1. Introduction

Though the term *wh*-in-situ was not coined until the 1980’s (Aoun et al. 1981), properties of *wh*-in-situ have been investigated since the 60’s. It is by now a familiar fact that Chinese *wh*-questions, as well as multiple questions in English, contain in-situ *wh*-words, i.e., *wh* words that do not undergo overt *wh*-movement, as in (1), in contrast with (2).

(1) a. Who bought what?
   b. Hufei mai-le shenme (Mandarin Chinese)
   ‘What did Hufei buy?’

(2) What did John buy?

The *wh*-words *what* and *shenme* ‘what’ in (1) stay in-situ in contrast with the moved *wh*-word *what* in (2). Note that *wh*-elements are in-situ in echo questions in English. Echo questions are a special type of question and fall outside the discussion of this article.

*Wh*-in-situ is not a root clause phenomenon, as we can see in the examples in (3). However, some languages which allow *wh*-in-situ in root clauses, do not allow it in embedded questions; French is such a language as is illustrated in (4) (see Bošković 2000, Cheng and Rooryck 2000, see also Boeckx et al. to appear).

(3) a. John wonders who bought what.
   b. Botong xiang-zhidao Hufei mai-le shenme
   ‘Botong wants to know what Hufei bought.’

(4) a. Jean a achete quoi?
   ‘What has Jean bought?’
   b. *Je me demande que Jean a achete quoi
   ‘Intended: I wonder what Jean has bought.’

Many issues and questions have been raised over the years concerning *wh*-in-situ. For instance, do in-situ *wh*-elements undergo covert *wh*-movement? If so, how is the movement similar and/or different from overt *wh*-movement? If not, how are in-situ *wh*-elements interpreted? Aside from questions concerning movement of in-situ *wh*-elements, there are also questions concerning the licensing of *wh*-in-situ. That is, what allows in-situ elements in Mandarin/French to stay in-situ in single questions (while this is not allowed in English)? In the case of Mandarin, which is unlike French (which also has overt *wh*-movement), the question can also be phrased differently: what prevents *wh*-phrases from undergoing overt *wh*-movement?

In this article, I concentrate on two issues: the licensing of *wh*-in-situ and the ‘movability’ of *wh*-phrases in-situ. The discussion below will eventually bring these two issues together. I will not discuss proposals claiming that the in-situness is only apparent (i.e., the in-situ *wh*-elements have actually been raised to the left periphery, but due to remnant movement of the rest of the sentence, the *wh*-movement becomes opaque) (see Munaro et al. 2001, and Simpson and Bhattacharya 2000).

2. Q and licensing

Most current work on *wh*-movement assumes that overt *wh*-movement is related to a Q-feature in $C^0$ (which may or may not drive the movement).

A discussion on *wh*-in-situ is therefore not quite complete without discussing it. I will first provide a brief review of the ancestor of the Q-feature (i.e., the Q-morpheme) and the controversy connected to it. We then turn to more recent renditions of the Q-morpheme before discussing the connection between Q and the question of what licenses/forces *wh*-in-situ.

2.1. The Q-morpheme

The notion of Q-morpheme dominated the discussion of question formation in the late 60’s and early 70’s. Katz and Postal (1964), working with the assumption that

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transformations do not change meaning (i.e., deep structure determines meaning), posited a Q-morpheme to account for the meaning contrast between (5a) and (5b):

(5) a. Did Bill see John?
   b. Bill saw John.

The presence of a Q-morpheme can also account for a similarity between wh-questions and yes-no questions: both are paraphrases of “I request that you answer ...”; this is the so-called “Performative” reading. A wh-question such as (6a) has a deep-structure representation (6b), under the assumption that wh-words, though similar to indefinites, must be specified as “questioned”:

(6) a. Who saw John?
   b. Q [wh someone] saw John

Though Katz and Postal argued that the Q-morpheme is only present in direct (i.e., matrix) questions (to account for the presence of subject-aux inversion and the lack of whether/if in direct questions), Baker (1970) countered that the Q-morpheme should be posited in both direct and indirect questions (the differences between direct and indirect questions being subsumed under the notion of subordination). More importantly, Baker made the following claims:

(7) a. Q can be lexically realized; in English, it is realized as if/whether. (In other languages, Q can be realized as question particles, e.g., Japanese.)
   b. The movement rule has Q as part of the structural description. (He further discussed the ramifications of a “replacement” version of the question transformation (i.e., move a wh-word to replace Q) based on Jacobs and Rosenbaum (1968).
   c. Following a suggestion in Bach (1968), Q functions as an operator.

The claim in (7c) was essentially conceived to account for the famous multiple question in (8), which contains an in-situ wh-phrase which book. The two different readings of the sentence are reflected in the answers in (8a) and (8b).

(8) a. John and Martha remember where we bought which book.
   b. John remembers where we bought the physics book and Martha and Ted remember where we bought The Wizard of Oz.

The crucial function of the operator Q is that it can “bind” one or more question words. In the case of (8a), the embedded Q operator binds both which book and where; in contrast, in (8b), the matrix Q operator binds both who and the embedded which book. By treating Q as an operator, the “scope” of the in-situ wh-phrase in (8) can be accounted for.

As far as in-situ wh-phrases are concerned, the Q-morpheme serves to determine their scope, nothing more. Though the positing of the Q-morpheme or variations of it has widely been accepted in the literature since Baker (1970), it did lead to objections (see Kuno and Robinson 1972, and Langacker 1974).

Before Bresnan (1970), Q was simply an extra node above a sentence. Bresnan (1970) argued that Q is a Wh complementizer (with interrogative Comp nodes represented as [+wh]). Since then, a wh-question is assumed to have a [+wh] feature in Comp (see for example Chomsky 1981). It should be noted that objections to the Q-morpheme were raised essentially because of the fact that the model of grammar was changed. For instance, Grimshaw (1977) argued that, assuming that interpretation is not at D-structure (but at Logical Form (LF)), there is no need to posit a Q-morpheme since a moved wh-phrase would be interpreted accordingly at LF.

Since Chomsky (1981), [+wh] has been assumed to be in Comp/C0. Various treatments of wh-movement make use of the [+wh] feature (see among others Rizzi 1991, and Chomsky 1991). More recently (e.g., Chomsky 1995, chapter 4), interrogative C0 contains a Q feature. Note that even though Q is in C0, it is not an operator itself. Chomsky (1995) considers the Q feature to be an interpretable feature, and only when it is strong, it triggers overt movement. See section 4 for more discussion regarding interpretability of Q as well as movement associated with in-situ wh-phrases.

2.2. Licensing

The question of what licenses wh-in-situ does not have a simple answer, especially if we consider the differences in types of wh-in-situ (discussed further in section 5). Even if we assume that in-situ wh-elements are on a par with moved wh-phrases in that they also undergo wh-movement (albeit at LF), the question still arises why the in-situ wh-elements do not undergo movement in overt syntax.

Not surprisingly, most of the proposals addressing this issue link wh-in-situ with the CP domain. There is a group of proposals which we can characterize as “landing site” proposals. Baker (1970) is probably the first to link the Q-morpheme with the in-situ of wh-phrases in Japanese. In particular, the wh-movement transformation rule posited by Baker moves a question word to be adjacent to an initial Q (or to replace an initial Q). Since Japanese question particles are sentence final (i.e., Q is final), the structural description of the transformation is not met in Japanese. In other words, Baker considers the position of the Q-morpheme to be a major factor in the lack of overt wh-movement in Japanese. Kayne (1994) represents a more recent attempt from such a perspective. To account for sentence final particles (assumed to be in C0) within the antisymmetry framework, Kayne claims that IP in languages like Japanese moves to SpecCP. In other words, in languages with final particles, the SpecCP is always occupied. This in turn provides an explanation for why wh phrases in Japanese do not undergo overt
wh-movement: there is no SpecCP for wh-elements to move to (cf. Sybesma 1999 for IP-to-SpecCP movement in Chinese as wh-movement). Fukui (1986) discusses the more general differences between Japanese and other languages in their functional projections. He proposes that Japanese does not have the CP layer at all, and hence no landing site for wh-phrases (cf. Kuroda 1988).

Pesetsky (2000), taking a typological view of wh-movement, argues that languages differ as to how many specifiers are allowed in CP. In wh-in-situ languages such as Japanese and Korean, the setting is C0-spec, i.e., no specifier is allowed in CP, in contrast with languages like Bulgarian, which allows multiple specifiers in CP (Cm-spec). (some details of Pesetsky’s proposal are discussed in section 5).

Chomsky (1991) also correlates the availability of question particles (and thus Q) with wh-in-situ. She puts forth the Clausal Typing Hypothesis stating essentially that the clause type/force of a sentence is determined in overt syntax. In languages with question particles, the question particles (overt or covert) can determine the type/force of question and therefore render overt movement unnecessary (and thus not possible). In languages without question particles, clause typing has to be done by moving a wh-phrase to SpecCP. In other words, not all languages have a Q-morpheme (or a Q-feature) in C0.

Chomsky (1995, Ch. 4) also takes the Q-feature in C0 to be connected to in-situ. He but assumes that all languages have a Q-feature in interrogative C’s. The difference between English and Chinese/Japanese rests upon the strength of the Q-feature. In particular, the Q-feature in Chinese/Japanese is weak and since only strong features must be checked in overt syntax, no overt movement is necessary to check the weak Q-feature in this type of language. Note that the strength of Q is not correlated with other properties in a language.

Since Chomsky (1995), most works within the Minimalist Program assume the Q-feature in C0, though it is connected to in-situ. In Chomsky (2000) (without feature strength), the Q-feature is not directly related to wh-in-situ anymore (the proposal is more in line with Hagstrom 1998, and Watanabe 1992a, 1992b, see section 4). In Nissenbaum (2000) (see also Chomsky 2001a, and 2001b), wh-in-situ or covertness of movement is not due to any particular driving force or the lack of it. Rather, it has to do with when movement takes place in relation to Spell-out.

All of the above proposals put the burden on the CP domain. Sharply different from such proposals, Kim (1991) claims that the in-situteness of wh-phrases in Korean/Japanese comes from the wh-phrases themselves. Kim correlates the fact that wh-words in Korean/Japanese serve as morphological bases for forming indefinite and universal quantifiers with their inability to undergo overt wh-movement. He argues that wh-elements in Korean/Japanese are simply quantifiers (i.e., not wh-words) (see also Nishigauchi 1986). Thus movement of wh-elements in these languages is akin to Q(uantifier) R(aising), which takes place in LF. Tsai’s (1994b) proposal also rests upon the nature of wh-elements. He claims that languages differ as to where the wh/Q-feature/operator is generated: at the word level (e.g., English), at the phrasal level (e.g., Japanese) or at the sentence level (e.g., Chinese). The proposal amounts to saying that wh-elements in Chinese and Japanese are not wh operators (cf. Cheng 1991 and Li 1992) (see section 4 for further discussion). Note however that there are languages such as Hungarian which form quantifiers based on wh-elements but do not have wh-in-situ.

The above mentioned proposals concentrate essentially upon obligatory wh-in-situ languages such as Chinese and Japanese (in contrast with English types of languages with obligatory wh-movement). According to Tsai (and also Cheng and Rooryck 2002, Pesetsky 2000, Watanabe 2001), there is more than one type of wh-in-situ and certainly more than one type of wh-in-situ language. Aside from obligatory wh-in-situ languages, there are also optional wh-in-situ languages (e.g., French and European Portuguese among others; see Cheng 1991, Denham 2000). These languages force us to reconsider the licensing issue. How is the CP domain or the wh-element itself responsible for “optional” in-situ? Bošković (2000) suggests the possibility of late insertion of Q-feature in C0 in French, while Cheng and Rooryck (2000) claim that French in-situ questions are licensed by a special intonational Q-morpheme. These are nonetheless still connected to the C-domain. Cheng and Rooryck (2002) provide data in European Portuguese (Setubal dialect) suggesting that Focus can also license wh-in-situ. In particular, the positions which allow non-fronted wh-elements correlate with positions in which the corresponding non-wh-elements may be interpreted as having focus. (9a,b) show that the VOS order (which is allowed if no wh-elements are involved) is not possible if the object is a wh-phrase, in contrast with the SVO order.

(9) a. O João viu quem? (SVO)  
   João  see who  
   *viu quem o João? (VOS)  
   saw who Joa ˜o  
   ‘Who did Joao see?’

<table>
<thead>
<tr>
<th>Word order</th>
<th>Focus set</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVO</td>
<td>O, VP, or IP</td>
</tr>
<tr>
<td>VSO</td>
<td>S and O</td>
</tr>
<tr>
<td>VOS</td>
<td>S</td>
</tr>
</tbody>
</table>

From (10) (based on the discussion of focus in Costa 1997), it is clear that in a VOS order, O is not in the focus set whereas in an SVO order it is. Further, in European Portuguese, non-fronted wh-subjects in an embedded clause taking matrix scope can also be in postverbal position, as illustrated in (11). As we can see from (10), both VSO and VOS order allow the subject to be in the focus set.
In short, there are many proposals concerning the licensing of wh-in-situ. If we take into consideration the different types of wh-in-situ, different licensing strategies may indeed be needed (see Cheng and Rooryck 2002 for discussion).

3. Covert movement or not
Since the late 70’s, with the development of trace theory, meaning is no longer attached to D-structure or S-structure. Instead, there is a level of semantic interpretation, called Logical Form (LF) (see Chomsky 1976 among others). Given LF, it is quite natural to consider in-situ wh-words on a par with quantifiers (i.e., to undergo raising). Huang (1982a) and Aoun, Hornstein and Sportiche (1981) (henceforth AHS) first argued for movement of in-situ wh-words at LF. AHS specifically argued against treating this movement as Q(uantifier) R(aising) (see Mahajan 1990 for treating Hindi wh-in-situ as QR). Below I first summarize the arguments for LF wh-movement. In section 3.2, I discuss arguments against wh movement at LF.

3.1. Arguments for LF wh-movement
Various arguments for LF wh-movement have been presented in the literature. Most of them rest upon the similarities between in-situ wh-questions and wh-questions with extraction (see also Bayer 2000). Below I present some of these arguments.

3.1.1. Parallels between wh-extraction and wh-in-situ
Selectional requirements
It is well-known that different verbs select for different types of complement clauses. For instance, verbs such as ask require an interrogative complement, verbs such as believe must have a declarative complement, and verbs such as know can take both. Huang (1982b) argues that verbs in Mandarin Chinese show the same selectional requirements as those in English (see (12)–(14)); movement of in-situ wh-words can account for the selectional requirement with the wh-words satisfying the requirements as in the English counterparts. (For issues of selection, see Grimshaw 1977, 1979, Pesetsky 1982, and Lahiri 1991, 2002).

(12) Huangrong xiangxin Guojing mai-le shenme?
Huangrong believe Guojing buy-PERF what
‘What does Huangrong believe that Guojing bought?’

Locality effects
Just like wh-questions involving moved wh-words, wh-questions involving in-situ wh-words show locality effects. In particular, the typical argument-adjunct asymmetry is also found with wh-in-situ. A comparison of (16) and (18) and (17) and (19) shows that though in-situ arguments can be interpreted as taking scope out of wh-islands and relative clauses, in-situ adjuncts cannot. This is accounted for if in-situ wh-words undergo movement at LF: overt adjunct extractions illustrate the same ungrammaticality. (Note that three different interpretations are possible in (16) with the readings in (b) and (c) as less preferred interpretations).

(16) Judou xiang-zhidao shei mai-le shenme (?)
Judou want-know who buy-ASP what
a. ‘Judou wonders who bought what.’
b. ‘for which y, y a thing, Judou wonders who bought y’
c. ‘for which x, x a person, Judou wonders what x bought’

(17) Hufei xiang-zhidao shei weishenme shengqi (?)
Hufei want-know who why get-angry
a. ‘Hufei wonders who gets angry why.’
b. ‘for which x, x a person, Hufei wonder why x gets angry’
c. ‘what is the reason x, Hufei wonder who gets angry for x’

(18) Botong xihuan shei xie de shu?
Botong like who write de book
‘for which x, x a person such that Botong likes the book that x wrote’
(19) *Qiaofeng xihuan Botong weishenme
  Qiaofeng like Botong why
  xie de shu?
  write de book
  'for what reason x such that Qiaofeng like the
  book that Botong wrote for x'

Crossover (see Simpson 1995, Hornstein 1995 among
others)
(21a, b) illustrate that wh-in-situ also generates
strong and weak crossover, just like their moved
 counterparts in (20). Again, this is explained if the
strong and weak crossover, just like their moved
wh-words always have wide scope with
respect to other quantifiers. If in-situ wh words
undergo wh-movement (to SpecCP), the wide scope
property of wh-in-situ is explained.

(22) mei-ge-ren dou mai-le shenme?
    every-CLCL -person all buy-ASP what
    'What everybody buy?'

(23) mei-ge-ren dou shuo shei zui congming?
    every-CLCL -person all say who most clever
    'Who does everybody say is most clever?'

In the above two sentences, the questions have the
reading in which the wh-word takes scope higher than
the universal quantifier (cf. Aoun and Li 1993a).

Superiority
If wh-in-situ undergoes wh-movement, superiority
effects such as the one in (24b) can be subsumed
under the E(mpty) C(ategory) P(rinciple) (see Pesetsky
2000 for a recent treatment and also the discussion in
section 5.1. below).

(24) a. Who hid what?
    b. *What did who hide?

3.1.3. Two types of wh-in-situ
Pesetsky (1987) presented a different argument for LF
wh-movement. He argued that there are two types of
in-situ wh-phrases: D iscource-linked and non-
D iscource-linked. D-linked wh-phrases do not under-
go wh-movement (licensed instead by wh-binding
(unselective binding) à la Baker) while non-D-linked
ones do. By arguing that there are two types of
wh-in-situ, one of which involves LF wh-movement, he
in turn argues for LF wh movement.

Pesetsky’s argument rests upon superiority effects
and the so-called “strongly non-D-linked” wh-words.
As we have seen in (24b), superiority effects arise when
an object wh-word moves over a subject wh-word.

However, when the wh-words involved are not who and
what, but which-NPs, the superiority effect disappears,
as shown by the contrast between (25) and (26).

(25) a. ??What, did you persuade who(m) to read e_l?
    b. *Mary asked [what, [who read e_l]]?

(26) a. Which book, did you persuade which man to
    read e_l?
    b. Mary asked which book, which man read e_l?

Pesetsky’s account for the difference between (25) and
(26) is that which-NPs are D-linked (and thus are not
quantifiers), and they do not undergo LF wh-movement,
in contrast to who and what, which are non-
D-linked (and are quantifiers), and thus subject to
wh-movement.

The second argument concerns the so-called
"strongly non-D-linked" wh-words such as what-the-
hell in English (see also Lasnik and Saito 1992, and den
Dikken and Giannakidou 2002). The Japanese equi-
valent is wh-ittai (as in (27)) (see also Hagstrom 1998).
As we see from the contrasts between (28) and (29),
though typical wh-words do not trigger subjacency
effects in Japanese, wh-ittai does.

(27) Mary-wa John- ni ittai nani-o ageta-no?
    Mary-TOPTOP John-DATDAT the-hell what-ACC gave-Q
    'What the hell did Mary give to John?'

(28) a. Mary-wa [ John-ni nani-o ageta]
    Mary-TOPTOP John-ga nani-o yomu mae-ni
dekaketa-no?
    Mary-TOPTOP John-DATDAT what-ACC read before
    yomu mae-ni [ dekaketa-no]?
    'What did Mary meet the man who gave (it) to
    John?'
    b. Mary-wa [John-ga nani-o yomu mae-ni] ageta
    Mary-TOPTOP John-NOMNOM what-ACC read before
    yomu mae-ni] dekaketa-no?
    left-Q
    'What did Mary leave before John read (it)?'

(29) a. *Mary-wa [ [John-ni ittai nani-o
    Mary-TOPTOP John-DAT DAT DAT the-hell what-ACC
    ageta] hito-ni ] atta-no?
    gave man-DAT met-Q
    'What did Mary meet the man who gave (it) to
    John?'
    b. *Mary-wa [John-ga ittai nani-o
    Mary-TOPTOP John-NOMNOM the-hell what-ACC
    yomu mae-ni] dekaketa-no?
    read before left-Q
    'What did Mary leave before John read (it)?'

If strongly non-D-linked wh-words must undergo
movement, the ungrammaticality of (29) is explained.
However, it should be noted that nani in (28) does not
have to be D-linked. If that is the case, the question
that arises is why subjacency is not induced, on a par
with (29).

3.2. Subjacency and arguments against
LF wh-movement
Though LF wh-movement appears to share many
properties with overt wh-movement, the asymmetry
breaks down when it comes to subjacency effects. This
is a problematic point for proponents of LF movement
of *wh*-in-situ. Consider first the lack of subjacency effects in multiple *wh*-questions in English (data taken from Huang 1995). (I will come back to subjacency effects in Japanese *wh*-in-situ in section 4):

(30) a. who remembers why we bought what?  
   → *wh*-island
b. who likes books that criticize who? → CNPC
c. who thinks that pictures of who are on sale?  
   → subject condition
d. who got jealous because I talked to who?  
   → adjunct condition
e. who bought the books on which table?  
   → adjunct
f. what saw John and who? → coordinate structure constraint

The movement counterparts of (30a–f) are all ungrammatical. Huang (1982b) considers bounding theory to be a condition on overt movement only; thus, (30a–f) fall outside the realm of bounding theory. This essentially treats subjacency as a well-formedness condition on S-structure chains rather than a condition on movement.

This treatment is however not satisfactory. It is argued by Longobardi (1991) as well as Reinhart (1991) among others, that subjacency effects arise with quantifier raising (QR) (see also Simpson 2000). Longobardi shows that although n(egative)-words and the negation marker *non* can have an intervening clausal boundary (as in (31)), no islands can intervene (as in 32a–c).

(31) non credo che lui pensi che io desideri  
   *NEGbelieve-I that he thinks that I wish  
   vedere nessuno  
   to see no one
'I do not believe that he thinks that I wish to see anyone.'

(32) a. Complex NP  
   *non approverei la tua proposta di vedere nessuno  
   *NEG approve-I the your proposal of to-see no one
   'I would not approve your proposal of seeing anybody.'
b. Sentential subject  
   *chiamare nessuno sara possibile  
   *to-call no one will be possible
   'To call no one will be possible.'
c. Adjunct clause  
   *non fa il suo dovere per aiutare nessuno  
   *NEG does-he the his duty for to-help no one
   'He does not do his duty in order to help anyone.'

The contrast between data such as (32a–c) and (30a–f) leads to proposals which look for explanations as to why sentences such as (30a–f) are grammatical. One such explanation, which is still often appealed to, is pied-piping (see Nishigauchi 1986, Choe 1987, and Pesetsky 1987). Pesetsky (1987) argues that by considering answers to questions, we can see that pied-piping is at work. In particular, in Japanese, normal answers to questions can just be one word (plus a copula) (as in (33)), but when an island is involved, a felicitous answer must recapitulate the entire island (as in (34)).

(33) Q: John-wa nani-o yonda-no?  
   John-TOP what-ACC read-Q
   'What did John read?'
A: *"Sensoo to Heiwa" desu 
   War and Peace COP
   'It's War and Peace.'

(34) Q: Mary-wa [John-ni nani-o ageta]  
   Mary-TOP John-DAT what-ACC gave
   hito-ni atta-no?
   man-DAT met-Q
   'What did Mary meet the man who gave to  
   John?'
A: */?? Konpyuutaa desu  
   Computer COP
   'It's a computer.'

The contrast between (33) and (34) suggests that in the question in (34), *nani 'what* does not move out of the complex NP; instead, the whole complex NP pied-pipes (the *wh*-feature of the *wh*-word gets percolated to the complex NP).

The pied-piping explanation of the lack of subjacency effects, however, cannot be the whole story. Aside from the problems pointed out by Fiengo et al. (1988) regarding question-answer pairs, and by von Stechow (1996) regarding the semantic interpretation of large scale pied-piped constituents, the pied-piping account yields the wrong predictions. First, as Huang (1982b) points out, if sentences such as (35b) are grammatical because of pied-piping, then sentences such as (36a,b) (i.e., standard superiority violations) should also be grammatical.

(35) a. *Who did [pictures of t ] please who?  
   b. *Who did [pictures of who ] please t?  
   (36) a. *Who did what please?  
   b. *Who did who buy?

Huang (1982b), assuming an ECP analysis of superiority violations, argues that if the extraction of *who* in (36a) leads to an ECP violation, then the extraction of *pictures of who* in (35b) should yield an ECP violation as well. Second, though pied-piping also exists in overt syntax, it is much more constrained, as we can see in (37) (from Lasnik and Saito 1992). In fact, when embedded questions are involved, very little pied-piping is allowed, as shown in (38).

(37) a. On which table did you put the book?  
   b. *After buying what did John leave?  
   c. *The man that bought what did John see?

(38) a. I wonder who Bill spoke to.  
   b. *I wonder pictures whom Bill saw.  
   c. *I wonder whose mother Bill spoke to.
   d. *I wonder pictures whom Bill saw.
   e. *I wonder Mary and whom Bill saw.
   f. *I wonder the books that who wrote Bill bought.
Given the contrast between overt pied-piping and LF pied-piping, the pied-piping account appears to switch the asymmetry from \textit{wh}-movement to pied-piping. That is, the difference between overt and covert \textit{wh}-movement is explained by pied-piping; however, there exists an asymmetry between overt and covert pied-piping.

Aside from the non-parallelism displayed with respect to subjacency (see also Cole and Hermon 1994), several other arguments have been put forth to argue against LF \textit{wh} movement (see Simpson 2000 for a detailed discussion). The arguments are essentially based on asymmetries between LF and overt \textit{wh}-movement, or between LF \textit{wh}-movement and QR. I discuss a couple of these asymmetries here to show that the arguments are not entirely non-problematic, and thus leaving the debate not completely settled.

Consider first the following examples by Brody (1995, p. 133):

\begin{enumerate}
\item a. John wondered [which pictures of himself] Bill liked t.
\item b. *John wondered when Mary saw [which pictures of himself].
\end{enumerate}

In (39a), \textit{himself} can have either \textit{John} or \textit{Bill} as antecedent. If \textit{wh}-in-situ undergoes LF \textit{wh} movement, one would expect \textit{himself} in (39b) to be able to be anaphoric to \textit{John} (i.e., similar to \textit{John wondered which pictures of himself Mary liked}). In other words, the asymmetry between (39a) and (39b) supports a view that there is no LF \textit{wh}-movement of in-situ \textit{wh} phrases. However, consider an example such as (40):

\begin{enumerate}
\item a. John, wondered [which pictures of himself] Bill liked t.
\item b. *John wondered when Mary saw [which pictures of himself].
\end{enumerate}

The fact that the coreference between \textit{John} and \textit{himself} can in fact be established shows that the situation is more complicated than the apparent contrast presented in (39) (see also Nissenbaum 2000, and related discussion in section 5).

Simpson (2000) puts forth an argument based on an asymmetry between LF \textit{wh} movement and QR. He shows that though QR can license VP-ellipsis of the kind shown in (41a) (for a discussion on Antecedent Contained Deletion, see May 1985), LF \textit{wh}-movement cannot (41b,c) (examples are from Simpson 2000):

\begin{enumerate}
\item a. John likes everyone who Bill does [\textit{vp}]
\item b. *Who used which argument that he could [\textit{vp}]
\item c. *Who criticized which course that Mary did [\textit{vp}]
\end{enumerate}

However, there are apparent judgement differences. Fiengo and May (1994, 242) presented sentences such as (42) as grammatical (see also Pesetsky 2000, which I will further discuss below).

\begin{enumerate}
\item a. Which spymaster suspected which spy that Angleton did [\textit{vp}]
\end{enumerate}

Given the disagreement in terms of judgement, it is quite difficult to consider this argument as a knock-down argument against LF \textit{wh}-movement.

In short, there are arguments for and against LF \textit{wh}-movement. The analysis that \textit{wh} in-situ involves \textit{wh}-movement of the \textit{wh}-phrase at LF has been vigorously re-examined in the 1990's. Not only is the asymmetry concerning subjacency a sore thumb, we are no longer satisfied with the stipulation that the parametric difference rests upon the level of movement (see Cheng 1991, and Tsai 1994b among others). Recent development within the Minimalist Program further provides theoretical grounds for re-examining covert movement.
4. Alternatives to LF \textit{wh}-movement

It should be noted that any alternative account must be able to explain the fact that in-situ \textit{wh}-words do share some characteristics with moved \textit{wh}-words (as noted in section 2.1 above). I will first discuss accounts making use of movement of an operator associated with \textit{wh}-phrases. In section 4.2, I discuss accounts which argue for no movement at all (of the \textit{wh} phrase or other elements associated with the \textit{wh}-phrase).

4.1 Movement of an operator

One of the problems with \textit{wh}-movement of \textit{wh}-phrases at LF is the asymmetry between movement at LF and movement in overt syntax, as discussed above. Nevertheless, it remains a fact that \textit{wh}-in-situ has a lot in common with \textit{wh}-movement. There are a number of proposals which try to capture such similarities and differences by proposing that what is moved in in-situ \textit{wh}-questions is not the \textit{wh}-phrases themselves but an operator (or a Q-marker) associated with the \textit{wh}-phrase (see also an overview in Watanabe, 2001). The similarities between \textit{wh}-in-situ and moved \textit{wh}-stem from the fact that in both cases movement in syntax proper is involved, and the differences derive from the fact that what is moved is not the \textit{wh}-phrase in both cases.

4.1.1 Operator morphologically linked with \textit{wh}-word

Watanabe (1992a) re-examines the controversy over subjacency. In contrast with multiple questions in English and Chinese \textit{wh}-in-situ, which lack subjacency effects, Japanese (and Korean) \textit{wh}-in-situ has been said to in fact induce subjacency effects (see also Wahba, 1991 regarding \textit{wh}-in-situ and subjacency effects in Iraqi Arabic). This then presents a picture of non-uniform \textit{wh}-in-situ: some types of \textit{wh}-in-situ induce subjacency while other types do not. This leads to the question of whether \textit{wh}-in-situ should be uniformly handled at LF. In Japanese, we see subjacency with \textit{wh}-in-situ and also the lack of it, as we can see from the contrast between (43a) and (43b) (from Lasnik and Saito, 1992).

(43) a. John-wa [nani-o katta hito]-o
   John-top what-acc bought person-acc
   sagasite iru no?
   looking-for Q
   ‘What is John looking for the person who bought?’
b. ??John-wa [Mary-ga nani-o
   John-top Mary-nom what-acc
   katta ka dooka] siritagatte iru no?
   bought whether know-want Q
   ‘What does John want to know whether Mary bought?’

Though (43a) is grammatical, (43b) is not; it has the status of a \textit{wh}-island violation (the relative clause in (43a) may have undergone pied-piping). Watanabe (1992a) further shows that the picture is more complicated than this if we consider multiple \textit{wh}-questions in Japanese. In particular, in multiple \textit{wh}-questions in Japanese, if there is one \textit{wh}-word outside of a \textit{wh}-island while another is inside of the \textit{wh}-island, the sentence is grammatical. However, if both \textit{wh}-words are inside the \textit{wh}-island, the sentence is ungrammatical:

(44) a. John-wa [Mary-ga nani-o
   John-top Mary-nom what-acc
   katta ka dooka] dare-ni tazuneta no?
   bought whether who-dat asked Q
   ‘Who did John ask who whether Mary bought what?’
b. ??John-wa [Mary-ga nani-o
   John-top Mary-nom what-acc
   katta ka dooka] Tom-ni tazuneta no?
   bought whether Tom-dat asked Q
   ‘What did John ask Tom whether Mary bought it?’
c. ??John-wa [dare-ga] nani-o
John-TOP who-NOM what-ACC
katta ka doko-k] Tom-ni tazuneta no?
bought whether Tom-DAT asked Q
‘What did John ask Tom whether who bought t?’

(44a) not only contrasts with (44b,c) but also (43b). It shows that the addition of a wh phrase outside of the wh-island voids the wh-island effect. Note that this also presents problems for proposals which claim that there is subjacency at LF. (44a) is comparable to also presents problems for proposals which claim that there is subjacency at LF. (44a) is comparable to related quantifiers:

In (45a), there is a wh-word who outside of the wh-island. The sentence is grammatical. The standard explanation is that who undergoes wh-movement in overt syntax, not crossing any island since it originates outside of the island and the second wh-word what only undergoes wh-movement at LF, which is not subject to subjacency. However, this standard explanation cannot explain the Japanese facts since Japanese only has in-situ elements.

Watanabe argues that the contrast between (44a) and (44b,c) illustrates a two-level movement involved in multiple questions: the first level is sensitive to subjacency while the second level is not. He further maintains that the movement which is sensitive to subjacency is S-structure movement (with the operator part of the wh-word moving to SpecCP). This is supported by data showing that an interrogative clause constitutes an island for S-structure movement (such as scrambling) in Japanese. The second level of movement is at LF. (Watanabe’s proposal thus supports the view that subjacency only constrains overt operations; see Watanabe, 1992b for more details.)

In other words, given this proposal, Japanese wh-in-situ involves S-structure operator movement. Thus, even though we do not “see” the movement due to the null operator, it is nevertheless movement in syntax; thus subjacency effects are expected. Watanabe’s proposal opens up a new way of looking at wh-in-situ: a non-overt part of a wh-element undergoes movement in overt syntax.

Before I move on to other alternative accounts of wh-in-situ, I would like to point out that Watanabe’s proposal of Japanese wh-in-situ as involving moving an operator which is part of the wh-word has some morphological support. Japanese wh-words can be considered to be made up of an indefinite and a (non-overt) quantifier (see Kuroda, 1969). Consider a simple paradigm involving Japanese wh-words and related quantifiers:

(46) dare ‘who’ dare-mo ‘everyone’
nani ‘what’ nani-mo ‘everything’
doko ‘where’ doko-mo ‘everywhere’
itsu ‘when’ itsu-mo ‘whenever’
dare-ka ‘someone’
nani-ka ‘something’
doko-ka ‘somewhere’
itsu-ka ‘someone’

Given (46), it is reasonable to consider dare ‘who’ to have an invisible wh-operator (i.e., dare-Op). In Watanabe’s proposal, it is this invisible operator which undergoes movement to SpecCP (see also Cheng 1991). The question which arises in connection to this account is whether languages with such a morphological make-up necessarily involve this type of movement or vice versa.

Hagstrom (1998) takes Watanabe’s proposal further, and claims that what actually moves in Japanese is the question particle. Hagstrom examines data in Sinhala, Japanese and Okinawan and puts forth the proposal that the question marker in these languages moves to the surface position from a position adjacent to the in-situ wh-phrase. Consider the sentences in (47a-c). Hagstrom takes the ka particle associated with the indefinite in (47a) to be the same as the ka in (47b,c). More specifically, ka in (47b,c) has moved from the wh-word nani ‘what’ to its surface position.

(47) a. John-ga nani-ka-o katta (Kuroda, 1965)
John-NOM what-Q-ACC bought
‘John bought something.’
b. John-ga nani-o
John-NOM what-ACC
kaimasita ka (Hagstrom, 1998)
bought.polite Q
‘What did John buy?’
c. John-ga [Mary-ga nani-o
John-NOM Mary-NOM what-ACC
katta ka] sitteiru
bought Q know
‘John knows what Mary bought.’

See Hagstrom (1998) for details regarding the interpretation of ka (as an existential quantifier and an interrogative marker).

Hagstrom’s thesis also discusses the semantics of single-pair and pair-list readings in multiple questions. I will not go into the details here. Those whose are interested in issues related to pair-list readings should also consult Dayal (1996, 2002), Bošković (1999), Barss (2000) and Pesetsky (2000).

4.1.2 Aoun and Li (1993b)

Aoun and Li (1993b) argue that no movement of in-situ wh- phrases is involved in wh-in-situ; instead, there is movement of a question operator, which is associated with the in-situ wh phrases. However, this question operator differs from the one posited by Watanabe or Hagstrom. Their argument against LF
**wh:**-movement crucially rests upon the interaction between the adverb *only* and *wh*-in-situ. As shown by the contrast between (48) and (49), *only* can be associated with an element in its c-command domain, but it cannot be associated with a trace (see Tancredi, 1990).

(48) Steve only saw Joanna.
   a. *(but didn’t talk to her)*
   b. *(but not Sharon)*

(49) Joanna, he only saw.
   a. *(but didn’t talk to her)*
   b. ‘*...(but not Sharon)*

(48) is ambiguous: *only* can be associated with the verb or with the object NP, but in (49), which involves a topicalized NP, *only* can only be associated with the verb and not the object NP. (50) shows that we have the same pattern with quantifiers.

(50) Someone only loves everyone in the room.

In (50), *everyone in the room* can only have narrow scope with respect to *someone*. This is not surprising since QR raises the quantifier phrase to the left of *only*.

However, *only* can modify in-situ *wh*-phrases, as shown by the multiple question in English (51a) and the Mandarin example in (51b).

(51) a. Who only likes what?
   b. *ta zhi xihuan shei?*
   he only like who
   ‘Who does he only like?’

Aoun and Li argue that the contrast between (49)–(50) and (51a,b) suggests that the in-situ *wh*-words have not been extracted. They propose that in-situ *wh*-words are associated with a question operator. In English multiple questions, the *wh*-word that has been proposed to SpecCP is the question operator associated with the in-situ *wh*-word. In Chinese, on the other hand, the *wh*-word is associated with a non-overt question operator, which undergoes movement to SpecCP. They further suggest that this null operator is base-generated in a Qu-projection (QuP) (or 2P à la Laka, 1990).

By positing a Qu-operator, the scope properties of *wh*-questions involving in-situ *wh* words as well as weak crossover effects in in-situ *wh*-questions can be accounted for. For the argument-adjunct asymmetry, Aoun and Li appeal to Generalized Binding (Aoun, 1986): the relation between the *wh*-phrase and the Qu-operator is a bindee-binder relation. Adjuncts (but not arguments) require a local Qu-operator; in cases where in-situ adjuncts are in islands, the associated Qu-operator must also be generated in islands. The subsequent movement of the Qu-operator can thus lead to island violations.

Note that though Aoun and Li’s Qu-operator proposal is quite similar to Watanabe’s proposal in that what is moved in overt syntax is a null operator, but they differ from Watanabe’s account in that the in-situ *wh*-elements in their account are bound by the operator without any (covert) movement while Watanabe assumes that the in-situ *wh* still undergoes covert movement. It should also be noted that if the null operator associated with arguments can be base-generated far away from the *wh*-arguments (as proposed in Aoun and Li), we would not expect a contrast between (44a) and (44b,c).

### 4.2 No movement

Having no movement attached to *wh*-in-situ is certainly an alternative to movement in LF. In fact, during the early 70’s, movement at LF was not an option, and no movement was the null hypothesis. In Pesetsky (1987), the interpretation by binding à la Baker (1970) is revived for D-linked *wh*-phrases (more specifically, the D-linked *wh*-phrases in-situ are interpreted by unselective binding (Heim, 1982)). Tsai (1994a), after examining the differences between *wh* arguments and *wh*-adverbials in Chinese also argues that there are two types of *wh*-in-situ’s, one which undergoes movement (*wh*-adverbials) and one which doesn’t (*wh*-arguments).

With the Minimalist Program (Chomsky, 1995), this direction has been further reinforced. In particular, in Chomsky (1995), both the *wh*-feature in C⁰ and the *wh*-feature of the *wh*-phrase are interpretable. There is thus no need for the *wh*-feature of the *wh*-phrase (or the *wh*-phrase itself, for that matter) to move to C⁰. Chomsky also assumes that the in-situ *wh*-phrase is interpreted via unselective binding.

Reinhart (1998), working with Minimalist assumptions, argues that unselective binding is not adequate. Reinhart first argues that there is in fact no LF *wh*-movement involved in *wh*-in-situ questions (see also Simpson 1995, 2000). Aside from the argument in relation to the non-parallelisms with respect to subjacency, she points out that given the notion of economy (Chomsky 1991), we would not expect (52) to be ambiguous:

(52) Who knows where to find what?

The in-situ *wh*-word *what* in (52) can have either embedded or matrix scope (i.e., associated with either *where* or *who*). If *wh*-movement is involved, we do not expect this since, given economy considerations, movement of *what* to the embedded SpecCP should bar further movement to the matrix SpecCP.

With no actual *wh*-movement taking place in syntax or at LF, Reinhart addresses the question of how the in-situ *wh*-words can be interpreted. Consider a *wh*-question in Mandarin:

(53) Zhang San mai-le shenme
    Zhang San buy-PERF what
    a. ‘which x, x a book, such that Zhang San bought x’
    b. ‘which x, such that Zhang San bought x, x a book’
If we assume that the \textit{wh}-word in (53) has not undergone traditional \textit{wh}-movement at LF, the interpretation indicated in (53a) is not easily attained (regardless of whether a feature set or an operator associated with the \textit{wh}-word moves or not). Instead, we would have (53b) (the interrogative force can be from a non-overt \textit{wh}-particle (Cheng, 1991) or a non-overt \textit{wh} operator (Aoun and Li, 1993b)). In other words, if an in-situ element is left in-situ and we interpret it without any extra mechanism (with simple absorption or unselective binding), then we have the restriction of the \textit{wh}-element also in-situ. The problem that arises from this can be seen from examples such as (54).

(54) who will be offended if we invite which philosopher
  a. for which \textit{<x, y>}, if we invite \textit{y} and \textit{y} is a philosopher, then \textit{y} will be offended.
  b. Luci will be offended if we invite Donald Duck.
  c. for which \textit{<x, y>}, \textit{y} is a philosopher, and if we invite \textit{y}, \textit{y} will be offended.

Given an example such as (54), if the in-situ \textit{wh}-phrase is interpreted in-situ, the restriction of the in-situ phrase remains in an \textit{if}-clause, as shown in (54a). This implies that anything that is not a philosopher can be a value for \textit{y}. This would allow (54b) to be a possible answer to the question in (54). To avoid this, the restriction of the \textit{wh}-phrase \textit{which philosopher} must be “pulled out” (as represented in (54c)).

The question that arises is how we can achieve the “pulling out” of the restriction without \textit{wh}-movement. Reinhart proposes that Choice functions (i.e., functions applying to a non-empty set and yielding an individual member of the set) can achieve this. Reinhart shows that the wide scope reading of existentials can be explained by quantification over choice functions (since the variable associated with the Choice function can be bound arbitrarily far away; see Reinhart, 1998 for details). By extension, since \textit{wh}-phrases are existential quantifiers, the same mechanism can be applied. (54) then would have the informal representation (55a); the semantic representation is indicated in (55b), from Reinhart (1998: 41, ex. (24b, c)).

(55) a. for which \textit{<x, f>}, if we invite \textit{f(philosopher)}, \textit{x} will be offended
  b. \textit{P1(3<x, f>} (CH (\textit{f}) & \textit{P = ^} \textit{(we invite \textit{f(philosopher)}) \rightarrow (x will be offended)}) & true (\textit{P}))

Reinhart further argues that the argument-adjunct asymmetry mentioned above should be considered an argument-adverbial asymmetry. Though both \textit{how} and \textit{what way} are adjuncts (syntactically and semantically), only the adverbial adjunct \textit{how} leads to a \textit{wh}-island violation in (56).

(56) a. *who fainted when you behaved how?
  b. who fainted when you behaved what way?

To explain this contrast, Reinhart claims that \textit{wh}-adverbials differ from \textit{wh}-NPs in that (i) the former does not have an N-set (and thus no N-role or variable) and (ii) they denote functions ranging over higher-order entities. In other words, \textit{wh}-adverbials cannot be interpreted via choice functions, and are therefore unable to be interpreted in-situ (and must be interpreted in \textit{SpecCP}). This, according to Reinhart, explains why sentences such as (57) are ungrammatical:

(57) *who arrived why?

Note however that it is not the case that \textit{wh}-adverbials can never stay in-situ. In Chinese/Japanese, \textit{wh}-adverbials can stay in-situ just as \textit{wh}-arguments. Thus, though Reinhart may be correct that \textit{wh}-adverbials have no N-set, this may not be the reason why (57) is ungrammatical.

Tsai (1994), also argues for an argument-adverbial distinction. However, he argues that though \textit{wh}-arguments do not undergo covert \textit{wh}-movement, \textit{wh}-adverbials do.

The alternatives to LF \textit{wh}-movement proposed have in fact shown that simple covert \textit{wh} movement is not enough. In particular, there are different types of \textit{wh}-in-situ which warrant different treatments. This is the topic that I will turn to in the last section. Before I discuss the typology of \textit{wh}-in-situ, I would like to note that given the copy theory of movement, a possible direction for \textit{wh}-in-situ is that the in-situ effects arise because the lower copy is pronounced instead of the higher copy (see among others Bobaljik, 2002, Nissenbaum, 2000 and Pesetsky, 1998). However, such an account is not immediately workable for \textit{wh}-in-situ because of the possible asymmetries between moved \textit{wh}-constructions and \textit{wh}-in-situ constructions. Nevertheless, only further research in this area will reveal whether or not this is a worthwhile direction for research on \textit{wh}-in-situ.

5. Types of \textit{wh}-in-situ
From the discussion above, we have encountered various types of \textit{wh}-in-situ, e.g., D-linked vs. non-D-linked, \textit{wh}-arguments vs. \textit{wh}-adverbials, Japanese \textit{wh}-in-situ vs. Chinese \textit{wh} in-situ. Recent works (since late 90’s) start to take the direction that there are indeed different types of \textit{wh}-in-situ, and that they warrant different treatments: covert phrasal movement, no movement, feature movement. In this section, I briefly discuss some of the issues involved.

5.1 Covert movement: phrasal or featural?
As we have seen above, many arguments have been put forth against covert \textit{wh}-movement. This essentially concerns covert \textit{phrasal} \textit{wh}-movement. Chomsky (1995) argues that covert movement is in fact feature movement (since at LF, there is no reason to pied-pipe the category). In other words, for Chomsky, there is no longer the possibility of covert
‘’phrasal’’ movement. However, several recent proposals argue for treatments which differentiate between covert phrasal movement and covert feature movement. The question then is whether there are in fact arguments to support the claim that covert movement is not just feature movement.

Pesetsky (2000) offers such an argument. He first reviews arguments concerning Antecedent Contained Deletion (ACD) constructions which show that covert phrasal movement must take place to provide a proper antecedent. Consider a classic case such as (58).

(58) a. Mary [\(\varphi\rbracket \text{invited} [\[\rho\rbracket \text{everyone that I did}\] \[\varphi\Delta\]]]
   b. [\[\rho\rbracket \text{everyone that I [\[\varphi\rbracket \text{invited t }]} [\text{Mary [\[\varphi\rbracket \text{invited t }]}]

In (58), the quantificational DP everyone that I did undergoes (covert) phrasal movement (in this case QR). After QR, the elided VP can take the VP invited t as its antecedent. ACD constructions which can successfully resolve the ellipsis site can thus be used to test whether or not covert phrasal movement has taken place. Some examples involving ACD showing that wh-in-situ in multiple questions in English involves covert phrasal movement can be found in Fiengo and May (1994):

(59) a. Which girl invited which student that John did? (F&M, 1994, 242)
   b. Which spymaster suspected which spy that Angleton did?

In both (59a) and (59b), since the VP ellipsis site can be resolved, one can argue that covert phrasal movement of the DP headed by which-NP has taken place. In other words, sentences such as (59ab) argue for covert phrasal movement of wh-in-situ in multiple wh-questions. (See section 3.2 of Pesetsky, 2000 for arguments against a Case-based theory of ACD.)

Nissenbaum (2000) offers another argument. He re-examines wh-in-situ in relation to Condition A of the binding theory. One of the original asymmetries between overt and covert wh-movement is that covert wh-movement does not feed Condition A. Nissenbaum assumes, following Richards (1997), that in-situ wh-phrases undergo “tuck-in” adjunction (that is, adjoined elements do not become the outer Spec but the inner Spec). By taking into consideration the tuck-in possibility as well as movement through intermediate vPs, Nissenbaum shows that covert wh-movement in fact feeds Condition A (data from Nissenbaum, 2000).

(60) a. Who, thinks Mary was looking at which picture of himself?
   b. *Who, thinks Mary was looking at a picture of himself?

(61) a. Which boy thinks Mary\(_i\) wants him to buy which picture of herself? 
   b. *Which boy thinks Mary\(_i\) wants him to buy a picture of herself?

The in-situ wh-phrases in (60) and (61) undergo covert wh-movement and tucks-in under the matrix wh-phrases. In (60a), himself is licensed in the VP associated with the matrix verb think while in (61a), herself is licensed in the VP associated with want.

In view of Pesetsky (2000) and Nissenbaum (2000), it is clear that covert phrasal movement of wh-in-situ elements does exist. See also Cheng and Rooryck (2002) who argue that the focus-licensed wh-in-situ in European Portuguese (Setubal dialect) undergoes covert phrasal movement (see section 2.2 above).

Let us now turn to the question of whether or not there is any evidence that in-situ wh elements undergo anything other than covert phrasal movement. Pesetsky (2000) argues that there is. Here I briefly go over his arguments (a) that in some cases of wh-in-situ, covert phrasal movement does not take place, and (b) that there is feature movement of in-situ wh elements. Consider first (62a) (example from Pesetsky, 2000, p. 31, ex. 61a).

(62) a. *I need to know which girl Sue ordered [which boy that Mary (also) did \(\Delta\)] to congratulate ___.
   b. I need to know which girl ___ ordered [which boy that Mary (also) did \(\Delta\)] to congratulate Sarah.

Recall from the discussion above that covert phrasal movement resolves ACD (see also the example in (62b)). In (62a), we have another case of ACD involving wh-in-situ, but in this case, the ACD is not resolved (note that superiority cases involving D-linked wh-phrases are usually only marginal, and not ungrammatical). What is the difference between this case and the previous cases discussed? (62a) involves a superiority violation; the wh-phrase which is generated higher in the structure (termed wh\(_1\) by Pesetsky) is not moved, but a lower one (wh\(_2\)) is. Pesetsky argues that in such cases, the wh\(_1\) does not undergo covert phrasal movement.

The question that arises is whether or not wh\(_1\)-in-situ undergoes any movement at all. Here the argument that Pesetsky provides is a bit intricate. I’ll present an outline of the argument here and readers who are interested in the details should consult the work.

First, as Richards (1997) shows, in Bulgarian, which has multiple wh-fronting, in multiple questions involving more than two wh-phrases, the order of the second and the third wh phrase is free (i.e., wh\(_1\)-wh\(_2\)-wh\(_3\) or wh\(_1\)-wh\(_3\)-wh\(_2\)). This, according to Richards, is because Attract Closest only constrains movement once (i.e., only wh\(_1\)). In English, a similar pattern can be found, as shown in (63) and (64). Note that superiority effects disappear when more than two wh-words are involved.

(63) a. What did who give to whom?
   b. ?Who did who give what?

(64) a. ?Who did who persuade to buy what?
   b. What did who persuade whom to buy?
Pesetsky argues that given the fact that (63) and (64) are all grammatical, the wh-word who (i.e., wh₁) must have already checked the wh-feature in C0 (and thus have satisfied Attract Closest). And since who certainly does not undergo overt wh-movement, and also not covert phrasal movement (because of (62)), feature movement must have taken place.

Pesetsky also notes that intervention effects (involving quantifiers and negation) can probably be used as diagnostics for feature movement. Cheng and Rooryck (2000) have used intervention effects to argue that in French wh-in-situ, feature movement is involved. Cheng and Rooryck (2002) take one step further and show that given the different types of wh-in-situ in European Portuguese, only one type (in embedded questions with se ‘if’) is sensitive to intervention effects (and thus involves feature movement). See also Cheng and Rooryck (2002) for a discussion of wh-advverbials in Chinese showing that feature movement is involved.

If these results are interpreted correctly, then there is indeed feature movement, which is different from covert phrasal movement (because of intervention effects and Condition A effects). Chomsky (2001b) argues for the elimination of feature movement. However, if the results discussed above are sustained, then feature movement cannot be eliminated from the computational system. One might wonder whether the relation Agree can replace feature movement. I am of the opinion that it cannot, because Agree is the most basic relation (before any movement takes place, Agree has to take place first). If feature movement is sensitive to intervention effects, it belongs to a subset of relations involving Agree (since Agree itself cannot be sensitive to intervention effects).

### 5.2 How many types?

In the above discussion, we have looked at wh-in-situ from the licensor perspective as well as from the perspective of the wh-phrases themselves (i.e., movement possibilities). From the licensor point of view, we have the following possibilities: wh-phrase, Q-particle, defective Q, and focus. From the movement possibilities, we have seen wh-in-situ with covert phrasal movement, wh-in-situ with covert feature movement, and wh-in-situ without movement. The question is whether the licenser of wh-in-situ “dictates” the movement possibility. From the summary table in (65), it appears that the licenser cannot completely determine the movement possibilities:

<table>
<thead>
<tr>
<th>Licenser</th>
<th>Movement</th>
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<tbody>
<tr>
<td>Multiple questions/EP</td>
<td>wh-phrase/Focus</td>
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<td>D-linked wh-phrases/</td>
<td>wh-phrase/Q particle</td>
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<tr>
<td>Chinese wh-in-situ (arg)</td>
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<tr>
<td>French wh-in-situ/</td>
<td>defective Q/</td>
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<tr>
<td>English wh₁/</td>
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<tr>
<td>Chinese</td>
<td>Q particle</td>
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<tr>
<td>wh-in-situ (adv)</td>
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</tbody>
</table>

It appears to be the case that licensors do play a role, but the properties of the wh-phrases also play a role. The availability of certain licensors determines whether or not a language has extra types of wh-in-situ (aside from wh-in-situ in multiple questions). For instance, French has a defective Q-morpheme, which allows French to have matrix wh-in-situ while European Portuguese also allows Focus to license wh-in-situ.

Licensers are not, however, the only determining factor in the types of wh-in-situ. Take Chinese as an example. The availability of Q-particles in Chinese determines that Chinese allows wh-in-situ in matrix and embedded questions. But wh-arguments and wh-advverbials differ because wh-arguments in Chinese are not operators.

In short, the movement possibility of in-situ wh-phrases is determined by a combination of factors. From the movement possibilities, it appears that we only have limited types (three, if we are on the right track regarding covert movement).

From the discussion above, one possible extra case involves languages like Japanese, which appears to move an operator out of the wh-phrase. Future research will show whether this type can be subsumed under one of the three types mentioned above.

### A Wh-in-situ Bibliography


CHOMSKY, N. (2001b) Beyond Explanatory Adequacy. Ms. MIT.


