

Wh-Elements in Situ: Syntax or LF?

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1 Introduction

In languages such as English, *wh*-interrogatives must be overtly moved from their base-generated position to a clause-peripheral position—the Specifier (Spec) of Complementizer (Comp) position—as illustrated in (1).

- (1) What_i did John see x_i ?

In sentences containing multiple interrogatives, such as (2), it is assumed that the *wh*-elements in situ (i.e., the *wh*-elements that have not been overtly moved to the Spec of Comp position) are subject to a covert raising process in the Logical Form (LF) component. After the application of this covert movement, the *wh*-element in situ in (2) ends up in the Spec of Comp already containing the *wh*-element that has been overtly moved in Syntax (see Chomsky 1981, Kayne 1984, and Aoun, Hornstein, and Sportiche 1981, among others).

- (2) Who_i x_i saw what?

In other languages such as Mandarin Chinese (hereafter simply Chinese), *wh*-interrogatives are not overtly moved to the Spec of Comp, as illustrated in (3).

- (3) a. Zhangsan kandao shenme?
Zhangsan saw what
'What did Zhangsan see?'
b. Zhangsan zai nar kandao ni?
Zhangsan at where saw you
'Where did Zhangsan see you?'

Since the seminal work of Huang (1982), the assumption within the Government-Binding literature has been that in Chinese, *wh*-elements in situ obligatorily undergo a raising

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process at LF. At LF the *wh*-elements in (3a) and (3b) are covertly raised to the Spec of Comp position. Since in both English and Chinese, *wh*-elements in situ are subject to a covert raising process, the generalizations concerning these elements can be stated and accounted for in the LF component. In other words, the existence of a covert raising process applying to *wh*-elements in situ in both languages permits a unified cross-linguistic account of these elements in the LF component.

In this article we provide evidence indicating that in both English and Chinese, *wh*-elements in situ need not raise to the Spec of Comp in the LF component. Furthermore, capitalizing on the existence in Chinese of question markers (Qu-markers) such as the one in (4),

- (4) Ni yao shenme ne?
 you want what *wh*-question marker
 ‘What do you want?’

we argue that *wh*-elements in situ are coindexed and interpreted with respect to a question operator (Qu-operator) that is raised to the appropriate Spec of Comp position by S-Structure. In other words, we argue that Chinese has overt raising of a Qu-operator and that the scope of a *wh*-in-situ is determined by reference to the Qu-operator it is coindexed with. This being the case, it becomes possible to state and account for the various generalizations concerning *wh*-elements in situ in Syntax rather than the LF component in Chinese as well as English.

In section 2 we review and discuss the arguments concerning the existence of a covert raising process in the LF component. In section 3 we present the evidence indicating that *wh*-elements in situ need not raise at LF to the Spec of Comp. In section 4 we argue that a *wh*-in-situ is interpreted with respect to a Qu-operator that is raised to the appropriate Spec of Comp position by S-Structure. In particular, we show that the raising of the Qu-operator is sensitive to the various island constraints regulating overt extraction. Finally, in section 5 we discuss the syntactic representation of the Qu-operator.

2 *Wh*-Raising at LF

In the following subsections we review and discuss the arguments supporting the existence of a covert process of *wh*-raising. We review the arguments based on Chinese since they are more direct; but some of these arguments also apply to *wh*-in-situ in English (see Aoun, Hornstein, and Sportiche 1981, Huang 1982, among others).

2.1 *Interpretation and Selectional Restrictions*

In English the scope of a *wh*-element is determined by overtly moving the *wh*-element to the Spec of Comp. For instance, the *wh*-element has embedded scope in (5a) and matrix scope in (5b).

- (5) a. $[_{CP_1} \text{He wonders } [_{CP_2} \text{what}_i \text{ [you bought } x_i]]]$.
 b. $[_{CP_1} \text{What}_i \text{ does [he think } [_{CP_2} \text{you bought } x_i]]]$?

The same scope interpretation obtains in the corresponding cases of Chinese where the *wh*-element is not overtly moved into Spec of Comp:

- (6) a. Ta xiang-zhidao ni maile shenme.
 he wonder you bought what
 ‘He wonders what you bought.’
 b. Ta renwei ni maile shenme?
 he think you bought what
 ‘What does he think you bought?’

The interpretation of (6a–b) is derived by postulating a covert movement of the *wh*-in-situ to the Spec of Comp (see Huang 1982). After *wh*-raising has applied, (6a–b) will have LF representations similar to those of (5a–b):

- (7) a. $[_{CP_1} \text{ta xiang-zhidao } [_{CP_2} \text{shenme}_i \text{ [ni maile } x_i]]]$
 he wonder what you bought
 b. $[_{CP_1} \text{shenme}_i \text{ [ta renwei } [_{CP_2} \text{ni maile } x_i]]]$
 what he think you bought

The LF raising of *wh*-in-situ will also make it possible to meet the requirement on selectional restrictions straightforwardly. For the English sentences (5a–b), the selectional requirements between the verb and the subcategorized complement are met by simply stating that verbs like *wonder* must select a [+wh] Comp and verbs like *think* must select a [–wh] Comp. For the Chinese sentences (6a–b), these requirements are met at LF after *wh*-elements have been raised (as illustrated in (7a–b); see Huang 1982).

2.2 Weak Crossover Effects

Weak crossover effects have been used as evidence for the existence of a raising process applying to *wh*-in-situ (and quantifier phrases) in the LF component:

- (8) a. *What_i does his_i mother like x_i ?
 b. *His_i mother likes everyone_i.
 (9) a. *Xihuan ta_i de ren kandao shei_i?
 like he DE man saw who
 ‘Who did the person that likes him see?’
 b. *Xihuan e_i de ren kandao shei_i?
 like DE man saw who
 ‘Who did the person that likes (him) see?’

Like (8a–b), (9a–b) display a weak crossover effect. At LF, after *wh*-raising, (9a–b) will have LF representations similar to those of (8a–b) (see (10a–b)) and will be ruled out by the Leftness Condition (see Chomsky 1977, Higginbotham 1980) or the Bijection Principle (see Koopman and Sportiche 1982).

- (10) a. [_{CP} shei_i [_{IP} [_{NP} [_{CP} xihuan ta_i de] ren] kandao x_i]]
 who like he DE man saw
 b. [_{CP} shei_i [_{IP} [_{NP} [_{CP} xihuan e_i de] ren] kandao x_i]]
 who like DE man saw

2.3 Locality Conditions

In addition to the weak crossover effects that would be accounted for straightforwardly under a raising analysis, the interpretation of sentences containing *wh*-elements in situ displays an argument-adjunct asymmetry—an asymmetry that is expected if *wh*-elements are raised at LF. One of the most influential arguments to this effect has been made by Huang (1982). Huang points out the existence of an asymmetry between *wh*-elements in argument and adjunct positions: the interpretation of *wh*-in-situ in argument position can violate various island constraints, whereas *wh*-in-situ occurring in adjunct position cannot do so. This asymmetry is expected under a raising analysis: *wh*-elements in situ are raised at LF, generating variables that are subject to various well-formedness conditions on empty categories such as the Empty Category Principle (ECP; Chomsky 1981), which requires an empty category to be either lexically governed or antecedent-governed. The ECP allows arguments to be raised out of islands but not adjuncts in (11a–b).

- (11) a. Ta xiang-zhidao shei maile shenme?
 he wonder who bought what
 ‘He wonders who bought what.’
 ‘What does he wonder who bought?’
 ‘Who does he wonder bought what?’
 b. Ta xiang-zhidao shei weishenme likaile.
 he wonder who why left
 *‘He wonders who left why.’
 *‘Why does he wonder who left?’
 ‘Who does he wonder left why?’

In the LF representations (12a–c) for (11a), *who* and *what*¹ can be raised out of the *wh*-island because the gaps in both subject and object positions are lexically governed (objects being lexically governed by V and subjects being lexically governed by Infl in

¹ For the sake of simplicity, we will represent Chinese forms by their English glosses in italics. However, the Chinese forms will still be used together with English glosses when the need arises.

Chinese, according to Huang). The variable bound by *why* in the LF representations (13a–c) for (11b), on the other hand, must be antecedent-governed. A Comp occupied by *who* in the embedded clause will prevent the variable bound by *why* from being antecedent-governed.

- (12) a. [_{CP₁} ta xiang-zhidao [_{CP₂} shei_i shenme_j [<sub>x_i maile x_j]]]
 he wonder who what bought
 b. [_{CP₁} shei_i [ta xiang-zhidao [_{CP₂} shenme_j [<sub>x_i maile x_j]]]]
 who he wonder what bought
 c. [_{CP₁} shenme_j [ta xiang-zhidao [_{CP₂} shei_i [<sub>x_i maile x_j]]]]
 what he wonder who bought</sub></sub></sub>
- (13) a. *[_{CP₁} ta xiang-zhidao [_{CP₂} shei_i weishenme_j [<sub>x_i x_j likaile]]]
 he wonder who why left
 b. *[_{CP₁} weishenme_j [ta xiang-zhidao [_{CP₂} shei_i [<sub>x_i x_j likaile]]]]
 why he wonder who left
 c. [_{CP₁} shei_i [ta xiang-zhidao [_{CP₂} weishenme_j [<sub>x_i x_j likaile]]]]
 who he wonder why left</sub></sub></sub>

The same argument-adjunct asymmetry surfaces in other contexts involving islands, some of which are given in (14)–(16) (see Huang 1982 and Lasnik and Saito 1984, 1992, among others).

Sentential subjects

- (14) a. Shei lai zui hao?
 who come most good
 ‘Who is *x* that [*x* come] is the best?’
 b. *Ta weishenme lai zui hao?
 he why come most good
 ‘Why(*x*) such that [he came *x*] is the best?’

Complex NPs

- (15) a. Ni xihuan shei xie de shu?
 you like who write DE book
 ‘Who(*x*) such that you like the book *x* wrote?’
 b. *Ni xihuan ta weishenme xie de shu?
 you like he why write DE book
 ‘Why(*x*) you like the book he wrote *x*?’

Adjuncts

- (16) a. Ta yinwei ni shuo shenme hua hen shengqi?
 he because you say what word very angry
 ‘What(*x*) such that he was angry because you said *x* words?’

- b. *Ta yinwei ni weishenme shuo hua hen shengqi?
 he because you why say word very angry
 'Why(x) such that he was angry because you said words x?'

2.4 Scope

Recent accounts for scope interaction between *wh*-operators and QPs are based on the assumption that *wh*-elements in situ undergo raising at LF (see May 1985, Aoun and Li 1989, 1991, 1993b). For instance, consider the contrast between the unambiguous sentence in (17) and the ambiguous one in (18).

- (17) Who saw everything? (unambiguous)
 (18) What did everyone see? (ambiguous)

According to May (1985), the QP in (17) can adjoin only to VP and the QP in (18) only to IP, as represented in (19) and (20), respectively.

- (19) [_{CP} who_i [_{IP} x_i [_{VP} everything_j [_{VP} saw x_j]]]]
 (20) [_{CP} what_j [_{IP} everyone_i [_{IP} x_i [_{VP} t_j [_{VP} see x_j]]]]]]

The other possible representations violate an adjacency condition on government (the ECP) or, more precisely, the Path Containment Condition (PCC; Pesetsky 1982). In (20) the two operators govern each other (IP not being a maximal projection in May's treatment). Therefore, it is ambiguous according to his Scope Principle, which essentially assumes that ambiguity arises when two operators govern each other. In contrast, the two operators in (19) do not govern each other because the top node of the adjoined VP structure is a barrier to government. The contrast between (17) and (18) thus can be accounted for by the ECP or the PCC under the assumption that quantificational elements undergo raising at LF.

Because contrasts similar to the one illustrated in (17) and (18) hold in languages that display no subject-object asymmetry with respect to movement (see (11a), for instance), Aoun and Li's account of this contrast does not rely on the ECP or the PCC. Instead, it is based on the existence of the Minimal Binding Requirement (MBR) and the Scope Principle:

- (21) *The MBR*
 A variable must be bound by the most local potential \bar{A} -binder.
 (A qualifies as a "potential" \bar{A} -binder for B iff A c-commands B and the coindexing of (A, B) would not violate the binding principles.)
 (22) *The Scope Principle*
 An operator A may have scope over an operator B iff
 A c-commands B or an \bar{A} -element in the chain headed by B.

To briefly illustrate the working of these principles, we consider once again the

contrast between (17) and (18). The QP in (17) cannot adjoin to IP or CP; if it did, an MBR violation would occur. Therefore, the only well-formed representation of (17) is (19), where both variables are bound by the most local potential \bar{A} -binder. The QP in (18) is adjoined to IP, as in (20). In this representation t_j is the most local potential \bar{A} -binder for x_j , and the raised *everyone* is the most local potential \bar{A} -binder for x_i . The raised *everyone* is not a potential \bar{A} -binder for t_j , although it is the most local one: the coindexing of the raised *everyone* with t_j would make the object variable x_j coindexed with the subject variable x_i ($i = j$), thus creating a violation of Principle C.² According to the Scope Principle, (19) yields only the reading where the *wh*-operator has wide scope. In (20) both the *wh*-operator and the QP can have wide scope: the *wh*-operator because it c-commands the QP, and the QP because it c-commands the intermediate trace bound by the *wh*-operator.

Both May's and Aoun and Li's accounts for the contrast between the English sentences (17) and (18) indicate the relevance of variables and intermediate traces (\bar{A} -elements), that is, the relevance of the LF movement of *wh*-elements and QPs. In Chinese a contrast similar to the one in (17)–(18) occurs.

- (23) a. Shei kandaole meige dongxi? (unambiguous)
 who saw every thing
 ‘Who saw everything?’
 b. Meigeren dou kandaole shenme dongxi? (ambiguous)
 everyone all saw what thing
 ‘What did everyone see?’

Under the assumption that *wh*-elements in situ raise at LF, (23a–b) will have LF representations similar to those of (17)–(18) and will be subject to the same analysis. Thus, the Chinese facts can be used to support the existence of a process raising *wh*-elements at LF.

In sections 2.1–2.4 we have summarized the arguments supporting the assumption that *wh*-elements in situ undergo raising at LF. Despite these arguments, there exist some facts that seem to point to the opposite conclusion: that *wh*-elements in situ remain in situ at LF.

3 Nonraising of *Wh*-in-Situ

Essentially, the relevant facts supporting nonraising of *wh*-in-situ to the Spec of Comp concern the interaction of *only* and *wh*-in-situ.

² Empty categories generated by quantifier raising (QR) are not subject to Principle C (see Aoun and Hornstein 1985, Hornstein 1984, Aoun and Li 1991). Therefore, the structure in (i) will be ruled out by the MBR.

(i) [QP₁ [QP₂ [$x_1 \dots x_2$]]]

For detailed discussions of the applications of the MBR, see Aoun and Li 1989, 1991, 1993b.

3.1 Only

As pointed out in the literature, *only* can be associated with an element in its c-command domain. For instance, in (24a–b) *only* is associated with the verb (or the verb phrase) and in (25a–b) with the postverbal object. (See, among others, Anderson 1972, Kuroda 1969, Jackendoff 1972, Rooth 1985, Kratzer 1989, and Tancredi 1990.)

(24) a. He only likes Mary. (he doesn't love her)

b. Ta zhi xihuan Mali.
he only likes Mali
'He only likes Mali.'

(25) a. He only likes Mary. (he doesn't like Sue)

b. Ta zhi xihuan Mali.
he only like Mali
'He only likes Mali.'

For the purpose of our discussion, it is relevant that the postverbal object associated with *only* cannot undergo overt movement in Syntax: it cannot be topicalized as in (26a–b), nor can it be (*wh*-)moved to Spec of Comp as in (27a–b).

(26) a. *Mary_i, he only likes x_i.

b. *Mali_i, ta zhi xihuan x_i.
Mali he only like

(27) a. *Who_i does he only like x_i?

b. *ta zhi xihuan x_i de nage ren_i³
he only like DE that man
'the man that he only likes'

The following generalization, which Tancredi (1990) calls the Principle of Lexical Association (PLA), encodes the restriction at work with *only*:

(28) *Principle of Lexical Association*

An operator like *only* must be associated with a lexical constituent in its c-command domain.

In light of the PLA, let us consider the interaction of *only* with elements that are putatively subject to movement in the LF component. For instance, sentences involving *wh*-in-situ associated with *only* are acceptable:

(29) a. Who only likes what?

³ Since no overt movement of *wh*-elements occurs in interrogatives in Chinese, the effect of *only* on overt *wh*-movement is illustrated by the relativized structures.

- b. Ta zhi xihuan shei?
 he only like whom
 'Who does he only like?'

3.2 Only and QPs

The contrast between (26) and (27) on the one hand and (29) on the other hand may be accounted for by assuming that the PLA holds at S-Structure but not at LF. This assumption cannot be maintained, however, in light of the following contrast:

- (30) a. Someone loves every boy in the room. (ambiguous)
 b. Someone only loves every boy in the room. (unambiguous)
 (instead of everyone in the room, boy and girl)

May (1985) and Aoun and Li (1993b) generate the wide scope reading of (30a) by adjoining the object QP to IP:

- (31) [_{IP} every boy in the room_i [_{IP} someone loves x_i]]

The lack of ambiguity of (30b) may be accounted for by the PLA under the assumption that it holds at LF. In this case the object QP will not be able to "cross" *only* and adjoin to a position that c-commands the subject QP (such as IP).

Similar facts exist in Chinese. Consider the contrast between the ambiguous passive sentence (32a) (see Aoun and Li 1989) and the nonambiguity of the passive that contains *only* (32b).

- (32) a. Meigeren dou bei yige ren ma guo. (ambiguous)
 everyone all by one man scold ASP
 'Everyone has been scolded by a man.'
 b. Meigeren dou zhi bei yige ren ma guo. (unambiguous)
 everyone all only by one man scold ASP
 'Everyone has only been scolded by a man.'

Once again, the lack of ambiguity of (32b) may be accounted for by the PLA under the assumption that it holds at LF.

3.3 Only and Antecedent-Contained Deletion

We have argued that the contrast between (30a) and (30b) and the one between (32a) and (32b) may be accounted for if it is assumed that the PLA holds at LF. Further evidence supporting this conclusion comes from the interaction between *only* and so-called antecedent-contained deletion. The following discussion is based on Tancredi 1990. Consider first an example of antecedent-contained deletion such as (33).

- (33) I saw one man you did.

Sentences containing a missing VP are assumed to undergo a process of reconstruction

at LF: the missing VP is copied at LF from an appropriate antecedent (see Sag 1976, Williams 1977). In (33) the reconstruction site is contained within the VP that presumably has to be reconstructed. If VP reconstruction applies directly to the VP in (33), it would be impossible to generate a legitimate representation. In order to circumvent the problem of infinite regress, May (1985) assumes that in the process of generating the LF representation of (33), the quantified expression *one man you did* undergoes QR, yielding (34a). From (34a), the matrix VP can be reconstructed into the empty VP position as in (34b).

- (34) a. $[_{IP}[\text{one man you did}]_i [_{IP} \text{I saw } x_i]]$
 b. $[_{IP} \text{one man you did (see } x_i) [_{IP} \text{I saw } x_i]]$

Now consider the following sentence involving *only* in an antecedent-contained deletion context:

- (35) I saw only one man you did.

(35) is identical to (33) except for the presence of *only*. (35), however, is not ambiguous and has only the following reading: 'there is a group of (possibly many) men that you saw, and I saw only one member of that group'. Three LF representations are to be considered for (35):

- (36) a. $[\text{one man you did (only see } x) [_{IP} \text{I only saw } x]]$
 b. $[\text{one man you did (see } x) [_{IP} \text{I only saw } x]]$
 c. $[\text{only one man you did (see } x) [_{IP} \text{I saw } x]]$

According to Tancredi, (36a–b) violate the PLA. (36a) is generated by first raising *only* to VP, then raising the object NP at LF, and finally reconstructing the matrix VP. The interpretation corresponding to (36a) will be the one where *only* restricts *one man I saw* and *one man you saw*, so that we would each have seen exactly one man. The unavailability of this representation indicates that (36a) is not well formed: it violates the PLA since neither occurrence of *only* is associated with a lexical constituent in its c-command domain. (36b) also violates the PLA: this representation is generated by reconstructing the VP $[\text{see } x]$ into the empty VP position. Only (36c) is well formed with respect to the PLA: *only* is associated with a lexical item in its c-command domain. This representation gives the reading corresponding to (35). In brief, the discussion of (35) provides further support for the relevance of the PLA at LF: without the PLA, the LF representations (36a–b) could not be excluded.^{4,5}

⁴ A reviewer points out that the *only* test suggests that there is no expletive replacement in sentences like (i), as illustrated by the contrast between (ii) and (iii).

- (i) There might be one man in the garden.
 (ii) There might be only one man in the garden.
 (iii) *One man might only be in the garden.

⁵ According to Tancredi (1990), the unambiguous sentence (35) is to be contrasted with the following

3.4 Only and Wh-in-Situ

So far we have discussed two types of evidence indicating that the PLA applies in the LF component.⁶ This result is crucial to our discussion given the well-formedness of (29a–b) (repeated here):

- (37) a. Who only likes what?
 b. Ta zhi xihuan shei?
 he only like whom
 ‘Who does he only like?’

The acceptability of (37a–b) is problematic if *wh*-in-situ must move to the Spec of Comp at LF. Such a movement would cross *only* and violate the PLA. On the other hand, if *wh*-in-situ either does not undergo raising at LF at all or does not need to raise all the way to the Spec of Comp, nothing will rule out these sentences.

3.5 Only, QPs, and Wh-in-Situ

The interaction of the PLA and *wh*-in-situ led us to conclude that *wh*-in-situ need not undergo raising at LF to the Spec of Comp. The interaction of QPs and *wh*-operators in sentences containing *only* leads us to the same conclusion. As briefly discussed in section 2.4, the ambiguity of sentences like (38a–b) may be accounted for by the MBR and the Scope Principle.⁷

sentence:

- (i) John only played chess after I taught him how to.

As the readings in (ii) demonstrate, (i) is three ways ambiguous.

- (ii) a. John only played chess after I taught him how to only play chess.
 b. Only chess is an *x* such that John played *x* after I taught him how to play *x*.
 c. Only chess is an *x* such that John played *x* after I taught him how to play chess.

Assuming that *only* in (i) may ambiguously be analyzed as inside or outside the VP, it is possible to reconstruct *play chess* and *only* simultaneously as in (iia) or as in (iii).

- (iii) John only [played chess] after I taught him how to [play chess].

The interpretation of the LF representation of (iii) as in (iib) or (iic) will depend on whether the *after* clause is within or outside the scope of *only*. When the *after* clause is within the scope of *only*, both instances of the word *chess* will be associated with *only*. The resulting sentence will be interpreted as in (iib). When the *after* clause is outside the scope of *only*, the reconstructed copy of *chess* will not be able to associate with *only*. The resulting structure will be interpreted as in (iic).

⁶ Tancredi claims that the PLA applies at S-Structure as well as LF, citing evidence similar to (35). These facts are compatible with the assumption that the PLA holds at S-Structure *and* LF; they do not force this conclusion, however. That is, one may still maintain that the PLA holds at LF only. For the purpose of our discussion, we need only establish that the PLA applies at LF. The fact that it could also apply at S-Structure is not crucial here.

⁷ In contrast to (38a–b), sentences (ia–b) involving multiple *wh*-elements are not ambiguous in English and Chinese.

- (i) a. Who said everyone bought what?
 b. Shei shuo meigeren dou maile shenme?
 who say everyone all bought what
 ‘Who said everyone bought what?’

An analysis of these facts is to be found in Aoun and Li 1993b.

- (38) a. What did he say everyone bought? (ambiguous)
 b. Ta shuo meigeren maile shenme? (ambiguous)
 he say everyone bought what

The LF representation of (38a–b) is given in (39).

- (39) [_{CP} what_i [_{IP} he say [_{CP} t_i [everyone_j [_{IP} x_j bought x_i]]]]]

Now consider the Chinese sentence (40), which minimally differs from (38b) by the presence of *only*.

- (40) Ta zhi shuo meigeren maile shenme? (unambiguous)
 he only say everyone bought what
 'He only said everyone bought what?'

Unlike (38b), (40) is not ambiguous: the *wh*-element necessarily has scope over the quantified phrase. If *what* is raised at LF to the matrix Spec of Comp, (40) will have a representation similar to (39). It ought to be ambiguous for the same reason (38b) is ambiguous.

- (41) [_{CP} shenme_i [_{IP} ta zhi shuo [_{CP} t_i [meigeren_j [_{IP} x_j [_{VP} t_i [_{VP} maile x_i]]]]]]]
 what he only say everyone bought

If, on the other hand, *what* does not undergo LF raising to the Spec of Comp, no intermediate trace will be generated in (41), and the QP will therefore not have scope over *what*. What prevents *what* from raising at LF to the matrix Spec of Comp? The answer obviously is the PLA. If *what* were to raise to the matrix Comp, it would cross *only*, thus violating the PLA.⁸

Summarizing, in section 2, we showed that raising *wh*-elements in situ at LF captures many interesting grammatical generalizations. In this section we showed that the interaction of *only* with QPs and *wh*-elements may be accounted for if it is assumed that *wh*-elements in situ need not raise at LF to the Spec of Comp. Our task in section 4 will be to bring the two conflicting sets of results together.

4 Question Operators

We would like to suggest that the conflicting results may be reconciled if we assume that a *wh*-in-situ does not need to raise to the Spec of Comp at LF and that in Chinese the *wh*-in-situ is coindexed and interpreted with respect to a question operator (Q-operator) that is raised to the appropriate Spec of Comp position by S-Structure.

An overt question marker is found in many languages that allow *wh*-words to stay in situ, such as Chinese and Japanese. For instance, Chinese has a *wh*-question marker *ne* (42a) and a *yes/no* question marker *ma* (42b).

⁸ The PLA also rules out a "one fell swoop" extraction of *what* to the matrix Spec of Comp in (40).

- (42) a. Shei lai ne?
 who come QU
 ‘Who is coming?’
 b. Ta lai ma?
 he come QU
 ‘Is he coming?’

In Japanese an overt Qu-marker also occurs:⁹

- (43) Dare-ga ki-masu ka?
 who-NOM come-POLITE QU
 ‘Who will come?’

The overt Qu-marker is an X^0 category. It occurs in the Comp position at S-Structure, which is a clause-final position in head-final languages such as Chinese and Japanese. We would like to suggest that the overt Qu-marker *ne* that surfaces in the head Comp position in Chinese is generated by the mechanism of Spec-head agreement. In various languages, the presence of an operator in the Spec of Comp position triggers the occurrence of an agreement marker in Comp, as indicated by Schneider-Zioga (1987) for Kinande, Chung and McCloskey (1987) for Irish (discussed in Rizzi 1990:55–56), and Rizzi (1990:56) for French and West Flemish (see also the discussions and references cited there). Take Kinande for example. Schneider-Zioga notes that interrogatives exhibit agreement in class between the *wh*-element in Spec of Comp and the element in Comp:

- (44) a. IyodI yO kambale alangIra
 who (cl.1) that (cl.1) Kambale saw

⁹ An overt Qu-marker in Chinese (a) can only occur in the matrix clause and (b) is optional, as illustrated by (i)–(iii).

- (i) Wo zhidao shei laile.
 I know who came
 ‘I know who came.’
 (ii) *Wo zhidao [shei laile ne]?
 I know who came QU
 (iii) Shei laile (ne)?
 who came QU
 ‘Who came?’

In Japanese the particle *no* occurs only in the matrix clause; *ka* can be used either in embedded or in matrix clauses (see, among others, Miyagawa 1987, Lasnik and Saito 1992):

- (iv) Dare-ga ki-masu ka/no?
 who-NOM come-POLITE QU
 ‘Who will come?’
 (v) John-ga [Mary-ga nani-o katta ka/*no] siritagatteiru koto
 John-NOM Mary-NOM what-ACC bought QU want-to-know fact
 ‘the fact that John wants to know what Mary bought’

Pertinent to our discussion, we need to claim that an abstract Qu-operator exists in the cases where the overt Qu-marker is not present (see also footnote 12).

- b. aBahI Bo kambale alangIra
who (cl.2) that (cl.2) Kambale saw
- c. EkIhI kyO kambale alangIra
who (cl.7) that (cl.7) Kambale saw
- d. EBIhI ByO kambale alangIra
who (cl.8) that (cl.8) Kambale saw

This agreement takes place obligatorily with a *wh*-element and optionally with a *wh*-trace. For Chinese, we postulate the existence of a full-fledged nonovert Qu-operator XP, which moves to the appropriate Spec of Comp position and triggers Spec-head agreement.^{10,11} The overt manifestation of this Spec-head agreement mechanism is restricted to the matrix Comp in this language: the marker *ne* is morphologically realized in the Comp of the matrix clause.¹²

If the existence of a Qu-operator is recognized, a question arises concerning the status of the so-called *wh*-element in Chinese. Clearly, a *wh*-element cannot be an interrogative operator itself in this analysis. If it were, the biuniqueness relations holding between operators and variables would be violated (see Chomsky 1982, Koopman and Sportiche 1982): two operators, the nonovert operator and the *wh*-operator, would have to bind the same variable. However, there is evidence that in Chinese the *wh*-element, which stays in situ, is to be treated as a kind of polarity item, rather than a true operator. This evidence is discussed and analyzed by Li (1992) (see also Cheng 1991, Kim 1989, 1991, Kuroda 1965, and Nishigauchi 1990). We recapitulate some of the facts here.

Unlike English *wh*-elements, the so-called *wh*-elements in Chinese can be construed either as interrogative words or as noninterrogative indefinite elements ('some, any'), as illustrated in (45a–b).

- (45) a. Ta yiwei wo xihuan shenme?
he think I like what
'What does he think I like?'
- b. Ta yiwei wo xihuan shenme.
he think I like what
'He thinks that I like something.'

The fact that a *wh*-element can be construed as an interrogative word or a noninterrogative indefinite element indicates that *wh*-elements in Chinese are not intrinsically

¹⁰ Postulating the existence of a question operator is in line with various proposals concerning the existence of Qu-elements made for English by Katz and Postal (1964), Baker (1970), Van Riemsdijk and Williams (1981), and Pesetsky (1987) and for English and French by Benmamoun (1991a,b) (see also footnote 28).

¹¹ We will return to the issue of where the Qu-operator is generated both in this section and in section 5.

¹² In a language like Japanese, the overt manifestation of this Spec-head agreement is not so restricted: the marker *ka* is morphologically realized in the matrix as well as embedded Comp, as illustrated by (43a–b). However, there is another Qu-marker *no* in Japanese, which occurs only in the matrix clause (see footnote 9). See Aoun and Li 1993a,b for relevant discussions.

interrogative operators. Furthermore, the distribution of these *wh*-elements obeys various constraints discussed in detail by Li (1992). We mention some that support the existence of an operator binding these *wh*-elements.

The indefinite *wh*-element displays a behavior parallel to that of negative polarity items. It does not occur in standard positive contexts (46) but does occur in typical negative polarity contexts such as negation (47a–b), *yes/no* questions (48), and conditionals (49).¹³

- (46) *Ta xihuan shenme.
 he like what
 ‘He likes something/anything.’
- (47) a. Ta bu xihuan shenme.
 he not like what
 ‘He doesn’t like anything.’
 b. Ta bu wei shenme ren zuo shi.
 he not for what man do thing
 ‘He does not work for anyone.’
- (48) Shei/Shenme ren xihuan ta ma?
 who/what man like him QU
 ‘Does anyone like him?’
- (49) Yaoshi/Ruguo shenme ren/shei xihuan ta. . .
 if what man/who like him
 ‘If anyone likes him. . .’

In negative contexts the indefinite *wh* is allowed in object position of verbs (47a) and prepositions (47b) but not in the subject position of the clause containing the negative element:

- (50) *Shenme ren bu xihuan ta.
 what man not like him
 ‘Someone/Anyone does not like him.’

¹³ Also see Huang 1982 for the ‘‘affective’’ contexts (conditionals, questions, negation) for the distribution of indefinite *wh*-elements. As well as occurring in typical negative polarity contexts, an indefinite *wh*-element occurs with nonfactive verbs:

- (i) Wo yiwei/renwei/cai/xiwang ni xihuan shenme (dongxi).
 I think/think/guess/hope you like what thing
 ‘I think/guess/hope that you like something.’
- (ii) *Wo baoyuan/yihan ni zuo/xihuan shenme.
 I complain/regret you do/like what
 ‘I complained/regretted that you did/liked something/anything.’

According to Li (1992), the indefinite *wh*-element occurs in the contexts where the truth-value is negated (negation), where it is not fixed (*yes/no* questions, conditionals, nonfactive verb complements), and where it is not asserted directly.

This subject-object asymmetry in the availability of an indefinite *wh*-element in negative contexts can be accounted for in case *c*-command is a structural requirement between the indefinite *wh* and its licenser: in (47a–b), but not (50), the *wh*-element is *c*-commanded by the negative licenser. This account is supported by the contrast between (51a) and (51b), whose minimal difference lies in the position of negation.

- (51) a. Ta bu gen shenme ren shuohua.
 he not with what man speak
 ‘He does not speak with anyone.’
 b. *Ta gen shenme ren bu shuohua.
 he with what man not speak
 ‘He does not speak with anyone.’

It is also supported by the fact that the indefinite *wh*-element can occur in subject position when it is licensed by elements in Comp such as the conditional marker *if* (49) and the *yes/no* question marker *ma* (48).

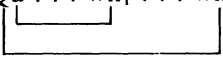
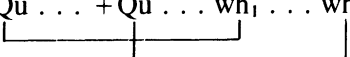
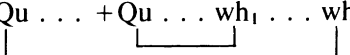
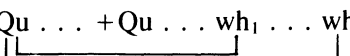
In discussing (46)–(51), we have mentioned some of the licensing conditions governing the occurrence of an indefinite *wh*-element. These conditions support our view that the *wh*-element is not to be treated as an intrinsic interrogative operator. We are now in a position to discuss the interaction of the indefinite *wh*-element and the interrogative *wh*-element. This interaction, as discussed by Li (1992), obeys a minimality requirement: the *wh*-element must be linked to the closest licenser. As indicated in footnote 13, a *wh*-element, in its noninterrogative indefinite construal, may be licensed by a nonfactive verb such as *yiwei* ‘think’:

- (52) Ta yiwei shei xihuan shenme.
 he think who like what
 ‘He thought somebody liked something.’

Now consider a sentence like (53), where the verb *xiang-zhidao* ‘wonder’ selects an interrogative clause.

- (53) Ta yiwei wo xiang-zhidao shei xihuan shenme.
 he think I wonder who like what
 ‘He thinks that I wonder who likes what.’
 *‘He thinks that I wonder what someone likes.’
 *‘He thinks that I wonder who likes something.’

In this sentence both of the *wh*-elements must be interpreted as interrogative elements rather than noninterrogative indefinite *wh*-elements. Schematically, the facts in (53) can be represented in (54), where +*Qu* stands for the *wh*-question licenser (the overt marker *ne* or the abstract marker *Qu*, which is not overtly realized in embedded Comps) and –*Qu* stands for the non-*wh*-question licenser.

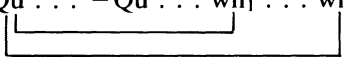
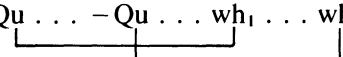
- (54) a. $-Qu \dots + Qu \dots wh_1 \dots wh_2$

 b. $*-Qu \dots + Qu \dots wh_1 \dots wh_2$

 c. $*-Qu \dots + Qu \dots wh_1 \dots wh_2$

 d. $*-Qu \dots + Qu \dots wh_1 \dots wh_2$


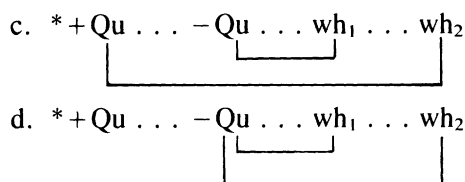
In brief, the *wh*-element displays a Minimality effect: it must be linked to the closest licenser. This Minimality effect can be accounted for if the existence of a question licenser is recognized. The Minimality effect therefore supports the existence of a question licenser.

Further, there are facts indicating that the question licenser is to be treated as an operator. Recall that an indefinite *wh*-element can be licensed by a conditional, as in (49), or by a nonfactive verb such as *yiwei* 'think', as in (52). With this in mind, consider the following sentences:

- (55) Yaoshi shei xihuan shenme, ta jiu gaoxing ne?
 if who like what he then happy QU
 'If who likes what, he would be happy?'
 *'If who likes something, he would be happy?'
 *'If someone likes what, he would be happy?'
 *'If somebody likes something, he would be happy.'
- (56) Ta yiwei shei xihuan shenme ne?
 he think who like what QU
 'Who(*x*), what (*y*), he thought *x* liked *y*?'
 *'Who(*x*), he thought *x* liked something?'
 *'What(*y*), he thought somebody liked *y*?'
 *'He thought who liked what.'

Here neither *wh*-element can be interpreted as a noninterrogative indefinite element: both must be interpreted as interrogative elements. The facts displayed in (55) and (56) are schematically represented in (57).

- (57) a. $+Qu \dots -Qu \dots wh_1 \dots wh_2$

 b. $*+Qu \dots -Qu \dots wh_1 \dots wh_2$




These facts may be accounted for if it is assumed that the $+ \text{Qu}$ licenser must be linked with a wh -element. That is, a $+ \text{Qu}$ licenser is a true operator that must be linked to a wh -element; if it is not, the prohibition against vacuous quantification is violated. On the other hand, a $- \text{Qu}$ licenser such as a nonfactive verb (*think*) or a conditional (*if*) need not be linked with a wh -element. Given this discussion, a representation like (57d) would violate the prohibition against vacuous quantification and one like (57a) would not. But why is it that (57a) does not violate the Minimality requirement? If we compare (57a) with (57b) and (57c), it appears that the $- \text{Qu}$ licenser can be bypassed only when it is not “activated,” that is, when it is not linked to a wh -element. The generalization that emerges is the following (see Li 1992):

- (58) The linking of a wh -element with an operator is subject to Minimality.

The linking of A with B [$\dots A \dots B \dots$] obeys Minimality iff there is no intervening C [$\dots A \dots C \dots B$] such that C is linked to another element D, $D \neq B \neq A$.

In (57a), although $- \text{Qu}$ intervenes, the linking of the wh -element with $+ \text{Qu}$ does not violate (58). In (57b), (58) is violated: the linking of wh_1 with $+ \text{Qu}$ is interrupted by $- \text{Qu}$, which is linked to wh_2 ; the linking of wh_2 with $- \text{Qu}$ is interrupted by wh_1 , which is linked to $+ \text{Qu}$. In (57c), the linking of wh_2 with $+ \text{Qu}$ violates Minimality: it is interrupted by $- \text{Qu}$ linked with wh_1 .

In brief, the facts discussed in (53)–(57) can be captured by the Minimality requirement (58) and the analysis that considers the $+ \text{Qu}$ licenser to be an operator that needs to be linked to a wh -element. The wh -element thus functions as a variable \bar{A} -bound by the $+ \text{Qu}$ operator.¹⁴

With this, we proceed to show how the generalizations captured by a raising approach to wh -elements presented in section 2 can be accounted for by a nonraising approach.

4.1 Scope and Selectional Restrictions

Recall that the scope of a wh -element is generally determined by moving it in Syntax or at LF to the Spec of Comp. The evidence discussed in sections 3.4–3.5 indicated that wh -elements in situ do not or need not raise to the Spec of Comp. Given the existence of a Qu -operator, we may determine the scope of a wh -in-situ by reference to the Qu -

¹⁴ We are assuming that elements that are locally \bar{A} -bound are to be treated as variables (see Chomsky 1981:185).

operator it is coindexed with. In the Chinese sentence (59), for instance, the *wh*-in-situ is coindexed with the matrix *Qu* and is interpreted as having matrix scope.

- (59) [_{CP} *Qu*_i [_{IP} Zhang shuo [_{CP} Li maile shenme_i]]]?
 Zhang say Li bought what
 ‘What did Zhang say Li bought?’

It is generally assumed that languages such as Chinese and Japanese differ from English with respect to the level where selectional restrictions are met (see Lasnik and Saito 1984, Aoun 1986): selectional restrictions are met at S-Structure in English and at LF in Chinese (see Huang 1982). In the English sentence (60a) the selectional requirements of the verb *wonder* are not met at S-Structure, and it is therefore unacceptable. Since in Chinese the selectional requirements are to be met at LF, the sentence corresponding to (60a) will be well formed. At LF, after *wh*-raising takes place, the selectional requirements of the verb *xiang-zhidao* ‘wonder’ are met.

- (60) a. *Who wonders Mary bought what?
 b. Shei xiang-zhidao Mali maile shenme?
 who wonder Mali bought what

The existence of a *Qu*-operator in Syntax in Chinese allows us to unify the levels where selectional restrictions are met. We now can assume that in both English and Chinese the selectional requirements are met by S-Structure.¹⁵

We have indicated that in Chinese the selectional requirements and the scope of a *wh*-element may be determined with respect to the *Qu*-operator this *wh*-element is coindexed with. Therefore, the satisfaction of selectional requirements and the determination of *wh*-element scope cannot be invoked to support the necessity of raising a *wh*-in-situ at LF to the Spec of Comp. The same conclusion may be reached concerning the behavior of *wh*-in-situ in weak crossover contexts.

4.2 Wh-in-Situ and Weak Crossover

We first consider the weak crossover effects illustrated in (61a–b).

- (61) a. *[[Xihuan ta_i de] ren] kandao shei_i?
 like he DE man saw who
 ‘Who did the person that likes him see?’
 b. *[[Xihuan e_i de] ren] kandao shei_i?
 like DE man saw who
 ‘Who did the person that likes (him) see?’

¹⁵ In English the *wh*-element itself moves at S-Structure to satisfy the selectional restrictions, and in Chinese the *Qu*-operator may be generated in or be moved to the appropriate Spec of Comp by S-Structure (or in a question projection; see section 5). Section 6 presents some discussion of the difference between English and Chinese with respect to the nature of the *Qu*-operator.

These sentences have the LF representations in (62a–b), under a nonraising analysis.

- (62) a. [Qu_i [NP[_{CP} xihuan ta_i] de ren] kandao shei_i]
 like he DE man saw who
 b. [Qu_i [NP[_{CP} xihuan e_i] de ren] kandao shei_i]
 like DE man saw who

Since the Qu-operator is coindexed with the *wh*-in-situ and the relation between this Qu-operator and the *wh*-element is akin to an operator-variable relation, the weak cross-over effects in (61a–b) can be captured by the Bijection Principle or whatever principle one may want to assume to account for them.

4.3 *Wh-in-Situ and the ECP*

In this section we discuss the argument-adjunct asymmetry displayed by *wh*-elements in situ in island contexts. First consider the *wh*-island contexts originally given in (11a–b).

- (11) a. Ta xiang-zhidao shei maile shenme?
 he wonder who bought what
 ‘What does he wonder who bought?’
 ‘Who does he wonder bought what?’
 ‘He wonders who bought what.’
 b. Ta xiang-zhidao shei weishenme likaile.
 he wonder who why left
 ‘Who does he wonder left why?’
 *‘Why does he wonder who left?’
 *‘He wonders who left why.’

In section 2, following Huang (1982), we indicated how the ECP captures the contrast between (11a–b). However, the ECP constrains NP-traces and *wh*-traces generated by overt and covert movement, not lexical items. Assuming that *wh*-elements in situ do not raise at LF to the Spec of Comp, these elements will not necessarily bind a gap at LF. As formulated, the ECP cannot be invoked to account for the contrast between (11a–b). Therefore, it will have to be reformulated to apply to *wh*-traces and to *wh*-in-situ.

The discussion of weak crossover effects in section 4.2 and the claim that the relation between a Qu-operator and the *wh*-element it is coindexed with is an operator-variable relation provide some insights concerning the extension of the ECP to *wh*-in-situ: the ECP may be made to apply to variables in general and not only to *wh*-traces.¹⁶

In a Generalized Binding account, the argument-adjunct asymmetry is made to fol-

¹⁶ The ECP will have to apply to NP-traces as well. This raises questions concerning the naturalness of the class of elements to which the ECP applies. These questions have been discussed in the literature and various solutions have been provided.

low from the binding principles (see Aoun 1985, 1986, Aoun et al. 1987). Since the relation between a binder and a bindee is not restricted to nonovert elements, a binding account for the argument-adjunct asymmetry can be maintained even if *wh*-elements in situ are not raised at LF to the Spec of Comp. This amounts to treating the relation between the Qu-operator and the *wh*-in-situ as a binder-bindee relation (see Aoun 1985:162). In brief, a binding account for the distribution and interpretation of *wh*-elements can be offered under a raising or a nonraising analysis of *wh*-elements in situ.

Whatever formulation of the ECP effects is adopted, the generalizations we need to capture concerning the argument-adjunct asymmetry exemplified by (11a–b) are as follows:

- (63) a. A *wh*-in-situ such as *why* in adjunct position must have an antecedent (i.e., must be antecedent-governed) in the minimal clause in which it occurs.
 b. A *wh*-in-situ such as *who* or *what* in argument position need not have a local antecedent in the minimal clause in which it occurs.¹⁷

4.3.1 *Wh-in-Situ and Wh-Islands* In light of the generalizations in (63a–b), consider (64), where the Qu-operator is in the matrix clause and the *wh*-element is in the embedded clause.

- (64) [Qu_i [ta renwei [Zhangsan weishenme_i/zenme_i laile]]]?
 he think Zhangsan why/how came
 ‘Why/How does he think Zhangsan came?’

In (64) the domain where the *wh*-adjunct ought to have an antecedent, according to generalization (63a), is the embedded clause. The only way to satisfy this requirement is to allow the Qu-operator to be generated in the embedded clause and to be subsequently moved to the matrix Spec of Comp by S-Structure, as in (65). For concreteness, we assume that the Qu-operator is generated in the embedded Spec of Comp. In the following section, however, we will discuss evidence suggesting that this Qu-operator in fact may originate within the embedded IP and later be moved, first to the embedded Spec of Comp and then to the matrix one.

- (65) [CP₁ Qu_i [IP₁ ta renwei [CP₂ t_i [IP₂ Zhangsan weishenme_i/zenme_i laile]]]]
 he think Zhangsan why/how came

In (65) the *wh*-element has an antecedent—the trace in Spec of Comp—thus satisfying requirement (63a).

¹⁷ English and Chinese differ with respect to whether a *wh*-element in subject position (in tensed clauses, in particular) needs to have a local antecedent: in English, but not in Chinese, a local antecedent is required.

Huang (1982) assumes that the subject position in Chinese, but not in English, is lexically governed by Infl. This is why a *wh*-element in subject position in Chinese does not need to be antecedent-governed. Aoun (1985, 1986) assumes that a *wh*-element in the subject position in Chinese has no local domain in which it should be bound because Agr(reement), which defines an opaque domain for the subject position in languages such as English, is missing in this language (also see Aoun et al. 1987).

By assuming that the Qu-operator may be moved in Syntax, we expect the distribution of the Qu-operator to be sensitive to the various constraints (such as the ECP and Subjacency) that regulate overt extraction processes. Sections 4.3.2–4.3.4 provide evidence that this is indeed the case.

Now consider the contrast between (11a) and (11b). We start with (11a), repeated here.

- (11) a. Ta xiang-zhidao shei maile shenme?
 he wonder who bought what
 ‘What does he wonder who bought?’
 ‘Who does he wonder bought what?’
 ‘He wonders who bought what.’

Recall that the two *wh*-elements in argument position need not be locally bound (see generalization (63b)). According to Huang (1982), (11a) has three possible interpretations depending on whether the two *wh*-elements have distinct scope or not. The three interpretations are generated by the following representations (see (69) for the bracket representation $i[j]$ in (66c)): ¹⁸

- (66) a. [_{CP₁} Qu_j [_{IP₁} ta xiang-zhidao [_{CP₂} Qu_i [_{IP₂} shei_i maile shenme_j]]]]]¹⁹
 he wonder who bought what

¹⁸ As discussed by Huang (1982), the interpretation where both *wh*-elements have matrix scope (see (i)) violates the selectional requirements of the verb *xiang-zhidao* ‘wonder’.

(i) [_{CP₁} Qu_{i[j]} [_{IP₁} ta xiang-zhidao [_{CP₂} [_{IP₂} shei_i maile shenme_j]]]]]
 he wonder who bought what

¹⁹ A reviewer points out that, according to Kim (1989), Japanese and Korean do not allow either of the embedded *wh*-elements to have the matrix scope interpretation, even though Chinese allows them to. Thus, the translation given is the only possible interpretation for the Korean sentence (i) and the Japanese sentence (ii).

(i) John-un [nwu-ka mwues-ul sat nunci] mwulet ni?
 John-TOP who-NOM what-ACC bought QU asked QU
 ‘Did John ask who bought what?’
 (ii) John-wa [dare-ga nani-o katta ka] tazuneta ka?
 John-TOP who-NOM what-ACC bought QU asked QU
 ‘Did John ask who bought what?’

We would like to relate the difference between Chinese on the one hand and Japanese and Korean on the other to another difference between these languages. Hoji (1985) observes that a sentence of the form in (iii) (exemplified in (iv)), whose subject is a QP and whose object is a *wh*-element, is not acceptable in Japanese (also see Kim 1989 for the same generalization in Korean).

- (iii) *QP-ga . . . wh-o
 (iv) *Daremo-ga dare-o syootaisita no?
 everyone-NOM who-ACC invited QU
 ‘Who did everyone invite?’


This is not the case in Chinese, as indicated by the well-formedness of sentences like (v).

- (v) Meigeren dou qingle shei?
 everyone all invited who
 ‘Who did everyone invite?’

- Now consider (11b).

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has at least two functions: to indicate the scope of a *wh*-element and to provide a binder (an antecedent) for the *wh*-element. With this in mind, let us return to the issue of absorption. We would like to suggest that Absorption occurs when distinct *wh*-elements end up coindexed with the same Qu-operator. In the representation (68), for example, the Qu-operator is coindexed with *who*. *What* is absorbed into *who* if the Qu-operator that is coindexed with *who* is also used to indicate the scope of *what*.

$$(68) \quad [\text{Qu}_i \dots [\text{who}_i \dots \text{what}]]$$


For ease of representation, we will use the bracket notation in (69) to indicate that *what* is absorbed into *who* and that the Qu-operator expresses not only the scope of *who* but also the scope of *what*.

$$(69) \quad [\text{Qu}_{[i]} \dots [\text{who}_i \dots \text{what}_j]]$$

The bracket index $i[j]$ denotes that the element that has the index j is absorbed into the element that has the index i . Note that after Absorption occurs (bracket index marked), the relation between the Qu-operator and the *wh*-element with the bracketed index (*what*) cannot be a true binding relation with respect to the application of the binding theory. If it were, *what* would be bound by the Qu-operator and the coindexed *who*, creating a Principle C violation.

The discussion in the previous paragraph distinguishes (11a–b), their English counterparts (70a–b), and the Chinese sentence (70c).

- (70) a. He wonders who saw what.
 b. *He wonders who left why.
 c. *Ta xiang-zhidao ni weishenme likai-bu-likai.
 he wonder you why leave-not-leave
 ‘He wonders whether you left why.’

The contrast between the English sentences (70a) and (70b) or between the Chinese sentences (11a) and (11b) lies in the fact that *who* and *what* can undergo Absorption, but not *who* and *why*. The two possible representations for (70b) are (71a–b), similar to (67b–c), except that *who* undergoes overt *wh*-movement in English.²¹

- (71) a. * $[_{CP1} \text{Qu}_j [_{IP1} \text{he wonders } [_{CP2} \text{who}_i [_{IP2} x_i \text{why}_j \text{left}]]]]$
 b. *he wonders $[_{CP2} \text{who}_i \text{Qu}_j [_{IP2} x_i \text{why}_j \text{left}]]$

Like (67b–c), these representations are not well formed. (70a) has the representation given in (72). In (72) *who* undergoes syntactic *wh*-movement and *what* is absorbed into *who*.

²¹ In English *who* in (70a) has moved to the Spec of Comp by S-Structure.

(72) he wonders [$\text{who}_{i[j]} [x_i \text{ saw what}_j]$]

In this representation the raised *who* indicates not only its own scope but also the scope of *what*. Since *what* in the object position does not need an antecedent, (72) does not violate the locality condition (63b). In contrast, (73a), with the LF representation in (73b), is not acceptable.

(73) a. *He wonders what who saw.

b. [$\text{what}_{j[i]} [\text{who}_i \dots x_j]$]

In (73b) *who* is absorbed into *what*. It is unacceptable because a subject *who* in English, in contrast to the subject in Chinese and an object *what* in English, must have an antecedent in the local domain, as in (72). (See Chomsky 1981, Huang 1982, Aoun 1986, Aoun et al. 1987 for the local domain relevant to a subject in English and its irrelevance in Chinese.) In (73b) *who* does not have a binder in the local domain. Once again, note that for the Chinese sentence (11a), either (72) or (73b) is possible because a *wh*-element in subject or object position in Chinese does not need an antecedent in the local domain (see footnote 17).²²

The discussion in the previous paragraphs shows that if a *wh*-element needs an antecedent in the local domain, it cannot be bracket-indexed with (absorbed into) another *wh*-element. This is further illustrated by other cases such as the unacceptability of (70c). An adjunct *wh*-element *why* and the A-not-A question element both are subject to the locality requirement (63a) (see Huang 1982). If Absorption does not occur in this case, (70c) will have the representation in (74a). If Absorption does occur, as in (74b–c), the Qu-operator can only function as an antecedent for one of the two question elements, not for both. The locality requirement thus will be violated.

²² Alternatively, we may assume with Rizzi (1990) that a subject *wh* in English, as well as an object *wh*, does not need an antecedent in a local domain. The *that-t* effect will be subsumed under the requirement of lexical government: a trace in subject position is not lexically governed by Comp when it contains an overt complementizer *that*. This would predict that if a subject *wh* is overtly extracted, as in (i), the *that-t* effect will appear.

(i) *Who_i do you think that x_i left?

In contrast, if the subject *wh* is not overtly extracted, lexical government will not be relevant and the *that-t* effect will not be an issue. Indeed, if we claim that *who* in the embedded subject position in (ii) does not undergo movement, lexical government will not be relevant and the sentence will not be ruled out by the conditions on movement (thanks to a reviewer for bringing to our attention the acceptability of (ii)).

(ii) Who thinks that who left?

The acceptability of (ii) is not necessarily an argument for the lack of movement of a *wh*-in-situ at LF, however, if we assume with Aoun et al. (1987) that lexical government is relevant at PF (S-Structure) but not LF. These accounts for the acceptability of (ii)—either that *wh*-elements in situ stay in situ at LF or that lexical government is irrelevant at LF—suggest that the unacceptability of (73a), with its LF representation in (73b), is not to be accounted for by the locality conditions on movement as suggested in the text. In other words, the standard Superiority effect illustrated in (73a) is a phenomenon independent of the ECP. There are indications that this is true: (iii) displays a Superiority effect despite the fact that each *wh*-element occurs in a properly governed position (see, among others, May 1985, Williams 1986).

(iii) *What did John persuade whom to do?

and thus violates the lexical government requirement that Lightfoot and Weinberg assume to hold for all gaps generated in Syntax. Similarly, t_i in (76b) is not lexically governed.²³

Now consider the three possible representations of (75a):

- (77) a. [CP₁ Qu_i [IP₁ ni xihuan [NP[CP₂ shei_i xie de] shu]]]
 you like who write DE book
- b. [CP₁ Qu_i [IP₁ ni xihuan [NP[CP₂ t_i [shei_i xie de] shu]]]
 you like who write DE book
- c. [CP₁ Qu_i [IP₁ ni xihuan [NP[CP₂ t_{1i} [CP₂ t_{2i} [shei_i xie de]] shu]]]
 you like who write DE book

Representations (77b–c), like (76b–c), are to be ruled out by lexical government (or other conditions, see footnote 23). (77a) is well formed: the *wh*-argument need not have an antecedent in the relative clause in which it is contained (see generalization (63b)), and no ECP violation occurs.

4.3.3 Wh-in-Situ and CED Effects In the previous sections we discussed the distribution of *wh*-arguments and *wh*-adjuncts in situ in two island contexts: *wh*-island contexts and complex NP contexts. We suggested that *wh*-adjuncts, unlike *wh*-arguments, cannot appear in such contexts; if they do, an ECP violation occurs. This analysis also accounts for the distribution of *wh*-arguments and *wh*-adjuncts that occur within adjuncts, as in (78a–b).

- (78) a. Mali yinwei Zhang shuo shenme shengqi ne?
 Mali because Zhang say what angry QU
 ‘What(x), Mali got angry because Zhang said x ?’
- b. *Mali yinwei Zhang weishenme shuo hua shengqi ne?
 Mali because Zhang why say word angry QU
 ‘Why(x), Mali got angry because Zhang said words x ?’

Assuming generalization (63b), *what* need not have a local antecedent within the clause in which it is generated. Thus, the Qu-operator need not be generated within the adjunct

²³ Additionally, (76b) violates Subjacency. Since CP₂ is not θ -marked, it is a barrier. NP inherits barrierhood from CP₂. The movement from t_i to Qu_i thus violates Subjacency. In (76c) no Subjacency violation occurs.

There are other ways to rule out (76b–c), as pointed out by a reviewer: Assume the existence of a relative clause operator. If the Qu-operator moves to the matrix first and then the relative clause operator moves into the Spec of CP, Strict Cyclicity will be violated and the trace of the Qu-operator will be obliterated.

(76b) also violates Minimality if relativization involves an operator in the (Spec of) Comp of the relative clause. No such violation should occur in representation (i) involving a resumptive pronoun unless it is assumed that these elements are bound by nonovert operators.

(i) *[CP₁ Qu_i [IP₁ ni xihuan [NP[CP₂ t_i [ta weishenme, yao zhaogu tamen de] haizi]]]]]
 you like he why will care them DE children
 ‘Why(x), you like the children that he cares x ?’

Let us start by discussing the canonical examples illustrating the scope interaction of *wh*-elements and OPs.

(83) a. Shei kandaole meige dongxi? (unambiguous)
 who saw every thing
 'Who saw everything?'

- b. Meigeren dou kandaole shenme dongxi? (ambiguous)
 everyone all saw what thing
 'What did everyone see?'

- (84) a. [_{CP} Qu_i [_{IP} shei_i kandaole meige dongxi]] (unambiguous)
 who saw every thing
 b. [_{CP} Qu_i [_{IP} meigeren dou kandaole shenme dongxi_i]] (ambiguous)
 everyone all saw what thing

These representations yield only the reading where the Qu-operator has wide scope. Recall the earlier suggestion, however, that the Qu-operator is generated within the clause and then moved to the Spec of Comp as in (85a–b).

- (85) a. [_{CP} Qu_i [_{IP} shei_i [_{I'} x_i [_{VP} meige dongxi_j [_{VP} kandaole x_j]]]
 who every thing saw
 b. [_{CP} Qu_i [_{IP} meigeren_j [_{IP} x_j [_{I'} x_i dou kandaole shenme dongxi_i]]]]
 everyone all saw what thing

In (85a) the movement chains ($Qu_i \dots x_i$) and ($everything_j \dots x_j$) do not violate the MBR: the most local \bar{A} -binder for x_i is Qu_i and the most local binder for x_j is *everything_j*. In (85b), although the adjoined *everyone_j* is a closer \bar{A} -binder to x_i , it is not a potential binder: the coindexing of x_i with *everyone_j* will make the *wh*-element A-bound by the subject x_j , creating a Principle C violation. According to the Scope Principle (22), (85a) yields the reading where the Qu-operator and the *wh*-element coindexed with it have wide scope. (85b) yields two readings: the reading where the Qu-operator and the *wh*-element have wide scope, and the reading where the QP has scope over the Qu-operator and the *wh*-element coindexed with it since the QP c-commands the trace left by the extraction of the Qu-operator.²⁵

In section 4.3 our analysis led to the following result: a Qu-operator that serves as an antecedent for a *wh*-in-situ will never be generated within an island. If it is generated

²⁵ The trace generated by the movement of the Qu-operator is neither assigned Case nor θ -marked. If an A-position receives either Case or a θ -role, the trace of a Qu-operator will be in an \bar{A} -position. As an \bar{A} -element, it will be relevant in the determination of relative scope (see the Scope Principle (22)).

there, its extraction will violate constraints such as the ECP. The interaction of *wh*-elements and QPs provides an opportunity to test the validity of this result. The ambiguity of (83b) was traced to the fact that the QP c-commands the trace left by the Qu-operator (see (85b)). Therefore, the QP has scope over the chain containing the *wh*-element. In turn, the Qu-operator c-commands the QP and has scope over it.

In light of these considerations, let us look at the following abstract representation:

(86) [_{CP} Qu_i [_{IP} NP . . . (*x_i*) . . . V . . . [_{Island} . . . QP V *wh*-argument_i]]]

For (86) to be well formed, the Qu-operator in the matrix CP could not have originated within the island. Thus, (86) should yield only the reading where the Qu-operator (and the *wh*-element it is coindexed with) have scope over the QP. The reading where the QP has scope over the chain (Qu_i, *x_i*) is not available because the QP does not c-command either the Qu-operator or the trace generated by the movement of the Qu-operator.

The fact is that sentences that are to be analyzed along the lines of (86) indeed are unambiguous:

- (87) a. Ta keneng hui yinwei Li jiao meigeren mai shenme shengqi ne?
 he maybe will because Li ask everyone buy what angry QU
 ‘What(*x*), he might get angry because Li asks everyone to buy *x*?’
 b. Ta keneng hui kandao xiwang meigeren mai shenme de ren ne?
 he maybe will see hope everyone buy what DE man QU
 ‘What(*x*), he might see the man that likes everyone to buy *x*?’

In (87a–b) the *wh*-argument occurs within an island. As expected, these sentences are not ambiguous. They have only the reading where the Qu-operator has scope over the QP.

The proposed analysis also leads us to expect a representation like (88) to yield ambiguity.

(88) [_{CP} Qu_i [_{IP} QP_j . . . (*x_i*) . . . V . . . [_{Island} . . . NP V *wh*-argument_i]]]

In (88) the Qu-operator is generated in the matrix Infl and then raised to the matrix Spec of Comp. The QP c-commands the trace left by the Qu-operator. According to the Scope Principle (22), (88) should yield two readings: the reading where the Qu-operator and the *wh*-argument coindexed with it have scope over the QP, and the reading where the QP has scope over the chain containing the Qu-operator and the trace that it binds. Although the judgment is subtle (see footnote 26), this expectation seems to be fulfilled: (89a–b), which are analyzed along the lines of (88), can be construed as ambiguous.

- (89) a. Meigeren keneng hui yinwei Li jiao ta mai shenme shengqi ne?
 everyone maybe will because Li ask him buy what angry QU
 ‘What(*x*), everyone might get angry because Li asks him to buy *x*?’

- The proposed analysis also accounts for the nonambiguity of (40) (repeated here as (41)).

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5 The Representation of the Qu-Operator

In the previous sections we discussed some evidence supporting the existence of a non-overt question operator. By S-Structure this nonovert question operator ends up in the Spec of Comp of an interrogative clause. It is not necessarily base-generated in the Spec of Comp of an interrogative clause, as shown by the fact concerning the scope interaction of QPs and *wh*-elements discussed in section 4.4: in a representation such as (86), repeated here as (100), the Qu-operator could not have been generated within the island. Therefore, this representation yields only the reading where the Qu-operator has scope over the QP.

(100) [_{CP} Qu_i [_{IP} NP . . . (x_i) . . . V . . . [_{Island} . . . QP V *wh*-argument_i]]]

On the other hand, a representation such as (88), repeated here as (101), yields ambiguity. The Qu-operator is generated in the matrix clause and then extracted to the matrix CP. The QP c-commands the trace left by the Qu-operator and the Qu-operator c-commands the QP.

(101) [_{CP} Qu_i [_{IP} QP . . . (x_i) . . . V . . . [_{Island} . . . NP V *wh*-argument_i]]]

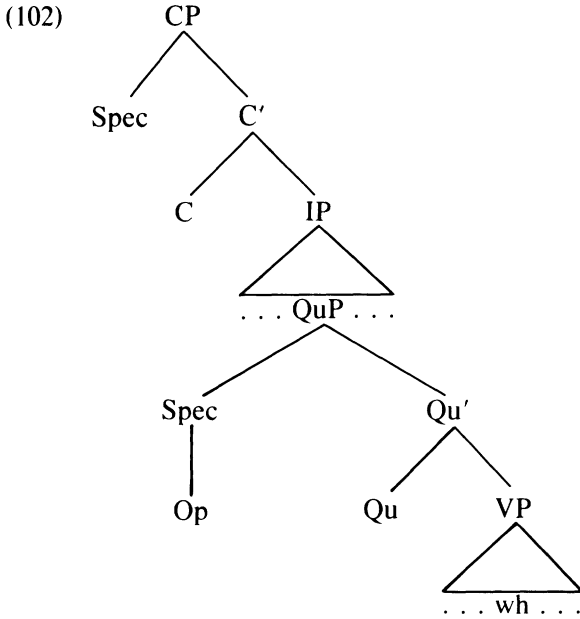
Since the distribution of the Qu-operator is sensitive to islands, it is natural to assume that movement is involved in the generation of this element: a Qu-operator is not necessarily base-generated in the Spec of Comp of the interrogative clause. A representation in line with X-bar theory and the recent treatments of functional categories outlined by Chomsky (1986, 1991), Pollock (1989), and Ouhalla (1990) would be to assume the existence of a question projection within the clause whose Spec position is filled by the Qu-operator, as in (102).²⁷ This view is argued for in detail by Benmamoun (1991a,b).²⁸

²⁷ There is evidence for the existence of a Qu-operator. This concerns V-not-V questions in Chinese, illustrated in (i) (see Huang 1982).

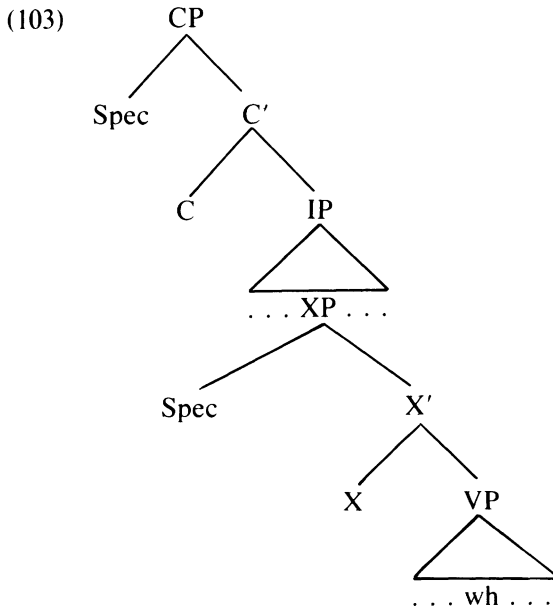
(i) Ni renwei ta lai-bu-lai?
you think he come-not-come
'Do you think he will come?'

The V-not-V question has matrix scope in (i). A movement approach to V-not-V questions would move the question form to the matrix (Spec of) Comp. V-not-V, however, is an X⁰ category, and according to the Head Movement Constraint, it is not allowed to undergo long-distance movement. The existence of a Qu-operator provides a way to solve the problem: being an XP category, the nonovert Qu-operator coindexed with the V-not-V element is not subject to the Head Movement Constraint. (However, see Baltin 1991 for the possibility of long-distance head movement at LF.)

²⁸ This representation is similar to the account of negation provided by Ouhalla (1990), which argues for the existence of an operator generated in the Spec of the negation phrase and incorporates the insight of Kim's (1989) analysis, where it is argued that the Qu-marker is generated in Infl and then moved to Comp.



In fact, we can generalize the structure further. In the spirit of Laka Mugarza's (1990) proposal that there is a phrase ΣP in which emphasis and other elements are generated, we may claim that there is an XP in Chinese that generates different types of sentences such as questions, indicatives, and suggestions. More specifically, (102) is to be replaced by (103), where X can have any of the four combinations of the features $[\pm Qu]$, $[\pm wh]$.



If the features are [+Qu, +wh], a [+wh] question will be generated and a Qu-operator can occur in the Spec position of this projection. This operator subsequently moves to the Spec of Comp inside or outside the clause.²⁹ [+Qu, –wh] will yield *yes/no* questions. [–Qu, –wh] will yield statements. [–Qu, +wh] may be related to exclamatory sentences like (104).

- (104) Ta you duomo hao ya!
 he has how good PARTICLE
 ‘How good he is!’

Needless to say, this proposal requires further study of various languages, especially those with richer systems of propositional particles that indicate clause type.³⁰

6 Conclusion

As noted at the outset, works in generative syntax have assumed that in a language like English, *wh*-elements in situ in sentences involving multiple interrogatives are subject to a covert movement in the Logical Form component. Evidence for this covert movement was first drawn from the fact that *wh*-elements in situ obey various constraints applying to gaps generated by overt movement such as the Empty Category Principle. Huang’s (1982) work on this subject proved to be influential. Previous studies had focused on the behavior of *wh*-elements in situ in languages that display an obligatory (e.g., English) or optional (e.g., French) overt *wh*-movement to the Spec of Comp. Huang was the first to point out that the postulation of a covert *wh*-raising process at LF provides an elegant account for the behavior of *wh*-elements in languages that display no overt movement of *wh*-interrogatives to the Spec of Comp.

From a typological point of view, Huang’s results were significant. They allowed linguists to unify the seemingly disparate behavior of *wh*-elements across typologically unrelated languages. As some linguists quipped, “Chinese, as a result of Huang’s work, appears to be like English but at LF.” That is, the behavior of *wh*-elements in Chinese appears to be similar to the behavior of *wh*-elements in English. The difference between the two languages is that in Chinese, extraction of these elements operates exclusively at LF.

In this article we have argued that in Chinese and English *wh*-elements in situ stay in situ even in the LF component: they do not need to raise at LF to the Spec of Comp

²⁹ A trace derived by movement of a [+Qu] (or [+wh]) element is generally taken to be a [–Qu] (or [–wh]) element. This is why, in a movement approach to *wh*-elements, the requirement that the matrix verb takes a [–Qu] (or [–wh]) is satisfied (see Lasnik and Saito 1984).

(i) How_i do you think [t_i [he fixed it x_i]]?

The same can be maintained in the approach proposed here: after the movement of a [+Qu] element from an embedded clause to the matrix clause, the embedded clause no longer contains a [+Qu]. It contains the trace of a [+Qu], which is a [–Qu]. The embedded clause thus cannot be interpreted as an interrogative.

³⁰ Kim (1989) notes that in Korean and Japanese a Qu-morpheme and an indicative mood marker are base-generated in the same place, Infl, preceding a complementizer.

position. Furthermore, we argued that in Chinese *wh*-elements in situ are coindexed and interpreted with respect to a question operator that is moved to the appropriate Spec of Comp by S-Structure. Thus, it becomes possible to state and account for, at S-Structure, the various generalizations concerning Chinese *wh*-elements in situ. In this respect, Chinese and English are alike. Then where does the difference between the two languages lie? An obvious difference is that the *wh*-element in Chinese can be interpreted as a noninterrogative indefinite element or as an interrogative element. A *wh*-element in Chinese is interpreted as an interrogative element when it is licensed by a question operator +Qu or as an indefinite element when it is licensed by a –Qu element. On the other hand, a *wh*-element in English is intrinsically interpreted as an interrogative element. Following Katz and Postal (1964), Baker (1970), Van Riemsdijk and Williams (1981), Pesetsky (1987),³¹ and Benmamoun (1991a,b), it is possible to assume that question markers are also available in English. For concreteness, like Benmamoun, we assume that a representation such as (105) exists in English and that the *wh*-element is raised to the Spec of Qu and then to the Spec of Comp.³²

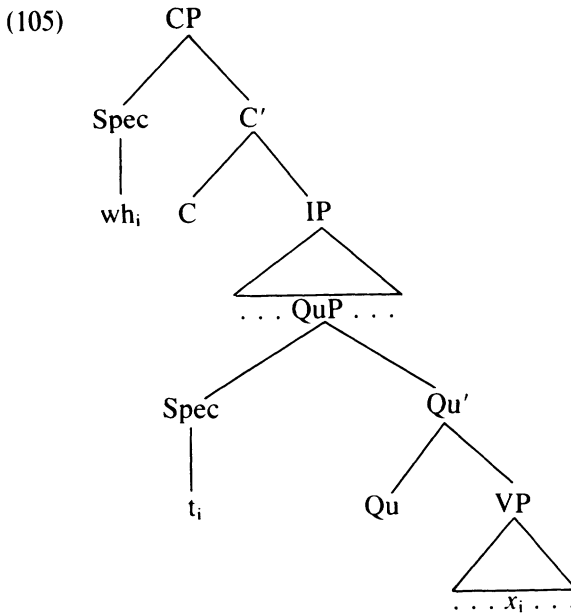
³¹ The main distinction between our analysis and Pesetsky's (1987) is that ours allows all *wh*-elements to stay in situ. In contrast, Pesetsky's distinguishes D-linked and non-D-linked *wh*-elements and argues that only non-D-linked *wh*-elements need to undergo raising at LF. The arguments are based on the difference in behavior between D-linked and non-D-linked *wh*-elements with respect to Superiority and Subjacency effects: non-D-linked *wh*-elements display Superiority and Subjacency effects, whereas D-linked elements do not. Williams (1986), however, notes that both types of *wh*-element must undergo movement in Romanian and that they nevertheless display the same contrast with respect to Superiority and Subjacency effects. He therefore argues that such distinctions are not to be captured in terms of movement versus nonmovement at LF. In fact, a binding analysis of the contrast between D-linked and non-D-linked *wh*-elements is discussed by Weinberg and Hornstein (1988). Like all other binding analyses, their approach does not necessarily rely on the existence of a movement process.

Empirically, typical adjuncts, which generally cannot be D-linked, can be modified by *zhi* 'only' in Chinese. For instance, in (i) *how* can be modified by *zhi*. For independent reasons, *zhi* in Chinese cannot precede a *because* expression or *why* (see (ii)–(iii)). The unacceptability of (ii)–(iii) may be due to the fact that *zhi* is base-generated at a position lower than the reason phrase.

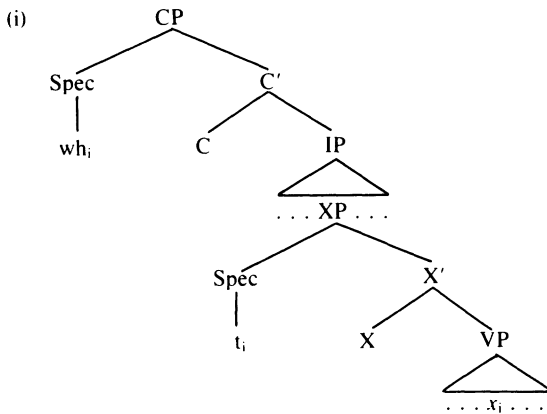
- (i) Ta *zhi* zuo de zenmeyang jiu zoule?
he only do DE how then left
'He only did how then left?'
- (ii) *Ta *zhi* weishenme shengbingle?
he only why grew-sickness
'Why(x), he only became sick x?'
- (iii) *Ta *zhi* yinwei tianqi shengbingle.
he only because weather grew-sickness
'He only became sick because of the weather.'

The acceptability of sentences like (i) indicates that, contrary to the suggestion of Cheng (1991), the effect of *only* is not necessarily related to D-linking properties. Publication deadlines prevent us from including a full discussion either of Cheng 1991 or of Watanabe 1991, which reaches conclusions similar to ours. See Aoun and Li 1993a for relevant discussion.

³² Just as (103) can replace (102), (i) can replace (105).



Now, assuming representations (102) and (105), one may surmise that the difference between Chinese and English is to be traced back to the existence of the nonovert operator in the Spec of Qu position in Chinese but not in English. As a consequence of the existence of this operator, the *wh*-element itself in a language like Chinese cannot be treated like an operator: it functions as a polarity item. The *wh*-element in English, on the other hand, functions as an operator. This operator, on its way to the Spec of Comp position, first moves to the Spec of Qu position. In this position, the Spec-head agreement mechanism operates on it, and the nonovert Qu head is licensed accordingly.³³



³³ We are assuming that every empty category needs to be licensed, either by binding or by Spec-head agreement. The first type of licensing applies to traces (see Chomsky 1981); the second type applies to elements

Several questions concerning the Qu-operator hypothesis remain to be discussed. For example: A detailed cross-linguistic investigation of the nature of the Qu-operator and its distribution is needed. A discussion of languages such as French or Lebanese Arabic that have an optional *wh*-movement would also be relevant. A reevaluation of the role of the Logical Form component is called for. A full discussion of all these issues obviously goes beyond the scope of this article, which was to establish that there is overt movement of a question operator in Chinese and that *wh*-elements in situ need not raise to the Spec of Comp at LF.

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such as *pro*, which is licensed by being in a Spec-head relation with *Agr* (see Chomsky 1981, Rizzi 1986, among others).

In the case of multiple *wh*-questions in English, movement of one *wh*-element through the Spec position is sufficient to trigger Spec-head agreement. In other words, we are claiming that the *wh*-in-situ in (i)–(ii) does not undergo movement, as evidenced by its interaction with *only* discussed in section 3.

(i) Who saw *what*?

(ii) Who said that *who* saw John?

Absorption of the two *wh*-elements would occur when the *wh*-in-situ ends up being bracket-indexed with another *wh*-element in the Spec of Comp.

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