 LF, ECP, and Non-Vacuous Quantification

For the purposes of this chapter I will assume that at the linguistic level of Logical Form (LF), all quantificational expressions appear in operator positions and all non-quantificational expressions appear in argument positions. I will examine the syntax of LF on the basis of a range of data from English, Chinese, and Japanese. Within this model, quantifier-variable representations may be derived by the rule Move α, which may be applied in the component of Syntax or in the component of LF. Sentences with ordinary quantificational NPs are subject to QR (May 1977), an instance of Move α. *Wh*-movement is taken to be a rule that applies universally, if not in Syntax then in LF. Thus, Chinese and Japanese differ from English not in having or not having a rule of *wh*-movement, but in where the rule may apply. Furthermore, we will treat all focused constituents as quantificational in some real sense, even if they do not involve movement in Syntax, on a par with ordinary quantificational NPs and *wh*-phrases.[1]

An important principle of grammar that will figure prominently in our discussion is the Empty Category Principle (ECP) of Chomsky (1981):

(1) ECP (Chomsky 1981):
A trace must be properly governed.

A category α is said to be properly governed if and only if (a) it is lexically governed, i.e., governed by a V, N, A, or P; or (b) it is "locally controlled," i.e., governed by its own antecedent. The notion government is defined, following Aoun and Sportiche (1983), as follows:

(2) Government (Aoun and Sportiche 1983):
α governs β iff every maximal category containing α also contains β, and conversely.

As is pretty well known, the ECP is intended to account for a fairly wide range of subject/object asymmetries observed in language. For example, the asymmetries illustrated by the following pairs of sentences are assumed to fall under the ECP:

(3) a. This is the book that I said that the man bought t.
b. *This is the man that I said that t bought the book.

(4) a. ?This is the book that I wonder how much you like t.
b. *This is the man that I wonder how much t likes the book.

(5) a. Je n'ai exige que la police arrete personne.
'I didn't require that the police arrest anybody.'
b. *Je n'ai exige que personne soit arrete.
'I didn't require that anybody be arrested.'

(6) a. Who remembers why we bought what?
b. *Who remembers why who bought the book?

Examples (3)–(4) illustrate a subject/object asymmetry under overt *wh*-movement, commonly known as the "COMP-trace effect." Example (5) illustrates the same asymmetry under the LF rule of QR, sometimes referred as Kayne's "ne personne effect" (Kayne 1979, 1981). And (6) illustrates the same asymmetry under abstract *wh*-movement in LF, the "superiority effect" in the sense of Chomsky (1973). In each of the (b)(but not (a)) sentences, a subject trace created either by Move α in Syntax or abstract movement in LF is neither lexically governed nor locally controlled, thus not properly governed, in violation of the ECP. In Chomsky (1981) it is further proposed that the asymmetry between legitimate raising with S'-deletion and illegitimate raising without S'-deletion, as shown below, may also be attributed to the ECP:

(7) a. John is likely [$_S$ t to win].
b. *John is probable [$_{S'}$[$_S$ t to win]].

Let us refer to asymmetries of the sort just illustrated as the "standard ECP effects." Of interest to our discussion here is that the full range of familiar ECP effects are apparently lacking in Chinese and Japanese. A single kind of evidence for this observation comes from the fact that, in these languages, one can question either a subject or an object embedded in an indirect question. For example, the sentence (8) in Chinese, with *shei* 'who' and *shenme* 'what' appearing syntactically unmoved in the embedded clause under *xiang-zhidao* 'wonder,' can be interpreted as a direct question on either 'who' or 'what.'[2]

(8) ni xiang-zhidao [shei mai-le shenme]?
you wonder who bought what

a. 'Who is the person such that you wonder what he bought?'
b. 'What is the thing such that you wonder who bought it?'

This is because the sentence can be uttered as a question to which either (9a) or (9b) may be an answer:

(9) a. wo xiang-zhidao [Lisi mai-le shenme].
I wonder Lisi bought what
'I wonder what Lisi bought.'

b. wo xiang-zhidao [shei mai-le shu].
I wonder who bought book
'I wonder who bought the book.'

The answer (9a) provides a value for the embedded 'who' in (8), and (9b) provides a value for the embedded 'what.' The LF representations of the two readings of (8) are given in (10a) and (10b):

(10) a. [$shei_i$ [ni xiang-zhidao [$shenme_j$ [t_i mai-le t_j]]]]
who you wonder what bought

b. [$shenme_j$ [ni xiang-zhidao [$shei_i$ [t_i mai-le t_j]]]]
what you wonder who bought

These representations are parallel to the structures of (11a) and (11b) in English:

(11) a. *[Who_i [do you wonder [$what_j$ [t_i bought t_j]]]]?
b. ?[$What_j$ [do you wonder [who_i [t_i bought t_j]]]]?

But although there is a difference in degree of acceptability between (11a) and (11b) in English, as between the (a) and (b) members of (3)–(6), both (10a) and (10b) must be considered well-formed in Chinese, given that both (9a) and (9b) are acceptable answers to (8). A similar observation can be made for Japanese, as indicated in (12), which has two readings on a par with (8):

(12) [dare-ga nani-o katta ka] kangaeteru ndai?
who-NOM what-ACC bought Q thinking Q
'Who is the person such that you wonder what he bought?'
'What is the thing such that you wonder who bought it?'

I will not try to enumerate all available evidence for the observation that Chinese and Japanese lack a full range of standard ECP effects. Let us now consider the following question. How is the apparently systematic difference between Chinese and Japanese on the one hand, and English on the other, with respect to the ECP to be accounted for? One easy answer could be that the ECP should be formulated as a parameter that may be a principle of grammar for some languages but may not for others, and not formulated as

a principle of UG. However, this conception appears to me to be extremely implausible on grounds of learnability, especially because we are dealing with empty categories, whose properties can hardly be determined inductively on the basis of overt phenomena or experience, and therefore presumably reflect inner resources of the mind. A more plausible conception, I think, is to take the ECP as a principle of UG, and derive the typological differences concerned from some other learnable parameter or parameters.

In this chapter I am not concerned with what the parameter or parameters are and how they might derive the observed typological differences. I will only mention that a plausible idea to derive the lack of ECP effects in Chinese and Japanese is to assume that subjects in these languages are always properly governed in their own clauses. One way to execute this idea is to assume that in these languages S is a projection of V, and not of INFL, so that subjects, like objects, are directly governed by their lexical verbs. Another way to execute this idea is to assume that the INFL is lexical, say, in Chinese, though not in English. Both alternatives are plausible and each has nontrivial consequences, though I will not go into them here. My present purpose is to show that the second conception of the ECP, namely that of taking it as a principle of UG, is not only methodologically but also empirically supported. I will show that although Chinese and Japanese do not exhibit standard subject/object asymmetries, they nevertheless exhibit certain systematic argument versus adjunct asymmetries that may most profitably be attributed to the ECP. The correctness of this analysis thus supports the idea that the ECP represents a facet of the human language faculty.

To begin with, consider again (10a) and (10b), the LF representations of (8). The fact that they are equally well-formed in Chinese shows the lack of subject/object superiority effects, as we have seen. Note now that the mere fact that each of them is well-formed shows, furthermore, that abstract *wh*-movement in LF must be allowed to violate subjacency, in this case the *wh* island constraint. In (10a), 'who' has been moved across a *wh* island headed by 'what,' and in (10b), 'what' has been moved across a *wh* island headed by 'who.' The example given in (13) further shows the irrelevancy of subjacency, in this case the CNPC:

(13) ni zui xihuan [[wo piping shei] de wenzhang]?
you most like I criticize who DE article
'Who is the person such that you like the articles in which I criticize him?'

The Japanese example corresponding to (13) is (14), which like (12) also shows the irrelevancy of subjacency:

(14) boku-ga dare-o hihansi-ta ronbun-o yon-da no?
I-NOM who-ACC criticized paper-ACC read Q
'Who is the person such that you read the papers where I criticized him?'

There is extensive further evidence showing that subjacency must be prevented from blocking the application of QR across certain islands. For example, in (15) we have a quantificational NP appearing within a relative clause in Chinese. As the translation shows, this Q-NP may be interpreted as having scope over the entire matrix clause, violating the CNPC:

(15) [[meige ren xie] de shu] dou hen youqu.
every man write DE book all very interesting
'For every x, books that x wrote are very interesting.'

What we have observed in Chinese and Japanese questions also applies to English multiple questions, in particular to the interpretation of syntactically unmoved *wh* phrases in this language. For example, as Baker (1970) has observed, the syntactically unmoved *what* in (16) may be interpreted as being paired with the matrix *who*; the movement of *what* in LF violates the *wh* island constraint.

(16) Who remembers where we bought what?

The sentence (17), with *everybody* interpretable as having sentential scope, so that it means everybody is such that pictures of him are on sale, further shows that QR may violate subjacency, in particular the subject condition of Chomsky (1973):

(17) Pictures of everybody are on sale.

It is therefore quite safe to conclude that subjacency is a condition that obtains only in the syntactic component, but not in LF.

In all the examples we have given, the phrases involved are noun phrases like 'who' and 'what.' There are cases where the abstract movement of a *wh* phrase apparently cannot violate subjacency, however, in particular if what is involved is an adverbial *wh* phrase like 'why' and 'how.' Consider sentences like (18), (19), and (20):

(18) ni xiang-zhidao [shei weishenme mai-le shu]?
you wonder who why bought book
'Who is the person such that you wonder why he bought the book?'
NOT: 'What is the reason x such that you wonder who, for x,
bought the book?'

(19) ni xiang-zhidao [shei zenme mai-le shu]?
you wonder who how bought book
'Who is the person such that you wonder how he bought the book?'
NOT: 'What is the means x by which you wonder who, by x,
bought the book?'

(20) *ni zui xihuan [[wo weishenme piping Lisi] de wenzhang]?
you most like I why criticize Lisi DE article
'What is the reason x such that you like the articles in which I, for x, criticized Lisi?'

Compare the sentences (18)–(19) with (8). Like (8), (18) and (19) each contain two syntactically unmoved *wh* phrases in the embedded clause. In (8), we have 'who' and 'what.' In (18) we have 'who' and 'why' and in (19) we have 'who' and 'how.' Example (8) is ambiguous in being interpretable as a direct question on either 'who' or 'what.' However, (18) and (19) are not ambiguous; they each can be interpreted as a direct question on 'who' but not as a direct question on 'why' or 'how.' This shows that, although 'who' and 'what' may violate the *wh* island constraint in LF, 'why' and 'how' cannot. Compare also (20) with (13). Like (13), (20) contains a *wh* phrase within a complex NP. The well-formedness of (13) as a question, as opposed to the ill-formedness of (20), shows that while 'who' may violate the CNPC in LF, 'why' cannot. What we have seen in Chinese can also be easily seen to obtain in Japanese and English. Take the paradigm (21) in English, for example:

(21) a. Who remembers where we bought what?
b. Who remembers where we met who?
c. *Who remembers what we bought why?
d. *Who remembers what we bought how?

Also the paradigm in (22):

(22) a. Who bought what?
b. Which man pleased which woman?
c. *Who bought the books why?
d. *Who bought the books how?

The *wh* phrase at the end of each of these sentences is syntactically unmoved and is moved in LF. The asymmetry shown in these examples shows that LF movement of *who, what, which woman*, etc., may violate the *wh* island constraint, but not the movement of *why* and *how*.

What is the relevant distinction between the two types of *wh* phrases that we have seen that gives rise to the asymmetry observed? I would like to suggest that what is relevant is the distinction between argument and adjunct. *Who, what, which woman*, etc., are arguments of sentences, but *why* and *how* are not: they are adjuncts, or one might say they are operators or predicates. This distinction seems to me to be correct, and is further supported by the following observation in Chinese. The interpretation of the so-called A-not-A question as well as the cleft sentences in Chinese also appear to obey a full range of island conditions. An example of the A-not-A question is given in (23):

(23) ni xihuan-bu-xihuan ta?
you like-not-like him
'Do you like him or not?'

There is good reason to assume that the formation of an A-not-A question involves a phonological reduplication applied on the basis of a question operator in preverbal adverbial position, which I will call the A-not-A operator. According to this view, the S-structure of (23) looks something like (24):

(24) ni [A-not-A] xihuan ta.
you Q-yes/no like him

Furthermore, there is good reason to assume that (23) undergoes movement in LF, by which the A-not-A operator is raised to operator position, giving rise to the LF representation (25):

(25) [[A-not-A]$_i$ [ni t_i xihuan ta]]
you like him

An example of a cleft sentence in Chinese is (26):

(26) Zhangsan shi mingtian yao lai.
Zhangsan SHI tomorrow will come
'It is tomorrow that Zhangsan will come.'

The formation of a cleft sentence involves placing an emphatic operator in the form of a copula, the element *shi* in example (26). I will assume that interpretation of cleft sentences involves the movement of this focus operator to operator position, as in (27):

(27) [SHI$_i$ [Zhangsan t_i mingtian yao lai]]
Zhangsan tomorrow will come

The assumption that movement is involved here enables one to account for the fact, among others, indicated in (28) and (29):

(28) ni xiangxin [Zhangsan xihuan-bu-xihuan ni]?
you believe Zhangsan like-not-like you
'Do you believe that Zhangsan likes you, or do you believe that Zhangsan does not like you?'

(29) Lisi shuo [Zhangsan shi mingtian yao lai].
Lisi said Zhangsan SHI tomorrow will come
'It is tomorrow that Lisi said that Zhangsan will come.'

In (28) and (29) we have an A-not-A operator and a focus operator, respectively, appearing in an embedded clause. As the translation shows, each of the embedded operators may be interpreted as having matrix scope. Example (28) may be a direct question on the choice between 'likes' and 'doesn't-like'; and (29) may have the embedded focused constituent 'tomorrow' interpreted as indicating the speaker's emphasis. Now, consider (30):

(30) ni xiang-zhidao [shei xihuan-bu-xihuan ni]?
you wonder who like-not-like you
'Who is the person such that you wonder whether he likes you or not?'
NOT: 'Do you wonder who likes you or do you wonder who doesn't?'

This sentence is not ambiguous. It may be interpreted as a direct question on 'who' but not a direct question on the choice between 'likes' and 'doesn't like.' This shows that although 'who' may cross a *wh* island headed by the A-not-A operator, the A-not-A operator may not cross a *wh* island headed by 'who.' Observe also (31), where we have a 'who' and a focus operator *shi* embedded in the lower clause:

(31) *ni xiang-zhidao [shei shi mingtian yao lai].
you wonder who SHI tomorrow will come

This sentence is ill-formed. In particular, the sentence cannot have the interpretation according to which the focus operator *shi* has matrix scope. This shows, among other things, that the focus operator cannot cross a *wh* island headed by 'who.'

The two operators we have just seen, the A-not-A operator and the focus operator *shi*, are clearly not arguments of sentences, but adjuncts. The fact that they cannot violate island constraints shows that they are on a par with 'why' and 'how,' rather than with 'who' and 'what.' This is in accordance with our hypothesis that what is responsible for the asymmetry is the distinction between adjuncts and arguments.

How should we account for this argument/adjunct asymmetry? One simple solution is to stipulate that subjacency, although it does not apply to arguments in LF, must still obtain for adjuncts in LF. (On the other hand, subjacency applies to both arguments and adjuncts in Syntax.) However, there are a number of problems associated with this hypothesis, of which I will mention only the most obvious one: that it is a pure stipulation. Although it is a stipulation of UG and presumably causes no problem in learning, and it is true that certain stipulations are plainly unavoidable, it remains desirable to see if such a stipulation can be dispensed with.

I would like to suggest that the argument/adjunct asymmetry follows, free, from the ECP, not from a stipulation about subjacency. The idea underlying this suggestion is as follows. Recall that the standard ECP effects reflect subject/object asymmetries. But why are there such asymmetries? One plausible

functional explanation is that there is a closer dependency relation between a verb and its object than between the verb and its subject. In terms of government, the subject/object asymmetry is reflected by the fact that objects are governed by the verb, but not subjects. This proximity between object and its lexical governor in terms of government also corresponds to the dependency of subcategorization. Since there is an intrinsic tight dependency between object and verb, movement of an object may often go long-distance. On the other hand, since there is a looser inherent relation between a verb and its subject, the subject may not be moved too far away from the verb, in order for the relatively loose relationship to obtain. This is the reason why movement of a subject has to obey a more strict locality requirement. In terms of the ECP, this is reflected in the requirement that traces of subjects in English, not being lexically governed, must be governed by their own antecedents, namely locally controlled, though traces of objects, being lexically governed, need not be locally controlled. Now, concerning adjuncts like 'why,' 'how,' A-not-A, and the focus operator, the dependency between an adjunct and a verb is obviously quite loose. Therefore, if our functional explanation for observed subject/object asymmetries is correct, then we will expect that movement of an adjunct has to obey a more strict locality requirement than that of an object. It is quite commonplace to assume that adjuncts lie outside the maximal projection of a VP. Therefore, adjuncts, unlike objects, are not lexically governed, according to (2). Not being lexically governed, the traces of adjuncts must therefore be locally controlled, like the traces of subjects in English. This is, I claim, exactly what accounts for the asymmetry between adjuncts like 'why,' 'how,' etc., and arguments like 'who,' 'what,' etc. In other words, I argue that the ill-formedness of the (a) sentences in the following paradigms is completely on a par with the ill-formedness of the (b) and (c) sentences:

(32) a. *Who remembers what who bought?
b. *Who remembers what we bought why?
c. *Who remembers what we bought how?

(33) a. *What did who buy?
b. *What did you buy why?
c. *What did you buy how?

(34) a. *Tell me what who bought.
b. *Tell me what you bought why.
c. *Tell me what you bought how.

Let us see how the (b) and (c) sentences can be excluded on a par with the (a) sentences. I will now concentrate on English examples only, but it will not be difficult to show that the strict locality requirement on movement of adjuncts in Chinese and Japanese can also be accounted for in the same fashion. As a way of execution, let us assume, along with Aoun, Hornstein,

and Sportiche (1981), that there is a rule that indexes a COMP at S-structure on the basis of the index of the *wh* phrase it contains at that level. Thus, after COMP-indexing applies at SS, the structure of (33a) is (35), with the COMP identified as *i*, the index of *what* that it contains.

(35) $[[_{\text{COMP}i}\ \text{what}_i][\text{did who buy } t_i]]$?

After the syntactically unmoved *who* is moved to COMP in LF, we have:

(36) $[[_{\text{COMP}i}\ \text{who}_j\ \text{what}_i][\text{did } t_j \text{ buy } t_i]]$?

In this structure, the trace of *what*, t_i, is lexically governed by the verb, in accordance with the ECP. The trace of *who*, t_j, on the other hand, is not lexically governed by the verb; therefore, ECP requires it to be governed by its own antecedent, *who*. However, who_j is properly contained in the branching COMP, which is identified with the index of $what_i$, not *j*, and COMP is itself a maximal node, blocking government of t_j by who_j. The subject trace is therefore neither lexically governed nor locally controlled, hence the ill-formedness of (33a). In a similar fashion, (33b) and (33c) can be ruled out by the ECP. Take (33b), for example. At SS, the structure of (33b) is (37), after COMP-indexing applies:

(37) $[[_{\text{COMP}i}\ \text{what}_i][\text{did you buy } t_i \text{ why}]]$?

After *why* is moved into COMP in LF, we have (38):

(38) $[[_{\text{COMP}i}\ \text{why}_j\ \text{what}_i][\text{did you buy } t_i\ t_j]]$?

The trace of *what* is lexically governed and therefore properly governed, as before. The trace of *why*, t_j, however, lies outside of the maximal projection of the VP, and is therefore not lexically governed by the verb. As such, it must be locally controlled, governed by *why*. But, again, because *why* occurs within the maximal projection of COMP, which is not identified with the index of *why*, *why* does not govern its trace. The trace of *why*, t_j, is thus not properly governed, in violation of the ECP. It should be relatively easy to see how the same assumption will enable one to rule out (33c), as well as all the sentences in (32) and (34).

Note that the assumption we make not only rules out the sentences in (32)–(34). It also accounts for contrasts of the sort indicated in (39)–(41):

(39) a. Who bought what?
b. *What did who buy?

(40) a. Tell me why you bought what.
b. *Tell me what you bought why.

(41) a. Tell me how you bought what.
b. *Tell me what you bought how.

We have already indicated how the (b) sentences in (39)–(41) can be ruled out. Let us see how the (a) sentences can be ruled in, thus accounting for the contrasts. Consider first (39a). At SS, after COMP indexing, we have (42); at LF, after *what* is moved, we have (43):

(42) $[[_{\text{COMP}i}\ \text{who}_i][\text{t}_i\ \text{bought what}]]$?

(43) $[[_{\text{COMP}i}\ \text{what}_j\ \text{who}_i][\text{t}_i\ \text{bought t}_j]]$?

Note crucially that the COMP is identified with the index of *who*, not with *what*. The trace of *what*, t_j, is not directly governed by its own antecedent, but since it is already lexically governed in object position, it is already properly governed. The trace of *who* is not lexically governed, so must be locally controlled. Since COMP is identified with *who*, the antecedent of t_i, it is itself the antecedent, too. Since the COMP (=*who*) does govern t_i, t_i is locally controlled, therefore also properly governed; hence the well-formedness of (39a). In a similar manner, (40a) and (41a) can be ruled in. In (40a), since *why* is moved in Syntax, its trace is locally controlled in the same way that the trace of *who* in (39a) is locally controlled. Likewise for the trace of *how* in (41a).

What we have seen up to now is that the subject/object asymmetry formerly known as the superiority phenomenon is but a special case of a more general complement/non-complement asymmetry, namely the asymmetry between complements like objects on the one hand (which are lexically governed), and non-complements like subjects and adjuncts on the other (which are not lexial1y governed). Now I will show that the subject/object asymmetry formerly known as the COMP-trace phenomenon is also but a special case of the more general complement/non-complement asymmetry. Consider these paradigms:

(44) a. ?This is the book which$_i$ I wonder where you bought t$_i$.
b. ?This is the book which$_i$ I wonder when you bought t$_i$.
c. ?This is the book which$_i$ I wonder why you bought t$_i$.
d. ?This is the book which$_i$ I wonder how you bought t$_i$.

(45) a. *This is the man who$_i$ I wonder where t$_i$ bought the book.
b. *This is the man who$_i$ I wonder when t$_i$ bought the book.
c. *This is the man who$_i$ I wonder why t$_i$ bought the book.
d. *This is the man who$_i$ I wonder how t$_i$ bought the book.

(46) a. *This is the place where$_i$ I wonder [who bought the book t$_i$].
b. *This is the day when$_i$ I wonder [who bought the book t$_i$].

c. *This is the reason why$_i$ I wonder [who bought the book t$_i$].
d. *This was the means by which$_i$ I wonder [who bought the book t$_i$].

All of the sentences in (44)–(46) violate subjacency. But, as is well known, the sentences in (44) are considerably better than the ones in (45). This illustrates the COMP-trace effect. The sentences in (44) violate only subjacency, but the sentences in (45) violate both subjacency and the ECP. Note that the sentences in (46) are on a par with those in (45), not with (44), in their degree of acceptability. Like the sentences in (45), the sentences in (46) are completely impossible with the construal indicated, i.e., with the traces of 'where,' 'when,' 'why,' and 'by which' construed as originating from the lower clauses. The fact that (46) parallels (45) rather than (44) readily follows from our conception of the ECP. Since the trace of 'where,' 'when,' 'why,' etc., is not lexically governed, it must be locally controlled. But in each sentence of (46), local control is impossible, because the COMP immediately above each of the relevant traces is lexically filled with 'who,' preventing proper government of the adjunct trace.[3]

We have seen that the ECP accounts for a full range of observed complement/non-complement asymmetries. These asymmetries are those that exist between various constituents within sentences. There is also an important complement-adjunct asymmetry within noun phrases that has not been observed before, but is apparently quite systematic. Consider (47) and (48):

(47) Of which city did you witness [the destruction t]?
(48) *On which table did you like [the books t]?

In both these sentences, a PP has been extracted out of an NP. The PP in (47) is a complement of the noun *destruction*. The PP in (48) is not a complement of the noun *books*, but rather its modifier, i.e., an adjunct. The asymmetry between (47) and (48) is thus the same type of asymmetry that we have been concerned with all along. This asymmetry, furthermore, also readily follows from our conception of the ECP. It is standard practice to regard noun phrase complements as dominated by N' and noun phrase modifiers as adjoined to NPs. Thus, we have the D-structures for the bracketed NPs in (47) and (48):

(49) [$_{NP}$ the [$_{N'}$ destruction of which city]]

(50) [$_{NP}$ [$_{NP}$ the books] on which table]

The PP *of which city* is governed by the noun *destruction*, a case of lexical government. The PP *on which table*, on the other hand, is not lexically governed by the head *books*, since a maximal NP node intervenes between the head and the PP. Therefore, when the latter PP is moved, its trace must

be locally controlled. In (48), however, local control is impossible, since the antecedent and the trace are separated by a maximal node, the outer NP node containing the trace. The ECP thus correctly rules out sentences like (48).[4]

In conclusion, we have shown in this chapter that well-known subject/object asymmetries should be seen as constituting a special case of a more general complement/non-complement asymmetry. This conception of the ECP eliminates an otherwise necessary stipulation on subjacency involving movement in LF. Our analysis, if correct, has a number of interesting implications. Some of these will be pointed out in the remainder of this chapter.

First, although Chinese and Japanese lack a full range of "standard ECP effects," they do exhibit argument/nonargument asymmetries. If the latter are to be accounted for by the ECP, as I have argued here, then the ECP also applies in Chinese and Japanese. This provides support for the idea that the ECP should be formulated as a principle of UG rather than a parameter itself, an idea we have indicated to be also plausible on grounds of learnability. Secondly, our analysis provides an interesting empirical argument for the reformulation of the superiority condition of Chomsky (1973) as a special case of the ECP. According to the definition of superiority given by Chomsky, α is superior to β if and only if α asymmetrically c-commands β. The superiority condition says that movement must affect the superior of two terms first before it affects the inferior one. Thus, since subjects asymmetrically c-command objects, they must be moved before the latter. This accounts for the contrast between (39a) and (39b). The same superiority condition can be extended to account for the contrast between (40a) and (40b), as well as that between (41a) and (41b). This is because adjuncts like *why* and *how*, just as subjects, also asymmetrically c-command objects, and are superior to objects. On the other hand, if neither of two terms asymmetrically c-commands the other, as in the examples of (51) and (52), then no difference in grammaticality need result:

(51) a. To whom did you give which book?
b. Which book did you give to whom?

(52) a. Tell me to whom I should give which book.

b. Tell me which book I should give to whom.

All of (39)–(41) and (51)–(52) can be accounted for by either the ECP or the superiority condition. The crucial evidence in favor of the ECP, however, comes from (53) and (54):

(53) a. *Why did who buy the book?
b. *Who bought the book why?

(54) a. *Tell me why who bought the book.
b. *Tell me who bought the book why.

There are two logical possibilities concerning subjects and adjuncts with respect to superiority. Either that neither is superior to the other, or that one of them is superior to the other. If the former, then the superiority condition does not apply, and we should expect both the (a) and (b) sentences to be good, which is contrary to fact. If the latter, then the condition applies, and we should expect the (a) sentences to be good and the (b) sentences bad, or conversely. This is, again, contrary to fact, since both (a) and (b) are equally bad. On the other hand, the ECP correctly predicts that all of these sentences are ill-formed, as one can see upon a moment's thought. Since both *who* and *why* are not lexically governed, both their traces must be locally controlled. But only one of the traces at most can be locally controlled, since there is only one COMP per sentence, and each COMP can be given one unique index only. Both (a) and (b) are thus excluded by the ECP, regardless of whether *why* or *who* gets moved first.[5]

A similar consequence of our analysis is that it provides an interesting piece of evidence for the ECP as an empirically more adequate principle underlying the COMP-trace phenomenon than the earlier formulation proposed in Chomsky and Lasnik (1977). In Chomsky and Lasnik's work, the COMP-trace configuration is ruled out by a filter that states that a trace immediately following a COMP is ill-formed. However, this filter applies only to subject traces, which directly follow their COMPs, but not adjunct traces, which do not immediately follow the COMP. Chomsky (1981) has indicated a conceptual advantage in eliminating the filter in favor of the ECP. Now we also have an empirical argument for the elimination of the filter.

Note also that, if our analysis is correct, we have argued for a more generalized version of the ECP than is proposed in previous work. For example, Jaeggli (1980) formulates the ECP as a principle specifically applying to NP-traces, thus exempting traces of PPs and adverbial phrases from the effect of the principle. Our analysis argues for an empirically more adequate and conceptually simpler (and more general) version of the principle.

Finally, a corollary of this is that movement of a category, be it an argument or an adjunct, must leave a trace. Note that this is beyond the requirement of the Projection Principle. If our analysis is correct, it might be taken as an argument for a strong version of the principle of non-vacuous quantification (cf. May 1977; Chomsky 1982), so that everything appearing in operator position, regardless of whether it originates as an argument or an adjunct, must bind a trace at LF. As this does not seem to be a requirement of any logical language, this is indication for the assumption that LF exists as a linguistic level of representation, distinct from the level of real semantics.