Chapter Two

The Syntax and Semantics of Wh-Questions

0. Introduction

Although English and Chinese use different strategies to type a wh-question (Cheng 1991, 1997), and thus differ from each other with respect to syntactic wh-movement, both languages involve wh-expressions that remain in-situ in overt syntax. In English, wh-in-situ only occurs in multiple wh-questions, as illustrated in (1), whereas in Chinese, wh-in-situ is the norm, as shown in (2).

(1) Who t bought what?
(2) Ni mai-le shenme?
   you buy-ASP what
   ‘What did you buy?’

There are also languages such as Bulgarian, Polish and Huangarian that require multiple instances of overt wh-movement to the left periphery of CP in multiple wh-questions. In the following Bulgarian multiple wh-questions, all the wh-expressions move overtly to the sentence-initial position, even though all the wh-words originate from the same embedded clause, as shown in (3b). (3c) shows that a wh-word in Bulgarian may not remain in-situ. Of course, if the relevant wh-word in (3c) is replaced by a non-wh-word, it can stay in-situ.
Despite the above differences in overt syntax among languages with respect to syntactic wh-movement, Huang (1998 [1982b]) proposes that all wh-expressions in natural language undergo movement to some clause-initial position to form an operator-variable relation, though languages may differ in terms of where this movement applies, in overt syntax or at LF. On this view, at some point the English wh-question (1) and the Chinese multiple wh-question (2) will be assigned a representation, as demonstrated in (4) and (5) in their syntactic derivation:

(4) \[\text{what}, \text{who}, [t_i \text{ bought } t_j] \]

(5) \[\text{shenme}, [\text{ni mai-le } t_i] \]

Another approach to wh-interpretation is a non-movement one, which
proposes that all wh-expressions, whether moved or not, be bound by an abstract Q(uestion)-morpheme. The non-movement approach is first proposed by Baker (1970), according to whom a Q-morpheme, as an operator, can unselectively bind all the free variables in its c-command domain. If this approach is adopted, the LF representations for (1) and (2) would be (6) and (7):

(6) \([Q_{<i,j>} [\text{Who}_{j} \text{ t}_{j} \text{ bought } \text{what}_{i}]]\)?

(7) \([Q_{i} [\text{ni mai-le } \text{shenme}_{i}]]\)?

In the last fifteen years or so, the unselective binding approach has been further developed in Nishigauchi (1986), Pesetsky (1987), Cheng (1991), Aoun and Li (1993), Cole and Hermon (1994), Shi (1994), and Tsai (1994b). Although both the movement and the non-movement approaches have their respective theoretical and empirical advantages in accounting for WH phenomena, they also have their respective limitations when examined carefully against linguistic data in natural language. In the following discussion, I first investigate these two approaches and present evidence and arguments to show where they fail, and then give my own account of wh-phenomena. Specifically, I will argue that the interpretation of wh-expression is basically regulated by two factors: locality and prominence. Previous studies pay little attention to prominence except for the notion of c-command, though enough attention has been paid to locality. I will show that it is the interaction of prominence and locality that determines the interpretation of wh-elements in Chinese as well as English.

The discussion will be organized as follows. In section 2 I will review different approaches to wh-questions and argue that these approaches have their
respectively limitations in accounting for wh-phenomena. In section 3, I will set up
two parameters to classify wh-questions across languages and develop a clausal
typing condition to account for wh-phenomena. I will also discuss the island effects
on wh-interpretation and the multiple wh-phenomena in both Chinese and English.
I will show that Chinese and English obey the same constraint on the interpretation
of wh’s in-situ, though Chinese and English employ different strategies to type
wh-clauses, and argue that wh-island effects are also observed in Chinese in
multiple wh-questions. In section 4, I will redefine the wh-clausal typing condition,
distinguishing it from the wh-interpretation condition, and show that
wh-interpretation is constrained by economy considerations. In section 5, I will
show that the so-called additional WH effects can be adequately accounted for
under the analysis assumed in this chapter.

1. To Move or not to Move?

To move or not to move? That is the question. If one does not assume LF
movement for wh-expressions, one has to explain why some wh-elements that stay
in-situ exhibit locality effects. If one assumes that all wh-expressions move either
in syntax or at LF, one has problems related to movement. The LF movement
approach tries to establish a correspondence between wh-interpretation and some
locality conditions. The ideal picture for this approach is that if a derivation is out,
it must result from a violation of some locality conditions at some point of the
derivation, in either overt syntax or LF. The problem for this approach is that the
picture often cannot be idealized as expected. There are always some sentences that
should be out, but are actually in, and some sentences that should be in, but are
actually out. Different locality conditions have been proposed to account for wh-quantification, but these locality conditions often cannot make adequate predictions since they are both too strong and too weak.

1.1 LF Wh-Movement

1.1.1 Superiority Effects

The Superiority effect is a restriction on the distribution of wh-expressions involved in multiple wh-questions, as illustrated below:

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

   (Pesetsky 2000: 15)

(9) a. Whom did John persuade t to visit whom?
   b. *Whom did John persuade whom to visit t?

   (Comorovski 1996: 91)

This effect can be captured by Kuno and Robinson’s (1972) constraint given in (10):

(10) A wh-word cannot be preposed crossing over another wh-word.

Chomsky (1973) proposes that (10) be replaced by a more general condition, termed Superiority Condition:
(11) Superiority Condition

No rule can involve X, Y in the structure

\[ \ldots X \ldots [\alpha \ldots Z \ldots -WYV \ldots] \]

where the rule applies ambiguously to Z and Y and Z is superior to [m-commands] Y.

What Kuno and Robinson (1972) and Chomsky (1973) try to account for is the fact, as exhibited in (8) and (9), that the derivation is made worse by the movement of the lower wh-expression when more than one wh-expression is involved. In Minimalist Program, Chomsky (1995: 311) reduces the above arbitrary and structure specific restrictions on overt movement to a more general locality condition on movement, which can be viewed as an instance of the economy strategy of preferring shorter links.

(12) Minimal Link Condition

K attracts \( \alpha \) only if there is no \( \beta \), \( \beta \) is closer to K than \( \alpha \), such that K attracts \( \beta \).

Arguments supporting the LF movement approach come from the claimed covert Superiority effects with wh-adjuncts, similar to those as shown in (8) and (9). As observed in Huang (1998[1982b]), wh-adjuncts are not allowed to occur in the following multiple wh-questions.

(13) a. *What did you buy t how?
   b. *Who t arrived why?
If we assume that wh-in-situ must undergo movement at LF, then the unacceptability of (13) can be straightforwardly accounted for by the same independently motivated condition that rules out (8b) and (9b). However, the Superiority Condition fails to account for the acceptability of (8a) and (9a), though capturing (13).

1.1.2 Subjacency

In GB syntax, overt Wh-movement is constrained by Subjacency and the Empty Category Principle (henceforth, ECP) (Chomsky 1973, 1981). Subjacency states that no rule may move an element from Y to X in the configuration in (14) below:

(14) … X … [α … [β … Y … ] … ] … X …

where α and β are bounding nodes.

The bounding nodes defined in (14) may be parameterized across languages and in English, they are two cyclic nodes, NP and S (=IP). As discussed in Huang (1998 [1982b]), the Subjacency condition covers a number of constraints formerly proposed by Ross (1967) such as the Complex NP Constraint and the Sentential Subject Constraint. Hence, the Subjacency condition can adequately account for the ungrammaticality of the sentences below (Huang 1998 [1982b]):

(15) *[CP Whoi [IP do you like [NP the books [CP that [IP describe ti]]]]] ?

(16) *[CP Whoi [IP did [NP [CP that [IP she married ti]]]] surprise you]]?
In (15) the wh-expression moves to the matrix C node by crossing an island formed by NP, CP, and IP. In (16) the movement of the wh-expression crosses an island formed by NP, CP, and IP. In both cases, Subjacency is violated.

Although Subjacency can correctly rule out the illicit overt movement of wh-expressions in (15-16), it fails to rule in the grammatical covert wh-movement at LF. In the following sentences, all the wh’s-in-situ are assumed to move to the matrix C at LF.

(17) \[Who \text{ likes } [\text{NP books that } [\text{IP criticize } whom]]]?

‘Which person x and which person y such that x likes books that criticize y.’

(18) \[Ni \text{ xihuan } [\text{NP[iP piping shei] de } shu]]?

you like criticize who DE book

‘Which person x such that you like books that criticize x.’

(19) \[[\text{IP Shei kan zhe ben shu zui heshi]}\]

who read this CL book most appropriate

‘What is x such that it is most appropriate for x to read this book.’

In the above English and Chinese examples, all the wh’s-in-situ are allowed to move and take matrix scope at LF by crossing two or more bounding nodes on the LF movement approach. Although the assumed LF movement of wh-expressions in (17-19) violates Subjacency, these sentences are not ungrammatical.

1.1.3 ECP
Although the covert movement of arguments does not obey Superiority or Subjacency, it seems that the covert movement of adjuncts is constrained by these locality conditions, as demonstrated below:

(20) *Who e arrived why?
(21) *[[Ta weishenme xie] de shu] zui youqu
        he why    write   DE book most interesting

‘Books that he wrote why are most interesting?’

(Huang 1998 [1982b]: 373)

According to Huang (1998 [1982b]), the difference between overt and covert movement with respect to Superiority and Subjacency can be reduced to ECP, which is defined in (22) below.

(22) The Empty Category Principle (ECP)

A nonpronominal empty category must be properly governed.

Proper government is defined below:

(23) Proper Government

A properly governs B iff A

(i) lexically governs B, or

(ii) antecedent-governs B.

In (22), ‘nonpronominal empty category’ refers to NP-traces and wh-traces. Since
traces created through Quantifier Raising at LF (i.e. raising of a quantified NP or covert movement of a wh-expression) are also A'-bound nonpronominal empty categories, and are thus on a par with wh-traces at S-Structure, they are also assumed to be subject to ECP. According to Huang, there is an asymmetry between overt syntactic movement and covert LF movement of wh-expressions with respect to Subjacency and ECP. In overt syntax, both Subjacency and ECP apply, but at LF, only ECP applies. This account captures correctly the adjunct cases in (20-21) and the Superiority effects with subjects in (8b-9b). In GB syntax, objects are assumed to be lexically governed by the verb, whereas subjects and adjuncts are not since (i) INFL, the potential governor for the subjects, is a functional, but not lexical head incapable of lexically governing the relevant subjects, and (ii) adjuncts are not sisters of verbs, and are thus not under the government of verbs. Now if wh-in-situ must move at LF, the ungrammaticality of (20-21) and (8b-9b) can be accounted for since the traces left by the wh-in-situ in these sentences are neither lexically governed nor antecedent-governed. For instance, in (8b) the wh-in-situ who adjoins to what in [Spec, CP] at LF, as shown in (24). From that position, it cannot antecedent-govern its trace since the Spec of CP is already assigned the index of what. Since the trace is neither antecedent-governed nor lexically governed, given the assumption that INFL is not a lexical governor, the sentence is ruled out as ungrammatical by ECP.

(24) \[CP [\text{Who}, [\text{what}_j]]_i [C \cdot \text{did} [\text{IP}_t \text{ buy } t_j]]]\)

The same is true for (20-21). In (20), the trace left by the adjunct why is not lexically governed, and it is not antecedent-governed, either, since it is adjoined to
who at LF, which has already indexed the Spec of CP. In (21), the trace left by the adjunct *weishenme* ‘why’ is not antecedent-governed after *weishenme* moves to [Spec, CP] at LF, since the antecedent-government is blocked by a sentential subject island. Huang’s (1998 [1982b]) account can explain not only the ungrammatical cases, but also the grammatical cases like (8a-9a), and (17-19). In (8a), (9a), (17) and (18), the traces left by the LF moved wh-expression are lexically governed since they function as objects. In (19), the subject trace is also lexically governed since Huang assumes that the INFL in Chinese is lexical, rather than functional, thus significantly differing from the INFL in English. Although Huang’s analysis successfully accounts for some adjunct and Superiority cases, it still leaves other ECP related cases unexplained, as demonstrated below:

(25) Who reads the books that who writes?

(Reinhart 1998: 33)

(26) *What did you persuade whom to read t?*

(27) a. Which book did which person buy?

b. *What did who buy?

(28) a. *What did who give t to Mary?

b. What did who give to whom?

(Pesetsky 2000: 17)

(29) Zenme shao de dan zui haochi?

how  cook DE egg most delicious

‘Eggs that are cooked HOW are most delicious?’

(Xu 1990: 370)

(30) Shei weishenme mei lai?
Who why not come

Lit. ‘Who did not come why?’

In (25), the wh-in-situ would adjoin to the sentence-initial who at LF, and thus fail to antecedent-govern its trace. Since INFL in English is functional, the wh-trace is not lexically governed. Hence, the ECP account would predict (25) to be ungrammatical. However, (25) is grammatical. As a matter of fact, the ECP account is not only too strong in ruling out some grammatical sentences, it is also too weak in ruling in some ungrammatical sentences. Specifically, the ECP account would rule in the unacceptable (26) since the traces left by the syntactically moved wh-expression and the LF moved wh-expression are both properly governed as they are objects of a verb, thus satisfying ECP. The ECP account will also have problems in accounting for the contrast between (27a) and (27b) in grammaticality. Although it can correctly rule out (27b), it will incorrectly exclude the grammatical (27a). (28a) and (28b) are also problematic for the ECP account. Although the movement of the wh-subject who at LF in both cases violates ECP, (28a) is out, but (28b) is in. (29) shows that the Chinese wh-adjunct zenme ‘how’ can occur within an island. (30) is regarded as an ungrammatical sentence under the ECP account since the trace of weishenme ‘why’ is not antecedent-governed at LF. However, (30) is not ungrammatical according to our judgment. Shi (1994: 310) points out that the question in (30) asks about the pairing of a set of individuals and a set of reasons. Hence, a statement like (31) can be taken as an appropriate answer.

(31) Zhangsan yinwei tai mang mei lai; Lisi yinwei shengbing mei lai.

Zhangsan because too busy not come Lisi because be-sick not come
‘Zhangsan did not come because he was too busy; Lisi did not come because he was sick.’

(Shi 1994: 311)

1.1.4 Crossover Phenomena

Strong Crossover phenomena are often taken as evidence in support of LF wh-movement in the literature.

(32) a. *Who did he say that Mary helped t_i?

b. *When did he say that Mary helped who_i?

In (32a) the wh-expression crosses over the binding pronoun in overt syntax, and thus results in a Binding Condition C violation since the trace left by the moved phrase is assumed to be an R-expression. In (32b), it is assumed that the wh-in-situ moves at LF, and thus results in a similar violation. Although this kind of analysis can account for the data above, it fails to account for (33). Simpson (2000) notes that in (33) below the wh-expression does not cross the co-indexed NP subject either in overt syntax or at LF, but the co-reference between them is equally impossible. This fact shows that wh-expressions, just like r-expressions, are also constrained by the Binding Condition C.

(33) *Jane_i wanted to know who_i Mary had seen t_i.

(Simpson 2000: 42)
Simpson (2000) further notes that the strong crossover account also fails to explain the following sentences:

(34) a. *[Whose gossip about which woman\textsubscript{k}]\textsubscript{j} did Jane\textsubscript{j} fervently deny \textsubscript{t}\textsubscript{k}?  
b. *[Whose\textsubscript{j} book\textsubscript{k}]\textsubscript{j} did John\textsubscript{j} borrow \textsubscript{t}\textsubscript{k}?  

(Simpson 2000: 42)

In (34) the wh-traces bear different indices from the elements that have been crossed by the moved wh-expressions. In order to account for the ungrammaticality of the above sentences, the bracketed wh-expressions have to be assumed to be reconstructed or copied to their original positions (cf. Chomsky 1993). As a result, the coindexation between the c-commanding subjects and the elements within the reconstructed or copied wh-expression will be ruled out by Condition C. However, if Binding Condition C can rule out (34), it can also rule out (32b). Hence, it is unnecessary to assume that the wh-in-situ in (32b) moves at LF.

1.2 D-Linking

Pesetsky (1987) argues that it is necessary to make a distinction between two types of wh’s-in-situ in terms related to discourse. One type undergoes LF movement, and the other does not. Consider the following examples:

(35) a. ?*What\textsubscript{j} did you persuade whom to read \textsubscript{t}\textsubscript{j}?  
b. Which book\textsubscript{j} did you persuade which man to read \textsubscript{t}\textsubscript{j}?
According to Pesetsky, the LF movement of the wh-in-situ in (35a) would violate superiority, and is thus marked as unacceptable. In contrast, the wh-in-situ in (35b) remains in situ, and thus violates no grammatical principles. How is it possible for the wh-in-situ in (35b) to involve no LF movement if it needs to be assigned scope? Pesetsky argues that which-phrases are D-linked wh-expressions, and D-linked wh-expressions are not quantifiers and thus have no quantificational force. Following Baker’s approach, he suggests that which-phrases be unselectively bound by an operator Q. As a result, no Superiority effects are expected because wh-in-situ does not move in sentences like (35b). Here, Pesetsky uses two strategies to resolve wh-quantification: wh-movement and unselective binding. For those wh’s-in-situ that must obey locality constraints, they must move at LF. For those wh’s-in-situ that are not constrained by locality conditions, they need not move. Although this account is plausible, it is just a restatement of the facts. The question why D-linked wh-expressions need not move is unanswered. Another problem for Pesetsky’s account is that it fails to explain why the following sentence is not fully acceptable, as noted in Comorovki (1996: 85):

(36) ?What did which student read t?

If a D-linked wh-expression can remain in-situ, (36) should be fully grammatical since *which student* does not move at LF and thus has no chance to violate ECP, according to Pesetsky’s analysis. However, (36) is not fully acceptable. Note that it is of no use to say that a which-phrase should be given the priority to move in overt syntax since the following sentence is still less acceptable even though the which-phrase is overtly moved.
(37) ?Which book did how many people buy?

One might argue that the less acceptability results from the LF movement of the non-D-linked subject wh-expression. However, this account will have problems in explaining (i) why (37) is not fully marked as ungrammatical if it violates ECP, and (ii) why (25) is fully grammatical since the LF movement of the non-D-linked embedded subject who will also violate ECP if non-D-linked wh-in-situ must move at LF, as assumed by Pesetsky.

1.3 Pied-Piping

The previous discussion shows that wh-in-situ fails to exhibit the full range of island effects that characterize overt wh-movement. In order to account for the scope property of the wh’s-in-situ that are not constrained by islands, Huang (1998 [1982b]) has to assume that Subjacency does not apply at LF. Although this is not implausible, there is no independent motivation for assuming that LF is not constrained by Subjacency, as argued in Shi (1994). To circumvent this stipulation, Nishigauchi (1986, 1990) suggests that in cases where a wh-expression occurs in an island, the entire island containing the wh-expression be pied-piped to the operator position (cf. Choe 1987; Pesetsky 1987; Longobardi 1987). As a result, the wh-expression is still contained within the island, and Subjacency is still observed at LF. Nishigauchi (1990: 48) gives the following evidence to show why it is the entire island, rather than the wh-expression contained in it, that is affected by LF movement.
Nishigauchi observes that apart from a full-fledged answer that repeats the entire sentence, an appropriate answer for a question like (38) is (39), instead of (40), though (40) is also a possible answer if treated as a truncated form derived from (39):


‘You read books that who wrote?’

(39) Austen-ga kai-ta hon desu.

‘(It’s) the book that Austen wrote.’

(40) Austen-desu.

‘(It’s) Austen.’

Hence, what (38) asks for is not the identity of an author, but the identity of the book making crucial use of the identity of the person who wrote it. Along this line, then, the LF representation for (38) should be (41), instead of (42):

(41) [You read y] [NP[[S x wrote] whox] books]y

(42) You read [[ x wrote] books][comp whox ka]

In (41), the entire complex NP occupies the operator position, and thus matches the appropriate answer (39).
Attractive as it may appear, however, Nishigauchi’s pied-piping analysis runs into a number of problems. It predicts that wh’s-in-situ contained in a complex NP cannot take scope over the head of the complex NP, since this analysis attempts to preserve island conditions at LF by assuming that the island pied-pipes with the wh-in-situ to some operator position, and the wh-in-situ never leaves the island. But, as pointed out by Fiengo et al. (1988), certain standard cases of ‘inversely linked quantification’ of the type discussed in May (1977) would require a wh-expression contained in a syntactic island to be interpreted out of the island, and this is at variance with Nishigauchi’s pied-piping analysis. Consider example (44) below (Fiengo et al. 1988: 86):

(43) Meige ren dou mai-le [yiben [shei xie de] shu]?
every man all buy-ASP one who write DE book

‘Everyone bought a book that who wrote?’

(44) daduoshude ren dou mai-le [[shei xie de] meiben shu]?
most man all buy-ASP who write DE every book

‘Most people bought every book that who wrote?’

According to Fiengo et al. (1988), (43) contains three quantifiers, whose scope order, under a natural reading, may be shei ‘who’> meige ren ‘everyone’> yiben shu ‘a book’. Although the wh-expression stays in-situ, it is separated from the existential quantifier in scope order by the universal. Thus (43) has the interpretation “Who is the person x such that everybody bought one book or another that x wrote?” This scope interpretation is identical to that of the following English sentence in which the wh-expression overtly moves to the operator
position:

(45) Who did everybody see a picture of t?

However, if we assume the pied-piping analysis for (43), this scope interpretation would not be available, for, if the entire complex NP is pied-piped to the matrix Comp, (i) *shei* ‘who’ would be unable to take scope over the existential quantifier *yiben shu* ‘a book’, and (ii) the wh-expression and existential quantifiers would not be separated in scope by the universal quantifier *meige ren* ‘everyone’.

Another problem for the pied-piping analysis, according to Fiengo et al., is posed by the semantics of the operators like *shei xie de meiben shu* ‘every book that who wrote’ in (44). The pied-piping analysis implies that the wh-operator in the form of a complex NP is existential in nature, adopting the question semantics of Karttunen (1977), but it is clear that this complex NP is also a universal quantifier, as it takes a universal determiner *meiben* “every”. If it is the whole complex NP that is quantified, then the pied-piping analysis would predict that the wh-expression *shei* ‘who’ and the universal quantifier *meiben shu* ‘every book’ cannot take on different quantificational forces, which is inconsistent with the quantificational facts in (44).

A third type of problem with Nishigauchi’s analysis, as pointed out in Fiengo et al., is that sometimes the wh-word contained in an island prefers to have an elliptical answer that does not repeat the island. In the following sentence, contrary to those cases involving complex NPs, the most natural elliptical answer to a question whose wh-expression occurs in the sentential subject is the one which only provides the value of the wh-expression, without repeating the whole
sentential subject (Fiengo et al. 1988: 85):

(46) [shei kan zheben shu] zui heshi?

who read this book most appropriate

‘That who read this book is most appropriate?’

a. *Zhangsan kan zheben shu.

‘That Zhangsan read this book.’

b. Zhangsan

As shown in (46), the most appropriate answer for the above Chinese question is not the elliptical answer that repeats the entire sentential subject, but the answer that spells out only the value of the wh-expression. If repeating the entire island in an elliptical answer is taken to be symptomatic of pied-piping, then the impossibility of doing this in (46b) will suggest that no pied-piping of the entire clause should take place. But if this is really the case, the pied-piping analysis cannot be maintained since this would indicate that island conditions are violated at LF, contra the basic assumption taken in the pied-piping analysis that island conditions are not violated at LF.

Apart from the problems pointed out in Feingo et al. (1988), Nishigauchi’s pied-piping analysis also has problems in accounting for the contrast in grammaticality among the following sentences:

(47) [Ni xihuan [NP piping shei] de shu]?  

you like criticize who DE book

‘Which person x such that you like books that criticize x.’
(48) *[Ta weishenme xie] de shu] zui youqu

   he why write DE book most interesting

   ‘Books that he wrote why are most interesting?’

(49) [Zenme shao de dan] zui haochi?

   how cook DE egg most delicious

   ‘Eggs that are cooked HOW are most delicious?’

To account for the contrast between (47) and (48), Nishigauchi suggests that a wh-expression must be identical in syntactic category with the dominating node in order for the [+WH] feature to be percolated to the latter. In (47) the wh-expression shei ‘who’ is [+N] so that its [+WH] feature can climb up to the complex NP as a result of feature percolation. In (48), the wh-expression weishenme ‘why’ is [-N], so its [+WH] feature cannot be percolated to the complex NP. As a result, the relevant complex NP will have no chance to be identified as [+WH], and, accordingly, will not be pied-piped to the operator position to take scope. If weishenme alone moves to the operator position, Subjacency will be violated. Hence, the ungrammaticality of (48). Although this analysis can account for the ungrammaticality of (48), it fails to do so for the grammaticality of (49). In (49) zenme ‘how’ is also [-N], but the sentence is grammatical as a wh-question.

   In order to circumvent the problems found in Nishigauchi’s analysis while maintaining the idea that Subjacency Condition holds at LF, Fiengo et al. take Nishigauchi’s analysis one step further to allow for both pied-piped movement and extraction of wh-expressions out of the pied-piped constituent. Adopting the stipulation from Chomsky (1986b) that an A’-binder will lose its barrierhood, they propose that the wh-in-situ first be pied-piped together with the entire island to the
IP-adjoined position, and the wh-expression then be raised out of the island to the operator position since the relevant island loses its barrierhood when IP-adjoined.

Under Fiengo et al.’s analysis, wh-expressions contained in a complex NP are now able to take scope over the head of that complex NP, as they end up in an operator position outside the complex NP. It seems that their analysis can solve some of the problems associated with Nishigauchi’s pied-piping analysis. However, Fiengo et al.’s analysis has its own share of problems, as pointed out by Shi (1994: 304). Shi argues that their analysis has problems in accounting for the following Chinese sentence which involves a wh-expression in a complex NP that is inside another complex NP.

(50) Ni renshi \([NP_1[t_i \text{ zhuadao} [NP_2[t_i \text{ sha shi} \text{ de} [xiongshou_i]\text{ de neige jingcha}_i]]\text{ de neige jingcha}_i]\text{ de neige jingcha}_i]\text{ ne?}\)

you know catch kill who DE murderer DE that policeman ne?

Q

‘You know the policeman that caught the murderer that killed whom?’

In (50), the LF movement of the wh-in-situ will inevitably violate Subjacency no matter what pied-piping strategy is taken. If the inner complex NP (NP₂) is pied-piped, the raising will violate Subjacency by crossing the outer complex NP (NP₁). Of course, one can assume that NP₁ is adjoined to the matrix IP first, and NP₂ is then adjoined to the IP of the inner relative clause of NP₁, and after adjoining to the IP of the inner relative clause, the wh-expression finally moves to the Spec of the matrix CP. However, as pointed out in Shi (1994), the final process of raising the wh-expression to the matrix operator position in (50) would cross two
CP bounding nodes which are not L-marked and thus barriers. Hence, the grammaticality of (50) would be left unaccounted for if one assumes that Subjacency is inviolable at LF. In addition to this problem unsolved, Fiengo et al.’s analysis also fails to account for the grammaticality of (49) since the LF movement of *zenme* 'how’ would violate ECP.

The above discussion shows that neither the pied-piping analysis proposed by Nishigauchi (1986) nor the one further revised in Fiengo et al. (1988) can adequately explain why sometimes locality conditions are violated, but the relevant sentences are still grammatical.

### 1.4 Unselective Binding and Choice Function

The alternative to the LF movement analysis of wh’s-in-situ is an operator binding approach, which makes use of the notion of unselective binding developed in Kamp (1981) and Heim (1982). On this approach, all wh-expressions, whether moved or not, should be treated as variables, and unselectively bound by an operator in its c-command domain. In the last fifteen years, the unselective binding approach has been further developed in Nishigauchi (1986), Pesetsky (1987), Cheng (1991), Aoun and Li (1993), Cole and Hermon (1994), Shi (1994), and Tsai (1994b).

An advantage of treating wh-expressions as variables is that it captures the fact that in many languages wh-expressions do not have fixed quantificational force and can be assigned different interpretations by different operators (cf. Haspelmath 1997). For instance, a wh-expression in Chinese is often ambiguous between a question and statement reading, as pointed out by Xu (1990: 357):
(51) Zheli que-le shenme
here miss-ASP what

a. What is missing here?

b. There is something missing here.

In (51) the wh-phrase *shenme* can be interpreted either as an interrogative phrase, meaning ‘what’, or as an existential indefinite, meaning ‘something’. As discussed in Huang (1998 [1982b]), Lee (1986), and Shi (1994), Chinese wh-expressions like *shenme* ‘what’, *shei* ‘who’, *nail* ‘where’, *zenme* ‘how’, and so on can also be interpreted as universal quantifiers when they are licensed by *dou* ‘all’. Since wh-expressions can achieve different quantificational forces when licensed by different operators, it is not unreasonable to assume that they are interpreted as interrogative phrases only when they are licensed by a Q operator.

Although the unselective binding approach can adequately account for the fact that wh-expressions may function either as interrogative NPs or indefinite NPs in natural language, it has its own problems. First, it fails to explain why the scope interpretation of some wh-expressions like *why* and *how* in English, and *weishenme* ‘why’ in Chinese is highly constrained, as demonstrated in (13) and (21). The unselective binding approach assumes that a Q operator can license any number of wh-expressions as long as they occur in its c-command domain (Baker 1970). Since the relation between the operator and the relevant variables is not constrained by locality conditions, it is expected that ECP or Subjacency effects will not arise when a wh-phrase occurs in an island. But (21) shows that locality effects do arise when *weishenme* ‘why’ occurs in an island. Another problem with the unselective
binding approach, as pointed out in Reinhart (1997, 1998), is that it could lead to wrong interpretations for sentences involving a conditional. Consider the following examples adopted from Reinhart (1998: 36-37):

(52) Who will be offended if we invite which philosopher?

Wrong:

(53) a. for which \(<x, y>\), if we invite y and y is a philosopher, then x will be offended
   
   b. \{P \mid (\exists<x, y>)(P=\neg((we invite y & philosopher(y)) \rightarrow (x will be offended)) & true(P))\}
   
   c. Lucie will be offended if we invite Donald Duck.

Right:

(54) a. for which \(<x, y>\), y is a philosopher and if we invite y, x will be offended
   
   b. \{P \mid (\exists<x, y>) ((y is a philosopher) & P=\neg((we invite y) \rightarrow (x will be offended)) & true(P))\}
   
   c. Lucie will be offended if we invite Donald Duck.

In (52), a wh-in-situ (i.e. which philosopher) occurs in an if-clause. If we apply the unselective binding analysis to represent (52), we get the LF representation (55):

(55) \[Q_{\langle i, j\rangle} [who_i will be offended if we invite which philosopher_j]]

(55) is equivalent to (53a), but not to (54a). The semantic representation for (55)/(53a) is (53b), where wh-expressions are treated as existential NPs, and the question denotes the set of propositions which are true answers to it. The problem
with (55)/(53a) is that the restriction is left in-situ. If (55)/(53a) is the question expression by (52), anything that is not a philosopher could be a value for y in (55)/(53a), given the representation (53b). Hence, (53c) could be one of the possible answers to (52), which is an undesirable result unexpected by the unselective binding approach. (54a) yields the correct set of answers for (52) since in (54a) the restriction is pulled out of the antecedent clause of an implication.

To circumvent the interpretative problems with the unselective binding approach, Reinhart proposes that wh’s-in-situ be interpreted via choice functions, and it is the function variable, rather than the individual variable, which is long-distance bound by the existential Q operator. The choice function can assign wide scope to wh-in-situ by allowing existential quantification over choice function (notated as ‘CH(f)’), and at the same time restricts the values that could possibly be assigned to the wh-variable to the domain defined by the N-restriction. According to Reinhart, the semantic representation for (52) is (56), where f is a choice function, and f(philosopher) denotes the philosopher selected by this choice function.

\[(56) \{P \mid (\exists <x,f>)(CH(f) \land P=\neg(we \ invite \ f(\text{philosopher}) \rightarrow (x \ will \ be \ offended \ & \ true(P)))\}\]

What (56) states is that a function f exists such that for some person x, if we invite the philosopher selected by f, x will be offended. In (56), f(philosopher) is in argument position, and it denotes the value of the function f.

I think that Reinhart’s Choice Function analysis is the right approach to solve the problems with wh’s-in-situ, but one issue that this analysis has to address is
how to account for the assumed argument-adjunct asymmetry in wh-interpretation. Reinhart (1998) claims that adverbial adjuncts cannot be interpreted via choice functions, and thus cannot be interpreted in-situ. However, this account still cannot explain why (29) and (30) are grammatical, though a wh-adverbial occurs in an island in these sentences.

1.5 Referentiality and Nonreferentiality

Xu (1990) observes that Chinese wh-adjunct *zenme* ‘how’ can take matrix scope while occurring in an island, as shown in (29), repeated below as (57):

(57) *Zenme shao de  dan zui   haochi?*

how   cook DE egg most   delicious

‘Eggs that are cooked HOW are most delicious?’

But it is also observed that Chinese wh-expression *weishenme* ‘why’ is highly restricted in scope interpretation, as shown in (21), repeated below as (58):

(58) *[[Ta weishenme xie]  de shu]  zui  youqu*

he why       write   DE book most interesting

‘Books that he wrote why are most interesting?’

Based on these facts, Lin (1992) claims that there is an asymmetry between *zenmeyang* ‘how’, a variant of *zenme,* and *weishenme* ‘why’ in regards to LF movement. In order to account for the asymmetry between *zenmeyang* and
weishenme in scope interpretation, Hua (2000) stipulates that zemeyang is a variable, but weishenme is an operator. Although this account captures the fact that weishenme cannot be interpreted out of an island, it is just a restatement of the fact since the question why zemeyang is a variable and weishenme is an operator is left unexplained. Tsai (1994a) argues that the relevant asymmetry at LF is not between zemeyang and wieshenme in particular, but between referentiality and nonreferentiality among wh-expressions in general. He suggests that wh-arguments and referential wh-adjuncts (when, where, instrumental how and purpose why), as one group, be differentiated from nonreferential wh-adjuncts (manner how and reason why) as another group in LF scope interpretation since only the former, but not the latter, are allowed to take scope out of islands at LF. To show that such a distinction may be necessary, Tsai observes that the questions below differ significantly in their acceptability:

(59) a. [Ta zemeyang chuli zhe-jian shi] bijiao qiadang?
   he how handle this-CL matter more appropriate
   ‘what is the means x such that it is more appropriate [for him to handle this matter by x]?’

b. *[Zhe-jian shi, ta chuli- de zemeyang] bijiao qiadang?
   This-CL matter he handle DE how more appropriate
   ‘what is the manner x such that it is more appropriate [for him to handle this matter in x]?’

(60) a. [Women wei(-le)shenme nianshu] cai you yiyi?
   we for what study just have meaning
   ‘which purpose x such that it is just meaningful [for us to study for x]’
b. *[Women *weishenme* nianshu] cai you yiyi?

we why study just have meaning

‘what is the reason x such that it is just meaningful [for us to study for x]’

(59a) is acceptable when the wh-expression is associated with an instrumental reading, while (59b) is unacceptable when it seeks for an answer with a manner reading. (60a) is grammatical when the wh-expression concerns the purpose, whereas (60b) is ungrammatical when it concerns the reason. In order to account for the contrast in acceptability among the above sentences, Tsai (1994a) labels the instrumental *how* and the purpose *why* as referential, and the manner *how* and the reason *why* as nonreferential. For Tsai, the referential vs. nonreferential distinction plays a crucial role in accounting for the differences of these wh-expressions in taking scope. He assumes that sentential subjects, relative clauses, appositive clauses,3 and [+N] complement clauses subcategorized for by verbs such as *yihan* ‘regret’, *jide* ‘remember’, and *tongyi* ‘agree’ constitute nominal islands that block the extraction of nonreferential wh-expressions at LF.

Although it is insightful and very close to the solution of the problems by proposing a referentiality/nominality vs. nonreferentiality distinction in accounting for wh-quantification in Chinese, Tsai’s (1994a) account is still problematic in a number of aspects. First, the notion of referentiality is not well-defined, as noted by Tsai (1994a: 130) himself. If there is no reliable criterion to make a distinction between referentiality/nominality and nonreferentiality, then it is stipulative to say that the instrumental *how* and the purpose *why* are referential, and the manner *how* and reason *why* are nonreferential. Since no clear distinction can be made between referentiality and nonreferentiality, this account is just a restatement of the fact that
these two groups of wh-expressions are different, and the reason why they are different in scope interpretation is still left unaccounted for.

In fact, the notion of referentiality has been widely explored in the literature. Rizzi (1990) associates referentiality with referential theta roles. Cinque (1990) further refines Rizzi’s (1990) analysis by defining the notion of referentiality as “the ability to refer to specific members of a set in the mind of the speaker or preestablished in discourse” (Cinque 1990: 16). Based on Rizzi’s and Cinque’s theory of referentiality, Chung (1993: 38) uses the notion of familiarity and descriptive content to define referentiality. Kiss (1993) also employs the notion of referentiality (under the term SPECIFICITY) to account for the wh-phenomena. According to Kiss (1993: 87), a wh-phrase is specific if it ranges over a set which is familiar to the participants of the discourse. Although various definitions of referentiality are available, Tsai does not specify clearly which definition of referentiality is employed in his analysis. Since he does not show how to tie the instrumental how and the purpose why to the notion of referentiality, we fail to see why the instrumental how and the purpose why are referential, but the manner how and reason why are non-referential.

Second, Tsai’s analysis fails to explain why in the following sentence, the purpose why, i.e., wei(-le)shenme ‘for what’ still cannot be interpreted out of the assumed A-not-A island even when it is referential, according to Tsai:

(61) *Ni xiangzhidao [ta wei(-le)shenme lai-bu-lai]?

you wonder he for-what come-not-come

*What is the purpose x such that you want to know that he will come or not come for x?’
According to Tsai’s analysis, the purpose why, as a referential wh-adjunct, should be unrestrained when occurring in an island, but in the above sentence, it is obviously blocked for taking matrix scope.

Third, as pointed out in Hua (2000), *zenmeyang* as a manner how can also be interpreted out of the island, as shown in the following sentence, where (62b) indicates that *zenmeyang* can have the manner reading:

(62) [Li xiaojie *zenmeyang* tiaowu] zui haokan?

Li miss how dance most beautiful
‘what means/manner x such that Miss Lisi looks the most beautiful to dance by/in x.’

a. Yong jiaojian tiao (zui haokan).
   by toe dance most beautiful
   ‘By dancing on toes.’

b. Man-man de tiao (zui haokan)
   slow-slow DE dance most beautiful
   ‘Slowly.’

Fourth, Tsai fails to explain why in the following sentence, the A-not-A operator, a nonreferential wh-operator, can be interpreted out of a nominal island:

(63) Ni dasuan [xia-ge yue qu-bu-qu meiguo]?

you plan next-CL month go-not-go America

Lit. ‘Do you plan to go or not to go to America next month?’
According to Tsai (1994a: 150-151), the following sentences are ungrammatical because the complement clauses selected by dasuan ‘plan’ and jihua ‘plan’ are [+N], and thus constitute nominal islands that will block the extraction of nonreferential wh-elements.

(65) *Lisi dasuan [weishenme mai diannao]?
Lisi plan why buy computer
‘What is the reason x such that Lisi plans [to buy a computer for x]?’

(66) *Lisi jihua [weishenme mai diannao]?
Lisi plan why buy computer
‘What is the reason x such that Lisi plans [to buy a computer for x]?’

However, this account obviously fails to account for the grammaticality of (63) and (64). It seems that the only way out is to treat the A-not-A operator as a referential element, but this will leave the ungrammaticality of sentences like (67) unaccounted for:

(67) *[Ta qu-bu-qu meiguo] bijiao hao?
he go-not-go America more good
Lit. ‘Is it better whether he goes to America or not?’
In (67), the A-not-A operator cannot take scope out of the subject island.

Fifth, according to Shi (1994: 306), *zenme* ‘how’ can also be used as a verb in Chinese, and in this case, we have good reasons to believe that *zenme* is not referential/nominal in any syntactic or semantic sense. But in the following sentence, the verb *zenme* can take matrix scope out of an island:

(68) a. [Ta ba ni zenme le] rang ni zheme shangxin?

    he BA you how ASP let you so sad

    *Lit.* ‘He treated you HOW so as to make you so sad?’

b. [[Ta ba Lisi zenme le] de shuofa] bijiao kexin?

    he BA Lisi how ASP DE claim more reliable

    *Lit.* ‘The claim that he treated Lisi HOW is more reliable?’

In (68), Tsai (1994a) would predict that the matrix scope interpretation of the nonreferential wh-verb should be blocked by the nominal subject and Complex NP islands. But the nonreferential wh-verb does take matrix scope in (68), without resulting in any ungrammaticality of the sentence.

2. Prominence and Locality: Theorizing the Interpretation of Wh-Questions

Hua (2000: 43) claims that wh-expressions in natural language may be ordered along a scale as in (69), with those towards the left more likely to function as variables, and those towards the right to function as operators. Hence, according to him, the difference between Chinese and English with respect to wh-interpretation lies in the fact that Chinese allows more wh-expressions to function as variables,
down to the manner adverb *zenmeyang* ‘how’, whereas English allows more wh-expressions on the scale to function as operators, up to the manner adverb *how*.

(69) which/who/what ← when/where ← how ← why

Under Hua’s analysis, a binary distinction is made between wh-operators and wh-variables on the two extremes of the scale. This distinction implies that the wh-expressions on the two extremes of the scale given in (69) are of two absolutely different types, each of which is homogeneous in terms of scope interpretation. Obviously, this account fails to cover the fact that wh-expressions on the two extremes can both function as operators and variables. For instance, in Bulgarian all wh-expressions are operators. Nishigauchi (1990: 93) notices that the acceptability of the following Japanese sentence would be improved when another wh-expression of the category NP appears within a complex NP island, in addition to the wh-adjunct *why*:

(70) ?(?)[NP [Dare-ga naze kai-ta] hon]-ga omosiroi-desu-ka?

    Who –N why wrote book-N  interesting-be-Q

    *Lit.* ‘Books that who wrote why are interesting?’

If *why* is an absolute operator, the improved acceptability of the above sentence is unexpected under Hua’s analysis, since this sentence should be ruled out by ECP no matter what additional wh-elements are added. Besides, Hua (2000) fails to explain why it becomes easier to take scope out of an island for the wh-expressions closer to the left extreme of the scale, while it becomes more and more difficult to
do so for those closer to the right extreme of the scale. Specifically, he fails to explain why some wh-expressions tend to be operators while others can be variables. To simply make a distinction between wh-operators and wh-variables is just a restatement but not an explanation of the relevant facts that wh-expressions may behave differently with respect to scope interpretation.

2.1 Focus and Wh-interpretation via Choice Functions

The previously discussed data seems to suggest that there is an asymmetry between the reason weishenme ‘why’ and other wh-expressions in Chinese. In the following, we will explain why the reason weishenme ‘why’ cannot be interpreted out of islands.

Xu (1990: 371) observes that there are two stress patterns for weishenme. When weishenme is pronounced with stress on the first syllable wei, it cannot be interpreted out of islands. When stress falls on shenme instead of wei, it can be interpreted out of islands. To distinguish these two stress patterns, I represent the former as weishenme, and the latter as weishenme. It is obvious that weishenme corresponds to Tsai’s reason why, and weishenme corresponds to his purpose why, which can be substituted for by wei(-le)shenme (cf. Huang 1998 [1982b]). When we associate these two stress patterns with their respective focus properties, we can see the reason why weishenme cannot be interpreted out of islands. It is well-known that inherently D-linked which-phrases can violate locality constraints for interpretation in English, as shown in (27a), repeated in (71) below:

(71) Which book did which person buy?
The question to ask is why D-linked wh-phrases can violate the locality constraint. I think that the answer lies in the prominence of these wh-phrases since an inherently D-linked wh-phrase ranges over a set of known membership that is prominent in discourse, and it is in this sense that it is D-linked. What is important here is that an inherently D-linked wh-phrase is licensed by a restricted set whose full membership is known to both speaker and hearer. As a first approximation, I assume that if a wh-element can be licensed by an accessible alternative set when it is in focus, it can be interpreted out of islands. Here lies an important difference between weishenme and weishenme. When wei ‘for’ is focused, no accessible alternative set can be generated. Whereas, when shenme ‘what’ is focused, at least an accessible alternative set of lexical items can be generated. When shenme is focused in weishenme, it is licensed by an accessible set of lexical items whose members may include zhe ‘this’ and na ‘that’, and thus weishenme can be answered by wei-zhe ‘for this’ or wei-na ‘for that’. In fact, we can further claim that wei in weishenme can only receive phonological stress, but not semantic focus since it cannot generate an alternative set when it is focused by the contrastive focus marker shi, as shown in (72a).

(72) a. *[Women shi weishenme nianshu] cai you yiyi?
   we FM why study just have meaning
   ‘what is the reason x such that it is just meaningful [for us to study for x]’

b. *Women shi weishenme nianshu?
   we FM why study

Lit. ‘Why is it that we study?’
c. [Women shi Wei(-le)sheme F nianshu] cai you yiyi?
   we FM for what study just have meaning

   ‘which purpose x such that it is just meaningful [for us to study for x]’

Notice that *weishenme* cannot be licensed by an alternative set when it is focused by *shi* even though it does not occur in an island, as shown in (72b). I assume that the contrastive focus marker *shi*, different from the copula use of *shi* ‘BE’, presupposes a set. This means that when an element is focused by *shi*, it always implies that there is an alternative set available, of which the focused element is a member. *Wei* cannot be focused by *shi* simply because *wei* is a function word that does not have any lexical content to receive semantic focus. Different from *wei* in *weishenme*, *shenme* in *wei* *shenme* can be licensed by an alternative set when it is focused by *shi*, as shown in (72c) above.

Huang (1982a) notices that when the focus marker *shi* co-occurs with a wh-word in the same clause, *shi* cannot focus an element other than the wh-word, as shown in (73a) and (73b) below. This indicates that in wh-questions a wh-word bears an inherent focus feature, and thus must be the only element that is overtly marked by a focus marker. In this aspect, *weishenme* ‘why’ is, again, different from other wh-words. In a wh-question sentence that is typed by the wh-word *weishenme*, the focus marker *shi* can focus elements other than *weishenme*, as shown in (73c). As a matter of fact, it is the wh-word *weishenme*, not elements other than it, that cannot be focused by *shi*, as shown in (72b) above and (73d) below. This fact demonstrates that *weishenme* does not bear an inherent focus feature, since if it does, it will not allow elements other than it to be focused by *shi* in its domain. Since *weishenme* cannot be focused by the focus marker *shi*, it can
be concluded that it, different from other wh-words, not only bears no inherent focus feature, but also rejects it.

(73) a. *Shi ZhangsanF da-le shei?
   FM Zhangsan beat-ASP who
   Lit. ‘Who is it Zhangsan that beat?’

b. Shi sheiF da-le ta?
   FM who beat-ASP him
   Lit. ‘Who is it that beat him?’

c. Weishenme shi ZhangsanF bixu cizhi?
   why FM Zhangsan must resign
   Lit. ‘Why is it Zhangsan who must resign?’

d. *Shi weiF shenme Zhangsan bixu cizhi?
   FM why Zhangsan must resign
   Lit. ‘Why is it that Zhangsan must resign?’

The focus marker test can show clearly that zenme(yang) patterns with weishenme rather than weishenme since zenme(yang), when focused by shi, can be licensed by an alternative set of lexical items like zheme(yang) ‘like this’ or name(yang) ‘like that’, which may provide a value for the focused element:

(74) Shi Zenme(yang)F shao de dan cai zui haochi?
   FM how cook DE egg just most delicious
   ‘Eggs that are cooked HOW are most delicious?’
Zenme(yang) can be focused by focus marker shi since zenme is a lexical rather than functional element, and thus focusing zenme can also generate an accessible set of lexical items over which the focused zenme ranges. Hence, zenme(yang), at least, can be answered by zheme(yang) or name(yang). Notice that in this respect, A-not-A morpheme patterns with weishenme since it also cannot be focused by shi:

(75) *Ni $\text{shi qu-bu-qu}^F$ meiguo?
  you FM go-not-go America
  ‘Do you go or not go to America?’

Pan (p.c.) suggests that the A-not-A element is a compound. As a first approximation, I assume that the A-not-A element is a compound formed by the incorporation of the Q morpheme (cf. Shi 1994). If this is really the case, the reason why it cannot be focused by shi is obvious since it is not possible to construct a set of entities out of part of a compound. For instance, one cannot construct a set of books from the compound ‘book-reading’.

Now, we can see why weishenme and the A-not-A element cannot be interpreted out of islands. The reason is very simple: they cannot receive contrastive/semantic focus.

Then, the question to ask is why a focused element can be interpreted out of islands. This is because under our analysis a wh-in-situ must be interpreted via the choice function application, and only when a wh-word can be licensed by an alternative set can it be interpreted via the choice function application. Given that a semantically focused element always implies the existence of an alternative set, it thus becomes possible for it to be interpreted out of islands via the choice function.
The difference between *weishenme* ‘why’ and *zenme(yang)* ‘how’ in Chinese and *why* and *how* in English is that for the former, there is an accessible set of lexical items to license it, but for the latter, such a set is not available. It is at this point that Tsai’s (1994a) idea of referentiality vs. nonreferentiality distinction is insightful, though I would prefer to say that the real distinction is between lexical/notional elements and functional elements. The Chinese *weishenme* ‘why’ and *zenme(yang)* ‘how’ are made of more than one element, and thus can be disintegrated into two separate parts, of which one part is a lexical element, and the other part is only a grammatical morpheme. Since the lexical element can receive semantic focus and be licensed by an accessible alternative set, it is interpretable in an island when the choice function operation applies. The English *why* and *how*, however, are different. Because they are functional elements, they cannot be licensed by an alternative set when focused. Hence, they are uninterpretable when occurring in an island since the choice function cannot apply to them.

Note that under the present analysis, wh-expressions that are not inherently D-linked can also be interpreted via the choice function, and this is actually what Reinhart (1998) has proposed. According to Reinhart’s analysis, pronominal wh-phrases can be treated as determiners. For instance, the wh-word *who* can be treated as a determiner, with the noun position empty. The empty N can be viewed either as denoting the set of entities in the model or as containing the selectional-restriction of the determiner (such as animacy).
2.2 Clausal Typing and Wh-Feature Strength: Two Parameters in Classifying Wh-Questions

Cheng (1991, 1997) assumes that the overt syntactic wh-movement is triggered neither by the strength of the wh-feature nor by the need for scope-marking. Instead, she proposes that wh-movement be driven by the need for a clause to have a specified type. Her hypothesis for clausal typing is given below:

(76) Clausal Typing Hypothesis (Cheng 1997: 22)

Every clause needs to be typed. In the case of typing a wh-question, either a wh-particle in \( C^\circ \) is used or else fronting of a wh-word to the Spec of \( C^\circ \) is used, thereby typing a clause through \( C^\circ \) by Spec-head agreement.

Following Cheng, I assume that different languages may use different strategies to type a question. In English, a wh-word must move to the sentence-initial position to type the relevant sentence. In Chinese, a question is typed by a (Q)uestion particle. Hence, wh-movement is unmotivated. As a first approximation, I assume that languages can be classified into three types with respect to wh-quantification: wh-operator languages, wh-variable languages, and wh-operator/variable languages. Languages such as Bulgarian and Chinese are on the two extremes, with English standing in between. In wh-operator languages, all wh-expressions must move overtly to the operator position, whereas in wh-variable languages, all wh-elements should stay in-situ. In wh-operator/variable languages such as English, at least one wh-element needs to move to the operator position to type the sentence, while the rest of the wh-elements can stay in-situ and be interpreted in-situ as variables, as

I assume that all these three types of languages need to do two things to make a question: (i) to choose an appropriate wh-clausal type, and (ii) to associate the wh-word with C for interpretation. Since both English and Chinese have wh’s in-situ, it is not unreasonable to assume that, although English uses a different strategy to type a wh-question, there is no fundamental difference between wh-elements in English and in Chinese in terms of wh-quantification force. That is, wh-elements in these two languages do not have inherent quantificational force. The only reason why English raises one wh-element to the operator position is that the Q particle strategy used in Chinese is not available in this language. In this respect, Bulgarian-type languages are fundamentally different from both English and Chinese since wh-elements in these languages are inherently quantificational. The question to ask is why these three types of languages exhibit different quantificational force. I think that the answer lies in the different morphological properties of wh-expressions in these languages.

Cheng (1991, 1997) observes that in multiple wh-fronting languages such as Bulgarian, Polish, and Hungarian, wh-words can be used to form indefinite NPs by either prefixing or sufffixing certain particles to them, as shown by the following Bulgarian data cited from Cheng (1997: 65):

(77) kój who njákoj someone
    kudé where njakude somewhere
    koga when njakoga sometimes
    kakvó what sort of njakakvo some sort of
Based on the above data, Cheng claims that the indefinite reading of the wh-words comes from the presence of an affix, which contributes existential force. Take the Bulgarian *njákoj* ‘someone’ as an example. Under Cheng’s analysis, this word, made up of *njá* and *koj*, forms a DP structure as below, with *koj* as the core which has no quantificational force, and *njá* as the determiner that contributes the existential quantificational force:

(78) \[
\text{DP} \\
\quad \text{D'} \\
\quad \text{D} \quad \text{NP} \\
\quad \text{njá} \quad \text{koj}
\]

As for the bare wh-words, they have the following DP structure:

(79) \[
\text{DP} \\
\quad \text{D'} \\
\quad \text{D} \quad \text{NP} \\
\quad \Phi_{\text{wh}} \quad \text{wh-word}
\]
Cheng proposes that when the bare wh-word is interpreted as an interrogative, the D position is occupied by a null determiner which can be considered as the null counterpart of which in English and thus has interrogative force: \([D \Phi_{[\text{+wh}]}.\] According to Cheng, the whole DP has to move to \([\text{Spec, CP}]\) since the null determiner \([D \Phi_{[\text{+wh}]}.\] must be licensed by a C° marked with \([\text{+WH}]\).

Tsai (1994b, 1999a, 1999b) claims that in English wh-expressions form an operator-variable structure at the lexical level. He observes that English wh-words and pronominals are more or less built on the same materials, as shown below:

\begin{align*}
\text{(80) a. wh-words} & \quad \text{b. pronominals} \\
\text{wh-o} & \quad \text{th-ey} & \text{th-en} \\
\text{wh-om} & \quad \text{th-em} & \text{th-ere} \\
\text{wh-at} & \quad \text{th-at}
\end{align*}

The only difference between the above two groups of words is that the prefix for pronominals is \textit{th}-, while that for wh-words is \textit{wh}-. Tsai notices that there is a crucial difference between these two morphemes: \textit{th}-, as a reduced form of English definite article \textit{the}, blocks binding from the suffix –\textit{ever} (*they\textit{ever}) since it can license the indefinite morpheme it attaches to. Whereas, \textit{wh}- does not block binding from \textit{ever} (e.g., whoever, whatever, whenever, etc.), which assigns universal force to the indefinites, since it cannot act as a determinant of quantificational force. On the basis of this observation, Tsai (1999b: 46) proposes the following morphological structure for English interrogative \textit{wh’s}:
I adopt Tsai’s basic assumption without further argument that *wh*- does not have quantificational force in English, but I do not think that an operator-variable structure is formed for English *wh*-words at the lexical level since there is no convincing evidence to show that the operator-variable structure is formed at that level. Tsai suggests that only *wh*-expressions, such as *what*, that can be ‘quantified’ by *-ever or some-*,-, form an operator-variable structure at the lexical level. However, as pointed in Hua (2000), if this morphological criterion were adopted, the English *wh*-adverb *how* would also form an operator-variable structure at the lexical level since we can derive such expressions as *however* and *somehow* from *how*. But this would leave the ungrammaticality of the following sentence, repeated from (13a), unaccounted for:

(82) *What did you buy how?*

In (82), the clause is typed by *what*, and since *how* can be quantified by *-ever or some-*,-, and thus form an operator-variable structure at the lexical level in English, it can have an interpretation. Since both *what* and *how* in (82) are licensed, the sentence should be grammatical, but it is not. Note that *how* need not move to the
operator position either for interpretation or for clausal typing in (82) since it is already interpreted by the relevant operator at the lexical level, and the clause is already typed by *what*, and it is also of no use to assume that the operator-bound wh-words in English have a strong [+WH] feature and thus must move since wh-in-situ is tested in this language, and English, different from Bulgarian, does not need front all wh-words in multiple questions.

I think that the difference among Bulgarian, English and Chinese wh-words lies in the content of D. Following Cheng, I assume that the wh-words in Bulgarian contain a strong fixed [+WH] feature in D, whereas those in English contain a weak wh-feature, instead of a strong [+WH] feature in D, and those in Chinese contains a weak and undetermined wh-feature specified as [±WH] ([+, -WH]) in D. Adopting both Cheng’s and Tsai’s idea of wh-word structure, I propose the following structure (83) for Bulgarian wh-words, structure (84a) for English wh-words, and structure (84b) for Chinese wh-words:

\[(83) \quad \begin{array}{c}
\text{DP} \\
\quad \begin{array}{c}
\text{D'} \\
\quad \begin{array}{c}
\text{D}^o \\
\quad \begin{array}{c}
\text{NP} \\
\quad \begin{array}{c}
[+\text{WH}] \\
\text{wh-word}
\end{array}
\end{array}
\end{array}
\end{array}
\end{array} \]
It can be seen from above that the crucial difference between the wh-words in Bulgarian-type languages as shown in (83) and those in English-type languages as shown in (84a) is that the former have a null D containing fixed strong [+WH] feature, whereas the latter have a D filled by a wh-word with a weak wh-feature. As for Chinese wh-words, the wh-feature in D, specified as [±WH], is not only weak, but also undertermined or unfixed. The reason why all wh-elements in
Bulgarian-type languages must move is simply because the wh-words in these languages are specified as [+WH] in wh-questions, and thus must move to the operator position to check off their strong wh-feature. Since the Bulgarian-type is not the focus of the present study, I will not discuss it any further here. Languages like Chinese and English are fundamentally different from the Bulgarian-type since wh-words in these languages can be interpreted in-situ. In English, wh-words that do not function as the wh-clausal typer can be interpreted in-situ by a Q operator since they do not have strong wh-features and thus do not need to move into [Spec, CP] to check off their features. In Chinese, no wh-word needs to be raised overtly into [Spec, CP] since a clause can be typed as a wh-clause by a Q particle, and wh-words can be interpreted in-situ by operators. When a wh-word in Chinese is interpreted in-situ by an operator, the relevant operator can be either a Q operator or a non-Q operator. It is in this sense that we say that the features of the wh-words in Chinese are specified as [+,-WH] (or [+WH]) and thus undetermined. Notice that, although the wh-word in English also does not have a strong wh-feature, wh-fronting occurs in English wh-questions. The reason why there must be one wh-word being fronted in English wh-questions is not because the relevant wh-word has a strong wh-feature, but because the clause needs to be overtly typed. If English does not use any strategy to label a sentence as a wh-question, then the relevant sentence may be ambiguous between a wh-question reading and an echo question reading. In many cases, Chinese fails to disambiguate these two readings out of context. For instance, the following sentence is ambiguous between a wh-question reading and an echo reading:

(85) Zhangsan mai-le     shenme?
Zhangsan buy-ASP what

a. Zhangsan bought what?

b. What did Zhangsan buy

The above fact is consistent with the characteristics of Chinese, which also shows ambiguity in many other structures. While Chinese often resort to context for disambiguation of sentence meanings, English tends to disambiguate them by structural means whenever possible. Since wh-fronting can disambiguate an echo question from an original question in English, it will be consistently used whenever an original question is to be formed. Of course, there is another possible way to explain why wh-fronting is obligatory in English wh-questions. We can assume that in English wh-questions C always bears a strong [+WH] feature, and this strong wh-feature has a morphological requirement, which can be satisfied only by a wh-element which enters into local agreement with C.

One thing that should be pointed out is that the Chinese sentence (85) can also be structurally disambiguated. If a Q particle is added to this sentence, we can only get a wh-question reading, as shown below:

(86) Zhangsan mai-le shenme ne?

Zhangsan buy-ASP what Q

‘What did Zhangsan buy?’

Although the Q particle strategy is not obligatorily used, it is always available in Chinese. But this Q particle strategy is not available in English. In order to type a wh-question, it has to use another strategy, which is wh-fronting. In the process of
clausal typing, the fronted wh-word in English will be assigned an interpretation by C° marked with strong [+WH] under agreement. Since one wh-word will suffice to do the job of labeling the sentence or satisfying the morphological requirement of C, all other wh-words need not move in English multiple wh-questions. For those wh-words that stay in-situ, I assume that they are interpreted via the operator binding. It can be seen that the main difference between English and Chinese with respect to wh-question formation lies in the Q typing. In English, the Q typing is realized by wh-raising, whereas in Chinese, it is done by the Q particle.

Another issue that should be taken into consideration is whether a Q particle is equal to a Q operator. As a first approximation, I assume that it is, though later on I will reformulate this account. Note that sentence (51) is ambiguous between a wh-question reading and an indefinite reading, but when a Q particle is inserted, it can only get a wh-question reading, as shown below:

(87) Zheli que-le   shenme ne?
     here miss-ASP what Q
     What is missing here?

The following sentence discussed in Hua (2000: 176) constitutes another piece of evidence that supports the operator property of the Q particle.

(88) *Lisi mai-le   zhe-ben shu   ne?
     Lisi buy-ASP this-CL book Q

(88) is ungrammatical because the Q particle as an operator binds nothing in the
sentence, thus violating the ban on vacuous quantification (May 1977; Kratzer 1995; Partee 1988). The use of the Q particle has two functions: (i) assigning a Q feature to C; and (ii) binding the wh-elements in its c-command domain (Notice that the Q particle *ne* can also bind an empty wh-word. For detailed discussion on the use of *ne*, see Shao 1996). The first function is clausal typing, and the second function is to disambiguate the identity of wh-words and thus assign them an interpretation. Note that the wh-feature on wh-words is not assigned by the Q operator, but triggered out by the Q operator. I do not assume that the Q operator *ne* in Chinese is a wh-particle as does Cheng (1991, 1997), since it does not have a wh-feature (see Miyagawa (2001) for a discussion on Japanese Q particles, which, he also assumes, do not have any wh-feature). If Q operators bear a wh-feature, the grammaticality of the following sentences are unexplained:

(89) a. Lisi lai-bu-lai ne?

Lisi come-not-come Q

‘Does Lisi come or not come?’

b. Lisi lai haishi bu lai ne?

Lisi come or not come Q

‘Does Lisi come or not come?’

The above sentences are not wh-questions, though each of them is compatible with the Q particle *ne*. (89a) is an A-not-A question and (89b) a disjunctive question. Note that neither the A-not-A question nor the disjunctive question is compatible with a wh-word, as shown in (90), but two wh-words are compatible with each other, be it a wh-argument or a wh-adjunct, as shown in (91):
(90) a. *shei lai-bu-lai?
   who come-not-come
   *Lit. ‘Does who will come or not?’

   b. *shei lai haishi bu lai?
   who come or not come
   *Lit. ‘Does who will come or not?’

(91) a. Shei mai-le shenme?
   who buy-ASP what
   ‘Who bought what?’

   b. Shei weishenme mei lai?
   who why not come
   *Lit. ‘Who did not come why?’

But, of course, there is a division of labor between the Q particles though they all bear a Q feature. For instance, the Q particle ma in Chinese, a yes-no question marker, is always in complementary distribution with ne. Thus, it cannot replace ne in (92) below, repeated from (89):

(92) a. *Lisi lai-bu-lai ma?
   Lisi come-not-come Q
   *Lit. ‘Will Lisi come or not?’

   b. *Lisi lai haishi bu lai ma?
   Lisi come or not come Q
   ‘Does Lisi come or not come?’
This also indicates that the A-not-A question and the disjunctive question are not yes-no questions since these two kinds of questions are incompatible with the yes-no question marker ma. Given that the questions typed by the Q particle ne are not of a homogeneous class, which may include wh-questions, disjunctive questions, and A-not-A questions, we conclude that the Q particle ne does not have a wh-feature. To make a distinction between these two Q particles, we may specify ma as a Q particle containing the feature [+Q, +yes-no], and ne as one containing the feature [+Q, -yes-no].

If we assume that wh-words in Chinese are associated with undetermined [±WH] features, two possibilities may arise: it is +wh, or it is –wh. Note that +wh is associated with the Q feature since the former entails the latter. Hence, if it is bound by a Q operator, it becomes +wh. Now that the wh-feature on a wh-word is triggered, the wh-word, as an activated goal, must identify itself with a probe for interpretation. C is such a probe which is also looking for a matching goal. They end up in matching their wh-features via the operator-binding. In English both the Q feature and the wh-feature are on C. When a wh-word moves to [Spec, CP], the wh-feature on C is checked off by the wh-word and the sentence is typed as a wh-question. As for the other wh-words in English multiple questions, they do not need to move since they are not inherently marked with a strong wh-feature, and typing is no longer necessary. But they need to get an interpretation. Hence, the operator binding via the choice function will apply.

We see that two processes are involved in the formation of wh-questions: (i) Q typing; and (ii) wh-feature matching. Q typing employs two strategies: (i) the Q particle typing; and (ii) wh-raising typing. Wh-feature matching can be done either
by moving a wh-word into the Spec of CP or by the operator-variable binding. If a wh-word is inherently specified as [+WH] in the lexicon, it has a strong wh-feature. If it is specified as [WH] or [±WH] in the lexicon, its wh-feature is weak. Q typing is a process of interpreting (labeling) the clause type, while wh-feature matching is a process of interpreting both C and wh-words. Now, we can construct two parameters from these processes to give a more precise prediction of the typological variation among wh-questions in different languages. One is the typing parameter, as shown below:

(93) The Typing Parameter
   a. wh-raising.
   b. Q particle.

The other is the [WH] strength parameter, as shown below:

(94) The Wh Parameter
   a. [+WH].
   b. [WH]/[±WH].

The interaction of these two parameters predicts that there are four types of wh languages: (i) the wh-raising and [+WH] type; (ii) the Q particle and [±WH]/[WH] type; (iii) the wh-raising and [WH]/[±WH] type; and (iv) the Q particle and [+WH] type. If we follow Chomsky (1993) in assuming that operators have a universally strong wh-feature, we can say that (94a) specifies the feature for operators, and (94b) for variables. Then, we can reformulate (94) as (95):
(95) The Wh Parameter

\[ \pm \text{Op(erator)} \]

(93) amounts to saying that if a language does not use the Q particle strategy to type wh-questions, it has to use the wh-raising strategy to do so. Thus, we can reformulate (93) as (96):

(96) The Typing Parameter

\[ \pm \text{Q-p(article)} \]

Bulgarian belongs to the \ [+Op, -Q-p\] type in which clauses needs to be typed by wh-raising, and all wh-words need to be identified with C because they are operators and thus bear a strong wh-feature. Chinese belongs to the \ [-Op, +Q-p\] type in which clauses are typed by a Q particle, and wh-words stay in-situ with their wh-features being fixed (triggered) by an operator. English belongs to the \ [-Op, -Q-p\] type in which clauses need to be typed by wh-raising, and wh-words that do not participate in clausal typing stay in-situ and be interpreted by a wh operator. I leave open the question whether the \ [+Op, +Q-p\] type exists in natural language, though theoretically its existence is possible.

The establishment of these two parameters, at least, shows that simply making a distinction between operators vs. variables in classifying wh-expressions may not adequately characterize the properties of wh-expressions in natural language. What matters is the interaction between the strength of the wh-feature on wh-words and the typing requirement of the language.
2.3 The C Typing Condition and Wh-Interpretation

The present analysis suggests that a wh-element be matched with C via wh-agreement for wh-interpretation. If a wh-word is inherently specified as [+WH] in the lexicon, it is an interrogative NP with a strong wh-feature, and must be interpreted in the left periphery of CP. If it is specified as [WH] in the lexicon, it is an interrogative NP with a weak wh-feature, and may thus be interpreted either in [Spec, CP] or via operator binding. If it is specified as [±WH] in the lexicon, it may be interpreted as either an interrogative NP (for a wh-question reading) or an indefinite NP (for an indefinite reading) in syntax, depending on the nature of the operator that binds it. In Bulgarian, the wh-feature on a wh-word is inherently specified as [+WH] in the lexicon. That is why its wh-feature is strong. In English and Chinese, the wh-feature of a wh-word is not specified in the lexicon and thus must be specified through either wh-agreement or operator binding in syntax. We can use the “probe-goal” system of Chomsky (2000, 2001) to account for the agreement process between C and wh-words. We say that it is the operation Agree that establishes an agreement relation between the probe, i.e., the C containing the [+WH] feature, and the goal, i.e., the wh-expression. I assume that Agree can be done either between a head and its Spec by Spec-head agreement or between C and a wh-word in a way similar to binding. If their features match, the wh-clause gets an interpretation. If their features do not match, the wh-clause does not have an interpretation, and the sentence will be ruled out as uninterpretable. In the Agree operation, the probe either attracts the closest goal to its Spec or enters into a binding relation with the closest goal.
Although Chinese uses a Q particle to type a wh-question, I assume that the wh-feature on C can be assigned only when C enters into agreement with a wh-word since, as shown in the previous discussion, a Q particle does not bear a wh-feature. I assume that in English it is the closest wh-element that is attracted to the operator position to agree with C, while in Chinese it is the wh-element closest to C that establishes a matching relation with C. I will soon show that locality alone cannot fully account for this probe-goal operation between C and the wh-word. Another factor we should take into consideration is prominence. It seems that C prefers to attract the closest and the most prominent wh-element. If this is really the case, a condition on the probe-goal operation can be formulated below:

(97) A probe C should agree with the most prominent goal, a wh-word, that is closest to it via either Spec-head agreement or operator-variable binding.

Prominence can be understood in terms of the following Prominence Hierarchy:

(98) The Prominence Hierarchy
   a. Subject > Non-Subject
   b. Argument > Non-Argument
   c. Lexical Element > Functional Element

Now, consider the following sentences:

(99) *[C°[weishenme, wh shei mei lai]]?  
    why who not come
Lit. ‘Who did not come why?’

(100) *[C°\text{wh} [Zhangsan weishenme\text{wh} xihuan shei]]? 
Zhangsan     why     like     who

Lit. ‘Why does Zhangsan like who?’

(101) *[CP What\text{wh} C°\text{wh} [did who buy t ]]?

The ungrammaticality of (99-101) results from a violation of (97). In fact, (97) can be regarded as a clausal typing requirement. It is reasonable to think that if C needs to choose an element from the sentence as its clausal-type label, it tends to choose the closest one since it conforms to the general principle of economy, and it also tends to choose the most prominent one since it is more representative. Hence, we say that (101) is unacceptable because English needs the closest and the most prominent wh-word to type the clause. But what about the above Chinese sentences? Note that the clauses are already typed by Q particles under our analysis. I think that the ungrammaticality of the above Chinese sentences also results from the violation of the clausal typing requirement. Note that since the Chinese Q particle does not contain a wh-feature, it can only specify C as a Q feature containing head. If a clause is to be interpreted as a wh-clause, its C should be interpreted with a wh-word. I assume that the Q particle is head-adjoined to C, and the binding between Q and a wh-word will cause the wh-feature of the wh-word being transmitted to C. As a result, C is typed as a wh-feature bearing C. In English, a clause is typed as a direct wh-question by (i) raising a wh-word into the Spec of CP, and (ii) moving AUX or inserting \textit{do} into C. Whereas in Chinese, what are involved in direct wh-question typing are these steps: first, a Q particle types C as Q by merger, and then, a wh-word types C as a wh-feature containing head via
operator-binding and feature transmission. Since, no matter whether C has a strong
wh-feature or not, it always needs to be associated with a wh-word for
wh-interpretation in natural language, I tentatively propose (102) instead of (97) as
a C typing condition:

(102) The C Typing Condition (CTC)

a. For wh-raising languages, a clause is typed as a wh-clause if the most
prominent wh-word moves overtly into [Spec, CP] via cyclic
movement.

b. For Q-particle languages, a clause is typed as a wh-clause if the
closest Q operator inserted in [Spec, CP] binds the most prominent
wh-word that is the closest to it.

Prominence is defined in (98), and closeness is defined below, on the basis of Pan

(103) The Closeness Condition

α is closer to X than β is iff the path from α to the minimal maximal
projection dominating X is a proper subset of the path from β to the
minimal maximal projection dominating X.

2.4 A-not-A and Multiple Wh-Questions

It is claimed that in Chinese the LF movement of wh-arguments does not exhibit
wh-island effects (Huang 1998 [1982b], 1982a, 1991; Tsai 1999b). Thus, neither an
A-not-A element nor a wh-phrase can block a wh-argument for scope interpretation at LF. It is also claimed in the literature (cf. Nishigauchi 1990; Watanabe 1992) that Japanese exhibits wh-island effects at LF, though it lacks Complex NP effects. This difference between Chinese and Japanese seems very interesting. Since Chinese and Japanese share similar properties in many other aspects in terms of wh-interpretation, one may ask why they should behave differently with respect to wh-island constraints. Although this difference between Chinese and Japanese will leave enough room for linguists to exercise their syntactic imagination, one thing is often ignored. That is the truth of the facts. Due to the lack of knowledge of a foreign language, the picture of wh-island effects presented in the literature is often taken for granted. However, upon closer examination, one may find that the assumed facts are not always true. Liu (1986) and Xu (1990) claim that linguists arrive at wrong conclusions because they take echo question readings for original question readings. Xu (1990) is the first to try to show what factors cause linguists to take the echo question for the original question. In the following, I will show that (i) wh-island effects are also observed in Chinese and the claimed non-existence is due to the fact that echo question readings and original question readings are not correctly distinguished (cf. Liu 1986; Xu 1990), and (ii) many WH facts in Chinese can be accounted for by the interaction of prominence and locality conditions subsumed under the C Typing Condition (henceforth CTC).

2.4.1 Feature Clash in C Typing

Now, consider why the following Chinese sentence is ungrammatical, though the wh-word closest to C is also the most prominent one:
According to Xu (1990), (104) and (105) are ungrammatical because they are semantically uninterpretable. Following the propositional approach to the semantics of questions (Karttunen 1977; Hamblin 1973), Xu (1990) claims that the semantic representation of a question should make reference to the set of possible answers, represented by a disjunction of statements, and the failure of (104) and (105) results from the fact that the set of possible answers to it does not exist. According to Xu, in asking (104), the speaker would be saying (106):

(106) Tell me which of the following is true: who like him or who does not like him.

But neither of the disjuncts in (106) has a truth value. This is why (104) is unacceptable since it is uninterpretable.

Under my analysis, C in (104) would be typed by two interrogative elements specified for two conflicting features. When bound by a Q operator, shei has the feature [+WH], but the A-not-A morpheme is specified as [-WH]. Under this situation, the feature of C would be left undetermined. Hence, the
ungrammaticality of (104). But it seems, at first sight, that our feature clash analysis fails to explain the grammaticality of (107):

(107) Ni xiang-zhidao shei xi-bu-xihuan ta?
    you wonder who like-not-like him
(108) Wo xiang-zhidao Lisi xi-bu-xihuan ta.
    I wonder Lisi like-not-like him
    ‘I wonder whether Lisi likes him or not.’
(109) Wo xiang-zhidao shei xihuan ta.
    I wonder who like him
    ‘I wonder who likes him.’

(Huang 1982a: 390)

Huang (1982a) claims that different verbs subcategorize for different clauses as their complements. Verbs like wen ‘ask’ are characterized as [+WH] verbs, which require indirect questions as their complements. Verbs like xiangxin ‘believe’ are characterized as [-WH] verbs, which cannot take indirect questions as their complements. Verbs like zhidao ‘know’ are characterized as [+,-WH], which can take either declarative sentences or indirect questions as their complements. Notice that, under Huang’s analysis, [-WH] means [-WH, -Q], but under the present analysis, when the A-not-A element is interpreted as [-WH], it only means that it lacks the relevant wh-feature, but does not mean that it lacks interrogative force. Hence, a complete feature characterization of the A-not-A element should be something like [-WH, +Q]. Since, according to Huang, in (107) xiang-zhidao ‘wonder’ is a verb subcategorizing for an interrogative complement, either shei or
the A-not-A element in (107) must take the embedded scope to satisfy the subcategorization requirement of the matrix verb. Although the A-not-A element is a phonetic realization of the INFL with Q under Huang’s (1991) analysis, he finds that (107) can only be answered by (108), not by (109). The sentence given in (108), as the only possible answer to (107), shows that only shei can take matrix scope. This means that the A-not-A element must take the embedded scope. Huang derives this result from his ECP account. He treats the A-not-A element as an adjunct operator, and thus predicts that its LF movement to the matrix operator position will violate ECP since the relevant movement will cross the wh-island formed by shei. Since shei, as an argument operator, can always be properly governed, it can cross the island formed by the A-not-A element to take matrix scope without violating ECP.

Huang (1991) has shown convincingly that the A-not-A question has an interrogative INFL constituent, and the phonetic realization of the INFL with [+Q] may take different forms in different Chinese dialects. Shi (1994) follows Huang’s basic assumption, but rejects his idea that the A-not-A element is an operator. He claims that the A-not-A element is a morphological realization of the Q morpheme, which has the function of a verb and not that of an operator, and thus cannot license wh-words. According to Shi, (104) is ungrammatical because the wh-word is not licensed by a Q operator since the relevant operator has been incorporated into the verb. (107) is grammatical because there is a matrix operator to license the wh-word though the embedded operator has been incorporated. Under Shi’s analysis, (107) cannot have a reading in which the A-not-A element takes matrix scope because it is impossible for the embedded clause to generate two operators.

I agree with Shi (1994) that the A-not-A element is formed by the
incorporation of the Q operator, and that the A-not-A element cannot bind
wh-words. Since we assume that the Q feature on C is assigned by the Q operator,
we can further assume that the Q feature in INFL is also assigned by the Q operator.
Assume that the Q operator can be assigned to either the C or the INFL of a
sentence. In both ways, the sentence is typed. If the Q operator is assigned to C, it
needs to bind a wh-word. If it is assigned to INFL, it is incorporated into INFL to
trigger the formation of the A-not-A question, as suggested by Huang (1991) and
Shi (1994). If we assume that a question can only be typed by one Q operator in the
Q particle languages, the reason why sentences like (104) is ungrammatical is
obvious since the wh-word shei ‘who’ is not bound by a Q operator, given that the
Q operator has already been incorporated into INFL. An interesting result of this
analysis is that it predicts that (107) should also be ungrammatical since the
wh-word shei ‘who’ in this sentence should also be unbound and thus uninterpreted.
We will argue that this prediction is correct. But, first, consider the question why
the A-not-A cannot take wide scope in (107). Law (2001) finds that the A-not-A
element cannot take matrix scope in the following sentence, and thus argues that it
does not move at LF:

(110) *Wangwu zhidao [ni juede [Lisi hui-bu-hui shengqi]]?

Wangwu know you think Lisi will-not-will angry

Lit. ‘Wangwu knows that you think whether Lisi will be angry?’

If the A-not-A element can move at LF, nothing blocks it in (110), and thus it
should have no problem in taking matrix scope by making cyclic head-movement
via C. The impossibility for it to do so in (110) indicates that it cannot move at LF.
McCawley (1994) argues that the following example chosen by Huang (1991) to show that the A-not-A element can take wide scope is not convincing since the supposed higher clause *ni juede* ‘you think’ can be treated as a parenthetical expression.

(111) Ni juede [ta hui-bu-hui shenqi]?

you feel he will-not-will get-angry

‘Do you think he will be angry?’

McCawley claims that in the following sentence, the A-not-A element cannot take matrix scope because the higher clause does not admit any interpretation as parentheticals:

(112) *Lisi yiwei [Edison you-mei-you faming dianhua]?

Lisi think Edison have-not-have invent telephone

‘Does Lisi think Edison invented the telephone?’

If Law and McCawley are right, then it is not the case that the specific movement of the A-not-A element will be blocked by the wh-island constraint, but that the movement of an A-not-A element out of its own clause is generally banned. If the A-not-A element cannot move out of its own clause at LF in (107), what about the wh-word *shei* ‘who’? Can *shei* move to the matrix operator position at LF in (107)? If it moves, it means that it seeks to be interpreted as a Q operator, assuming that any wh-word can be interpreted as a Q operator if it moves to the operator position. Although this option is possible, it seems that the wh-word *shei* ‘who’ in (107) may
not move since its movement must be carried out cyclically. Given that the embedded C is already typed as [-WH] under agreement with the feature contained in the A-not-A element, LF movement of shei with the feature [+WH] will be blocked when it moves cyclically through the embedded C because of feature clash. Notice that, if it does not move, it is a variable and should thus be bound by an operator, but it is not bound by an operator in (107), given that the Q operator has been incorporated into INFL. I further assume that positing another operator in the embedded clause to bind shei should generally be banned by the grammatical system. Given that one operator can unselectively bind all the variables in its c-command domain, the grammatical system is not motivated to generate more operators of the same nature than needed. Notice that, even if it is allowed to insert another Q operator into the embedded CP domain in (107), the sentence is still ruled out because of feature clash, given the fact that the two operators that bind two different wh-elements have different features. Inserting an operator into the matrix Spec of CP will also not work since the closest operator for the wh-word is the LF raised operator in the embedded CP domain. Only when the matrix operator and the most prominent wh-word are the closest to each other can the matrix clause be typed as a wh-question via operator binding. If the present analysis is correct, then shei ‘who’ in (107) must be left uninterpreted since it is not bound by an operator. It can be seen that there is a welcome result if we adopt Shi’s (1994) assumption that the Q operator has been incorporated into the A-not-A form in the A-not-A question, and at the same time insist that a question can be typed by inserting only one Q operator. If this line of analysis is on the right track, we can explain more satisfactorily why the A-not-A element cannot occur in an island in A-not-A questions such as (67). Assume that LF movement should also be
constrained by Subjacency. In (67), the A-not-A element cannot take wide scope since it is contained in an island. It also cannot be interpreted via the choice function since there is no Q operator to bind it, given that there is only one Q operator per sentence and the Q operator has already been incorporated into the INFL of the subject clause. As there is no way to help the A-not-A element take scope out of the subject clause, it cannot have the matrix scope interpretation.

If the wh-word shei ‘who’ is not bound in (107), then the next question to ask is why (107) is regarded as an acceptable sentence under Huang’s analysis. According to Xu (1990), the seemingly acceptable status of (107) results from the possibility that it can be easily interpreted as an echo question. Note that (104) can also be heard as an echo question, and in this case, it is acceptable (Note that, if an example discussed in this chapter is starred as unacceptable, I mean that it is ungrammatical under the intended original question reading). I agree with Xu that (107) can only be interpreted as an echo question. Consider the following sentence in which zenmeyang ‘how’ fails to be interpreted as an echo wh-word:

(113) *Ta wen ni Lisi zenmeyang za-mei-za kai na-dao men?

he ask you Lisi how break-not-break open that-CL door

_Lit._ ‘He asked you by what means Lisi had broken or not that door?’

Although a possible answer like (114) is available for (113), (113) is not an acceptable wh-question.

(114) Ta wen wo Lisi yong tie-chui za-mei-za kai na-dao men.

he ask I Lisi with iron-hammer break-not-break open that-CL door
‘He asked me whether Lisi had broken that door with an iron hammer.’

If Tsai (1994) is right in claiming that *zenmeyang* ‘how’ is referential when having the instrumental or means reading, and thus can be extracted out of an island at LF, the ungrammaticality of (113) is unexpected. Note that under Tsai’s (1994) analysis, a PP like *yong jinpodingren* ‘by a one-on-one approach’ in (116) has an instrumental reading. If we replace this PP with *zenmeyang* ‘how’, the sentence should be equally acceptable since *zenmeyang* should also have an instrumental reading, and thus can be freely extracted out of an island. However, (115) shows that *zenmeyang* cannot take matrix scope though it is referential, according to Tsai.

(115) *Ta wen ni tamen hui-bu-hui *zenmeyang* da zhe-chang lanqiu?

he ask you they will-not-will how play this-CL basketball

*Lit. ‘He asked me by what means they would or would not play this basketball match?’*

(116) *Ta wen wo tamen hui-bu-hui *yong jinpodingren

he ask I they will-not-will with one-person-on-one person
da zhe-cheng lanqiu.

play this-CL basketball

‘He asked me whether they would play this basketball match by a one-on-one approach.’

Under our analysis, (113) and (115) are unacceptable because it is difficult for *zenmeyang* ‘how’ to be interpreted as an echo wh-word in these sentences. (107) is acceptable because it is easy for *shei* ‘who’ to have an echo question interpretation.
Evidence can be given to show that the wh-word in (107) must be an echo wh-word. First, (107) cannot be answered by a single word that directly provides the value for the wh-word. In providing an answer for (107), one has to repeat the whole sentence, as in (108). If (107) is really an original question, one would ask why it does not accept a short answer that directly provides a value for the relevant wh-word. It should be noted that an echo question, as a simple sentence, can also be answered by directly providing the value for the relevant wh-word, but the crucial point is that an original question can always be answered by simply providing a value to the relevant wh-word, besides receiving a full-fledged answer that repeats the entire sentence, whereas an echo question, though it can receive a short answer in some cases, generally rejects short answers that only provide a value to the wh-word in many other cases, especially when it is embedded in a complement clause. Hence, if a certain question can receive both a full-fledged answer and a short one, we certainly would fail to make a distinction between an echo question and an original question with this ‘answer-length’ criterion. But if a question simply rejects short answers and can only receive a full-fledged answer that repeats the entire sentence, we have good reasons to believe that it is an echo question.

Second, the wh-word in (107) cannot be focused by a focus marker that will make it range over a set of individuals in the extralinguistic world. An echo question is usually used to express either the speaker’s surprise at information just made available to him or the speaker’s request for repeating what is just said by the hearer. According to Dayal (1996: 124), an echo question seeks to identify the previous utterance rather than establish the facts in the actual world. In Janda’s (1985) view, an echo question word quantifies over linguistic expressions rather
than individuals in the extralinguistic world. Hence, echo questions are just metalinguistic devices for requesting information about an unperceived or disbelieved string. If this is true, then an echo question must be built on previously unuttered sentences. Since an echo wh-expression is used to identify the previous utterance rather than establish the facts in the actual world, I assume that the echo reading of a wh-word is incompatible with the focus reading of a normal wh-word in original questions that presupposes a set of extralinguistic individuals. Hence, an echo wh-word cannot maintain its echo reading if focused by a contrastive focus marker that always requires a set of individuals. There is one such contrastive focus marker in Chinese. It is *jiujing-shi* ‘exactly/actually (BE)’, which roughly means: ‘what is it exactly/actually?’ Or, ‘what is it on earth?’ When this focus marker is associated with an individual, it always implies that this individual is a member of a set. In the following interrogative sentences, either the wh-subject or the wh-object can be focused by *jiujing-shi*:

(117) Mingtian de hui *jiujing-shi* sheiF qu canjia?

tomorrow DE meeting exactly-BE who go attend

‘Who is actually going to the meeting tomorrow?’

(118) Nimen *jiujing-shi* yao shenmeF?

you exactly-BE want what

‘What exactly do you want?’

But the wh-word in (107) obviously refuses to be focused by *jiujing-shi*, as shown below:
(119) *Ni xiang-zhidao jiujing-shi sheiF xì-bu-xihuan ta?
    you want-know exactly-BE who like-not-like him

    Lit. ‘You wonder who exactly it is that likes him or not?’

(119) is unacceptable because the echo question reading of the wh-word is cancelled by the focus marker and thus has to be interpreted as a normal wh-word in an original question. However, the relevant wh-word cannot have an original wh-question reading since it is not allowed to occur within the domain marked by the A-not-A element because of the wh-feature incompatibility.

Third, when the Q particle ne is attached to the end of the sentence in (107), it becomes unacceptable, as shown below:

(120) *Ni xiang-zhidao shei xi-bu-xihuan ta ne?
    you wonder who like-not-like him Q

    Lit. ‘You wonder who likes him or not?’

The unacceptability of (120) is expected because, as I have argued in the previous discussion, the Q particle ne can be used to disambiguate an echo question reading from an original question reading, given that ne is used to type an original question. But in (120) neither the wh-word shei ‘who’ nor the A-not-A element can have an original question reading.

Since an echo question word is incompatible with neither jiujing-shi nor the Q particle ne, I assume that the most reliable way to make a distinction between an original question word and an echo question word is to use both jiujing-shi and ne to test the relevant question word, as shown below:
(121) *Ni xiang-zhidao jiujing-shi shéi xi-bu-xihuan ta ne?
you wonder exactly-BE who like-not-like him Q

*Lit. ‘You wonder who exactly it is that likes him or not?’*

2.4.2 Scope-Taking in Multiple Wh-Questions

In the previous discussion, I have claimed that the use of the overt Q particle *ne* in Chinese can disambiguate an echo question from an original question. In fact, we can simply say that *ne* is an original or direct question marker since it can also disambiguate an indirect question from a direct (original) question. Notice that English also uses a similar strategy to distinguish a direct question from an indirect question. In English, direct questions are formed either by moving AUX to C or by inserting *do* under C, whereas indirect questions reject AUX-raising and *do*-support. It should be pointed out that in Chinese the covert Q operator is ambiguous between a direct question reading and an indirect one, but the overt Q operator is not ambiguous. Consider the following sentence:

(122) Ta wen ni [shéi lai-le].

he ask you who come-ASP

‘He asked you who had come.’

Since the embedded clause in (122) can only be interpreted as an indirect question, the use of *ne* will be excluded, as shown below:
(123) *Ta wen ni [shei lai-le ne].

he ask you who come-ASP Q

‘He asked you who had come.’

If *ne* occurs in the embedded clause, it will assign the embedded *C* a direct Q feature, and will thus violate the subcategorization requirement of the matrix verb, which selects an indirect question as its embedded clause. Now, consider the following sentence in which *ne* is put in the matrix clause-final position.

(124) *Ta wen ni [shei lai-le ]ne?

he ask you who come-ASP Q

*‘Who did he ask you had come?’*

When *ne* is placed at the matrix clause final position, it will assign a direct question reading to the matrix *C*. In that case, the embedded *C* will have no chance to get the relevant Q feature so as to be interpreted as an indirect question, since (i) the Q operator is not adjoined to the embedded *C*, and (ii) the wh-word *shei* in the embedded clause does not enter into agreement with the embedded *C*. Note that the Q operator *ne* has to bind the wh-word *shei* ‘who’ in the embedded clause, in order to avoid violating the ban on vacuous quantification. If *shei* is bound by *ne* in the matrix *C*, it will enter into agreement with the matrix *C* and be interpreted with the matrix *C*. As a result, the embedded *C* has no way to be assigned a Q feature, thus violating the subcategorization requirement of the matrix verb. Note that the English translation of (124) is also ungrammatical because of the same reason. In neither case, the subcategorization requirement of the matrix verb can be satisfied.
Notice that, if the matrix verb does not subcategorize for a question clause, then the relevant sentence will be acceptable, as shown below:

(125) Ta renwei shei  lai-le    ne?
        he think   who come-ASP Q

    ‘Who does he think has come?’

Now, consider the following ungrammatical English examples:

(126) a. *Who do you wonder [CP t; [IP t; bought what]]?
    b. *What do you wonder [CP t; [who bought t]]?

The reason why (126a) is ungrammatical is obvious. The matrix verb wonder subcategorizes for a wh-clause, but this requirement is not satisfied since the embedded clause is not headed by a wh-word. It seems that the trace left by the wh-word cannot be used to label a wh-clause. This means that a clause can be identified as a wh-clause only when it is overtly labeled by a wh-word in English. One may ask why the embedded C is not assigned a wh-feature, given the fact that there is a wh-trace left in the Spec of CP. We can assume that this is because when the wh-word moves through the Spec of the embedded CP, it does not enter into agreement with the embedded C. If it enters into agreement with it, its wh-feature will be identified with the embedded C. As a result, it will be anchored there in agreement. In that case, the sentence, as shown in (127), will be grammatical since the subcategorization requirement of the matrix verb is satisfied.
(127) You wonder who bought what.

But in (126a) what the wh-word who agrees with obviously is not the embedded C, but the matrix C, and thus the subcategorization requirement of the matrix verb is not satisfied.

Under the classic analysis assumed in generative grammar, (126b) constitutes a typical violation of wh-island constraint, but under my analysis, its ungrammaticality simply results from a violation of CTC given in (102). Given that the matrix C needs to be typed as Q, it is the closest and the most prominent wh-word who instead of the less close and less prominent what that should be moved to the matrix operator position. Now, consider another possibility: if both the matrix clause and the embedded clause need to be typed as Q in sentences like (126), what about moving the most prominent wh-word to the matrix C and the less prominent one to the embedded C?

(128) *Who, do you wonder [CP what [IP ti bought tj]]?

The above sentence shows that this possibility does not exist. In fact, the ungrammaticality of (128) also can be accounted for by CTC: the embedded C is not typed by the most prominent wh-word that is closest to it. Notice that the locality condition requires that the Agree operation between the probe and the goal should be done locally. Given that there is a local probe, i.e., the embedded C, for the goal who, it is unreasonable for who not to match with the local probe but with the matrix probe.

Now, let’s consider one more possibility: moving who to type the embedded C
and then moving *what* to type the matrix C by passing through the embedded CP domain, thus deriving the representation in (129), which is slightly different from the one given in (126b).

(129) ?*What do you wonder [*CP t_i [*CP who_j [t_j bought t_i]]]?*

However, the above derivation is also impossible since it violates CTC, too. Given that the matrix C needs to be typed as Q, the typing wh-word that should be chosen is *who* instead of *what* since it is the most prominent NP that is the closest to the matrix C. Although *who* is impossible to move since it already agrees with the embedded C, moving *what* to the matrix C will still be blocked by CTC. This amounts to saying that even when a qualified element has lost its ability to move to the matrix operator position, a less qualified element is still disallowed to replace it because of CTC. Of course, this is unfair for *what*, but this is the truth.

The above analysis shows that the wh-island constraint can be reduced to CTC, which is more general and less *ad hoc*. I will show that when CTC is adopted, a clearer picture of Chinese multiple WH phenomena can be obtained. Since Huang (1998 [1982b]), it is generally assumed in the literature that Chinese lacks wh-island effects. In the following, I will argue that wh-island effects are also observed in Chinese, and show that the existence of wh-island effects in Chinese can be predicted by CTC.

Consider the following sentence:

(130) Ni xiang-zhidao [shei mai-le shenme]?

you want-know who buy-ASP what
‘You wonder who bought what?’

According to Huang (1998 [1982b]), (130) is ambiguous between two direct question readings, as shown in (131). On one reading, as indicated in (131a), the wh-subject is interpreted with the matrix C and the wh-object is interpreted with the embedded C. On the other reading, as indicated in (131b), the wh-object is interpreted with the matrix C, whereas the wh-subject is interpreted with the embedded C.

(131) a. Who is the person x such that you wonder what x bought?
   b. What is the thing x such that you wonder who bought x?

The LF representations of these two possible readings are given in (132a) and (132b):

(132) a. [shei [ni xiang-zhidao [shenmej [ti  mai-le t_j ]]]]?
   who you want-know what buy-ASP
   *‘Who do you wonder bought what?’
   b. [shenmej [ni xiang-zhidao [shei [ti  mai-le t_j ]]]]?
   what you want-know who buy-ASP
   ?*‘What do you wonder who bought?’

Under Huang’s LF movement analysis, one wh-word has to move into the embedded [Spec, CP] to satisfy the matrix verb’s subcategorization requirement in (132). After that, the other wh-word can move to the matrix [Spec, CP]. In Xu’s
(1990: 365) words, this amounts to saying that long-distance wh-movement is possible in (132) only when there is a wh-island to violate. How is this possible? Under Huang’s analysis, this is possible because LF movement is constrained by ECP only, and the wh-island constraint, which is subsumed under the Subjacency Condition, applies only in overt syntax. The difference between the Chinese sentences in (132) and those English sentences in (128-129) is that in Chinese wh-words move at LF, whereas in English they move in overt syntax, which is constrained by Subjacency. According to Huang’s judgment, the following sentences are unambiguous:

(133) Ni xiang-zhidao shei weishenme mai-le shu?
you want-know who why buy-ASP book
‘Who is the person x such that you wonder why x bought books?’

(134) Ni xiang-zhidao shei zenme mai-le shu?
you want-know who how buy-ASP book
‘Who is the person x such that you wonder how x bought books?’

The reason why the wh-arguments in (133-134) as well as those in (132) can take matrix scope follows from ECP since the traces they left after LF movement can always be head-governed. And ECP can also explain why wh-adjuncts like weishenme ‘why’ and zenme ‘how’ cannot take matrix scope in (133-134) since the LF movement will leave their traces ungoverned, thus violating ECP.

Although this account is attractive, Liu (1986) and Xu (1990) point out correctly that it is incorrect due to the fact that Huang fails to make a distinction between echo questions and original questions. According to Xu, neither shei ‘who’
nor shenme ‘what’ in (130) can have the original (direct) question reading, though both of them can trigger the echo question reading. If Xu is correct, then there is no difference between the Chinese multiple question in (130) and the English one in (127): in both languages, the multiple wh-words contained in an embedded Q clause subcategorized for by the matrix verb can only have indirect question readings by taking embedded scope. Although Xu presents a picture that is completely different from the widely assumed one, it is, however, a true picture. In the following, I will show that Xu’s account is not only expected by CTC, but also supported by independent evidence which demonstrates that neither of the two wh-words in (130) can have a direct question reading.

The CTC accounts for (130) the same way as accounting for its English counterpart. If we associate the wh-subject shei ‘who’ with the matrix C, the matrix verb’s subcategorization requirement for the embedded clause is not satisfied. If shei is associated with the embedded C, it is anchored there in agreement and thus cannot agree with the matrix C. The possibility of associating the wh-object shenme ‘what’ with either the matrix C or the embedded C will be blocked by CTC because of the existence of a more prominent wh-phrase, i.e., shei. Hence, CTC can exclude the direct question reading of the two wh-words in (130) without assuming the existence of an LF-formed wh-island. At this point of discussion, something interesting emerges. It seems that different theories predict different pictures of the same set of linguistic facts. Under Huang’s analysis, the wide scope reading of wh-words in (130) is expected, but under my analysis, it is excluded. Now, what is crucial is the true picture of these linguistic facts.

I have shown that there are three ways to disambiguate echo questions from original ones in discussing the co-occurrence of the A-not-A element and the
wh-words in embedded questions. These three criteria will work equally well here in disambiguating echo questions from original questions in embedded multiple wh-questions.

First, (130) cannot be answered by simply providing the value for the wh-word as in answering an original question. In answering (130), repeated as (135) below, one has to repeat the previously uttered question, i.e., the whole sentence, besides providing a value for the wh-word, as shown in (136).

(135) Ni xiang-zhidao [shei mai-le shenme]?
    you want-know who buy-ASP what
    ‘You wonder who bought what?’
(136) a. Wo xiang-zhidao Zhangsan mai-le shenme.
    I want-know Zhangsan buy-ASP what
    ‘I wonder what Zhangsan bought.’
    b. Wo xiang-zhidao shei mai-le shu.
    I want-know who buy-ASP book
    ‘I wonder who bought books.’

In answering an original wh-question, besides repeating the entire sentence as an answer, one can directly provide a value for the relevant wh-word, no matter how complex the sentence is, as shown in (137) and (138):

(137) Ni renwei Lisi zhidaoshei hui lai?
    you think Lisi know who will come
    ‘Who do you think Lisi know will come?’
(138) a. Zhangsan.
   
   b. Zhangsan hui lai.
   
   Zhangsan will come.

In answering (137), one can either say (138a) or (138b). In neither case, one needs to repeat the whole sentence, though one can. But in answering (135), one must repeat the whole sentence. For instance, (136a) as one of the possible answers can be replaced neither by Zhangsan nor by Zhangsan mai-le shenme ‘Zhangsan bought what’.

Second, according to the native speakers’ judgment, (135) is incompatible with the Q particle ne, though it is compatible with the Q particle ma.

(139) a. *Ni xiang-zhidao [shei mai-le shenme] ne?
   
   you want-know who buy-ASP what Q
   
   ‘You wonder who bought what?’

   b. *Ni xiang-zhidao [shei mai-le shenme ne]?
   
   you want-know who buy-ASP what Q
   
   ‘You wonder who bought what?’

   c. Ni xiang-zhidao [shei mai-le shenme] ma?
   
   you want-know who buy-ASP what Q
   
   ‘Do you wonder who bought what?’

In (139a) ne takes matrix scope, but fails to bind a wh-variable. This is expected by CTC since neither of the wh-words in (135) can have a matrix scope reading, though they both can have an embedded scope reading as an indirect
matching question. If shei is associated with the matrix C, the subcategorization requirement for the embedded C is not satisfied. Note that, as discussed before, the wh-object is not qualified to type the embedded C, given that there exists a more prominent wh-word shei. The reason why (135) can be answered by the sentences in (136) is because either of the wh-words can have an echo question reading. Since an echo wh-word is incompatible with an original question marker ne, the unacceptability of (139a) is expected. Note that ne also cannot take embedded scope in (139b) since the matrix verb does not select a direct question as its complement clause. (139c) is acceptable because neither of the wh-words in the embedded clause can take matrix scope, and thus the whole sentence can be interpreted as a statement before ma is added. When ma is added, it is turned into a yes-no question.

Third, if it is true that the wh-word in (135) is interpreted as an echo wh-word when answered by the sentences in (136), then the relevant echo wh-word cannot be focused by a focus marker like jiujing-shi ‘exactly BE’ which forces the element in focus to be a member of an alternative set.

(140) a. *Ni xiang-zhidao [jiujing-shi sheiF mai-le shenme]? 
you want-know exactly-BE who buy-ASP what 

_Lit._ ‘You wonder who exactly it is that bought what?’

b. *Ni xiang-zhidao [shei jiujing-shi mai-le shenmeF]? 
you want-know who exactly-BE buy-ASP what 

_Lit._ ‘You wonder EXACTLY what who bought?’

As pointed out by Xu (1990), xiang-zhidao ‘want-know’ is not a Chinese
compound word though it is extensively cited in the GB literature. We may replace *xiang-zhidao* with a really existing verb like *wen* ‘ask’, which subcategorizes for an interrogative clause. But the relevant sentences are still unacceptable, as shown below:

(141) a. *Ta wen ni [jiujing-shi shei^F mai-le shenme]?*  
he ask you exactly-BE who buy-ASP what  
*Lit.* ‘He asked you who exactly it is that bought what?’

b. *Ta wen ni [shei jiujing-shi mai-le shenme^F]?*  
he ask you who exactly-BE buy-ASP what  
*Lit.* ‘He asked you EXACTLY what who bought?’

According to the native speakers’ judgment, (141) cannot be answered by the sentences in (142) when the relevant wh-word is focused by *jiujing-shi*:

(142) a. Ta wen wo Lisi mai-le shenme.  
he ask I Lisi buy-ASP what  
‘He asked me what Lisi bought.’

b. Ta wen wo shei mai-le shu.  
he ask I who buy-ASP books  
‘He asked me who bought books.’

The native speakers’ judgment on (140) is the same as that on (141): (140) cannot be answered by the sentences in (136) when the relevant wh-word is focused by *jiujing-shi*. This result is expected since (140) and (141) cannot be interpreted as
original questions, though they have echo question readings as well as embedded indirect question readings. When the relevant wh-words in (140) and (141) are focused by *jiujing-shi*, the possibility to interpret them as echo wh-words is excluded, and they have to be interpreted as wh-words in original questions. That is why they cannot be answered by sentences which are used to answer echo questions.

It can be seen from the above discussion that our analysis predicts that there is no difference between Chinese and English with respect to the wh-island constraints since both languages must obey CTC in making a wh-question. Xu (p.c) points out that it is unreasonable to assume that an ungrammatical sentence such as (104) will become grammatical when it is used as an embedded clause in (107). The present analysis predicts that both (104) and (107) are uninterpretable as original questions because they violate CTC. It seems to be true that a wh-word cannot move across another wh-word at LF in original questions in Chinese. What are extensively discussed in the literature are only sentences like (107) and (135). Sentences like the following are not considered:

(143) *Zhangsan wen ni [shei yiwei [Lisi mai-le *shenme]] ne?*

  Zhangsan ask you who think Lisi buy-ASP what Q

  *‘What did Zhangsan ask you who thought Lisi bought t?’*

(144) *Ni xiang-zhidao [ta wen-mei-wen Lisi [shei xi-bu-xihuan zhe-benshu]] you want-know he ask-not-ask Lisi who like-not-like this-CL book ne?*

  Q

  *Lit. ‘You wonder whether he asked Lisi who likes or not likes this book?’*
If wh-movement can freely cross wh-islands at LF, the ungrammaticality of the above sentences is unexpected. Note that in the above sentences, none of the boldfaced wh-words can take matrix scope, though Huang (1998 [1982b]) predicts that they can. The wh-object *shenme* ‘what’ in (143), as a head-governed argument, cannot take matrix scope by being associated with the Q particle, i.e., the matrix Q operator. Note that under Huang’s analysis, nothing can ban the LF movement of *shenme* to the matrix operator position in (143) since (i) wh-islands can be crossed by wh-arguments at LF in Chinese, (ii) the matrix operator position is not filled in (143), and thus moving *shenme* to it would not violate the Doubly Filled COMP Filter, and (iii) the subcategorization requirement of the matrix verb *wen* ‘ask’ is satisfied by *shei* in (143), and *shenme* has to move because the clause in which it occurs is subcategorized as -Q by the verb of the intermediate clause.

In (144), (145) and (146), none of the boldfaced wh-words can take matrix scope though nothing in the ECP account can block them. In each of these sentences, the matrix operator position is empty and thus can be filled by one of the wh-words at LF without violating the Doubly Filled COMP Filter. Since all the
boldfaced wh-words are head-governed arguments, their LF movement is expected to be free, and thus can cross other wh-words, including the A-not-A element, under the ECP analysis. However, the facts are that none of the boldfaced wh-words can take matrix scope.

Under the present analysis, *shenme* in (143) cannot take matrix scope because of CTC, and *shei* also cannot take matrix scope because it has to be interpreted with the C of the intermediate clause to satisfy the matrix verb’s subcategorization requirement. Hence, the only possibility to make (143) interpretable is to delete the Q particle *ne* and assign the two wh-words an indirect matching question reading.

Under our previous analysis, the ungrammaticality of (144), (145) and (146) is accounted for by a feature clash in the most deeply embedded C. Now, we can also account for it in another way. In (144) the A-not-A element in the intermediate clause cannot take matrix scope because it has to be interpreted with the intermediate C to satisfy the subcategorization requirement, and *shei* cannot take matrix scope because it is blocked by the A-not-A element in its own clause as well as the intermediate clause. Since the A-not-A element is formed by the incorporation of the Q operator, there is no Q operator that can bind *shei* in (144). Even if we posit a Q operator in the matrix CP, the matrix CP still cannot be typed as a wh-question since the operator and the wh-word are not the closest to each other and thus fail to satisfy CTC. Notice that the A-not-A element cannot bind *shei* even if it is LF raised since the former is incompatible with the latter in wh-feature. The same analysis can be applied to (145) and (146). These two sentences are unacceptable simply because the boldfaced wh-word fails to be bound by a Q operator.
2.5 Some Problems Solved

The previous discussion shows that the English sentence (147) below, repeated from (15), is not grammatical, but its Chinese counterpart (148), repeated from (18), is. The reason why they contrast in grammaticality is obvious: the English wh-phrase who has to move to the operator position to type the sentence. If it does not move, the sentence is not typed and thus will have no interpretation. If it is moved, island conditions would be violated. (148) is grammatical because the wh-word does not need to move out of the island to type the sentence since the sentence is typed by a Q particle which binds the wh-word in Chinese. Since the wh-word in Chinese can be interpreted in-situ via the choice function, it has an interpretation. Hence, nothing rules out (148).

(147) *[CP Whoi [IP do you like [NP the books [CP that [IP describe t1]]]]?]
(148) [Ni xihuan [NP [IP piping shei] de shu]]?

‘Which person x such that you like books that criticize x.’

It should be pointed out that in English those wh-words that do not participate in the typing of clauses also need to be interpreted via the choice function. (149), repeated from (17), and (150), repeated from (25), are grammatical because the wh-in-situ can be interpreted via the choice function.

(149) Who likes books that criticize whom?
(150) Who reads the books that who writes?
In (149) the wh-word occurs as an object, and in (150) it occurs as a subject. Since subjects are not assumed to be lexically governed, the grammaticality of (150) cannot be accounted for by LF movement and ECP. But it can be accounted for under our analysis. The ungrammaticality of the following sentence, repeated from (13a), is also expected under our analysis since the wh-in-situ *how* cannot be interpreted via the choice function application.

(151) *What did you buy how?*

Now, consider why the following two sentences contrast in acceptability:

(152) *What did who buy?*

(153) *Which book did which person buy?*

The unacceptability of (152) is expected by CTC since the wh-word that agrees with C is neither the most prominent nor the closest one. But, how to account for the acceptability of (153)? Since in (153) both wh-phrases are inherently D-linked, we can assume that they are both prominent in discourse, and in fact, for those D-linked wh-phrases, it is the discourse that will determine which one is more prominent. Assume that in (153) the relevant discourse determines that *which book* is more prominent, and then it can cross another which-NP that is nearer to C. What happens here is that prominence override locality. But, it seems that there are other cases that prominence cannot override locality. For instance, in (147) even if *who* is replaced by which-NP, the island effects still hold. This indicates that prominence
can override locality only in some cases in overt movement in English, but not in all cases. Specifically, Superiority Condition and Minimal Link Condition (MLC) can be violated, but island conditions seem to be inviolable in English.

Previously discussed examples like (36) and (37), repeated here as (154) and (155), seem to pose a problem for our account of D-linked wh-phrases.

(154) ?What did which student read t?
(155) ?Which book did how many people buy t?

If a D-linked wh-phrase is more prominent, why can it be crossed by a less prominent wh-element in (154), given that it is also a subject? If a D-linked wh-phrase is more prominent and thus can violate the locality constraint, why is (155) not a fully acceptable sentence? It seems that a plausible characterization of (154) and (155) is that a D-linked wh-phrase does not need to move, but can move across another wh-phrase. How is this possible? I assume that since a D-linked wh-phrase can be interpreted in discourse, it does not need to move to [Spec, CP] for interpretation, and since a D-linked wh-phrase is prominent in discourse, it can move across another wh-word. In case of (153) where two wh-phrases are both D-linked, either of them can move because either can be treated as prominent. Either can also stay in-situ because either can be interpreted in discourse as a discourse related element. Although this account seems plausible, it fails to explain why (154) and (155) are not fully acceptable. In section 3.2, I will try to provide a better account for (154) and (155).

Now, let us see if the following sentences, repeated from (28), can be accounted for in the same way:
(156) a. *What did who give t to Mary?

b. What did who give to whom?

It seems that the contrast in acceptability between the above two sentences cannot be accounted for the same way since none of the wh-elements in these sentences are D-linked. In next section I will discuss why the two sentences in (156) contrast with each other in acceptability.

3. The Principle of Economy in Wh-Interpretation

3.1 The Division of Labor between Clausal Typing and Wh-Interpretation

First, consider the question: Why is CTC needed in forming wh-questions? This amounts to asking what motivates CTC. It seems that CTC is motivated for both syntactic and semantic reasons. It is motivated for syntactic reasons because a wh-question needs to be typed syntactically. It is motivated for semantic reasons because the prominence of wh-phrases needs to be considered in forming a wh-question. Then, the next question to ask is why we should consider the prominence of wh-words in forming a wh-question. Before answering this question, let us consider the following sentences:

(157) a. *Ni  weishenme tou-le  shenme?

you why steal-ASP what

*‘Why did you steal what?’

b. Ni  wei(-le)shenme tou-le  shenme?
you why steal-ASP what

Lit. ‘For what reason did you steal what?’

The unacceptability of (157a) is predicted by CTC, but the acceptability of (157b) is not. Since CTC is related to multiple wh-questions, we need to consider the relation among wh-elements in multiple wh-questions. First, consider why CTC should not be violated in most cases. I think that the answer can be found in the contrast between (158) and (159):

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

(159) a. Which person bought which book?
    b. Which book did which person buy?

Hornstein (1995: 132) assumes that pair-list readings require set generators, and a non-inherently linked wh-phrase can be a set generator only when it occupies an A’-position. This assumption can account for the unacceptability of (158b) since what is less prominent than who and thus fails to function as a set generator, as it is not a D-linked wh-word. (159b) is acceptable since the wh-subject in (159b) is inherently D-linked and can thus function as a set generator even when it is in-situ. Following Hornstein (1995: 126), I assume that multiple wh-questions obligatorily receive pair-list readings. If this is true, then the interpretation of multiple wh-phrases must be built on the dependency between the relevant wh-phrases. It is at this point that the notion of set generator becomes important. I assume that if two wh-phrases are involved, one wh-phrase must function as a qualified set generator
so as to generate an accessible set that the other wh-phrase can depend on for interpretation. Take (158a) for an example. First, a set over which *who* ranges must be generated, and then the wh-phrase *what* can be paired with the elements of this set for interpretation. It is reasonable to think that the preferred set generator should be the most prominent wh-phrase, i.e., the subject, if prominence is understood in terms of grammatical functions, because it is easy for a subject to generate an accessible set since subjects are always associated with discourse saliency. When discourse saliency is taken into consideration, it is natural to assume that a subject is more prominent than an object, and a wh-argument is more prominent than a wh-adjunct. (157a) is uninterpretable because *weishenme* ‘why’ cannot generate an accessible set for the other wh-phrase to depend on for interpretation when *wei* is focused. (157b) is acceptable because *wei(le)-shenme* can generate a set of reasons or purposes when *shenme* is focused. Notice that if *shenme* in (157b) is not focused, the sentence will be out since in that case, *weishenme* fails to generate an accessible set. Another way to account for the acceptability of (157b) is basically theory-internal. If we treat the focused *shenme* in *weishenme* as an argument, we can explain why (157b) is acceptable since there is no ranking between *shenme* in *weishenme* and the wh-object in (157b) according to the prominence hierarchy given in (98). In (158b), *what*, as an object, is less prominent than the subject *who*, and is thus not a qualified set generator. Since *what* fails to generate a set for *who* to depend on for interpretation, *who* is not licensed. (159b), contrasting with (158b), is acceptable because a D-linked wh-phrase, be it in [Spec, CP] or in-situ, can always function as a set generator.

Now, consider why the following English sentence (160a) is grammatical, though the wh-word *why* in [Spec, CP] is not a qualified set generator.
(160) a. Why did Bill buy what t₁?

   b. *I wonder why you bought what t₁

In fact, (160a) is unacceptable as an original question. Hornstein (1995) argues that the acceptability of (160a) comes from the ease with which it can be heard as a sort of echo question. Hornstein (1995: 148) shows that if a sentence like (160a) is embedded under *I wonder, the relevant sentence, as shown in (160b), becomes unacceptable because it does not tend to be interpreted as an echo question. Notice that, if in (160b) the matrix subject is not the first person pronoun I, the wh-object *what can still be interpreted as an echo wh-word, and if it is interpreted as an echo wh-word, the relevant sentence becomes acceptable. Under the present analysis, the unacceptability of (160) as an original question is expected since *why, as an adjunct, is less prominent than the wh-object *what, and thus cannot function as a set generator.

The above discussion shows that prominence is needed only because multiple wh-questions depend on a prominent set generator for interpretation. It seems that prominence is only relevant to wh-interpretation, but not to clausal typing. If this is true, our CTC has incorporated two different things: clausal typing and wh-interpretation. If the wh-clausal typing condition is treated as a pure typing condition, it may not consider how wh-elements are interpreted. In that case, the typing condition may not need to consider prominence, though it has to consider locality. To make a distinction between clausal typing and wh-interpretation, I redefine CTC as below, which is a pure clausal typing condition.
(161) The Pure Clausal Typing Condition (PCTC)

a. For wh-raising languages, a clause is typed as a wh-clause iff there is a wh-word that moves overtly into [Spec, CP] via cyclic movement without crossing any strong island.

b. For Q-particle languages, a clause is typed as a wh-clause if the closest Q operator inserted in [Spec, CP] is interpreted with a wh-word that is the closest to it.

(161a) implies that in wh-raising languages, a clause would fail to be typed as a wh-question if the wh-word placed in [Spec, CP] is extracted from a strong island.

Strong islands are defined below (Cinque 1991):

(162) Strong islands are Complex NPs, and subject/adjunct clauses.

3.2 Economy and Wh-Interpretation

As for wh-interpretation, I think that it is necessary to make a distinction between syntactic and semantic interpretations.

(163) Wh-Interpretation in Syntax

A wh-word can be directly interpreted in syntax iff it matches with C via the Agree operation.

I think that the Agree operation should be generalized to include the operator-variable binding since binding means co-indexation that results in
agreement. Hence, I define the Agree operation as below:

(164)  The Generalized Agree Operation

A probe can enter into the Agree operation with a goal via either Spec-head agreement or operator-variable binding iff the following two conditions are met:

a. The probe and the goal are the closest to each other before the application of the Agree operation.

b. The goal is not contained in an island.

The above definition requires that Agree obey strict locality constraints. This is reasonable since Agree is a syntactic operation. However, if we adopt the above strict definition of the Agree operation, a natural question that one may ask is why only the operator-variable binding involved in syntactic interpretation is sensitive to island constraints. If there is no evidence to show that the operator-variable binding should be constrained somewhere but free elsewhere, it is stipulative to say that it should be constrained only in syntactic interpretation. A possible solution to this problem is to assume that the operator-variable binding is free from island constraints in general, and only movement, be it overt or covert, should be sensitive to islands. Following this line of reasoning, we can assume that the Agree relation between the probe and goal defined by the operator-variable binding in (164) is not realized by binding, but by the Spec-head agreement at LF. Let us assume that there is an LF movement on a par with overt syntactic movement and that this LF movement is as highly constrained as is overt movement. Since there is no evidence to show that the LF movement is not constrained by island conditions, I
assume that the following condition on wh-movement is true:

(165) The Condition on Wh-Movement

A wh-element can move to the Spec of CP in either syntax or LF iff it moves for clausal typing or wh-feature checking, and the movement does not violate the strong island constraints.

Now, we can redefine the Agree operation as below:

(166) The Agree Operation (Revised)

A probe can enter into the Agree operation with a goal via Spec-head agreement in either syntax or LF iff the following two conditions are met:

a. The probe and the goal are the closest to each other before the application of the Agree operation.

b. The goal is not contained in an island.

In our previous discussion, we treat the choice function application as a means to interpret wh’s-in-situ. If we treat the Agree operation as a way to interpret wh-expressions in syntax, we can treat the choice function application and the pair-list reading as a way to interpret wh-expressions in semantics.

(167) Wh-Interpretation in Semantics

A wh-word is interpreted in semantics if it is interpreted via the choice function application or in the pair-list reading.
The condition on the choice function application is defined below:

(168) The Condition on the Choice Function Application

A wh-expression can be interpreted via the choice function if it can range over a set of elements that can be individuated.

The following is the condition on the pair-list reading:

(169) The Condition on the Pair-List Reading

B can be interpreted with A in the pair-list reading if (i) A can function as a set generator, and (ii) B can be paired with the members of the set generated by A.

The following is the condition on the set generators:

(170) The Condition on Set Generators

A is a set generator for B if (i) A precedes B and is more prominent than B or (ii) A is an inherently D-linked wh-phrase that c-commands the trace of B.

The definition of prominence, given in (98), is reformulated as follows:

(171) The Prominence Hierarchy

a. Subject > Non-Subject

b. Argument > Non-Argument
Since all wh-expressions need to be interpreted in some way, we can formulate a wh-interpretation condition as below:

(172) The Wh-Interpretation Condition

A wh-expression must be properly interpreted, and it is properly interpreted if it is interpreted in syntax or semantics.

Now, it can be seen that there is a division of labor between wh-clausal typing and wh-interpretation. Wh-clausal typing can be done by either wh-raising or the Q particle insertion. Wh-interpretation in syntax is done by the Agree operation, whereas wh-interpretation in semantics is realized via the choice function application or the pair-list reading. In a single wh-question, the wh-expression can be interpreted via either the Agree operation or the choice function application. If it is interpreted via the Agree operation, it is directly interpreted in syntax. If it is interpreted via the choice function application, it is interpreted in semantics. In a multiple wh-question, one of the wh-expressions can be interpreted in syntax if the Agree operation is available, and the wh-expressions that are not interpreted via the Agree operation prefer to be interpreted via the pair-list reading.

The above discussion shows that wh-expressions can be interpreted in either syntax or semantics. Following the spirit of minimalism, I claim that wh-interpretation in syntax is always preferred to the one in semantics since the former is the most economical way to interpret a wh-expression (cf. Reuland 2001).
for similar ideas in his discussion on reflexive interpretation). The syntactic operation is the most economical one because it does not need the application of any extra non-syntactic mechanism. If this line of analysis is on the right track, then the interpretation of wh-expressions must be constrained by the following economy consideration:

(173) **The Principle of Economy (PE)**

Choose the most economical operation whenever possible unless it is intended to cancel the interpretation associated with it.

a. Syntactic Interpretation > Semantic Interpretation
b. Default Interpretation > Non-Default Interpretation

(where A > B means that A is more economical than B)

Now, consider why the two sentences in (156), repeated as (174) below, contrast in acceptability:

(174) a. *What did who give t to Mary?  
    b. ?What did who give to whom?

In (174a), the movement of what violates PE because the movement of the wh-object what cancels the opportunity for the wh-subject who to be interpreted in syntax by the Agree operation. Although what is moved to [Spec, CP] in (174a), it is not interpreted in syntax by the Agree operation, according to (166). Note that what is worse is that the fronting of what also cancels the possibility for what to be interpreted in the pair-list reading since what is less prominent than who, and is
thus not a qualified set generator. Assuming that in multiple wh-questions the pair-list reading is the default interpretation of wh-words, the movement of *what* (174a) results in a second violation of PE since *what* is not interpreted in the pair-list reading. Since both *who* and *what* fail to be interpreted economically, the ungrammaticality of (174a) is expected. In the above representation, (174b) is marked as ? since this sentence is not fully acceptable according to the native speakers’ judgment. This is expected since PE is violated when *what* moves to the operator position, as the fronting of *what* deprives the wh-subject *who* of the possibility to be interpreted in syntax by the Agree operation. (174b) is better than (174a) since, although *who* fails to be interpreted in syntax, it can still be interpreted in semantics as it can generate a set for *whom* to be paired with. When two wh-phrases co-occur in a sentence and if the prominent one c-commands the less prominent one, they will try to derive the pair-list reading. Since *who* is more prominent than *whom*, and can thus function as a set generator (Notice that this shows that a set generator does not necessarily occupy an A’-position though it must be prominent), both *who* and *whom* can get interpreted. What is interesting is that, although the fronted *what* cannot license other wh-words that follow it in the pair-list reading, *what* itself is licensed in the pair-list reading. Since the wh-subject can function as a set generator for the indirect wh-object *whom*, and a matching relation can be established between *who* and *whom*, the fronted *what* can be reconstructed to its original position at LF to be interpreted with *who* and *whom* in the pair-list reading. The drastically improved acceptability of (174b) shows that what matters to the multiple wh-question is whether the wh-words involved can be interpreted in the pair-list reading. Suppose that the pair-list reading (as the default interpretation) is the most economical way to interpret wh-words involved in the
multiple wh-question. Then, the reason why (174b) is made acceptable is explained. Note that the present analysis predicts that (159b) should not be as good as (159a) since the derivation in (159a), repeated below as (175a), is the optimal one according to PE. In fact, this prediction is consistent with some native speakers’ judgment. In (159b), repeated below as (175b), PE may not be violated, though the fronting of the wh-object cancels the chance for the wh-subject to be interpreted in syntax via the Agree operation. However, an inherently D-linked wh-phrase may not need to be interpreted via the Agree operation. (175b) is not as good as (175a) since, everything being equal, a closer goal is always preferred to a less close one by the probe. Notice that in (175b) the pair-list reading is not destroyed by the movement of the wh-object, given that the inherently D-linked wh-subject c-commands the trace of the moved wh-object and can thus function as a set generator.

(175) a. Which person bought which book?
   b. (?)Which book did which person buy?

Following this line of analysis, we can also account for (154) and (155), repeated as (176) and (177) below:

(176) ?What did which student read t?

(177) ?Which book did how many people buy t?

The difference between (176) and (174a) is that in (176) the movement of what may not destroy the pair-list reading of the two wh-expressions since the
wh-subject is an inherently D-linked which-phrase that c-commands the trace of what, and can thus function as a set generator. The less acceptable status of (176) may result from the fact that the grammatical system cannot determine whether PE is violated. Note that PE may be violated in (176) because the movement of what deprives the which-phrase of its chance to be interpreted in syntax via the Agree operation. PE may not be violated in (176) since the wh-subject is an inherently D-linked which-phrase and thus may not depend on the Agree operation for interpretation, assuming that an inherently D-linked which-phrase may depend on discourse rather than syntax for its default interpretation. Now, consider (177). As in (176), although the wh-subject fails to be interpreted in syntax by the Agree operation due to the fronting of the D-linked wh-phrase in (177), the sentence is not fully ruled out since the pair-list reading is not destroyed, given that the D-linked wh-phrase may be more prominent than the non-D-linked wh-subject according to (171), and it also precedes the wh-subject. One may ask why (177) is not starred as completely ungrammatical if it violates PE. If we regard PE as a mechanism to derive the preferred interpretation, we can see why (177) is not starred as ungrammatical. In multiple wh-questions, the preferred interpretation forwh-elements is the pair-list reading. If PE is just treated as a condition to help derive the pair-list reading, then the reason why (176) and (177) are not ruled out is clear because the pair-list reading is still maintained.

According to Bolinger (1978), sentences like (158b) can also be made more acceptable in a certain context if the wh-words are forced to be D-linked. But, notice that even when the acceptability of the sentences like (158b) is improved by forcing the wh-words to be D-linked, the wh-words cannot be interpreted in the pair-list reading since the fronted wh-object is not a qualified set generator. This is
also expected by PE since the costly derivation in (158b) may be acceptable only when it is intended to cancel the interpretation associated with the most economical one. It seems that the most economical way to derive wh-questions is to keep the order of wh-words that is established by the default or canonical word order since only from such an order can the pair-list readings be obtained by the wh-words that are not inherently D-linked. But this account seems to fail to account for the following sentence:

(178) who did everyone like?

The above sentence can have a pair-list answer, in addition to an individual answer and a functional answer, as shown below:

(179) a. John and Mary. (individual answer)
    b. His mother. / Their mothers. (functional answer)
    c. Bill likes John and Tom likes Mary. (pair-list answer)

The question to ask is why the pair-list reading can be obtained in (178) even when the wh-object is fronted. I claim that (178) can still obtain its pair-list reading not only because everyone is an inherent set generator that c-commands the trace of who, but also because moving the wh-object who in this sentence is the only licit way to form a wh-question. In this sense, movement is the last resort. I assume that if a licit wh-question can be formed without moving the wh-word, then moving the wh-word will result in the loss of pair-list readings. This is exactly what happens in Chinese. Consider the following Chinese sentences:
(180) a. Meigeren dou xihuan shei ne?

everyone all like who Q

‘Who does everyone like?’

b. shei, meigeren dou xihuan ne?

who everyone all like Q

In (180a) the pair-list reading obtains, but in (180b) it is lost. All this suggests that an unmarked derivation is to keep an unmarked meaning. Whenever a canonical or unmarked derivation is available in syntax, the use of a marked one is to cancel the semantic implication associated with the unmarked one. In this sense, PE can be seen as a means to guarantee the unmarked derivation of wh-questions in syntax. Although PE is not an absolute grammatical constraint, any derivation that violates it has a price to pay because PE specifies the most economical way to interpret wh-questions.

In the above discussion, we have shown that PE is basically a mechanism to help derive the pair-list reading in multiple wh-questions. In fact, what lies behind PE is the prominence of the relevant wh-words. PE is employed to guarantee that the less prominent wh-word can depend on the most prominent one for interpretation since only in this way can the pair-list reading be properly derived, given the fact that the production of the pair-list reading depends on a set generator, and only a prominent wh-word can function as the set generator. Consider the following sentence, repeated from (100):

(181) *Zhangsan weishenme xihuan shei?
Zhangsan why like who

Lit. ‘Why does Zhangsan like who?’

In the above sentence, the wh-adjunct is interpreted in syntax via the Agree operation, but the wh-object fails to be interpreted via the pair-list reading since the wh-word preceding it is not prominent and thus cannot function as a set generator. Since the wh-object fails to be interpreted in the pair-list reading, PE is violated in (181), and hence, the sentence is out. Notice that we have argued that in multiple wh-questions, all the wh-words involved prefer to be interpreted in the pair-list reading. In (181), both the wh-object and the wh-adjunct fail to be interpreted in the pair-list reading, given that the wh-adjunct precedes the wh-object, but fails to function as a set generator. The facts discussed above indicate that in mutiple wh-questions, the most important thing is to derive the pair-list reading. If the violation of PE results in the loss of the pair-list reading, the sentence will be excluded, whereas, if the violation of PE does not result in the loss of the pair-list reading, as shown in (175) and (176), the sentence may not be ruled out.

Notice that the present analysis does not explain whether the wh-object shei ‘who’ in (181) can be interpreted via the choice function application, though it predicts that (181) should be ruled out because the wh-object in it fails to be interpreted in the pair-list reading. I think that the wh-object in (181) cannot be interpreted via the choice function application. If it can, the reason why (181) is unacceptable will not be adequately explained. In section 3.5, I will explain why the wh-object in (181) cannot be interpreted via the choice function application.
3.3 The Structure of Chinese Wh-Questions

In Chinese wh-questions, the Q particle is located at the sentence-final position, but in our previous discussion we seem to assume that C is located at the left periphery of the sentence. How is this possible, given our proposal that the Q particle is an operator in C? Obviously, the structure of wh-questions in Chinese is not stated clearly in our previous discussion. Following Ning’s (1993) proposal for Chinese relative clauses, I propose the following structure for Chinese wh-questions:

(182)

In (182) the Q particle is under C°, which is head-final and located at the right periphery of the sentence. In this case, my proposal that the Q particle is an operator must be inaccurate. Let us say that the Q particle is a realization of the C head, and a Q operator is independently introduced into the Spec of CP to support and agree with C°. All this done, the sentence becomes a Q sentence, but not a wh-question. In order to form a wh-question, C needs to be interpreted with a wh-word. This is done by associating the Q operator Op with the closest wh-word, according to PCTC. When Op is associated with a wh-word, it will share the wh-feature with it. Since Op is in an agreement relation with the Q particle, it will
transmit its wh-feature to it. As a result, a wh-question is formed.

### 3.4 Multiple Wh-Questions Revisited

With the distinction between clausal typing and wh-interpretation, we can account for the multiple wh-phenomena in a more satisfactory way. Consider (125), repeated below as (183):

\[(183)\]

(a) *Who\(_i\) do you wonder [\(CP\; t_i\; [\; p\; t_i\; bought\; what]]?\]

(b) *What\(_i\) do you wonder [\(CP\; t_i\; [\; who\; bought\; t_i]]?\]

(183a) can only be derived via cyclic movement. If not, the cyclicity requirement given in PCTC will be violated. As a result, the sentence would fail to be typed. However, if the wh-word moves cyclically, it cannot move to the matrix CP domain when it moves into the embedded [Spec, CP] since it would be anchored there in agreement, given that the embedded C has a wh-feature as required by the matrix verb. Note that the derivation in (183a) also violates PE since the probe and the goal are not closest to each other before movement. As a result, the wh-word in (183a) is not interpreted in syntax by the Agree operation.

Now, consider (183b), which contrasts with (128), repeated below as (184), in derivational history.

\[(184)\]

(*What\(_i\) do you wonder [\(CP\; t_i\; [\; CP\; who\; [t_j\; bought\; t_i]]]]?\]

(183b) is an illicit derivation since (i) what is not allowed to make further
movement when it agrees with the embedded C, and (ii) the fronting of what is excluded by PE. In (184), who agrees with the embedded C to satisfy the subcategorization requirement, and what moves to the matrix CP domain via embedded CP adjunction. (184) constitutes a standard wh-island violation, but is not that worse than (183a), a phenomenon usually accounted for under proper government. Under the present analysis, (184) is not that worse because it does not violate PCTC since the subcategorization requirement for the embedded C is satisfied by who. The derivation is not well-formed because the movement of what violates PE. Note that, according to our condition on wh-interpretation in syntax, what is not interpreted in syntax, though it is located in the matrix CP domain. It is obvious that the most economical way for what to be interpreted is that it pairs with who in the pair-list reading. However, its movement destroys that preferred interpretation since what is less prominent than who, and thus fails to function as a set generator though it precedes who. That is why it is not a good sentence. Now, consider (127), repeated here as (185):

(185) *Who, do you wonder [CP whatj [Ip t; bought t;]]?

Although what is moved into the embedded CP domain in (185), it is not interpreted in syntax by the Agree operation, according to our definition. Since the preferred interpretation for who is cancelled by the movement of what, PE is violated in (185). Besides, the movement of what also cancels its own opportunity to be interpreted in the pair-list reading, which constitutes another violation of PE. The movement of who to the matrix [Spec, CP] in (185) also violates PE since the probe and the goal are not closest to each other before the movement and who thus
fails to be interpreted in syntax by the Agree operation. Since PE has been violated several times, there is no way for (185) to be grammatical.

Now, consider the following Chinese multiple wh-question:

(186) Ta wen ni [shei mai-le shenme].

he ask you who buy-ASP what

‘He asked you who bought what.’

The present analysis expects that the multiple wh-words in (186) can only have the embedded indirect question reading. Since the embedded C has a Q feature as required by the matrix verb, the wh-subject cannot take matrix scope by crossing the embedded C, according to PCTC and PE. If the wh-subject, as a goal, is associated with the matrix probe (Q operator) for interpretation, it is not interpreted in syntax via the Agree operation since they are not the closest to each other. The closest probe for the wh-subject is the embedded Q operator. Since the wh-object is not contained in a strong island, it can move at LF, but such a movement would cancel its opportunity to be interpreted in the pair-list reading and thus violates PE, given that the most economical way for the wh-object to be interpreted is to pair with the embedded wh-subject in the pair-list reading. Notice that even if the wh-object is associated with the matrix Q operator for interpretation, it is not interpreted in syntax via the Agree operation since they are not the closest to each other. Under the present analysis, if we insert a Q operator into the Spec of the matrix CP in (186), that means that we want to type the sentence as a wh-question. But associating the matrix Q operator with the wh-object cannot make the sentence a wh-question since PCTC is not satisfied, given that the wh-object is not the
closest to the matrix Q operator.

It should be noted that the above examples in English and Chinese do not indicate that wh-words in embedded multiple wh-questions cannot take wide scope in general. In fact, they only indicate that a Q feature containing C blocks the wide scope interpretation of the wh-word. If the relevant C does not contain a Q feature, the wh-word can take wide scope, as shown below:

(187) a. Who do you think bought what?
   b. Ni renwei shei mai-le shenme?
      you think who buy-ASP what
      ‘Who do you think has bought what?’

In the above sentences, the wh-words in the embedded clauses can have a wide scope reading.

Now, consider the following sentence:

(188) Who wonders who bought what?

(188) can be answered by (189a) and (189b) but not (189c) and (189d) since the latter two answers are not grammatical sentences themselves.

(189) a. John does.
   b. John wonders who bought the book, and Bill wonders who bought the pen, and …
   c. *John wonders Bill bought what, and Mary wonders Ted bought what,
d. *John wonders Bill bought the book.

Neither (189c) nor (189d) is grammatical because the embedded C is not typed by a wh-word, thus failing to satisfy the subcategorization requirement of the matrix verb. The problem is how to account for the acceptability of (189b). It seems that the embedded wh-object can be interpreted out of the embedded CP domain which is typed as [+WH]. Following Kuno and Robinson (1972), I argue that the embedded wh-object may not be interpreted as a direct question word in (188), though it can have the pair-list reading with the matrix wh-word. Notice that the embedded wh-object in (188) can be left without being provided a value, as indicated by (189a). In (190), both of the wh-words must be obligatorily provided a value in the answer, as shown in (191), since the two wh-words are direct question words.

(190) Who bought what?
(191) a. John bought a book, and Bill bought a pen, and …
    b. *John does.

It can thus be assumed that only indirect questions can be left unanswered. Since I assume that the embedded wh-object in (188) is a wh-word in an indirect question, I must explain why it can have an answer, given that an indirect question does not need an answer. I think that the distinction between a direct question and an indirect question does not lie in the possibility of having an answer, but in the obligatoriness of having an answer. It is obligatory for a direct question to seek an
answer, whereas it is unnecessary for an indirect question to have an answer. This is their fundamental difference. For instance, the following Chinese sentence (192) can be optionally answered by (193), though it is an indirect question:

(192) Wo xiang-zhidao shei hui lai.
    I want-know who will come
    ‘I want to know who will come.’
(193) Lisi hui lai.
    Lisi will come.
    ‘Lisi will come.’

The English translation of (192) can also be answered by the English translation of (193). Suppose that one speaks to an addressee with a sentence like ‘I want to know who will come’. It is quite natural for the addressee to respond with a sentence like ‘Lisi will come’, though the former sentence is not a wh-question.

The following examples discussed in Kuno and Robinson (1972: 481) further show that answerability may not be taken as evidence to support the claim that an answerable wh-word should be interpreted as a direct question word.

(194) Who remembers where we bought these books?
(195) a. John does.
    b. John remembers where we bought the physics book and Martha and Ted remember where we bought The Wizard of Oz.

(194) can be answered by (195a), but what is interesting is that it can also be
answered by (195b). Of course, no one wants to treat *these books* as a question word. If (195b) as a possible answer to (194) cannot prove that the NP *these books* is a direct question word, (189b) as a possible answer to (188) also cannot prove that the embedded wh-object is a direct question word.

Notice that, although I argue that the embedded wh-object in (188) may not be interpreted as a direct wh-question word, I do not claim that it cannot be interpreted with the matrix wh-subject in the pair-list reading. In fact, nothing under the present analysis can prevent it from having the pair-list reading with the matrix wh-subject. Under the present analysis, wh-island effects are predicted by PCTC. But PCTC won’t be violated when the embedded wh-object is interpreted with the matrix wh-subject since typing is done by the matrix wh-subject and the embedded wh-object plays no role in typing.

### 3.5 A Note on *Weishenme* and A-not-A, and PCTC Further Revised

Since we make a distinction between the Agree operation and the choice function application, we can explain why there is a difference in grammaticality between the following sentences:

(196) a. Ta weishenme xie  shu?

    he why     write book

    ‘Why did he write books?’

b. *[Ta weishenme xie   de shu]  zui  youqu?*

    he why write DE book most interesting

    *Lit. ‘Books that he wrote WHY are most interesting?’*
In (196a) the wh-word *weishenme* is interpreted in syntax via the Agree operation since it can move to [Spec, CP] at LF. In (196b) the wh-word *weishenme* cannot move to the matrix [Spec, CP] since it is contained in an island. Hence, it cannot be interpreted in syntax by the Agree operation. Since the Agree operation is not available, it is quite natural for us to proceed to the next step and see whether the choice function can be applied. According to our condition on the choice function application given in (171), choice function can only apply to wh-expressions that can range over a set of elements that can be individuated. If this is true, then the reason why *weishenme* cannot be interpreted via the choice function is clear. It cannot range over a set of elements that can be individuated. Consider the following sentences:

(197) a. Ta zenme ye/dou bu ken qu.
    he how FM/all not will go
    ‘He won’t go any way.’

b. *Ta weishenme ye/dou bu ken qu.
    he why FM/all not will go
    ‘He won’t go for any reason.’

In the above sentences, *zenme* ‘how’ can be focused by an emphatic marker *ye* or quantified by *dou* ‘all’, but *weishenme* ‘why’ cannot. Xu (1990: 371) notes that *zenme* as well as other wh-words in Chinese can be interpreted as either indefinite pronouns or adverbs, and only *weishenme* shows some peculiarity in this aspect. I think that the reason why *weishenme* cannot be interpreted as an indefinite adverb
results from the fact that it refuses individuation. Because it cannot range over a set of elements that can be individuated, it cannot be used as an indefinite adverb, and thus refuses to be focused by ye or quantified by dou, which requires the individuation of the relevant wh-phrase.

Now, let us consider another question related to weishenme in (197b). If weishenme cannot be properly interpreted when contained in a strong island, are sentences like (196b) still wh-questions? This amounts to asking whether weishenme in sentences like (196b) can type the sentence as a wh-question. According to the definition of PCTC given in (161), (196b) should be a wh-question. But we intuitively feel that it is not a qualified wh-question. Note that the typing condition defined for wh-raising languages in (161a) is a strict condition, according to which wh-words extracted from strong islands cannot type a clause as a wh-question. Hence, one of the possible reasons why the following sentence is ungrammatical is that it fails to be typed as a wh-question.

(198) *Who do you like [the book that ti wrote]?}

According to (161b), a clause would be typed as a wh-question if the Q operator is interpreted with a wh-word that is the closest to it. However, (161b) does not make it clear what ‘interpret’ means. Let us assume that a wh-word is interpreted with a Q operator if it is interpreted with it via either the Agree operation or the choice function. If this is true, sentences like (196b) can be excluded by reformulating PCTC as below:

(199) The Pure Clausal Typing Condition (PCTC)
a. For wh-raising languages, a clause is typed as a wh-question iff there is a wh-word that moves overtly into [Spec, CP] via cyclic movement without crossing any strong island.

b. For Q-particle languages, a clause is typed as a wh-question iff there is a wh-word interpreted with the closest $C_{[+Q]}$ via either the Agree operation or the choice function application.

Following the analysis assumed in section 3.3, let us assume that in Chinese $C$ has a Q feature, and the Q particle is an overt instantiation of $C$. All this done, the clause becomes a Q clause, but not a wh-question. In order to form a wh-question, $C$ needs to be interpreted with a wh-word. If the relevant wh-word is not contained in a strong island, it can directly move to [Spec, CP] at LF to agree with $C$, and be interpreted with $C$. If the relevant wh-word is contained in a strong island, it cannot move to [Spec, CP] because of the island constraint. Since the operator insertion strategy is available in Chinese, a Q operator can be inserted into [Spec, CP] to bind the relevant wh-word. Since binding means feature transmission and the Q operator agrees with $C$, the clause is typed as a wh-question. In (196b), the wh-word *weishenme* ‘why’ is contained in a strong island, it cannot move to [Spec, CP] at LF. Then, it has to be interpreted with $C$ via the choice function. However, since *weishenme* cannot range over a set of elements that can be individuated, it cannot be interpreted via the choice function. Since there is no way for $C$ to be interpreted with a wh-word, the clause fails to be typed as a wh-question. As a result, (196b) violates PCTC. Assuming that a sentence that violates PCTC is uninterpretable, we can see that the ungrammaticality of (196b) must result from its uninterpretability. A welcome result of this analysis is that we can make a
distinction between the untyped sentences and the illicit derivations that violate PE.

Consider the following sentences ((200b) is repeated from (70)):

(200) a. *[NP [Kare-ga naze kai-ta] hon]-ga omosiroi-desu-ka?
   he -N why wrote book-N interesting-be-Q
   Lit. ‘Books that he wrote why are interesting?’
   (Nishigauchi 1990: 93)

b. ?(?)[NP [Dare-ga naze kai-ta] hon]-ga omosiroi-desu-ka?
   Who –N why wrote book-N interesting-be-Q
   Lit. ‘Books that who wrote why are interesting?’

According to Nishigauchi (1990), (200a) is completely ungrammatical, but (200b) is somewhat better than (200a), if not perfectly grammatical, when another wh-phrase is added. This difference in grammaticality between the above two sentences is anticipated by the present analysis. Under the present analysis, (200a) is in fact uninterpretable since the sentence fails to be typed as a wh-question, given that naze ‘why’ cannot be interpreted with C when it occurs in an island. The acceptability of (200b) is improved since PCTC is satisfied and the sentence is typed as a wh-question by the wh-word dare ‘who’, which can be interpreted with C via the choice function. It is not fully grammatical because naze fails to be interpreted. The difference in acceptability between (200a) and (200b) shows that it is necessary to make a distinction between the uninterpretability of the sentence and the uninterpretability of the wh-word. (200a) is worse because, besides having an uninterpretable wh-word in it, the sentence itself is uninterpretable since it fails to be typed as a wh-question. (200b) is better because, although there is an
uninterpretable wh-word in it, the sentence is interpretable since it is typed as a wh-question.

In our previous analysis, we assume that the A-not-A element is formed by the incorporation of the Q operator into the INFL, following Shi (1994). On the basis of this assumption, let us use our newly revised PCTC to give a more satisfactory explanation to the ungrammaticality of the following sentence, repeated from (67).

(201) *[Ta qu-bu-qu meiguo] bijiao hao?

He go-not-go America more good

Lit. ‘Is it better whether he goes to America or not?’

Following Huang (1991), let us assume that the A-not-A element is the Chinese counterpart of *whether* in English, and thus a counterpart of the wh-element with a feature specified as [-WH]. If the A-not-A element is a wh-element, it cannot move out of the subject island at LF according to (165) since LF movement is constrained by island conditions under the present analysis, though it can move to the C of the subject clause. In (201), the Q operator is directly adjoined to the INFL of the subject clause to trigger the A-not-A formation (If the Q operator is adjoined to the matrix INFL, it will be the matrix INFL that forms an A-not-A). According to (199b), only when a wh-word is interpreted with the closest C can the relevant sentence be typed as a wh-question. In this case, it is the subject clause rather than the matrix clause that is typed as an A-not-A question since the A-not-A element containing the operator can move to [Spec, CP] of the subject clause. Since the A-not-A element cannot move out of the subject island, the only way for it to take matrix scope is to insert a Q operator in the matrix [Spec, CP]. Even if we assume
that we can insert another Q operator into the matrix [Spec, CP] without considering the economy requirement of the grammatical system, the matrix clause still fails to be typed as a question since the matrix operator binds nothing. First, the matrix operator cannot bind the A-not-A element because it already agrees with the Q operator that is incorporated into it. This means that the choice function cannot apply to the A-not-A element since it is already interpreted via the Agree operation in the subject clause. Second, the matrix clause cannot be typed as a wh-question because PCTC cannot be satisfied, due to the fact that the newly inserted matrix operator is not the closest operator to the A-not-A element, as compared with the Q operator introduced into the subject clause and incorporated into the INFL of the subject clause. According to Law (2001), (201) is ungrammatical since the subject clause is interpreted as a direct question and the matrix predicate is incompatible with the argument which is a direct question. The present analysis is consistent with Law’s account. According to the present analysis, (201) is ungrammatical because, besides violating the ban on vacuous binding, it also violates PCTC and thus fails to be typed as an A-not-A question, though the sentence needs to be typed and interpreted as a question.

Consider the following sentence:

(202) [Wo qu Meiguo haishi bu qu Meiguo] bijiao hao?

I  go America or   not go America more good

‘Is it better that I go to America or that I do not go to America?’

(Huang 1991: 313)

According to Huang (1991), the above sentence is a true disjunctive question.
Following Huang (1991), I assume that true disjunction questions are not formed by the incorporation of the Q operator into the INFL. Since the Q operator can be inserted in the matrix [Spec, CP], and the questioned elements contained in the subject clause can be licensed and interpreted via the choice function, (202) satisfies PCTC and is thus typed and interpreted as a question.

Pan (p.c.) asks if the sentences like (203a) would cause any problem for the newly defined PCTC. In the following sentence, the A-not-A element can satisfy PCTC, and the wh-word *shenme* ‘what’ can be interpreted via the choice function. It seems that our further refined analysis would wrongly predict that it is a well-formed wh-question.

(203) a. *Wo xiang-zhidao Lisi xi-bu-xihuan shenme?*

I want-know Lisi like-not-like what

*Lit.* ‘I want to know whether Lisi likes or not like WHAT?’

b. *[CP Who [IP t bought what]]?*

c. *Zhangsan weishenme xihuan shei?*

Zhangsan why like who

*Lit.* ‘Why does Zhangsan like who?’

In fact, the ungrammaticality of (203a) is just predicted by the present analysis. First, since the embedded Q operator is incorporated into the embedded INFL, there is no Q operator to bind the wh-word *shenme*. Inserting another Q operator into the embedded CP domain is not allowed by the grammatical system. Even if it is allowed, it will result in the feature conflict, given that the A-not-A element and the wh-word have different wh-features. Second, the matrix clause cannot be typed
as a wh-question by inserting another Q operator into the matrix CP domain. According to PCTC, a clause is typed as a wh-question if there is a wh-word interpreted with the closest Q operator. Although in (203a) the wh-word can be interpreted via the choice function if an operator is inserted into the matrix [Spec, CP], it cannot type the matrix clause as a wh-question because the matrix operator is not the closest Q operator to the wh-word. The Q operator closest to the wh-word is the embedded Q operator which is incorporated into the INFL, and raised to the embedded Spec of CP at LF. Although this operator is available, it cannot bind the wh-word because of the feature incompatibility.

Reinhart (1998) suggests that wh’s-in-situ be bound by an existential Q operator and interpreted as function variables via choice functions. Under her analysis, a Q operator must be independently introduced into the sentence to bind the function variables. I think that in multiple wh-questions, if the pair-list reading is intended, the operator that binds the function variables does not need to be independently introduced if there is a wh-word that moves into [Spec, CP] either in syntax or at LF. I assume that a fronted wh-word can function as the Q operator that binds not only its own trace, but also other wh-words in-situ. Notice that the LF raised wh-operator in fact does not exist in English under the present analysis since (i) in English a wh-question must be typed by an overtly moved wh-word according to PCTC, and (ii) when the clause is typed, no wh-word is allowed to move into [Spec, CP] according to the Condition on Wh-Movement given in (165), since the relevant wh-movement is unmotivated. It is not motivated for clausal typing because the clause is already typed. It is not motivated for wh-feature checking because the wh-feature on the wh-word is not strong in English. Although the LF raising of a wh-operator is not available in English, it is available in Chinese.
In Chinese, a wh-word can raise to [Spec, CP] at LF if it is not contained in an island, and the relevant wh-movement is motivated for wh-clausal typing, given that a wh-word must be interpreted with the closest $C_{+[Q]}$ in wh-clausal typing according to PCTC. I think that the insertion of an operator is the last resort. An operator can be independently inserted into the clause only if no wh-word in the clause is allowed to function as an operator or when a wh-in-situ is intended to take wide scope over the moved wh-element. If this line of analysis is on the right track, then in (203b) the wh-word *who*, as an operator, binds not only its own trace, but also the wh-object interpreted as a function variable. In (203c), repeated from (181), the wh-word *weishenme* functions as an operator after it moves into [Spec, CP] at LF. However, since *weishenme* cannot range over a set of entities, it cannot interpret the wh-object in-situ in the pair-list reading, though it can interpret its own trace.

4. Further Discussion

4.1 Wh-Island Effects in Japanese

It is assumed that Japanese differs from Chinese with respect to wh-island effects (cf. Wantanabe 2001). I have shown in the previous discussion that this assumption is based upon a false picture of Chinese multiple wh-questions, and Chinese also exhibits wh-island effects. If there is no difference between Chinese and Japanese with respect to multiple wh-interpretation, what makes linguists think that they should be different? This seems to be related to the fact that no linguist is a native speaker of both Chinese and Japanese. What is interesting is that if we go through the relevant literature on Japanese wh-questions, we will soon find that it is not the
case that all linguists assume that Japanese is a wh-island effect sensitive language, and in fact, it is still under debate whether Japanese exhibits genuine wh-island effects (cf. Lasnik and Saito 1984, 1992; Nishigauchi 1990; Pesetsky 1987; Watanabe 1992). A natural question to ask is: why do linguists differ in their judgments on the same set of data? A possible answer is that if one can get an echo question reading for the relevant wh-word in multiple wh-questions in Japanese, one tends to think that there is no wh-island effects, whereas if one fails to get an echo question reading for the relevant wh-word, one tends to conclude that wh-island effects exist. Consider the following Japanese sentence (204a) cited from Nishigauchi (1990: 33):

(204) a. Tanaka-kun-wa [dare-ga nani-o tabe-ta-ka] oboe-te-i-masu-ka?

\[
\text{Top who-N what-A eat-P Q remember is Q}
\]

‘Does Tanaka know who ate what?’

b. For which x, x a person, does Tanaka know what x ate?

According to Nishigauchi, for some speakers, (204a) can be interpreted as (204b). However, he also notes that even for those speakers that can interpret (204a) as (204b), there are some restrictions, one of which is that the wh-word that purports to take matrix scope must be pronounced with a marked intonation, i.e., with a heavy stress on it. This is interesting since I find that the Chinese wh-words in (107) and (130) also need a heavy stress support when it is intended to be interpreted as a wide scope-taking wh-word in an echo question. Hence, I think that when the relevant wh-word can obviate wh-island effects in Japanese multiple wh-questions, it is in fact interpreted as an echo question as in Chinese. Now, we can have a
fourth criterion to distinguish an original question from an echo question. A wh-word in an original question does not need any extra stress support, but an echo wh-word needs it.

Another assumed difference between Chinese and Japanese with respect to wh-quantification lies in the interaction between wh-in-situ and QP (quantifier phrase), as shown below:

(205) a. *? Daremo-ga nani-o katta no? (Japanese)
   everyone what bought Q
   b. Nani-o daremo-ga  t  katta Q?
   c. Meigeren dou mai-le shenme? (Chinese)
      everyone all buy-ASP what
      ‘What did everyone buy?’
   (Watanabe 2001: 215)

Hoji (1986: 88) observes that if a wh-phrase is c-commanded by a QP, the sentence becomes ungrammatical in Japanese, as indicated by (205a), but when the relevant wh-phrase is scrambled over the QP, the sentence becomes grammatical, as shown in (205b). Watanabe (2001) notices that the Chinese counterpart (205c) to (205a) is not only grammatical, but also allows a pair-list reading like (206), which is rendered in English:

(206) John bought beer, Mary a bottle of wine, …

Watanabe finds that in this respect, Japanese is different from Chinese since not
only is (205a) unacceptable but also the acceptable (205b) lacks a pair-list reading, as observed by Hoji (1986). According to Watanabe, even those who find (205a) acceptable do not get the pair-list reading. Based on the above facts, Watanabe assumes that Chinese differs from Japanese in whether wh-movement is involved. Japanese is a wh-movement language, and the Japanese sentence (205a) is unacceptable because wh-movement is blocked by a c-commanding QP *daremo-ga*. Chinese is a language that involves unselective binding but not wh-movement, and thus (205c) is grammatical since unselective binding is not blocked by an intervening QP.

Here, two things should be considered. First, why is (205a) unacceptable but (205c) is acceptable? Second, why is the pair-list reading available in (205c) not available in (205b)? I think that the answer to the first question should not be so complicated as to investigate whether some abstract wh-movement is involved in Japanese or Chinese. If we look at the relevant QPs in (205), we can find that the comparison is made between two different QPs in these two languages. The Japanese QP *daremo* is made of the wh-word *dare* ‘who’ plus the domain-widening particle *mo*. The Chinese QP *meigeren* ‘everyone’ is made of the distributive quantifier *mei* ‘every’, the classifier *ge*, and the noun *ren* ‘man’. Hence, *meigeren* can be counted as a Chinese counterpart to the English QP *everyone*, but not to the Japanese QP *daremo*. Notice that Chinese has a counterpart to *daremo*, which is *shei dou* ‘who all’. The Chinese *dou* ‘all’ is basically equivalent to the Japanese *mo* in meaning and function, and when a wh-word is quantified by *dou*, the relevant wh-word becomes a universal QP, as shown below:

(207) Shei dou xihuan zhe-ben shu.
Who all like this-CL book
‘Everyone likes this book.’

The interesting thing is that if we replace the object in (207) with a wh-word and make a Chinese sentence similar to (205a), we get a sentence that is as unacceptable as (205a) if shei ‘who’ is treated as a QP, as shown below:

(208) *?Shei dou mai-le shenme?
Who all buy-ASP what
‘What did everyone buy?’

Another interesting thing is that if we topicalize the wh-object, the sentence becomes acceptable, just as the Japanese sentence (205b) is.

(209) Shenme, shei dou mai-le?
What who all buy-ASP

What will happen if we replace the QP in (205a) with another one that is not derived from a wh-word? There is such a word in Japanese, which is minna ‘everyone’. If we replace the QP in (205a) with minna, the sentence is not only acceptable but also allowed for a pair-list reading, as shown below:

(210) Minna-ga nani-o katta no?
everyone what buy Q
‘What did everyone buy?’
Now, we can see that the first question is not a real question since two different things are being compared. In fact, the first question should be asked in this way: why are (205a) and (208) unacceptable? I think that the answer can be derived from PCTC. If we apply PCTC to (205a) and (208), the Q operator will automatically be associated with the closest wh-elements. However, the closest wh-words in these two sentences are also chosen as bindees by another operator which is a universal quantifier, mo in Japanese and dou in Chinese. Since a wh-word bound by two different quantifiers will result in a feature conflict, (205a) and (208) are thus ruled out. (205b) and (209) are grammatical because in each sentence, the fronted wh-word is the one that is the closest to the Q operator, and thus the Q operator and the universal quantifier can bind two different wh-words, thus avoiding a struggle between them.

Now, let us turn to the second question: why is the pair-list reading available in (205c) not available in (205b)? Notice that the pair-list reading is also unavailable in the Chinese sentence (209). This is because in both (205b) and (209), the optional fronting of a wh-word will cancel the semantic implication that obtains when the wh-word stays at its original site, as we have discussed previously. Notice that both (205c) and (210) can have a pair-list reading. But when the wh-objects are fronted, the pair-list reading is lost, as shown below:

(211) a. Shenme meigeren dou mai-le  
      what everyone all buy-ASP

   b. Nani-o minna-ga katta no?
      what everyone buy  Q
If we account for this phenomenon in minimalist terms, we can say that movement is never cost free. The so-called optional movement is not optional since it can derive new meanings by canceling old ones.

### 4.2 Additional WH effects

In a recent paper, Grewendorf (2001) proposes a quite interesting account for multiple wh-questions. He argues that in multiple wh-fronting languages like Bulgarian, a wh-word can be the landing site for another wh-word in overt wh-movement, and the wh-cluster formed by this movement then moves to the Spec of CP to form a wh-question. He further claims that in Japanese there is a covert process of wh-cluster formation, which is thus an LF-type analogue of overt multiple wh-fronting languages like Bulgarian. The idea to adjoin one wh-word to another one and then to move the newly formed wh-cluster away is not totally new. At least, it can be traced back to Saito (1994). What is new is that all wh-words can be adjoined to one another to form one cluster in either syntax or LF. Although this account is attractive, it is neither conceptually nor empirical adequate. Consider the following sentence, repeated from (70):

(212) \(?[NP \text{Dare-ga naze kai-ta} \text{hon}-\text{ga omosiroi-desu-ka?}]

Who –N why wrote book-N interesting-be-Q

Lit. ‘Books that who wrote why are interesting?’

Under Grewendorf’s analysis, the improvement of acceptability of the above
sentence is due to the fact that the wh-adjunct can adjoin to the wh-argument, and then the newly formed wh-cluster can covertly move out of the island. Since his analysis is based on the most recent version of minimalism (Chomsky 2000, 2001), one would ask how it is possible for a wh-element to be moved out of islands without violating the spirit of minimalism. Notice that since government is abandoned in minimalism and ECP plays no role, Grewendorf has to explain why movement should be sensitive to the distinction between wh-arguments and wh-adjuncts, besides accounting for what motivates an element to move out of islands.

There are also empirical problems with Grewendorf’s analysis. First, his account fails to explain why in the following Bulgarian examples discussed in his paper (cited from Richards 1997: 242), (213b) is more acceptable than (213a):

(213) a. *Koja kniga; otreče senatorat [mâlvata če iska da zabrani tą]?

   which book denied the-senator the-rumor that (he)-wanted to ban

   ‘Which book did the senator deny the rumor that he wanted to ban?’

b. ?Koj senator koja kniga; otreče [mâlvata če iska da zabrani tą]?

   which senator which book denied the-rumor that (he)-wanted to ban

   ‘Which book did the senator deny the rumor that he wanted to ban?’

   ‘Which senator denied the rumor that he wanted to ban which book?’

In (213a) the sentence is typed by a wh-expression that is extracted from a complex NP, and in (213b), the sentence is typed as a wh-question by the matrix wh-subject, and a wh-phrase is extracted from the complex NP. If Bulgarian is a wh-cluster formation language, then the two wh-words in (213b) must form a wh-cluster.
However, it is unknown at what stage the wh-cluster is formed since the two wh-words are separated by a Complex NP island. If no wh-cluster is formed in (213b), then one may ask why and when the wh-cluster formation process can be optional. Besides, if no wh-cluster is formed in (213b), the question why (213b) is better than (213a) is left unanswered in Grewendorf’s analysis.

Consider the following Japanese sentence in (214). According to my informants, there is no difference between (214) and (212) in acceptability. Notice that in (214), the wh-subject *dare* ‘who’ does not occur in the island, and thus there is no chance for the wh-adjunct in the island to adjoin to it first and then move together with it out of the island. When we take (214) into consideration, we can see clearly that the improved acceptability of (214) has nothing to do with the assumption that a wh-adjunct can move out of an island if it forms a wh-cluster with a wh-argument within the island.

(214) ?(?)Dare –ga [[John ga naze kai-ta] hon]-o katta ka?

Who –N John why wrote-P book-N bought Q

*Lit. ‘Who bought the book that John wrote why?’*

Second, if Japanese is a covert wh-cluster formation language, one may also ask why the two wh-words in (204a) do not form a cluster and then move to the matrix operator position to be interpreted as a direct matching question. Notice that if the two wh-words form a wh-cluster in (204a), there should be no wh-island effects since there is only one wh-word which is a wh-cluster.

I think that the so-called additional WH effects have nothing to do with the assumed wh-cluster formation process. The acceptability of (212) is improved with
a wh-subject added simply because the wh-subject can be interpreted with the matrix C via the choice function application, and hence, the relevant sentence is typed as a wh-question, thus satisfying PCTC. It is not fully acceptable because the wh-adjunct naze ‘why’ is uninterpretable in a strong island. The same analysis applies to (214). The acceptability of (213b) is improved because the sentence is successfully typed as a wh-question and PCTC is satisfied. It is not fully acceptable because the movement of the wh-object violates Subjacency. (213a) is worse than (213b) and thus fully ungrammatical because it violates PCTC, besides violating Subjacency.

Notice that the present analysis established on the interaction between PCTC and other grammatical constraints not only captures Richards’ (1997, 2001) observation expressed in his Principle of Minimal Compliance (PMC), but also fares better than his analysis. The following is the definition of PMC (Richards 2001: 601):

(215) **Principle of Minimal Compliance**

For any dependency D that obeys constraint C, any elements that are relevant for determining whether D obeys C can be ignored for the rest of the derivation for purposes of determining whether any other dependency D’ obeys C.

According to PMC, (213a) is unacceptable because Subjacency is violated, and (213b) is better than (213a) in acceptability because Subjacency is obeyed by adding a wh-subject. The basic idea underlying Richards’ PMC is that a certain constraint need be obeyed only once in a clause. Since Subjacency is obeyed once
in (213b), it can be ignored by the movement of the wh-object. Although PCM can account for the contrast between (213a) and (213b), it fails to account for the contrast between (213b) and the following Bulgarian sentence, as pointed out by Grewendorf (2001: 92):

(216) *Koji kakj ti iska da kaže molitva [predi da intervjuitume Marija t.]

According to Grewendorf (2001), the above example, which is provided to him by Marina Stojanova, is ungrammatical, though PMC is satisfied. If Subjacency need be obeyed only once in a clause, the movement of the wh-adjunct from the adjunct clause should be allowed, given that Subjacency is obeyed by the wh-subject in (216). It is obvious that PMC cannot account for the contrast between (213b) and (216) in acceptability. Under the present analysis, (216) is unacceptable because when the wh-adjunct moves to the matrix CP domain from the adjunct island, it not only violates Subjacency, but also fails to be interpreted. It cannot be interpreted with the matrix C in syntax via the Agree operation, due to the fact that the matrix C and the wh-adjunct contained in the adjunct clause are not the closest to each other. It also cannot be interpreted in semantics because it is a wh-adjunct and can be interpreted neither via the choice function application nor in the pair-list reading. Notice that under the present analysis, only the first fronted wh-word licensed by the Agree operation is interpreted in syntax in multiple wh-fronting languages, and wh-expressions other than the one licensed by the Agree operation can only be interpreted in semantics, though they need to move to the CP domain to check off their strong wh-features.
5. Economy in Wh-Interpretion Revisited

This work shows that a wh-question must satisfy the following two requirements:

(217) A wh-question must be properly typed.
(218) A wh-expression must be properly interpreted.

Neither (217) nor (218) needs to be stipulated in the grammar since (217) can be derived from the assumption that all clauses have complementizers (Bresnan 1970), and (218) can be derived from the Principle of Full Interpretation (Chomsky 1986a). On the basis of Reuland’s (2001) study of reflexives, I assume that when multiple wh-questions are considered, the above-mentioned two requirements can be satisfied in the following four different ways, which can be ranked according to the Principle of Economy:

(219)

A. Discourse interpretation

Semantic interpretation $\text{wh}_1 + \text{wh}_2 + \ldots \text{wh}_n = 1$

Syntactic derivation and interpretation Typing + Interpreting = 1

(The number of cross-modular operations is 2)

B. Discourse interpretation
Semiotic interpretation $\text{wh}_1 + \text{wh}_2 + \ldots \text{wh}_n = 1, \ldots, n$

Syntactic derivation and interpretation $\text{Typing} + \text{Interpreting} = 2$

(The number of cross-modular operations is 3)

C.

Discourse interpretation $\text{wh}_1 + \text{wh}_2 + \ldots \text{wh}_n = 1$

Semantic interpretation $\text{wh}_1 + \text{wh}_2 + \ldots \text{wh}_n = 2, \ldots, n$

Syntactic derivation and interpretation $\text{Typing} + \text{Interpreting} = 1$

(The number of cross-modular operations is 4)

D.

Discourse interpretation $\text{wh}_1 + \text{wh}_2 + \ldots \text{wh}_n = 1$

Semantic interpretation $\text{wh}_1 + \text{wh}_2 + \ldots \text{wh}_n = 2, \ldots, n$

Syntactic derivation and interpretation $\text{Typing} + \text{Interpreting} = 2$

(The number of cross-modular operations is 5)

(219A) can account for the following sentence:

(220) Who bought what?

In (220) the typing of the clause and the interpretation of who can be done by one operation in syntax. Hence, the number of the syntactic operation is 1. Since who and what can be interpreted in the pair-list reading by one semantic operation, the number of cross-modular operations for (220) is 2.

(219B) and (219D) can account for the following contrast in acceptability:
(221)  a. *What did who give t to Mary?
    
    b. ?What did who give to whom?

In (221a) typing does not mean the interpretation of what. Hence, the number is 2 since typing and the interpretation of what have to be done by two different processes in syntax. As pointed out in our previous discussion, in (221a) the movement of what cancels the opportunity for what and who to be interpreted in the pair-list reading, and since what and who have to be interpreted by two independent operations, the number of semantic operations is thus 2. Due to the fact that who and what cannot be interpreted as members of one pair by one operation in semantics and thus have to be interpreted as members of one pair by accessing the discourse, the total number of cross-modular operations is 5. Now, consider why the grammaticality of (221b) is greatly improved. Since in (221b) typing also does not mean the interpretation of what, the number of operations involved in syntax is 2. (221b) is better than (221a) because all the wh-elements involved in (221b) can be interpreted in the pair-list reading by one semantic operation. Hence, the number of the semantic operation involved is 1, and the total number of cross-modular operations involved is 3. Notice that the present analysis can also correctly predict that (221b) should not be as good as (220) since the former involves more operations than the latter.

(219C) can predict the unacceptability of the following sentence:

(222)  *Zhangsan weishenme xihuan shei?

    Zhangsan why like who
Lit. ‘Why does Zhangsan like who?’

In (222) the typing of the clause and the interpretation of *weishenme* can be done by one operation in syntax. Hence, the number of the syntactic operation is 1. Since *weishenme* and *shei* cannot be interpreted as members of one set in the pair-list reading by one semantic operation, the number of operations involved in semantics is 2, and the total number of cross-modular operations is 4, given the fact that these two wh-elements have to be interpreted as members of one set by accessing the discourse.

The above analysis shows that economy can be evaluated in terms of the number of operations involved. The basic idea is that the relevant derivation will become worse if the computational complexity of the syntax increases.

6. Summary

This chapter discusses how wh-questions are formed and how wh-elements are interpreted in Chinese and English, and shows that the formation and interpretation of wh-questions are constrained by economy considerations, specifically, PCTC and PE, which incorporate two factors: prominence and locality. It is shown that the derivation and interpretation of wh-questions are affected not only by locality conditions, but also by prominence considerations. It is the interaction between prominence and locality that determines how wh-questions can be derived and interpreted in the most economical way.
Notes

1 Examples like (27a) were first noted by Kayne (1984).

2 Although zenmeyang, like zenme, can have two distinctive readings, means and manner, it does not have the causal reading that zenme has.

3 According to Tsai (1994a), both relatives and appositives are located in the projection of N.

4 Tsai argues that verbs may be distinguished by their selection of complement clauses with different [N] features in their COMPs. Tsai suggests that verbs such as yihan ‘regret’, jide ‘remember’, tongyi ‘agree’, are distinct from verbs such as renwei ‘think’, cai ‘guess’, and shuo ‘say’ since the former select a [+N] complement clause, whereas the latter can only select a [-N] complement clause. The distinction roughly corresponds to Lin’s distinction between verbs of opinion and verbs of conjecture (see also Tang 1988).

5 Note that if weishenme ‘why’ occurs in the bracketed clause in (68a), as shown below, the sentence would be ungrammatical, and this shows that the bracketed part and the rest of the sentence should not be treated as two sentences.

(i) *[Ta weishenme bu lai] rang ni zheme shangxin?

He why not come let you so sad

Lit. ‘WHY he did not come so as to make you so sad?’

6 Note that weishenme can also be used to express reason.
7 If Miyagawa (2001) is right in claiming that in Japanese the wh-feature is on T and wh-phrase must move to the Spec of TP to enter into agreement with T, then Japanese might marginally belong to the fourth type in which clauses are typed by a Q particle, and wh-words are licensed by T, though not by C.

8 Pan (p.c.) points out that the two disjuncts in (106) can have truth values and both of them can be true, though the two who’s cannot have the same value. That is, the first who can have a value for the first disjunct, and the second who for the second disjunct. But the values for the two who’s have to be different, though the value for who in (104) has to be the same, which may be the reason why (104) is not acceptable.

9 Although xiang-zhidao ‘want-know’ is extensively cited in the WH literature, it is not a compound word in Chinese, as pointed out by Xu (1990). Xu (p.c.) further points out that the fact that xiang-zhidao must be followed by a wh-clause as its complement clause shows that it is the whole predicate rather than one single verb that subcategorizes for a complement clause.

10 Janda (1985) maintains that echo questions are derived by lexical substitution, and an echo wh-word may substitute not just for a Determiner or an NP, but also for a Verb, for a VP, for lexical sub-constituents, for a syllable, or for a non-constituent string of syllables. The following is one of Janda’s examples:

(i) Speaker A: She believes in ad-/sub-jacency.
   Speaker B: She believes in what … -jacency?

11 Pan (p.c.) asks how the echo question is typed. A plausible answer may be that echo
questions are universally typed by an intonation operator, which binds a wh-element that bears contrastive stress. Since standard English employs different strategies for typing original questions and echo questions, a wh-question is never ambiguous between the wh-reading and the echo reading in syntactic form. Chinese wh-questions are ambiguous between these two readings in surface form since wh-words are not raised in this language. However, this ambiguity can be resolved at the phonological level since the wh-element in an echo question is bound by an intonation operator and thus bears contrastive stress.

12 Note that *shi* ‘BE’ is different from *jiujing-shi*. The former is compatible with an echo wh-word since it can be used as a copula, and thus may be ambiguous between a copula and a focus marker uses, but the latter is incompatible with an echo wh-word because it is not ambiguous in its identity and cannot be used as a copula.

13 Pan (p.c.) points out that the reason why (189c) and (189d) are not acceptable is because the embedded *who* is merged with the embedded *C* and selected by the matrix verb, and thus one cannot supply an answer to it. The present analysis is consistent with Pan’s view. (189c) and (189d) are ungrammatical because the subcategorization of the matrix verb is not satisfied. Notice that if one does supply a value to *who*, one has to move the wh-object *what* to satisfy the subcategorization requirement of the matrix verb. However, if *what* is fronted, PE will be violated since it is not the closest wh-word to the embedded *C*. Moving *what*, besides cancelling the possibility for *who* to be interpreted in syntax, will also cancel its own possibility to be interpreted in semantics via the pair-list reading.

14 When *ye* means *also*, (197b) is grammatical, but on this reading, *ye* is not used to focus the wh-word.

15 When an element is specified as [-WH], it means that the relevant element belongs to the
WH family, but cannot be interpreted as a wh-question word. Note that a wh-word interpreted as an indefinite NP is also specified as [-WH]. Since both the indefinite wh-word and the A-not-A element are specified with the same feature, they can co-occur within the same sentence, as shown below:

(i) Ni  xiang-bu-xiang chi dian shenme?
           you want-not-want     eat some what
    ‘Would you like to eat something?’

16 The difference between Chinese and Japanese is that Japanese tends to use the QP derived from the wh-word to denote the notion of everyone, but such a preference is not found in Chinese.

17 Pan (p.c.) points out that the loss of the pair-list reading in (211) may be related to the linear order and the contrast between the movement of the wh-element and the non-movement of the wh-element. If not moving the wh-element can produce the pair-list reading, then moving it will lose the relevant reading. In English, there is no such contrast in sentences like those in (211), as the wh-element has to move.

18 Since the present study does not focus on multiple wh-fronting languages, I will not discuss whether multiple [Spec, CP]s or multiple [Spec, IP]s, and the notion of “tucked in”, as proposed by Richards (1997), should be employed to account for the distribution of the multiple fronted wh-words. For the relevant discussion, see Rudin (1988), Richards (1997), and Grewendorf (2001).