Wh-in-Situ

Josef Bayer

University of Konstanz, Germany

Lisa Lai-Shen Cheng

University of Leiden, the Netherlands

1   Introduction

In most of the languages of Indo-European origin constituent questions are formed by fronting an interrogative pronoun or a phrase which is headed by an interrogative determiner. The movement is shown in (1).

(1) $[_{CP}$ *wh*-phrase$_1$ $[_{C'}$ C $[_{IP}$ $[_{VP}$ … t$_1$ …]]]]

This displacement leaves a gap, and this gap corresponds to the *wh*-phrase. This state of affairs corresponds rather closely to the operator-variable dependency seen in predicate logic. This was inspiration for semanticists to extend such treatments to displacement phenomena as in (1). In logic, a variable is bound by either an existential or a universal operator. *Wh*-questions are "open" propositions in which the variable is bound by something that still needs to be supplied. This can be expressed by a so-called lambda operator. It creates a lambda-abstracted formula, λx [… x …].[1] If a referring expression is provided as is the case in a constituent answer, λ-conversion renders a truth-value. According to standard semantic assumptions (see Karttunen 1977), a constituent question is taken to be the set of true propositions expressed by [… x …], where the variable x is restricted in the familiar ways. The point is that not all *wh*-phrases undergo movement, while at the same time their interpretation seems to remain the same as if the phrase had been moved. In the *wh*-movement languages this can be seen in multiple questions. One *wh*-phrase moves to SpecCP, while all the others remain "in-situ." Interpretation of the in-situ *wh* is essentially the same as interpretation of the *wh* in SpecCP. *Who bought what?* is roughly λx λy BUY (x,y). Although the issue of multiple questions is obviously related to our narrower topic, and although we may occasionally draw into our discussion multiple questions, we leave this large thematic complex aside and refer the reader to Multiple *Wh*-Questions). The issue of the present chapter is rather rooted in languages in which displacement of *wh*-phrases can actually not be detected on the surface or in which detection of displacement if any would be far more subtle than in the languages that follow the model in (1). Consider example (2).

(2)   Mandarin Chinese
       Húfēi   mǎi-le   shénme
       Hufei   buy-PRF   what
       'What did Hufei buy?'

Shénme 'what' in (2) stays in-situ in contrast with the moved *wh*-word *what* in the English translation. The in-situ option is also there in *wh*-movement languages as in

English *You bought WHAT?*. But the latter is a special type of *wh*-question (e.g., echo questions) with very special contextual and prosodic requirements. (2) is clearly not of that type. It is an ordinary information-seeking question. In addition, *wh*-in-situ sentences are possible in indirect questions (i.e., embedded questions) whereas corresponding in-situ questions of English or French are not.

(3) Mandarin Chinese
  a. Bótōng   xiǎng-zhīdào   Húfēi   mǎi-le   shénme
      Botong   want-know   Hufei   buy-PRF   what
      'Botong wants to know what Hufei bought.'
  French
  b. *Je   me   demande   que   Jean   a   acheté   quoi
      I   me   wonder   that   Jean   has   bought   what
      Intended: 'I wonder what Jean has bought.'
  c. *I wonder John bought what.

Given that *shénme* corresponds to an operator that ultimately needs to bind a variable, the theoretical question is how this can be implemented syntactically. This chapter will provide an overview of the attempts to understand *wh*-in-situ across different languages and the different types of morphosyntactic options that languages may have in stock. We couch our discussion on a rough division between (a) work within the Principles and Parameters framework, largely the Government and Binding (GB) theory with levels of representation, and (b) the subsequent development toward a more strictly derivational minimalist account without levels of representation.

   The chapter is organized as follows: section 2 introduces the treatment of *wh*-in-situ in GB theory, namely in a theory with syntax-internal levels of representation, in particular with the distinction between S-structure and LF. In section 3, the discussion shifts to rethinking *wh*-in-situ within variants of the Minimalist Program (MP), that is a derivational theory in which levels of representation can only be the interface levels L(ogical) F(orm) and P(honological) F(orm). Section 4 is devoted to the role of intervention effects and treatments which cut across GB and the MP. Section 5 turns to observations and problems of optionality of *wh*-movement.

2   Covert movement and Logical Form

2.1   Quantifier raising and LF *wh*-movement

Considering the famous example from Hirschbühler (1982), *a Canadian flag hung in front of each embassy*, the natural reading requires wide scope of *each embassy*. In a theory with levels of representation such as GB theory, the obvious thing to do is to establish scope (based on c-command) by relegating invisible movement of quantifiers, namely Q(uantifier) R(aising), to the domain of grammar to which phonology has no access, the level of LF (see Quantifier Scope Ambiguities).

Multiple questions like (4a) could be treated in a similar way by assuming that the in-situ *wh*-phrase undergoes *wh*-movement at LF. Aoun, Hornstein, and Sportiche (1981) suggest that *what* acquires scope by adjoining at LF to the phrase which is in scope position in overt syntax as seen in (4b).[2]

(4) a. Who bought what?
     b. $[_{CP}$ what$_2$ who$_1$ $[_{IP}$ t$_1$ $[_{VP}$ bought t$_2$]]]

2.2 Covert movement in *wh*-in-situ languages

Given the level of LF, (2) can then be treated as involving normal *wh*-movement with the sole difference that it is "delayed." The effect of the movement is only "visible" as soon as the level of LF is reached:

(5) Mandarin Chinese
     shénme$_1$ [Húfēi mǎi-le t$_1$]   (=LF of (2))

2.2.1 Parallels between **wh**-*extraction* and **wh**-*in-situ*
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 overt extraction.

2.2.1.1 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 (1982) argues that verbs in Mandarin Chinese show the same selectional requirements as those in English:

(6) Mandarin Chinese
     Huángróng   xiāngxìn Guōjìng   mǎi-le   shénme?
     Huangrong   believe   Guojing   buy-PRF   what
     'What does Huangrong believe that Guojing bought?'

(7) Mandarin Chinese
     a. Qiáofēng   wèn   wǒ   Guōjìng   mǎi-le   shénme
         Qiaofeng   ask   me   Guojing   buy-PRF   what
         'Qiaofeng asked me what Guojing bought.'
     b. *Qiáofēng   wèn   wǒ   Guōjìng   mǎi-le   shū
         Qiaofeng   ask   me   Guojing   bought-PRF book
         Intended: '*Qiaofeng asked me Guojing bought a book.'

(8) Mandarin Chinese
     Bótōng   zhīdào   Huángróng   xǐhuān   shéi (?)
     Botong   know   Huangrong   like   who
     a. 'Botong knows who Huangrong likes.'   (indirect question)
     b. 'Who does Botong know Huangrong likes?' (matrix question)

Long movement of *shénme* in (6) satisfies the requirement of the *believe*-predicate, while short movement of *shénme* in (7a) satisfies the *ask*-predicate. Both wide and narrow scope yield interpretable results in (8).

2.2.1.2   *Locality effects*

Just like *wh*-questions involving overtly moved *wh*-words, *wh*-questions involving in-situ *wh*-words show locality effects. In particular, the typical argument–adjunct asymmetry seen in pairs like *?What do you wonder why John bought?* vs. **Why do you wonder what John bought?* is also found with *wh*-in-situ. While in-situ arguments can be interpreted as taking scope out of *wh*-islands and relative clauses, in-situ adjuncts cannot. Observe first that (9) is three-ways ambiguous:

(9)   Mandarin Chinese
    Júdòu   xiǎng-zhīdào   shéi   mǎi-le   shénme (?)
    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?'

As Huang (1982) points out, however, the wide-scope interpretation of the adjunct *wèishénme* indicated in (10c) is unavailable.

(10)   Mandarin Chinese
    Húfēi   xiǎng-zhīdào   shéi   wèishénme   shēngqì (?)
    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.   Intended: 'What is the reason x, Hufei wonders who gets angry for x?'

Similar results are obtained for scoping out of relative clauses:

(11)   Mandarin Chinese
    Bótōng   xǐhuān   shéi   xiě   de   shū?
    Botong   like   who   write   DE   book
    'For which x, x a person Botong likes the book that x wrote?'

(12)   Mandarin Chinese
    *Qiáofēng   xǐhuān   Bótōng   wèishénme   xiě   de   shū?
    Qiaofeng   like   Botong   why   write   DE   book
    Intended: 'For what reason x Qiaofong likes the book that Botong wrote for x?'

2.2.2   *Differences between overt movement and in-situ*

Though LF *wh*-movement appears to share many properties with overt *wh*-movement, the symmetry 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; see also Cole and Hermon 1994).

(13) 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. Who saw John and who? → coordinate structure constraint

These contrast with comparable cases with overt movement: *??What$_1$ do you remember why we bought t$_1$?* (cf. (13a)), **Who$_1$ do you think that pictures of t$_1$ are on sale?* (cf. (13c)), *??Who$_1$ did you get jealous because I talked to t$_1$?* (cf. (13d)), and so on.

In Mandarin Chinese, in-situ *wh*-phrases can appear in islands while taking matrix scope. (14a) is taken from Huang (1995).

(14) Mandarin Chinese
      a. Nǐ   xiǎng-zhīdào [wǒ wèishénme mǎi shénme]?
          you   wonder   I   why   buy what
          'What is the x such that you wonder why I bought x?'
          → *wh*-island

      b. Zhāngsān [yīnwèi shéi méiyǒu lái] hěn shēngqì?
          Zhangsan because who   not.have come very angry
          'Who is the x such that Zhangsan got angry because x didn't come?'
          → adjunct condition

Huang's analysis of *wh*-in-situ was an important step in the development of LF-theory in GB.

Together with May (1977; 1985) it formed the core of the LF-theory of GB. According to Huang (1982), LF derivations are constrained by the E(mpty) C(ategory) P(rinciple) but not by subjacency. Leaving aside differences between QR and covert *wh*-movement, this state of affairs was, of course, far from satisfactory. Therefore in the aftermath of this generalization much work was devoted to deriving the difference between overt and covert movement and therefore also the difference between *wh*-movement and *wh*-in-situ.

2.3   Coping with subjacency

2.3.1   *Pied-piping*

Nishigauchi (1986; 1990), Choe (1987), and Pesetsky (1987) have argued that LF-subjacency is largely invisible due to large-scale pied-piping (see also Pied-Piping). The following Japanese sentence (taken from Pesetsky 1987) should show a subjacency violation because *nani-o* 'what' appears in a relative clause, but it is in fact well-formed:

(15) Japanese
      Mary-wa [[John-ni nani-o   ageta] hito-ni] atta-**no**?
      Mary-TOP John-DAT   what-ACC gave   man-DAT   meet-Q
      'For which thing x did Mary meet a man who gave x to John?'

The central fact that supported the idea that it is not the *wh*-item *nani* 'what' which is moved but rather the whole island that contains it, is the way such a question must be answered: a felicitous answer has to repeat the island in which the relevant operator occurs. (16b) is a felicitous answer to (15) while (16a) is not:

(16)   Japanese
     a.   */??Konpyuutaa   desu
           computer   COP
       'It is a computer.'
     b.   [[konpyuutaa-o   ageta]   hito]   desu
           computer-ACC   gave   man   COP
       'It is the man who gave a computer (to him).'

This finding has inspired an analysis of *wh*-in-situ according to which it is not the operator proper that is moved out of an island at LF, but rather the entire island. In (15) the phrase to be moved at LF would be the entire NP headed by *hito-ni* 'man-DAT', including the relative clause, as reflected in the answer (16b).[3] Nishigauchi (1990, ch. 3) proposes a pied-piping analysis according to which there is first CP-internal *wh*-movement which marks the CP as [+*wh*], followed by movement of the [+*wh*] marked CP to the specifier of NP, which has the effect of assigning the feature [+*wh*] to the complex NP. In a final step, this complex [+*wh*] marked NP moves to the specifier of the matrix CP. Though this solution appears promising, it is not without problems. As Von Stechow (1996) has pointed out, it is not obvious how the LF representations produced by LF-pied-piping could be interpreted semantically.

    In particular, (15) asks for the identity of a thing such that a man gave it to John, rather than for the identity of some man. Nishigauchi (1990, 52) argues that such questions ask in fact for the entity referred to by the island, in this case … *hito-ni*, 'by making crucial use of' the thing(s) which the entity gave to John. As he nevertheless admits, an answer simply identifying a person would not be appropriate. Thus, the in-situ *wh*-operator must have left the island at some level of representation which serves as input to the semantic component.

    There have been attempts at coming to grips with the semantic problem while retaining the essential insights of the pied-piping analysis. One could argue that the analysis proceeds in two steps. First, the entire island is moved to an A'-position, then the *wh*-operator is moved out of it, not crossing another bounding node. It has in fact been suggested that A'-movement of a phrase XP causes XP to lose its status as a barrier (see Fiengo et al. 1988).[4] As a matter of fact, however, this way of coping with the subjacency problem at LF turns out to be problematic. First of all adjunction or movement to SpecCP would be a wildcard for getting rid of barrier-hood that seems far too unconstrained to cope with the data. Second, there is strong evidence that something like the exact opposite must be the case. Movement of XP to SpecCP in overt syntax usually bleeds sub-extraction from XP rather than debarrierizing it. Furthermore, the pied-piping solution is itself problematic. As noted in Fiengo et al. (1988), the pied-piping solution is not applicable to all island violations at LF.[5] We will return to this issue when we discuss other solutions.

2.3.2 Q-binding

The analysis according to which *wh*-in-situ involves *wh*-movement of the *wh*-phrase at LF was vigorously re-examined in the 1990s. Not only was the asymmetry concerning subjacency a sore point, but we were also no longer satisfied with the stipulation that the parametric difference rests upon the level of movement (see Cheng 1991; and Tsai 1994a among others).

Japanese is a prime case to suggest an alternative to *wh*-movement. Questions in Japanese are usually followed by a Q-particle which differs from case to case but is usually *-no, -ka*, as in (15) and (17) respectively. Nishigauchi (1990, 10) shows that *-ka* serves both the yes/no and the constituent question type.

(17) Japanese
Tanaka-kun-wa   [dare-ga nani -o   tabe-ta   -**ka**]   oboe-te- i-masu-**ka**?
Tanaka   -TOP   who-NOM what-ACC eat -PAST-Q   remember is   -Q
'Does Tanaka know who ate what?'

According to Nishigauchi (1990, ch. 4), who refers to Kuroda (1965), *dare* 'who', *nani* 'what', and so on, do not themselves have an interrogative feature. They are rather "indeterminate" pronouns. They are interpreted as non-interrogative in combination with other particles (among which *-ka* suffixed to the *wh*-phrase), as long as *-ka* is missing as a clause-final head:[6]

(18) Japanese
Dare-mo-ga   nani-ka-o   tabe-te-iru
everyone-NOM   something-ACC   eating-is
'Everyone is eating something.'

The interpretation of a question can only be obtained if these indeterminate pronominals are c-commanded by a Q-morpheme.[7]

The notion of Q-morpheme is not new at all. It dominated the discussion of question formation in the late 1960s and early 1970s. Katz and Postal (1964), working with the assumption that transformations do not change meaning (i.e., deep structure determines meaning), posited a Q-morpheme to account for the meaning contrast between *Did Bill see John?* and *Bill saw John*. A *wh*-question such as *Who saw John?* had then the deep structure representation Q [wh *someone*] *saw John*, under the assumption that *wh*-words, though similar to indefinites, must be specified as "questioned." 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:

(19) 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 (19c) was essentially conceived to account for the famous multiple question in (20a), which contains an in-situ *wh*-phrase *which book*. The two different readings of the sentence are reflected in the answers in (20b) and (20c).

(20) a. Question: Who remembers where we bought which book?
      b. Answer-1: John and Martha remember where we bought which book.
      c. Answer-2: 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 (20b), the embedded Q-operator binds both *which book* and *where*; in contrast, in (20c), the matrix Q-operator binds both the matrix *who* and the embedded *which book*. By treating Q as an operator, the scope of the in-situ *wh*-phrase in (20a) can be accounted for. As far as in-situ *wh*-phrases are concerned, the Q-morpheme serves to determine their scope, nothing more.

   Q-binding appears to be an important alternative to movement, in particular LF movement. An early version of it appears in Higginbotham and May (1981) under the notion *absorption*. In multiple questions, the overtly *wh*-moved phrase is in a proper scope position which happens to c-command another *wh*-phrase in-situ. The operator associated with the in-situ *wh*-phrase is absorbed by the matrix *wh*-operator, resulting in a double operator, as illustrated in (21).

(21) a. Who_i t_i bought what?
      b. for which <x, y>, x bought y

A version of this has been established under the name of *unselective binding*. The assumption is that *wh*-phrases are on a par with indefinites. According to Heim (1982), see also Lewis (1975) and Kamp (1981), indefinites have no quantificational force. They are variables, and as such they need to be bound by quantifiers/ operators.[8]

   This is exactly what Cheng's (1991) explanation of *wh*-in-situ amounts to. 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 peripheral position (C° or a related position in the C-domain).

   Having introduced Q-binding/unselective binding as an alternative to LF movement, let us now turn to some controversial issues and attempts to resolve them.

2.4   D-linking

Here we turn to the question whether *wh*-phrases behave completely homogene-
ously as overt *wh*-movement – apart from Huang's findings about adjuncts –
suggests, or whether semantic distinctions which are found among them have an
influence on their behavior in the grammar of *wh*-in-situ. A prominent difference
between *wh*-words and *wh*-phrases has become known under the term *D(iscourse)
linking*. We discuss D-linking here and move to further semantic distinctions in
section 3.

   We have so far seen two major alternatives: LF movement and the movement-free
approach of Q-binding/unselective binding. In his influential article, Pesetsky
(1987) argued that *both* the LF movement theory ("Chomsky-style") and the theory
of unselective binding ("Baker-style") are correct as they take care of different sets of
constructions. Consider the two following examples of multiple questions.

(22)   a.   Who read what?
       b.   *What did who read?

(23)   a.   Which child read which book?
       b.   Which book did which child read?

LF movement of the subject gives rise to what in GB theory would be an
ECP violation.[9] This rules out (22b). The same should, however, be true in (23).
So why does (23b) not incur the same violation? Pesetsky's answer is that the
wh-DP *which children* does not move because it is not an operator. Semantically a
which-phrase comes from a fixed set of entities as established by a discourse context.
The underlying assumption is that *wh*-words are genuine operators but D-linked
wh-phrases are not. Pesetsky (1987, 109) points out that D-linking is not necessarily
marked morphosyntactically. In (24), the context makes it clear that both the set of
transistors and the set of holes are fixed:

(24)   I know that we need to install transistor A, transistor B, and transistor C, and
       I know that these three holes are for transistors, but I'll be damned if I can
       figure out from the instructions *where what* goes!

The expected order would be *what goes where*. Thus, there can also be D-linking
without a visible morphosyntactic reflex. Pesetsky also points out that there are
cases of bare *wh*-words which would invariably be operators and as such must
undergo LF movement. These are *wh*-words which are modified with qualifications
like *the hell*.[10] Pesetsky calls these "aggressively non-D-linked."

(25)   a.   Who the hell caught what?
       b.   *Who caught what the hell?

Den Dikken and Giannakidou (2002) argue that *wh* + *the hell* is a polarity element
that must be immediately c-commanded by a non-veridical licenser. In a simplex
wh-question or in a multiple question like (25a), *the hell* is licensed by a presuppo-
sition that expresses a negative attitude on the part of the speaker. According

to their analysis, (25b) is illicit because *who* is an intervener that prevents *the hell* from being licensed by this non-veridical operator. In their footnote 30, however, they admit that the ban on *wh+the hell* phrases in-situ may be more general. As Obenauer (1994) has observed in French and as (26b) shows, the option of "aggressive non-D-linking" by *diable*-suffixation blocks the in-situ option. There is no intervener.

(26) French
      a. Où   (diable)   est-il   allé?
          Where   the.devil is-he   gone
          'Where the hell did he go?'
      b. Il est allé ou (*diable) ?

If Den Dikken and Giannakidou's (2002) analysis is correct, the obvious answer for the impossibility of leaving *wh-diable* in-situ would have to be that the clause which contains the in-situ *wh*-phrase is typed as assertive and as such lacks the non-veridical operator that the sentence with the fronted *wh*-phrase employs.[11]

The constellation seems to carry over to Japanese. In Japanese, superiority effects arise as soon as *ittai* is attached to the *wh*-word. In (27b), the *ittai* attached *wh*-phrase *ittai nani-o* 'what the hell' is hierarchically not the closest to the C-node marked by *no*. While in (27a) *ittai* is immediately c-commanded by the non-veridical operator *no*, *dare-ga* in (27b) is an intervener for *ittai nani-o*.

(27) Japanese
      a. [Ittai   dare-ga]   nani-o   tukamaeta-no?
          the.hell   who-NOM   what-ACC   caught-Q
          'Who the hell caught what?'
      b. ??Dare-ga [ittai   nani-o]   tukamaeta-no?
          who-NOM   the.hell   what-ACC   caught-Q
          Intended: 'Who the hell caught what?'

Similarly, subjacency effects resulting from the CNPC surfaces in cases with *ittai*, as in (28b), while such effects are otherwise notoriously absent in Japanese, as in (28a):

(28) Japanese
      a. Mary-wa [[John-ni   nani-o   ageta]   hito-ni]   atta-no?
          Mary-TOP John-DAT   what-ACC   gave   man-DAT   met-Q
          'What is the thing x such that Mary met the man who gave x to John?'
      b. *Mary-wa [[John-ni   ittai   nani-o   ageta]   hito-ni]   atta-no?
          Mary-TOP John-DAT   the.hell what-ACC   gave   man-DAT   met-Q
          Intended: 'What the hell is the thing x such that Mary met the man who gave x to John?'

By Den Dikken and Giannakidou's account, (28b) can be ruled out because *ittai* is too far away from the licensing operator *no* while the relative clause immediately containing *ittai* fails to provide a non-veridical licenser.

3 Accounts of *wh*-in-situ in theories with only interface levels (minimalist theories)

With the advent of the MP, covert *wh*-movement as discussed above needs to be reconsidered. First, if it is the feature [*wh*] which needs to be checked, there is no reason for the whole *wh*-phrase to undergo movement. Second, the extension condition demands that merge targets root syntactic objects, leaving covert *wh*-movement as an exception. In this section, we discuss several alternatives to covert *wh*-movement. We review different types of alternatives. In 3.1 we discuss accounts of *wh*-in-situ in terms of the covert feature movement operation as well as an alternative in which a question particle moves overtly. Section 3.2 introduces an account according to which *wh*-in-situ is actually overt movement which is subsequently obliterated by remnant movement; furthermore an account according to which there is a choice between pronunciation of the higher or the lower copy of a *wh*-movement chain. In 3.3 we discuss movement-free theories of *wh*-in-situ, essentially unselective binding and the Choice Function approach. Section 3.4 turns to the question whether there can be overt *wh*-movement that stops in a position lower than SpecCP, namely in a position that looks like in-situ but is in effect ex-situ.

3.1 Feature/particle movement

Chomsky (1995) takes feature movement as the basis, with phrasal movement as a consequence of pied-piping the phrase (see Pesetsky 2000, and the discussion below on intervention effects). He states that "covert operations are pure feature raising" (Chomsky 1995, 270). In other words, there is no covert phrasal movement, since there is no need to pied-pipe the phrase covertly. Pied-piping the phrase overtly occurs only for convergence in the overt component.

   Assuming that overt *wh*-movement is due to a strong Q-feature, which needs to be checked overtly (by C^0 for instance), and that such strong features cannot be introduced covertly, the consequence of the proposal in Chomsky (1995) is that in-situ languages such as Chinese and Japanese have weak Q features.

   An alternative to covert feature movement or any covert movement is the proposal of Hagstrom (1998) and Kishimoto (2005) for Sinhala, Japanese, and Okinawan (see also Aoun and Li 1993). Hagstrom (1998), based on Tonoike's (1992) and Kishimoto's work, claims that what actually moves in Japanese is the question particle itself. In particular, the question marker in Sinhala, Japanese, and Okinawan moves to the surface position in the CP from a position adjacent to the in-situ *wh*-phrase. Consider the sentences in (29a) to (29c). Hagstrom takes the *ka* particle associated with the indefinite in (29a) to be the same as the *ka* in (29b) and (29c) (see Hagstrom 1998 for details regarding the interpretation of *ka* (as an existential quantifier and an interrogative marker)). More specifically, *ka* in (29b) and (29c) has moved from the *wh*-word *nani* 'what' to its surface position.

(29) Japanese
    a. John-ga nani-ka-o katta
       John-NOM what-Q-ACC bought
       'John bought something.'

                                                  (Kuroda 1965)

    b. John-ga nani-o kaimasita ka
       John-NOM what-ACC bought.polite Q
       'What did John buy?'

                                           (Hagstrom 1998)

    c. John-ga [Mary-ga nani-o katta   ka] sitteiru
       John-NOM Mary-NOM what-ACC bought Q   know
       'John knows what Mary bought.'

Kishimoto (2005) argues that the particle *də* in Sinhala undergoes either overt or covert movement. The argument is based on an intricate set of facts concerning the position of *də* and the interpretation of the *wh*-questions.[12]

Cable (2007; 2010) argues for more elaborate structures for *wh*-phrase + Q-particle. In particular, he argues that there are two types of *wh*-in-situ languages, one with a Q-projection structure (30a), and the other with a Q-adjunction structure (30b):

(30) a. Q-projection b. Q-adjunction

             QP   XP
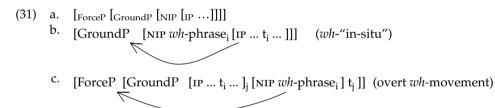   /\\   /\\
       XP   Q   XP   Q

As illustrated in (30a), a Q-projection structure is a structure in which Q projects into a QP. The XP can be a clause or a noun phrase. Given this structure, Attract Q can yield covert movement of QP, for example the *wh*-phrase together with the Q-particle. According to Cable, Sinhala is a Q-projection language. In contrast, Japanese and Korean are Q-adjunction languages. One crucial difference between Sinhala and Japanese/Korean is that the former does not allow the Q-particle to be at the right edge of a matrix *wh*-question (due to the QP-intervention condition; see Cable 2010 for details). In Japanese/Korean, since Q does not project to a QP, there is no violation of the QP-intervention condition. In the latter type of language, the Q can undergo movement (under Attract Q, for example) (as suggested in Hagstrom), separate from the *wh*-phrase, yielding sentences like (29b).

3.2   Overt movement

Another set of approaches to avoid movement at LF is to suggest that movement has indeed taken place overtly. However, due to various factors, the effect of the movement is not visible at PF. We discuss below two types of treatments which utilize overt movement to analyze *wh*-in-situ. In both of these types, the fact that overt movement has taken place takes care of the scopal properties of in-situ *wh*-phrases. The difference between these two treatments rests upon how the *wh*-phrases end up appearing as if they are in their canonical position.

3.2.1   *Remnant as disguise*

Following Kayne (1998), a number of proposals have been put forth to analyze *wh*-in-situ as overt movement. The basic idea is that all *wh*-phrases undergo overt movement to the left periphery. However, *wh*-movement is followed by remnant movement (see Remnant Movement). This has the effect of quasi obliterating *wh*-movement. Here we consider Munaro, Poletto, and Pollock's (2001) analysis of French *wh*-in-situ (see also Moro 2011 for Italian). These authors propose a more articulated CP-field with both ForceP and NewInformationP (NIP; similar to FocusP), which are relevant for *wh*-elements. In between ForceP and NIP is GroundP, which hosts presupposed elements, as illustrated in (31a). The analysis of *wh*-in-situ in French rests upon a discourse-configurational analysis of interrogatives. Assuming that *wh*-in-situ sentences are truncated sentences without a ForceP, Munaro, Poletto, and Pollock (2001) propose that *wh*-phrases have to be in focus, and are thus moved to NIP. After the *wh*-phrases in French undergo movement to NIP, subsequent remnant movement of the IP takes place moving the presupposed IP to the GroundP (as schematized in (31b)). This has the effect of disguising the extraction of the *wh*-phrase. In the overt *wh*-movement cases, since ForceP is present, the *wh*-phrase moves further to ForceP, see (31c).

(31)   a.   [$_{\text{ForceP}}$ [$_{\text{GroundP}}$ [$_{\text{NIP}}$ [$_{\text{IP}}$ …]]]]

  b.   [GroundP   [$_{\text{NIP}}$ *wh*-phrase$_i$ [$_{\text{IP}}$ … t$_i$ …]]]   (*wh*-"in-situ")

  c.   [ForceP [GroundP   [$_{\text{IP}}$ … t$_i$ …]$_j$ [$_{\text{NIP}}$ *wh*-phrase$_i$] t$_j$]] (overt *wh*-movement)

The analysis of *wh*-elements moving to NIP/FocusP yields a possible explanation of why *que* in French cannot be in-situ: it is too light to be in FocusP (in contrast with *quoi*). Further, it provides a motivation for the remnant IP movement, that is, the IP contains presupposed elements and thus must be in GroundP.

However, a number of problems remain with this type of analysis. First, it is unclear why 'in-situ' questions are truncated sentences. In particular, 'in-situ' questions have regular question semantics (see section 5.1 for further discussion about optional *wh*-in-situ languages like French). This also makes it difficult for such an account to extend to in-situ languages like Chinese and Japanese – given such an account, languages like Chinese and Japanese would only have truncated questions, which in our opinion, is a claim that cannot be substantiated. Another problem concerns sentences with multiple in-situ *wh*-elements such as:

(32)   French
       Jean   a   donné   quoi   à   qui
       Jean   has   given   what   to   whom
       'To whom has Jean given what?'

(32) has the word order of a non-question. For Munaro, Poletto, and Pollock's analysis to go through, the movements of *quoi* and *à qui* have to be such that the

surface order is maintained. This requires either that *à quì* moves first, violating Attract Closest, or that *à qui* has to have a tuck-in movement, which again is an extra mechanism.

3.2.2   *Pronounce lower copy*

Another type of proposal with overt *wh*-movement but yet yielding *wh*-in-situ is connected to the copy theory of movement (see Chomsky 1995). With the copy theory of movement, movement in overt syntax creates a chain with two copies (or more) which are then subsequently interpreted by both the PF and the LF interfaces. In a typical movement scenario, the copy that is being pronounced and the copy being interpreted are the same. Take (33) as an illustration: *which book* undergoes movement to SpecCP, leaving a copy in its original position, indicated by struckout font.

(33)   Which book did John buy ~~which book~~?

In English, both the PF and the LF interpret the higher copy, with the lower copy deleted at PF (indicated by strikeout). Bobaljik (2002), while examining A-movement, proposes that the PF and LF interfaces can determine which copy is "privileged" to be interpreted and they do not have to act in sync. That is, the interfaces can choose to both interpret the upper copy, yielding a scenario such as (33), in which we "see" the movement because the upper copy of the moved element is pronounced and it is also the one that LF interprets.

On the other hand, PF can choose to pronounce the lower copy, while LF chooses to interpret the higher copy, creating a scenario in which if we only look at the PF, it is as if the element has not moved, while qua interpretation, it appears to have moved (see Bobaljik 2002 for details).

This proposal can be extended to accommodate *wh*-in-situ: movement of the *wh*-phrase takes place in narrow syntax, leaving a copy in its original position. Subsequent PF interpretation privileges the lower copy while LF interpretation privileges the higher copy. In Reintges, LeSourd, and Chung (2006), this is taken up to account for *wh*-in-situ questions in Coptic Egyptian. In particular, *wh*-in-situ questions in Coptic Egyptian are accompanied by "relative tenses," which also appear in relative clauses. Relative tenses serve therefore as a diagnostics for *wh*-movement. In the case of *wh*-in-situ, the in-situness is due to the fact that at PF, the lower copy, rather than the higher copy, is spelled out.

Though this account of Coptic Egyptian seems plausible, much more needs to be done (within the "pronounce lower copy" approach) to see how the asymmetries associated with *wh*-in-situ questions (in contrast with fronted questions, as discussed in section 2.2.2) can be resolved. The other option is to consider the possibility that there are indeed various types of *wh*-in-situ (as suggested in Cheng and Rooryck 2002; Reintges, LeSourd, and Chung 2006).

3.3   No movement

In contrast to an overt movement approach to in-situness, there are proposals which go for a "no movement" approach, suggesting that there is neither overt nor covert

movement of in-situ *wh*-phrases. The Q-binding type of approach (including absorption or unselective binding, discussed in section 2.3.2) is in a way a predecessor of the no movement approach. Reinhart (1998), working with minimalist assumptions, however, argues that absorption or unselective binding is not adequate. She 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 non-parallelisms with respect to subjacency, she points out that given the notion of economy (Chomsky 1991), we would not expect (34) to be ambiguous:

(34)   Who knows where to find what?

   The in-situ *wh*-word *what* in (34) can have either embedded or matrix scope (i.e., associated with either *where* or *who*, comparable to (20a)). 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 (see Multiple *Wh*-Questions).
   With no actual *wh*-movement taking place in syntax or at LF, Reinhart addresses the question of how in-situ *wh*-words can be interpreted. Consider a *wh*-question in Mandarin:

(35)   Mandarin Chinese
       Zhāngsān mǎi-le shénme
       Zhangsan buy-PRF what
       a.   'Which x, x a thing, Zhangsan bought x?'
       b.   'Which x, Zhangsan bought x, x a thing?'

If we assume that the *wh*-word *shénme* 'what' in (35) has not undergone traditional *wh*-movement at LF, the interpretation indicated in (35a) is not easily attained. Instead, we would have (35b) (the interrogative force can be from a non-overt *wh*-particle (Cheng 1991), a non-overt *wh-operator* (as proposed in Aoun and Li 1993 or Watanabe 1992, or a *wh*-feature (Chomsky 1995)). 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 the restriction of the *wh*-element also remains in-situ. Reinhart notes a problem that arises from this as can be seen in examples such as (36).

(36)   Who will be offended if we invite which philosopher?
       a.   for which <x, y>, if we invite y and y is a philosopher, then x will be offended.
       b.   Lucy will be offended if we invite Donald Duck.
       c.   for which <x, y>, y is a philosopher, and if we invite y, x will be offended.

Given an example such as (36), if the in-situ *wh*-phrase is interpreted in-situ (using simple absorption or unselective binding), the restriction of the in-situ phrase remains in an *if*-clause, as shown in (36a). This implies that anything that is not a philosopher can be a value for *y*, allowing (36b) as a possible answer to the question in (36). To avoid this, the restriction of the *wh*-phrase *which philosopher* must be "pulled out" (as represented in (36c)).[13]

The question that arises is how we can achieve the "pulling out" of the restriction without *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. She argues 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 *wh*-phrases are existential quantifiers, the same mechanism can be applied. (36) would then have the informal representation (37a); the semantic representation is indicated in (37b), from Reinhart (1998, 41, exs 24b–24c)

(37) a. for which <x, f>, if we invite f(philosopher), x will be offended
      b. λp (∃<x,f> (CH(f) & p = ^((we invite f(philosopher)) → (x will be offended)) & true (p)))

The Choice Function analysis also provides an account for the argument–adjunct asymmetry mentioned in 2.2.1. Reinhart argues that the argument–adjunct asymmetry should be considered an argument–adverbial asymmetry: though both *how* and *what way* are adjuncts (syntactically and semantically), only the adverbial adjunct *how* leads to a *wh*-island violation in (38).

(38) a. *Who fainted when you behaved how?
      b. Who fainted when you behaved what way?

To explain this contrast, Reinhart argues that *wh*-adverbials differ from *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, *wh*-adverbials cannot be interpreted via choice functions, and are therefore unable to be interpreted in-situ (and must be interpreted in SpecCP). See Dayal (2002) as well as Von Stechow (2000) concerning problems with the Choice Function account.

Leaving multiple questions aside, consider now in-situ languages such as Chinese and Japanese. The in-situness in these languages does not rely upon multiple questions. In these languages, *wh*-adverbials can simply stay in-situ, as in (39):[14]

(39) Mandarin Chinese
      a. Zhāngsān   wèishénme   měiyǒu   lái?
          Zhangsan   why   not.have come
          'Why didn't Zhangsan come?'

      b. Lǐsì   zěnmeyàng   chúlǐ   zhè-jiàn   shì?
          Lisi   how   handle   this-CL   matter
          'In what manner did Lisi handle this matter?'

                                                          (adapted from Tsai 1994a)

In Chinese/Japanese, *wh*-adverbials, can stay in-situ just as *wh*-arguments. If all in-situ *wh*-phrases in Chinese/Japanese were to be interpreted via choice functions, we would not expect *wh*-adverbials to be licit, since they do not have an N-set.

If Reinhart (1998) is on the right track, *wh*-arguments and *wh*-adverbials are different in how they can get interpreted (see also Tsai 1994b) – the former via Choice Function and the latter via movement. This argument–adverbial distinction may be corroborated by the data concerning intervention effects (see section 4).

3.4   *Wh*-in-situ or *wh*-ex-situ?

Inspired by Kayne's (1994) theory of a universal base by which all languages are underlyingly head-initial, and OV order is always derived, there are a number of proposals which argue that what has been taken to be *wh*-in-situ is actually overt *wh*-movement, albeit not to SpecCP but to a lower position to the left of VP/*v*P.

   Jayaseelan (1996) argues for overt *wh*-movement in the Dravidian SOV language Malayalam, assuming an underlyingly head-initial VP which is directly dominated by a focus projection (FocP). Following universal head < complement order, *wh*-elements are assumed to originate in a postverbal position in which only unfocused elements can surface. *Wh*-elements are normally intrinsically focused and thus have to undergo movement to SpecFocP for focus checking.[15] The resulting structure looks like *wh*-in-situ because the rest of the VP-internal material must be evacuated from VP.[16] According to Jayaseelan, a strong empirical motivation for this account is that the unmarked word order SOV changes into OSV as soon as S is a *wh*-item, as in (40a):

(40)   Malayalam
    a.   ni<u>nn</u>-e   aarə aticcu? OSV
         you-ACC who beat
         'Who beat you?'
    b.   *aarə ni<u>nn</u>-e aticcu?   SOV

The [+*wh*]-subject moves to SpecFocP while the [–*wh*]-object must move higher. Other South Asian SOV-languages seem to be less strict than Jayaseelan suggests for Malayalam[17] but in most of them there seems to be a strong tendency to keep the *wh*-phrase linearly to the immediate left of the verb. Kornfilt (1997, 9–29) confirms this for the unrelated but typologically comparable language Turkish. According to Mahajan (1990) and Dayal (2014), the word order for *wh*-elements is not totally strict in Hindi-Urdu. There is evidence, however, that *wh* can move higher by virtue of scrambling, in which case it is likely to have taken scope in the position that Jayaseelan suggests. According to Jayaseelan (2001), the actual Q-operator resides in a clause-peripheral phrase, ForceP, which hosts the illocutionary force feature of the sentence. Q is assumed to bind the *wh*-element in SpecFocP; alternatively one could assume that it checks an uninterpretable counterpart of Q in the *wh*-phrase. According to this proposal, *wh*-movement is split: it moves to a lower Focus position in which it gets under the control of a base-generated Force head. Thus, there is no movement to SpecCP.

   More recently, Manetta (2010; 2011) has made out Spec*v*P to be the actual landing site of *wh*-items in Hindi-Urdu.[18] Given that *v*P is a phase in the MP, the left edge of *v*P seems to be a theoretically plausible candidate. The issue of covert versus

overt *wh*-movement in the South Asian languages gains an important additional dimension once languages with postverbal clausal complements are considered (unlike Dravidian languages).[19] These languages include major Indo-Aryan languages like Hindi-Urdu, Bangla, Marathi, Gujerati, Kashmiri and various others. Under the assumption that *wh*-phrases move overtly, there is a strong expectation that they can also move long distance. This is actually what is claimed to be the case by various authors. (41) is an example from Hindi-Urdu, Manetta (2011, 115), (42) is from Bangla, Simpson and Bhattacharya (2003):

(41) Hindi-Urdu
Sita-ne$_1$ kis-ko socaa [ki Ravii-ne t$_1$ dekhaa]?
Sita-ERG who-ACC thinks that Ravi-ERG saw
'Who did Sita think that Ravi saw?'

(42) Bangla
jɔn ke$_i$ bollo [$_{CP}$ t$_i$ cole gæche]
John who said left gone
'Who did John say left?'

Although Gurtu (1986) and Mahajan (1990) take long extraction to be an option, the status of these examples remains debatable. For various speakers (41) seems to be ungrammatical or semi-grammatical (K. V. Subbarao, p.c.), and natural examples are hardly ever found.[20] Furthermore, according to Davison (1988), Sinha (1993), Dayal (1996) and Subbarao (2012, 223 ff.) even if they exist, they should not be identified with familiar long *wh*-movement. For Hindi, Mahajan (1990) argues that *wh*-movement is adjunction in the sense of QR. For Bangla, Bayer (1996) suggests a base-generation analysis. Simpson and Bhattacharya (2003) assume that CP is in the direct object position of the matrix verb, and (42) is a case of straight *wh*-movement. This leaves the role of the CP-phase to be explained. As Mahajan (1990) points out, there is no indication of any activation of the left CP-edge in extraction in languages like Bangla and Hindi-Urdu. If *wh*-elements move, they usually stop at SpecFocP alias Spec*v*P but never at SpecCP. Notice also that insertion of the complementizer *je* degrades (42) for many speakers. Here, the reason could be a *that*-trace effect but as Probal Dasgupta (p.c.) points out, the presence of *je* degrades acceptability in general. If so, what are the options for *wh* to obtain matrix scope? One option is partial movement as seen in (43).[21]

(43) Bangla
tumi **ki** bhabcho [ke baRi kor-be]?
you what think who house make-will
'Who do you think will build a house?'

It is immaterial here whether *ki* is a pure scope marker (*wh*-expletive) or a *wh*-object that is coindexed with the *wh*-CP headed by *ke* ('who') as in the indirect dependency approach; see for discussion Gurtu (1986), Mahajan (1990), Multiple *Wh*-Questions, and Partial *Wh*-Movement. In languages like Bangla,

which partially follow the pattern of Dravidian syntax in having preverbal complements, another option is to raise the entire *wh*-CP to the left of the matrix verb.[22] Notice that while (44a), adapted from Bayer (1996), can only be understood with narrow *wh*-scope, the dominant reading of (44b) indicates wide *wh*-scope. In (44b), narrow scope is a marked option that requires an extra prosodic device and might not even be available for all speakers.

(44)   Bangla
      a.   ora   Suneche   [ke   aSbe]   *unambiguous*
          they   heard.have   who   come.will
          i. 'They have heard who will come.'
          ii. NOT: 'Who have they heard will come?'
      b.   ora   [[ke   aSbe]   (bole)]   Suneche[23]   *ambiguous*
          they   who   come.will   C   heard.have
          i. 'They have heard who will come.' (marked)
          ii. 'Who have they heard will come?' (unmarked, preferred)

Assuming that the *wh*-clause in (44b) is raised to SpecFocP or Spec*v*P, clausal pied-piping appears to be a secondary option of *wh*-scoping in languages like Bangla. One can assume that in (44b), the *v*P-phase having ceased to matter, Force of the matrix clause probes *ke*. Partial movement/indirect dependency as in (43) is the only option in languages like Hindi-Urdu, which lack head-final CPs. These two are the widely attested strategies in South Asian languages. Direct *wh*-movement across the CP-phase may exist in addition; but so far its status remains highly unclear.

   Movement to SpecFocP or Spec*v*P is independent of the word order question that plays a role in Jayaseelan's as well as in Simpson and Bhattacharya's work. In fact, Manetta (2010; 2011) assumes basic OV order. If objects would originate in postverbal position, one could expect them to be able to remain there in multiple questions. This is especially plausible in the South Asian languages where case-bearing elements, unlike in the Germanic OV languages, are regularly found in postverbal position. Nevertheless, multiple questions cannot strand a *wh*-phrase in the postverbal space as (45b) shows.

(45)   Bangla
      a.   dilip   goto   bochor   ka-ke   kon   boi-Ta   diyechilo?
          Dilip   gone   year   who-DAT   which   book-CL   gave
          'Who did Dilip give which book last year?'
      b.   *dilip   goto   bochor   ka-ke   diyechilo   *kon*   *boi-Ta*?
          Dilip   gone   year   who-DAT   gave   which   book-CL
      c.   ??dilip   ka-ke   goto   bochor   kon   boi-Ta   diyechilo?
          Dilip   who-DAT   gone   year   which   book-CL   gave

Given an OV basis, the DO could perhaps be in situ in (45a). However, the deviant status of non-adjacency in (45c) rather suggests that both *wh*-phrases have to move to a functional position. In other words, multiple questions appear to require multiple specifiers.[24]

Bhattacharya and Simpson (2012) adduce sluicing as another proof that Bangla and Hindi have *wh*-movement. Although they are not explicit about the landing site of *wh*, they assume an analysis of sluicing in close analogy to the standard account in terms of *wh*-movement followed by TP-deletion.[25] Assuming that due to its Q-scope-marking particle(s), Japanese is a language with *wh*-in-situ, it is interesting to see that sluicing can be observed in this language as well. This brings Abe (2015) to a theoretical proposal that does not rely on *wh*-movement but rather relies on a form of TP-deletion that spares contrastively focused *wh*-elements in situ. Overall it appears that sluicing is still too much a controversial issue to derive strong conclusions about the in-situ/ex-situ debate from it.

A similar discussion of *wh*-in-situ or *wh*-in-focus can be found within the Bantu linguistics literature. In many Bantu languages, for example, Zulu, non-subject *wh*-phrases need to be "immediately **after** the verb."[26] Aboh (2006), for example, argues for a focus-movement analysis of non-subject *wh*-phrases (in Aghem): essentially, the "immediate after the verb" position is the focus position. Buell (2006), Cheng and Downing (2012) and Hyman and Polinsky (2009) on the other hand, argue for a non-FocusP analysis. In fact, Cheng and Downing show that leaving the *wh*-phrase aside, everything in the verb phrase has to be evacuated, which is extremely similar to Malayalam at the descriptive level (see also Arregi's (2003) description and analysis of Basque). In other words, though non-*wh*-phrases in some Bantu languages are associated with focus, they are still in-situ.

To sum up, there are reasons to believe that what has previously been taken to be *wh*-in-situ in the South Asian languages is actually overt movement to the left edge of VP/*v*P. Except for the V2-language Kashmiri, there is no evidence for *wh*-movement to the C-domain. Thus, the South Asian languages seem to form a typologically interesting and significant type between full moving and in-situ languages.

4   Intervention effects

One of the phenomena that are central to the interpretation of in-situ *wh*-phrases concerns intervention effects (IE), which have also been called "Beck effects." There are a lot of discussions in the literature about this phenomenon, but so far, very little consensus has been reached. Languages can vary in several ways when it comes to sensitivity to particular types of interveners, whether there is in fact IE sensitivity (e.g., in Amharic, see Eilam 2008), as well as a substantial amount of speaker variation. Below we first introduce the facts of IE, and then we review different approaches.

Beck (1996), working under the assumption that there is LF *wh*-movement, shows that an in-situ *wh*-phrase in a scope-marking sentence or in a multiple question in German displays IE. Consider the examples in (46).

(46)   German
    a.   ??Wen   hat   niemand   wo   gesehen?
         whom has nobody   where seen
         'Where did nobody see whom?'

b. ??Wer hat jede Aufgabe wann gelöst?
   who has every problem when solved
   'Who solved every problem when?'

Beck shows that in-situ *wh*-phrases in a multiple question must not be c-commanded by negation, or by a quantifier such as *every* (i.e., inherently quantified expressions), as in (46a) and (46b). Such "inherently quantified expressions" are interveners, blocking LF *wh*-movement, yielding IE.[27]

   Beck and Kim (1997), and Tanaka (1997) (see also Hoji 1985, and Hagstrom 1998) show that Japanese and Korean show IE similar to what we have seen in German in (46), as illustrated in (47)–(48) (Korean data from Kim 2002):

(47) Korean
a. *amuto muôs-ûl sa-chi anh-ass-ni?
   anyone what-ACC buy-CHI NEG-PST-Q
b. muôs-ûl amuto sa-chi anh-ass-ni?
   what-ACC anyone buy-CHI NEG-PST-Q
   'What did no one buy?'

(48) Korean
a. ??nukuna-ka ônû kyosu-lûl chonkyôngha-ni?
   everyone-NOM which professor-ACC respect-Q
b. ônû kyosu-lûl nukuna-ka chonkyôngha-ni?
   which professor-ACC everyone-NOM respect-Q
   'Which professor does everyone respect?'

In (47) and (48), we see that scrambling of the *wh*-phrase out of the c-command domain of the intervener voids the IE. Kim (2002) argues that it is actually focus phrases (instead of quantifiers) that act as interveners. She provides examples such as (49) and (50) to illustrate this:

(49) Korean
a. ??Minsu-man nuku-lûl manna-ss-ni?
   Minsu-only who-ACC meet-PST-Q
b. nuku-lûl Minsu-man manna-ss-ni?
   who-ACC Minsu-only meet-PST-Q
   'Who did only Minsu meet?'

(50) Korean
a. ??Minsu-to nuku-lûl manna-ss-ni?
   Minsu-also who-ACC meet-PSST-Q
b. nuku-lûl Minsu-to manna-ss-ni?
   who-ACC Minsu-also meet-PST-Q
   'Who did Minsu, too, meet?'

Again, if the *wh*-phrase is scrambled out of the c-command domain of the focus item, the sentences become grammatical.

Soh (2005) argues that Mandarin Chinese differs from Japanese/Korean in that *wh*-arguments are not sensitive to IE (see however Kim 2002). This is illustrated in (51) and (52), (51a)–(51c) adapted from Soh (2005).[28]

(51)　Mandarin Chinese
　　　a.　Tā　zhǐ　mài　shénme?
　　　　　he　only　sell　what
　　　　　'What is the thing x such that he only sells x?'
　　　b.　Tā　yě　mài　shénme?
　　　　　he　also　sell　what
　　　　　'What is the thing x such that he also sells x?'
　　　c.　Méi-yǒu-rén　　gǎn　gēn　shéi　dǎjià?
　　　　　not-have-person　dare　with　who　fight
　　　　　'Who is the person x such that nobody dare(s) to fight with x?'

(52)　Mandarin Chinese
　　　lián　Lǐsì　dōu[29]　kàn-wán-le　　nǎ-běn　shū
　　　even　Lisi　DOU　　read-finish-PERF　which-CL　book
　　　'Which book did even Lisi read?'

Wh-adverbials, on the other hand, are sensitive to IE:

(53)　Mandarin Chinese
　　　*Méi-yǒu-rén　　wèishénme　shuō　nǐ　cízhí
　　　not-have-person　why　　　say　you　resign
　　　'What is the reason x such that for x, nobody said you resigned?'
　　　　　　　　　　　　　　　　　　　　　　　　(adapted from Soh 2005)

Ko's (2005) analysis on *why*-in-situ in fact points to an unexpected difference between Japanese/Korean and Mandarin. That is, though (53) shows that *wèishénme* 'why' in Mandarin cannot be preceded by the counterpart of *no one*, in Korean and Japanese, this is not the case:

(54)　Japanese
　　　a.　{Amwuto/?John-pakkey}　way　ku　chayk-ul　ilk-ci-anh-ass-ni?
　　　　　anyone/　John-only　　　why　that　book-ACC　read-CI-not-PAST-Q
　　　　　'Why did {no one/only John} read that book?'
　　　b.　Way {amwuto/John-pakkey} ku　chayk-ul　ilk-ci-anh-ass-ni?

(55)　Korean
　　　a.　Taroo-sika　　naze　sono　hon-o　yoma-nakat-ta　　no? (Kuwabara 1998)
　　　　　Taroo-only　　why　that　book-ACC read-not-PST　　Q
　　　　　'Why did only Taroo read that book?'
　　　b.　Naze　Taroo-sika　sono　hon-o　yoma-nakat-ta　no?

Ko (2005) proposes to merge *why* at the left periphery of the sentence, with subjects merged even higher (see also Yoon 2011). The question that remains is why such a combination is not possible in Mandarin.

Aside from an argument–adverbial asymmetry, there is also a lot of discussion concerning the nature of the intervener, as well as the cross-linguistic differences in the intervener.

4.1 Syntactic treatments of IE

The basic idea in Beck (1996) and Beck and Kim (1997) for accounting for IE is that after LF *wh*-movement of the in-situ *wh*-phrase, the trace of the *wh*-phrase is in a Negation Induced Barrier (NIB) (see Beck and Kim 1997 for detail). On the other hand, after scrambling (in the case of German, Korean, and Japanese), the LF-trace of the *wh*-phrase is outside of NIB, and thus, no IE arise. This analysis relies upon LF *wh*-movement to create an LF-trace (see Tanaka 1997; 2003, for an alternative analysis, which however still uses LF *wh*-movement). Furthermore, the NIB does not take into consideration focus elements (see below).

Pesetsky (2000) offers a more fine-grained distinction in LF movement, which aims at explaining IE in English. In particular, he distinguishes two types of covert movement: covert phrasal movement and covert feature movement. As we have discussed in section 3, within the MP, the default movement at LF should actually be feature movement, since there is no PF reason to pied-pipe the phrasal category. Pesetsky's analysis utilizes this distinction, and he shows that feature movement differs from phrasal movement in that the former is sensitive to IE, while the latter is not. Consider the superiority data below:

(56) a. Which book did which student read?
      b. *Which book didn't which student read?

As we have discussed above, in Pesetsky (1987), it is argued that D-linked *wh*-phrases do not need to undergo *wh*-movement; instead, unselective binding takes care of the interpretation of the in-situ *wh*-expression (see the discussion on unselective binding in sections 2 and 3). Pesetsky (2000) suggests that there is indeed movement associated with D-linked *wh*-phrases, but it is not category/phrasal movement. He argues that movement of the formal feature of *which student* in (56a) checks the *wh*-feature, and this is however blocked in (56b), since there is an intervening negation. In other words, feature movement is sensitive to interveners such as negation. Pesetsky extends this analysis further and argues that feature movement, in contrast with phrasal movement, is sensitive to IE.

4.2 Non-syntactic treatments of IE

Recently, there are a couple of proposals which argue for a non-syntactic treatment of IE.

4.2.1 Focus/**wh**-*alternatives*
Beck (2006) examines what she calls the "core" case of IE (see also Kim 2002), namely IE triggered by focus elements.[30] As shown by the sentences in (49) and (50), as well as the contrast between (57a) and (57b), a c-commanding focus element blocks *wh*-in-situ, while a topic element does not.

(57) Korean
    a.   *Minsu-man nuku-lûl po-ss-ni?
        Minsu-only who-ACC see-PAST-Q
        'Who did only Minsu see?'
    b.   Minsu-nun nuku-lûl po-ass-ni?
        Minsu-TOP who-ACC see-PAST-Q
        'Who did Minsu see?'
    c.   nuku-lûl Minsu-man po-ass-ni?
        who-ACC Minsu-only see-PAST-Q
        'Who did only Minsu see?'

<div align="right">(Beck 2006, exs 2a–2c)</div>

Leaving technicalities aside, the basic intuition in Beck's paper is that *wh*-phrases differ from non-interrogative focus phrases in that they have no ordinary semantic values; rather they introduce a set of alternatives, just as focus phrases also do. The problem with sentences such as (57a) (with the schema in (58)) is that within the phrase φ, the semantic values of the focus XP and the *wh*-phrase are not compatible – in order for the focus-sensitive operator to evaluate φ, the ordinary semantic values are needed for the focus phrase. But the *wh*-phrase does not have such values.

(58) $[Q \ldots [Op \; [_\varphi \ldots XP_F \ldots wh \ldots]]]$
     – Q = question operator
     – Op = focus-sensitive operator

At a first glance, this way of analyzing the intervention effect seems to sidestep LF *wh*-movement entirely. However, as pointed out by Beck herself, English *wh*-questions such as (59a) and (59b) appear problematic because the in-situ *wh*-phrases have a c-commanding focus element or a negation.

(59)   a.   Who did only John introduce to whom?
       b.   Which children didn't buy which book?

That is, English, in contrast with languages like German, seems to allow interveners more often. Further, IE only shows up under "permissible" superiority violations, as we have seen in (56a) and (56b), and in (60c) below.

(60)   a.   Which girl did (only) Mary introduce ____ to which boy?
       b.   Which boy did Mary introduce which girl to ____?
       c.   ^{??}Which boy did only Mary introduce which girl to ____?

To reconcile the English data, Beck follows Pesetsky (2000) in assuming that English allows covert phrasal movement, and when covert phrasal movement does not take place, covert feature movement takes place. This latter type of movement is sensitive to IE.[31] In other words, Beck's interpretation mechanism can be considered to underlie "feature movement." In other words, for Beck (2006), sentences such as (59a), (59b), and (60a) are grammatical because covert phrasal

movement of the in-situ *wh*-phrases is allowed, moving them out of the domain of the intervener. On the other hand, the only way to interpret *which*-phrases, and thus *which girl* in (60b) and (60c), is via feature movement (due to superiority). In other words, using the interpretational strategy proposed in Beck is the only way for sentences such as (60b) and (60c). As a result, (60c) is ungrammatical.

Haida (2007), working under the dynamic semantics framework, offers an alternative account to Beck (2006). He proposes that the alternatives of *wh*-elements arise because *wh*-elements are indefinites. Given that *wh*-elements are indefinites, interveners lead to the collapse of alternatives. This yields, if there is a *wh*-phrase present, a polar question reading, which is contradictory to the presupposition of the *wh*-question semantics. Under Haida's account, the *wh*-intervention effect has the same interveners as anaphoric binding, for example, quantifiers and negation. For focus particles, he derives it by the fact that *wh*-questions have an existential presupposition – and the focus particles lead to a contradiction or a presupposition violation.

4.2.2   *Information structure related*

Tomioka (2007) re-examines IE in Japanese and Korean. The interveners that he discusses in his paper happen to not include the core case in Beck's paper. Instead, the interveners include NPIs, certainly quantificational NPs, disjunctive NPs (61a) and (61b) as well as nominative subjects (62a) and (62b).

(61)   Japanese
    a.   ???[John-ka Bill]-ga   nani-o   yon-da-no?
        John-or Bill-NOM   what-ACC   read-PAST-Q?
        'What did John or Bill read?'
    b.   ?(?)[John-ina Bill]-i   mues-ul   ilk-ess-ni
        John-or Bill-NOM   what-ACC   read-PAST-Q
        'What did John or Bill read?'

(62)   Korean
    a.   ??Dareka-ga   nani-o   yon-da-no
        someone-NOM   what-ACC read-PAST-Q
        'What did someone read?'
    b.   ??Nwukwunka-ka   mues-ul   ilk-ess-ni
        someone-NOM   what-ACC   read-PAST-Q
        'What did someone read?'

Furthermore, Tomioka points out that not only does scrambling void the IE, IE become weaker in embedded contexts, see (63a) and (63b).

(63)   Japanese
    a.   Kimi-wa [CP daremo-ga   nani-o   yon-da-to]   omotteiru-no
        you-TOP   everyone-NOM   what-ACC read-PAST-COMP think-Q
        'What do you think that everyone read?'

Korean

b. Ne-nun [CP nwukwuna-ka   mues-ul   ilk-ess-ta-ko]   sayngkakha-ni
   you-TOP   everyone-NOM   what-ACC   read-PAST-DEC-COMP   think-Q
   'What do you think that everyone read?'

The data that Tomioka presents are difficult to reconcile under either a focus account (Beck 2006), or a feature movement account (Guerzoni 2006). He thus suggests to derive the IE in Japanese and Korean from information structure. In particular, he observes that the interveners all share the property that they cannot be topic-marked. In Japanese, this means that these are expressions that cannot have the topic marker *wa* attached to them. He calls these "anti-topic items." According to Tomioka, this means that even though these items can be in the "ground" part of the sentence (following the theory of information packaging of Vallduví 1992; 1995), they cannot be links (which are essentially topics). Rather, they have to be in the tail portion of the ground. Scrambling of the *wh*-elements (such as the example in the Korean example in (57c)) puts the anti-topic elements in the tail part of the sentence (the phonologically reduced part of the sentence). As a result, scrambling can void the IE. The fact that embedded contexts weaken the IE also follows from this analysis, assuming that there is no topic–focus articulation in embedded sentences.

Though the above analysis seems rather convincing, the question still arises concerning the connection between Beck's core case of IE and the anti-topic items. As Tomioka himself indicates, the anti-topic items may all share something in common; that is, they may all have an inherent property of not being compatible with being a topic. One possibility is that they are in fact focus items or they involve focus-sensitive operators. This then connects back to Beck's core case, and possibly the feature movement analysis of Pesetsky (2000) and Guerzoni (2006). It is therefore still possible and worthwhile to develop a unified analysis of IE, covering the core cases, as well as cases involving the anti-topic items.

Lastly, Hamlaoui's (2010) analysis is similar to Tomioka's in that it uses the notion of "anti-givenness," though she considers prosody to play a major role. Crucially, Hamlaoui argues that both the interveners and *wh*-phrases resist givenness, and this property of resisting givenness, according to Hamlaoui, has prosodic consequences. She posits two sets of Anti-Given Items: one set (AGI-1) is associated with focus reading, and carries sentential stress; the other set (AGI-2) (e.g., quantificational NPs, Japanese nominative subjects) carries phrasal stress, even though they are not associated with focus, they are interpreted as "new." However, languages can differ as to whether their *wh*-phrases, negative polarity items belong to AGI-1 or AGI-2. To illustrate briefly, Hamlaoui suggests that in Japanese/Korean, the essential problem of having AGI-2 in an intervening position is that there can be no optimal assignment of sentential stress when both AGI-2 and *wh*-phrase are present: if AGI-2 is assigned sentential stress, it deprives the *wh*-phrase from carrying sentential stress; if on the other hand, sentential stress is assigned to *wh*-phrase, it deprives AGI-2 from carrying stress.

5   Motivating in-situ and optionality

Thus far, we have not addressed the question of what allows or drives *wh*-phrases to stay in-situ in languages like Japanese, Korean, and Mandarin (i.e., leaving aside in-situ *wh* in multiple questions). Below we first discuss the issue of optionality: some languages allow optional *wh*-in-situ. In 5.2, we discuss recent work concerning the driving force of in-situ.

5.1   Optionality

Aside from the obligatory *wh*-in-situ languages, there are languages which show overt *wh*-movement, *wh*-in-situ and in some cases, also partial *wh*-movement. We have briefly discussed *wh*-in-situ in French above in section 3.2.1, under the topic of disguised movement. (64a) is repeated from (32a):

(64)   French
     a.   Jean   a   donné   quoi   à   qui
           Jean   has   given   what   to   whom
           'To whom has Jean given what?'
     b.   À   qui   Jean   a-t-il   donné   quoi
           to   whom   Jean   has-t-he   given   what
           'To whom has Jean given what?'

The question that arises with the pair in (64) for instance, is why French allows *wh*-phrases to stay in-situ, while English does not.

    Bošković (2000) as well as Cheng and Rooryck (2000) capitalize on the difference between matrix and embedded questions in French. That is, though matrix questions easily allow in-situ *wh*-phrases, embedded questions do not, as in (65b).[32] This difference suggests to Bošković that merger of the matrix CP can be delayed though that of the embedded CP cannot, since it violates the extension condition in the MP.

(65)   French
     a.   Pierre   a   demandé   qui   tu   as   vu
           Pierre   has   asked   whom   you   have   seen
     b.   *Pierre a demandé tu as vu qui

                                     (from Bošković 2000)

In other words, a matrix question with in-situ *wh*, such as (64a) is allowed because the interrogative CP projection is merged at LF rather than in narrow syntax. This is in some way similar to Munaro, Poletto, and Pollock's account of in-situness in French, because the CP is "truncated" as far as the narrow syntax is concerned. Cheng and Rooryck (2000) on the other hand, claim that French in-situ questions are licensed by a special intonational Q-morpheme (see also Deprez, Syrett, and Kawahara 2013).

    Denham (2000) explores an analysis similar to Bošković's (2000) analysis of French to account for optional *wh*-movement in Babine-Witsuwit'en (an

Athabaskan language). In Babine-Witsuwit'en, *wh*-objects can stay in-situ, move to an embedded clause (i.e., partial movement), or move to the matrix, as illustrated in (66).

(66) Babine-Witsuwit'en
    a. George [Lillian **nditni book** yik'iyelhdic] yilhni?
        George Lillian   which book 3s.read(OPT).3s 3s.told.3s
    b. George [**nditni book** Lillian yik'iyelhdic] yilhnif?
    c. **Nditni book** George [Lillian yik'iyelhdic] yilhni?
        'Which book did George tell Lillian to read?'

All three sentences yield the same interpretation.[33] Denham (2000) suggests that there is optional C selection (with *wh*-feature). If C is present, *wh*-phrase can undergo movement (either in the embedded clause or in the matrix). However, C (with *wh*-feature) is not responsible for Clausal Typing or scope. Instead, there is an additional projection TyP which is responsible for the (wide-)scope interpretation of the *wh*-phrase. The presence of this projection thus ensures that (66a)–(66c) yield the same interpretation. See also Pires and Taylor (2009) for a similar analysis and the discussion below.

    A mixed picture of *wh*-movement/*wh*-scoping is not unusual. Wahba (1991) has shown that Iraqi Arabic can use overt movement, in-situ/covert movement, and partial movement side by side. Cole and Hermon (1994) discuss evidence from a variety of languages which suggests that the scoping strategies are much less homogeneous across closely related languages and even within a single language than previously assumed. Imbabura Quechua has overt *wh*-movement, while Ancash Quechua has either overt or covert *wh*-movement. In Ancash Quechua both (67a) and (67b) are possible:

(67) Ancash Quechua
    a. May-man-taq$_i$ [José munan [María t$_i$ aywanan-ta]]?
        where-to-Q   José wants María   will-go-ACC
        'Where does José want María to go?'

    b. [José munan [María may-man$_i$ aywanan-ta]]?
        José wants María where-to   will-go-ACC
        (same as (67a))

In (67a), the Q-morpheme *taq* seems to be responsible for the attraction of the *wh*-phrase *may-man* 'where-to'. In (67b), no such morpheme appears. Both subjacency and ECP effects arise in Ancash overt movement but not in the in-situ cases. Following Aoun and Li (1993), Cole and Hermon assume a null *wh*-operator in SpecCP which binds the in-situ phrase in the sense of variable binding.

    The discussion of *wh*-movement, partial *wh*-movement and *wh*-in-situ in Cole and Hermon (1998) focuses on Malay, a language where all three types seem to coexist peacefully. As mentioned above, according to their analysis, *wh*-in-situ is licensed by a visible or invisible operator which serves as an unselective binder. But why should the language make use of the other two options – full as well as partial movement – in addition? Cole and Hermon suggest that the variation reduces to certain lexical options which exist in Malay but not in pure in-situ

languages such as Chinese or in pure movement languages such as English. Pure movement languages have *wh*-words of the form [OP+Var], namely lexical combinations of operator and variable features, whereas pure in-situ languages only have [Var] type pronouns, that is, pronouns which lack the operator feature. This would explain why they do not undergo movement but have to rely on an external operator. Malay is said to involve both options. The feature OP either stems from the lexicon as part of the relevant pronoun, or it is generated separately in SpecCP, in which case the pronoun is a variable that gets bound by OP. This leaves the third option, partial movement. Here one can observe island effects not only between the trace and the spelled out operator, but also between the spelled out operator and its ultimate scope position.[34] The partial movement chain is island-sensitive by definition. The covert chain results, according to Cole and Hermon, from the fact that there is an expletive which must be replaced by covertly moving the OP-feature of the head of the overt chain upwards. They also consider the possibility that OP-movement is forced by the Proper Binding Condition. In any of these cases, island sensitivity is predicted.

5.2   Movement vs. in-situ

From the very early discussions of *wh*-in-situ till now, many have considered the question of what (feature) makes such a divide between *wh*-movement languages and *wh*-in-situ languages. Is it the nature of the *wh*-phrases (e.g., that they are more like quantifiers thus undergoing QR at LF)? Or is there a *wh*-movement parameter (i.e., Japanese has, for instance, movement set at LF)?

   More recently, Richards (2010, ch. 3), assuming a multiple spell-out model and an edge-based mapping between syntax and phonology, argues that the difference between *wh*-movement and *wh*-in-situ falls out from how prosodic *wh*-domains in a language are created. In particular, if a language is capable of creating a single *wh*-domain (i.e., a prosodic domain; see below) that captures both the *wh*-phrase and the associated complementizer, then the language allows the *wh*-phrase to remain in-situ. If the *wh*-domain in a language is such that the *wh*-phrase is separated by Minor Phrases from the associated complementizer (C), then the *wh*-element undergoes movement to be closest to C. He states the Condition on *wh*-prosody as in (68).

(68)   Condition on *wh*-prosody
       Given a *wh*-phrase α and a complementizer C where α takes scope, α and C must be separated by as few Minor Phrase [prosodic phrase] boundaries as possible, for some level of Minor Phrasing.

                                                                  (Richards 2010, 151)

Richards proposes that there are two parameters which condition placement (in situ or moved) of *wh*-phrases:

(69)   Parameters
       a.   Final vs. initial C
       b.   Left or right edge of XP maps to corresponding edge of [prosodic phrase] boundary.

In addition, he states the following algorithm for constructing overarching Minor Phrases:

(70) a. For one end of the larger Minor Phrase, use a Minor Phrase boundary that was introduced by a *wh*-phrase.
b. For the other end of the larger Minor Phrase, use any existing Minor Phrase boundary.

Richards (2010, 182 ff.) argues in a case study that this approach correctly predicts that Chichewa (Bantu, Malawi) is a *wh*-in-situ language (Mchombo 2004). The parameters that he sets for Chichewa are stated in (71):

(71) a. Initial C
b. Right edge of XP maps to right edge of prosodic phrase boundary.

A simple matrix sentence yields the prosodic phrasing as indicated in (72). Given the right edge setting as well as the algorithm stated in (70), the Minor Phrases in (72b) are reduced to the ones in (72c), with the right edge of the *wh*-phrase maintained.

(72) a. C [$_{DP}$][whP] [$_{DP}$]
b. ( )( )( )
c. ( )( )

As we can see in (72c), the *wh*-phrase and the C in Chichewa have no intervening Minor Phrase boundaries. According to Richards, there is thus no need for the *wh*-phrase to move closer to C. We therefore expect Chichewa to be an in-situ language. Similarly, for French and Portuguese, he shows that since their parameter settings are similar to Chichewa, we expect them to also allow in-situ.[35]

Cheng and Downing (2011) compare Zulu with Chichewa. Though both languages have initial C and right edge of XP settings, that is, both languages have the same prosodic phrasal mappings, they are different when it comes to the position of the non-subject *wh*-phrases. In particular, Zulu non-subject *wh*-phrases have to be immediately after the verb (see also section 3.4 above) while in Chichewa, these *wh*-phrases can appear in various positions (though not fronted). The distribution of the non-subject *wh*-phrases are comparable to the distribution of focus phrases. Furthermore, in both languages, *wh*-subjects cannot stay in-situ even though it is closer to C than *wh*-objects. Cheng and Downing (2011) argue that what drives the in-situness in these languages is not related to the *wh*-prosody in these languages.

The possibility of optional movement in a language like French makes it clear that it is not such a hard divide between in-situ and movement. In fact, there are a number of papers which suggest that *wh*-in-situ is more common in *wh*-movement languages than we initially thought and that there are factors involved which are more discourse-related. Pires and Taylor (2009), for instance, show that given certain discourse-pragmatic contexts, both (Brazilian) Portuguese and English allow *wh*-in-situ. Aside from legal questioning, there are cases that require specifications, such as (73b) and questions that require an extra-linguistic context as in (74a) and (74b).

(73)   a.   A: I made desserts.
       b.   B: You made [what ↑ kind of desserts ↓]?

(74)   a.   Context: B sees his friend reading something.
       b.   B: You're reading what?

Crucially, Pires and Taylor argue that for these questions, the set of possible answers is part of the common ground.

French *wh*-in-situ has also been associated with a particular discourse context. Chang (1997) suggests that *wh*-in-situ questions in French are strongly presuppositional. The answer of *rien* 'nothing' to the in-situ question *Marie a acheté quoi?* 'What has Marie bought?' is considered to be inappropriate. Questions with *wh-diable* '*wh* the-hell' (as we have discussed in section 2.4), and with D-linked *wh*-phrases with *ça* can be considered to be corroborating evidence. As shown in (75) and (76), *wh-diable*, which is the so-called aggressively non-D-linked *wh*-phrase, cannot stay in-situ, and *wh-ça* which is very much D-linked cannot be moved.

(75)   French
       a.   Que   diable   a-t-elle   fait?
            what   hell   has-she   done
       b.   *Elle   a   fait   que   diable?
            she   has   done   what   hell
            'What the hell has she done?'

(76)   French
       a.   Tu   as   vu   qui   ça   (cette   après-midi)?
            you   have   seen   who   that   (this   afternoon)
       b.   *Qui   ça   as-tu   vu?
            who   that   have-you   seen
            'Who have you seen?'

                                                    (Cheng and Rooryck, 2000, ex. 16)

However, Mathieu (2004) (see also Starke 2001) shows that such presupposition is not generally present. Instead, what he suggests is that the *wh*-phrase in-situ is non-prominent/less salient in the discourse. Notably, he shows that *wh*-in-situ in French is not felicitous in contexts of iteration, as in (77):

(77)   French
       À   la   fête,   Jean   a   revu   deux   de   ses   anciens   amis.
       at   the   party,   Jean   has   reseen   two   of   his   old   friends
       'At the party, Jean saw two of his old friends again.'

       a.   Qui   est-ce que   Jean   a   vu   à   la   fête?
            who   is-this that Jean   has   seen   at   the   party
            'Who did Jean see at the party?'
       b.   *Jean a vu qui à la fête?'
            'Jean has seen who at the party?'

This is in fact quite similar to the context of specification discussed in Pires and Taylor (2009). In a judgment study on French, Adli (2013) identifies preferred acceptance of *wh*-in-situ in a sociolinguistically definable group of "sports-oriented" individuals who "hold a literary high school diploma" as opposed to other groups of speakers.

Aside from French, and (Brazilian) Portuguese, recent work by Sinopoulou (2009) and Vlachos (2010, 2012) on Modern Greek show that *wh*-in-situ in matrix questions is also possible in Modern Greek. Roussou, Vlachos, and Papazachariou (2014) summarize a number of differences between *wh*-ex-situ questions and *wh*-in-situ questions (e.g., the lack of island effects and exhaustive interpretation in *wh*-in-situ questions). They indicate that *wh*-in-situ in Modern Greek relies upon a "micro-discourse," as shown in (78); they are not licit in out-of-the-blue contexts.

(78)   Modern Greek
       Speaker A: My father, my mother and I went to the store to buy eggs,
                    milk and coffee.
                    My mother bought the eggs.
       Speaker B: Ke   o   pateras   su   aghorase *ti*?
                    and the father-NOM yours-CL bought-3SG what-ACC
                    'And what did your father buy?'

Roussou, Vlachos, and Papazachariou point out that from what Speaker A says, Speaker B is familiarized with the participants (agent and things) involved in the event. Importantly, they note that the value of the *wh*-phrase in-situ *ti* 'what' in (78) must range over the set of entities that are already mentioned in the micro-discourse.

6   *Wh*-drop in language acquisition and *wh*-in-situ

Various languages have been found to show the phenomenon of *wh*-drop. The languages include Dutch (Van Kampen 1997; 2009), English (Yamakoshi 1999; 2002), German (Felix 1980), Swedish (Santelmann 1997; 2004), Norwegian (Westergaard 2009), and others. Usually, the phenomenon is found in child language but it plays a role also in adult language as pointed out for the Bavarian dialect of German and for spoken Dutch (Bayer 2010) and for Wolof (Torrence 2012). Consider the following examples from adult Bavarian.

(79)   Bavarian
       a. **Wos** is-**n** do los?   b. [_] is *(-**n**) do los?
          what is-N here loose
          'What's going on here?'
       c. **Wos** dea-ts -**n** es do?   d. [_] dea-ts *(-**n**) es do?
          what do-2PL-N you here
          'What are you(PL) doing here?'

Deletion of the clitic element *-n* renders (79b) and (79d) ungrammatical; *-n*, a derivative of the discourse particle *denn* ('then'), identifies the drop-versions as *wh*-questions.

Roberge and Strik (2014) distinguish two types of *wh*-drop: type 1 is *wh*-drop in situ, type 2 is *wh*-drop in the left periphery. The cases in (79) are of type 2. According to Roberge and Strik, type 1, the in-situ case, falls into the broader category of argument omission, where the argument may simply happen to be a *wh*-word. Type 2 drop instead arises in a functionally defined position such as in the specifier of a V2-clause. The languages in which *wh*-drop could be systematically observed, and in which in particular *wh*-elements are affected are languages with an articulate left periphery.

Yamakoshi (2002) ran an elicitation task in order to find out about *wh*-drop in child Japanese. In addition, she explored natural speech data from Japanese children. Both of her investigations revealed that "*wh*-drop rarely occurs in child Japanese." Yamakoshi explains this via the difference in operator structure. While in the Western languages under consideration the *wh*-operator cannot be separated from the actual *wh*-item, the *wh*-operator in Japanese is, according to her, a zero element which is separated from the *wh*-item. The *wh*-item proper is not an operator. This amounts to saying that *wh*-drop is in fact operator drop. It cannot be overlooked, however, that there might be another strong factor involved, namely the position of the *wh*-element. The grammar of adult German shows that not only *wh*-drop but also the more familiar topic pronoun drop may occur only in SpecCP of the root clause, that is, in the functionally defined position $[_{CP} \_\_ [_{C'} V_{fin} \ldots]]$. As our previous discussion of South Asian has shown, lower occurrences of *wh*-phrases may not be strictly "in-situ" and may thus be in comparable positions. Nevertheless, it is highly suggestive that *wh*-drop as a circumscribed phenomenon has so far not been observed in languages that lack an articulate left periphery. We conclude from this that genuine *wh*-in-situ languages are special, and cannot be reduced to left-peripheral *wh*-movement that is supposed to be subsequently obliterated by remnant movement.

7   Summary and perspectives for future research

Theorizing about *wh*-in-situ has seen different stages all of which have led to important new insights. In the first phase of GB theory the overarching development was connected to the proposal of the level of Logical Form as a genuinely syntactic level of representation, and to the proposal that *wh*-movement can be postponed to the post-spell-out domain of the grammar. Parallelism between overt and covert *wh*-movement inspired the proposal of a maximally simple parametrical space in which natural language grammars could vary. The picture was clouded by the finding that overt and covert movement are not constrained in exactly the same way. The research that followed resulted in the detection of important variables that had not been recognized previously, and which continue to play leading roles in linguistic theory up to the present. The theoretical shift that was initiated in the late 1980s and early 1990s by Chomsky's proposal of a new and more rigidly derivational computational system and reduction of the levels to the interfaces had major effects

on the conceptualization of *wh*-movement in general and of *wh*-in-situ in particular. With the proposal of feature movement, reasoning about the involvement of LF and LF movement adopted a completely new quality. *Wh*-movement in the sense of entire *wh*-phrases undergoing displacement lost its central place in favor of the role of interrogative particles. At the same time a more liberalized theory of movement which embraces copy movement and remnant movement could revive and reinterpret parts of the classical GB and pre-GB accounts of *wh*-movement. Information about the range of languages with *wh*-in-situ property has been greatly enlarged. Next to the East Asian languages such as Chinese, Japanese, Korean, the South Asian languages (Indo-Aryan as well as Dravidian) as well as African languages started to play an increasing role and gave rise to a more fine-grained picture of variation than the initial theory of parameters. With the detection and crosslinguistic study of IE theorizing about *wh*-in-situ as compared to overt *wh*-displacement has acquired another empirical domain that enables a more nuanced approach. A problem for the earlier parameter theory is presented by languages which allow alternation between *wh*-movement, *wh*-in-situ, and perhaps other forms of scope extension such as partial movement or copy movement. This is the place where the familiar *wh*-moving languages come under consideration in a new light. The reason is that in these languages *wh*-in-situ cannot simply be reduced to fake questions such as echo questions.[36] But even if they can use the *wh*-in-situ format, this format seems to be heavily controlled by contextual factors which one does not observe in the "genuine" *wh*-in-situ languages, that is, in those languages in which leftward *wh*-displacement is either ungrammatical or a marked option at best.

Our review of older and more recent developments in the study of *wh*-in-situ suggests that various problems remain for future research. One problem is certainly to what extent there are semantic and pragmatic differences between different types of movement and scoping. This involves the problem of optionality which has so far been recognized and addressed but not actually solved. Another concern is the dominant role that syntactic theory ascribes so far to the left periphery. Typical in-situ languages usually lack an articulate left periphery. While all of them seem to have a clause-initial topic position, in most of the cases there is no convincing sign of an active left-peripheral C-domain which could play a role in scope and illocutionary determination. Future research in less discussed languages with either genuine *wh*-in-situ or optional *wh*-in-situ will shed light on these issues.

SEE ALSO: Multiple *Wh*-Questions; Partial *Wh*-Movement; Remnant Movement

Notes

1. Lambda-abstraction was originally introduced by the mathematician and logician Alonzo Church. For its application in linguistics, see Partee, Ter Meulen, and Wall (1990, 338–367) among numerous others.
2. Here we adapted the structure to a CP structure.
3. Due to the fact that Japanese is a pro-drop language, the dative can be missing.

4. Something similar is proposed by Von Stechow (1996). The difference is that – partially following Watanabe (1992) – Von Stechow suggests that there is pied-piping but that it is still an operation of overt movement, "invisible overt movement" so to say. At LF, the operator proper is moved out of the pied-piped phrase. For instance, the operator *nani-o* of (15) would have to appear in the specifier of the Q-operator ("interrogativizer") *no*.

5. This is illustrated by an example with a sentential subject containing a *wh*-phrase in Mandarin Chinese,

   (i) Mandarin Chinese

	Q, [shéi	kàn	zhè-běn	shū]	zuì	héshì		a
	who	read	this-CL	book	most	appropriate		SFP

       'Who is the x such that that x reads this book is the most appropriate?'

   a. A, *Zhāngsān kàn zhè-běn shū.

       Zhangsan read this-CL book

       'That Zhangsan read this book.'

   b. A, Zhāngsān.

                                (adapted from Fiengo et al. 1988, ex. 29)

6. Nishigauchi (1990, 117) states that *dare+mo* is literally 'who + also' while *nani-o + ka* is literally 'what-ACC + either'. A very similar constellation is found in Malayalam, a genetically unrelated Dravidian language, see Jayaseelan (2001).

7. See Tsai (1994a) for a comparable proposal for Mandarin Chinese.

8. To give an idea of unselective binding outside the domain of questions, consider Heim's use of adverbs of quantification in her account of donkey anaphora. In (i), binding of the pronouns would not be possible unless a c-commanding operator, a silent adverb taking wide scope, binds the variables as shown in (ii).

   (i)   If a farmer has a donkey, he beats it.

   (ii) ALWAYS$_{1/2}$ [[if a farmer$_1$ has a donkey$_2$] he$_1$ beats it$_2$]

9. The subject's trace would fail to be properly governed. Other deviations such as (ii) are not accounted for by the ECP.

   (i)   Who(m) did you give what?

   (ii) *What did you give who(m)?

   Therefore, a more general principle must be responsible such as Relativized Minimality (Rizzi 1990) or Attract Closest (Chomsky 1995).

10. *Which*-phrases cannot be made aggressively non-D-linked as can be seen by the ungrammaticality of *which books the hell,* etc.

11. This implies that in-situ questions don't have a non-veridical operator. Seen from the formal side of grammar, this seems to be correct. Notice in this context that German has discourse particles which can occur only in questions, e.g. *denn* (lit. 'then'). Although *wh*-in-situ questions may functionally be information questions in which the gap has previously been filled (see Reis, 2015), they do not license such particles.

   (i) German

	Wo	bist	du	**denn**	gewesen?
	where	have	you	THEN	been

   (ii)

	Du	bist	(***denn**)	WO	gewesen?
	you	have	THEN	where	been

       'Where have you been after all?'

See also Shlonsky (2012) on a similarly restrictive distribution of the "interrogative reinforcer" *donc* in French *wh*-interrogatives.

12. Kishimoto (2005) does not completely dispense with LF movement, since the particle can also undergo covert movement. See also Watanabe (1992) for a two-level movement analysis of Japanese *wh*-in-situ.

13. It should be noted though that the proposition that y is a philosopher is at no point under debate. It is presupposed. Reinhart (1997, fn. 19) refers to this aspect but discards it because "Associating presuppositions with existentially quantified NPs is highly problematic within any of the familiar semantic systems, as it disables basic entailments" (Reinhart 1997, 360).

14. See Tsai (1994b) for showing that the adjuncts in (39) are what he calls *non-referential adjuncts*, which do not pattern as arguments.

15. Malayalam also has the strategy of forming constituent questions by means of clefting, which we do not discuss here,

    (i) Malayalam
        aarə   aaNə [ninn-e   talli-(y)-atə]
        who   is   you-ACC   hit-PAST-NOMINALIZER
        'Who is it that hit you?'

    A fixed preverbal focus position has already been assumed by various authors such as Butt and King (1996) and Kidwai (2000) for Hindi-Urdu.

16. See Jayaseelan (2008) for discussion of different options including remnant VP movement.

17. See Pandharipande (1997, 11) who says that in Marathi "The usual word order of the sentences is generally unaffected by the introduction of a question word (though variations in word order are possible)."

18. Manetta also writes about Kashmiri, a V2-language. In Kashmiri, *wh*-elements move to the immediate left of the finite verb, which we simply assume to be in C.

19. It should be noted that *wh*-elements inside postverbal clausal complements can never take wide scope. (See the discussion of (44) below.)

20. Dayal (2017) claims that the Hindi-Urdu examples improve to perfection once the *wh* moves to the front position of the matrix clause. In this case, according to her, the wide-scope interpretation of *wh* is not mandatory. The same observation appears in Mahajan (1990, 134). According to K. V. Subbarao (p.c.), fronting of *kis-ko* to initial position improves (41). A related interpretive effect is not observed in languages like English or German where *wh* always moves to a matrix functional position.

21. We use the notion "partial movement" here in a theory-neutral way.

22. For details about complementation in Bangla, see Bayer (1996; 1999; 2001).

23. *bole* (lit. 'having said') is a final complementizer, also found in the Dravidian languages.

24. Corroborating evidence comes from Kashmiri, see Wali and Koul (1997, 26) and Manetta (2011, 27 ff.), similarly from Mahajan's (1990) observation that under long *wh*-movement in Hindi, no *wh*-element may be left behind in the postverbal CP-complement. The same observation is made for Bangla by Bhattacharya and Simpson (2012). For a useful overview of *wh*-scope and complementizer types in Indo-Aryan, Dravidian, and Tibeto-Burman see Subbarao (2012, ch. 6). A good synopsis of *wh* in modern Indo-Aryan can also be found in Bhatt (2003).

25. One problem is that the part to be elided does not necessarily form a constituent. Even if *wh* is moved, it can be preceded by non-*wh* material as can be seen in (45a). Such material is elided too. Therefore, the authors consider the possibility of more than a single deletion.

26. *Wh*-subjects in most of the Bantu languages need to be clefted. See Sabel and Zeller (2006) among others.

27. The interveners which can yield a distributive reading can lead to a grammatical sentence, but they cannot do so under the intended reading. See Beck (1996) for details and discussion.

28. Yang (2012) claims that there is a difference between quantificational interveners and focus interveners, *wh*-adverbials are sensitive to both while *wh*-arguments are only sensitive to focus interveners. However, for some speakers, *wh*-arguments are not sensitive to focus interveners (as discussed in Soh 2005).

29. *Dou* is glossed here as DOU because there is no consensus concerning *dou*. It has been called a universal quantifier, a distributive operator, and a maximality operator.

30. The core cases are cases which are cross-linguistically the most stable ones, according to Beck (2006).

31. Beck particularly notes that languages like Japanese, Korean, and German are different from English in not allowing covert phrasal movement to "void" IE.

32. In both Bošković (2000) as well as Cheng and Rooryck (2000), matrix questions with *wh*-in-situ in an embedded clause are reported as degraded, as in (i) (from Bošković 2000),

> (i) French
> $^{?*}$Jean et Pierre croient que Marie a vu qui?
> Jean and Pierre believe that Marie has seen whom
> 'Whom do Jean and Pierre believe that Marie saw?'

We note here that there is vast speaker-variation. In particular, young adults in France apparently consider sentences such as (i) quite natural in everyday conservation. Nevertheless there must be a difference between French and languages that do not show any overt involvement of the left periphery. In Bangla, embedded *wh*-clauses, for instance, the *wh*-phrase never moves to the left edge, such movement would rather lead to a loss of acceptability,

> (ii) Bangla
> mina jante ceyechilo [dilip kothay gælo]/$^{?*}$[kothay dilip gælo]
> Mina know wanted Dilip where went
> 'Mina wanted to know where Dilip went.'

33. The distribution seen in Babine-Witsuwit'en seems to be close to what can be observed in Bangla and in Malayalam, see Bayer (1999). Compare (66a)–(66b) with the Bangla example in (44b).

34. Consider the following contrast between overt, covert, and partial movement type of scope from a relative clause, where the intended reading should be a direct question,

> (i) *Di mana$_i$ [kamu fikir [Ali suka [perempuan yang tinggal t$_i$]]]
> at where you think Ali like woman that lives
> 'You think Ali likes the woman who lives where?'
> (ii) Kamu fikir [Ali suka [perempuan yang tinggal di mana]]
> (iii) *Kamu sayang [perempuan yang Ali fikir [apa$_i$ yang telah makan t$_i$]]
> you love woman that Ali thinks what that already eat
> 'You love the woman who Ali thinks ate what?'

35. Richards mentions that French and Portuguese are expected to have both in-situ and movement. However, it is unclear why such an option is allowed under his system.

36. For a detailed discussion of echo *wh*-questions in German, see Reis (2015). In the center of Reis' discussion is the insight that unlike in normal *wh*-questions, the gap in echo *wh*-questions has previously been closed in the discourse and is "re-opened" by the echo questions. Reis demonstrates this with an impressive list of facts. The *wh*-in-situ languages under consideration here have profoundly different properties and are certainly not restricted to the re-opening of a previously closed information gap.

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