

WHAT WOULD *WH*-IN-SITU BE LIKE IN PHASE THEORY?

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This paper is an attempt to reformulate the theories on *wh*-constructions under the framework of phase theory. The *wh*-in-situ phenomena have raised several issues that have not been adequately explained. I firstly reanalyze several approaches on *wh*-in-situ in the phase-based approach, then point out theoretical problems, especially in terms of the violation of PIC. It is also noticed that the asymmetry between *wh*-arguments and *wh*-adjuncts also plays a crucial role to analyze *wh*-in-situ. This paper explores a new approach to capture the asymmetry in terms of syntactic derivation. I suggest that the distinction between the two lies in their syntactic positions which lead to a difference in the licensing process of *wh*-elements.

Key words: *wh*-in-situ, Chinese, phase theory, *wh*-argument, *wh*-adjunct, asymmetry

1. Introduction

In this paper, I focus on *wh*-in-situ languages and discuss how those approaches - covert movement, feature movement and unselective binding - which have been suggested in previous studies (Huang 1982, Cheng 1991, Tsai 1994, Watanabe 2001) can be reanalyzed in phase-based approach. Firstly, covert movement at LF, as it is traditionally conceived, must be discarded due to new insights regarding the LF interface. Covert movement, according to Chomsky (2004, 2008), can be distinguished from overt movement in the ordering of the operations, transfer and movement: overt movement occurs before transfer to S-M (PF component), while the covert movement occurs after transfer to S-M. But there is a conflict between this analysis of covert movement and PIC (Phase Impenetrability Condition), which states that no operation is possible after transfer, since the domain that has been spelled-out is not visible. Movement after transfer therefore should not be possible; hence the concept of covert movement is a problem to phase theory.

Besides the covert movement approach, the unselective binding approach has also been proposed in order to explain the lack of *wh*-island effects. Recall that *wh*-elements in *wh*-in-situ languages such as Chinese and Japanese, in particular *wh*-arguments, are generally assumed to be variables instead of operators (Cheng 1991, Tsai 1994, Watanabe 2001). The difference between Chinese and Japanese depends on where the Q operator is generated (Tsai, 1994, Watanabe 2001). This captures the facts that there is *wh*-island effect in Japanese but not in Chinese. The former undergoes invisible feature movement,

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whereas unselective binding is utilized to explain the later. However, such a binding approach is an apparent violation of the PIC. I will discuss this problem and propose that each spelled-out phase maps to the semantics component and forms a full tree, where the binding relation can be confirmed without violating PIC.

Furthermore, I will also discuss an interesting question about the asymmetry between *wh*-arguments and *wh*-adjuncts which had been observed by Huang (1982). *Wh*-adjuncts, contrary to *wh*-arguments, are considered to be operators and must undergo movement so that the *wh*-island effects in this case can be properly explained. However, *wh*-elements in Chinese are indefinites or bindees lacking quantificational force (Cheng 1991), and *wh*-adjuncts are no exception. In this paper, I will argue that *wh*-adjuncts are similar to other *wh*-elements in that they bear the properties of indefinites, but differ from them by the way that *wh*-adjuncts bound by a Q binder and become operators in NS, taking scope over the entire clause.

This paper is organized as follows; I will show the basic facts about *wh*-in-situ language compared to overt movement in section 2. Then I review previous studies about overt *wh*-movement and summarize phase theory in section 3. In section 4, I review several non-overt movement approaches which have been suggested for *wh*-in-situ languages, and then I reanalyze those approaches from a phase-theory perspective. In section 5, I focus on asymmetries between *wh*-arguments and *wh*-adjuncts, and suggest that *wh*-adjuncts have different syntactic properties from *wh*-arguments. Section 6 concludes.

2. *Wh*-movement vs. *Wh*-in-situ

Unlike a *wh*-movement language such as English, *wh*-in-situ languages like Mandarin Chinese and Japanese seem to be able to interpret their *wh*-element in external merged position without any overt movement (Huang 1982, Richard 2001, Watanabe 2001), as (1b, c) shows.

- (1) a. *What* did John think [that Bill bought *e*]?
 b. (Chinese)
 Zhangsan renwei [Lisi mai-le *sheme*]?
 Zhangsan think Lisi buy-ASP what
 'What did Zhangsan think that Lisi bought?'
 c. (Japanese)
 Taroo-ga [Hanako-ga *nani-o* katta to] omotteiru no?
 Taroo-Nom Hanako-Nom what-Acc bought that think-Prog Q
 'What does Taroo think that Hanako bought?'

Moreover, it is also true that even though the position of *wh*-elements in the one differs from that in the other, the scope interpretations of the *wh*-elements are still the same (Huang 1982). That is, all of the *wh*-elements shown in (1) have a wider scope over the matrix clause.

However, *wh*-movement languages and *wh*-in-situ languages behave differently in certain syntactic environments. For instance, complex DP islands

and *wh*-islands tend not to incur subjacency effects in *wh*-in-situ languages. The data in (2) show the lack of *wh*-island effects, and the data in (3) show the lack of DP-island effects.

- (2) a. *[*What* did you ask [*who* bought ____]]? (Richard 2001 (2))
 b. (Chinese) (Huang 1982 (39))
 [ni xiang-zhidao [*shei* mai-le *sheme*]]?
 you wonder who bought what
 "For which person x, you wonder what x bought."
 "For which thing x, you wonder who bought x."
 (Answers)
 i. I wonder what Lisi bought. (who takes matrix scope: answer 'who')
 ii. I wonder who bought books. (what takes matrix scope: answer 'what')
 c. (Japanese) (Watanabe 2001(16b))
 John-wa [Mary-ga *nani*-o katta *kadooka*] dare-ni tazuneta no?
 John-Top Mary-Nom what-Acc bought whether who-Dat asked Q
 'Who did John ask whether Mary bought what?'
- (3) a. *Who did John read the book t bought?
 b. (Chinese)
 Zhangsan kan-le [*shei* mai de] shu ?
 Zhangsan read-ASP who buy DE book
 'For which x, x a person, Zhangsan read the book which x bought.'
 c. (Japanese)
 Taroo-ga [*dare*-ga katta] hon-o yonnda no?
 Taroo-Nom who-Nom bought book-Acc read Q
 'For which x, x a person, Taroo read the book which x bought.'

In (2b), the *wh*-element in the embedded clause can be interpreted as having scope over the matrix clause, just as it can in the Japanese example in (2c) (*wh*-island effect exists in Japanese but can be alleviated, I will discuss in a later section). In (3b, c), even though the *wh*-elements *shei* 'who' and *dare* 'who' stay inside the complex DP, those in-situ *wh*-elements are interpreted as having wide scope over the matrix clause, despite the fact that they have not undergone any overt (*wh*-)movement. The lack of complex DP island effect is generally captured by the assumption of a pied-piping mechanism (Nishigaushi (1986, 1999), Fiengo et al. 1988, Lasnik and Saito 1992). I will not go into detail about DP island effects in this paper.

Overt *wh*-movement languages and *wh*-in-situ languages are not just different in terms of where the *wh*-element is located, but also as regards what syntactic processes they undergo during the derivation. Even though the syntactic behavior of overt *wh*-movement languages and *wh*-in-situ languages vary, the semantics of a given *wh*-element and its scope interpretation are universal. The problem then reduces to how these *wh*-elements get their interrogative readings properly and how the grammar determines their scope. In what follows, I will review and summarize some of the previous studies about overt *wh*-movement and non-overt movement, and then see how these

approaches can be analyzed under a phase-based approach.

3. Overt Movement

3.1 Copy Theory (Fox 1999, Chomsky 2004)

Wh-elements in overt *wh* movement languages are considered as undergoing movement in overt syntax and leave variables at LF in their original positions (Fox 1999). The *wh*-operator moves to the scope position, usually [Spec, CP] cyclically and leaves copies in each step. Fox (1999) also assumes LF deletion which states that (a) every copy must be deleted except the operator, and (b) the tail of the chain (first copy) must be deleted except the restrictor and become a variable. Such a *wh*-variable will be bound by an operator in [Spec, CP], and the domain that the operator c-commands will be interpreted as the scope domain of the *wh*-element. The derivation is shown in (4).

- (4) Which book did Mary read *t*? (Fox 1999 (57))
 SS: [which book] did Mary [which book] read [which book]
 LF: [which book] did Mary [~~which book~~] read [~~which book~~]
 → [[_{Op} which] [_{restrictor} book]]_x did Mary read [x [_{restrictor} book]]
 (which is the book, *x*, such that Mary read the book identical to *x*)

In (4), *which book* undergoes overt movement at SS (Syntactic Structure) and leaves copies in three positions, VP internal position, *v*P adjoined position and specifier of CP. At PF, the copies of *which book* are deleted except the copy in operator position ([Spec, CP]). At LF, the copies of *which book* in intermediate positions are all deleted; the tail of chain is deleted (but not the restrictor *book*) and must become a variable, which is bound by the operator. As a result, *which book* can be construed in the operator position and the scope is determined by having a bound variable in original position.

However, Chomsky (2004) has a different point of view about the copy theory in phase-based approach. Chomsky (2004) suggests that only a copy instead of a trace is in the original position. Overt movement is then simply a situation where the copy in original position loses its phonological features under Spell-Out. This is stated as follows.

- (5) K is a copy of L if K and L are identical except that K lacks the phonological features of L.
 (Chomsky (2004, 111(7)))

Contrary to overt *wh*-movement, covert *wh*-movement in copy theory based on (5) can be construed as occurring when the copy in original position (*wh*-in-situ) keeps its phonological feature but not other copies. I will discuss covert *wh*-movement in detail and point out a problem in this analysis.

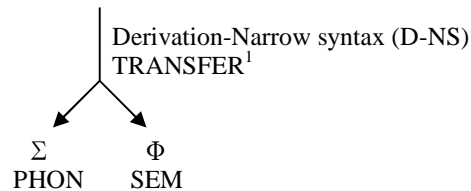
In the next section, I will summarize phase-theory and show how overt *wh*-movement is generally analyzed.

3.2 Overt *Wh*-Movement in Phase-Based Approach

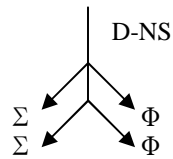
3.2.1 Phase Theory

Within the Minimalist framework, it is assumed that the derivation proceeds by phases, and the TRANSFER (to LF (SEM) and PF (PHON)) must be convergent, which means that all uninterpretable features must be checked before TRANSFER. Following Chomsky (2004), CP and *v*P are phases and Spell-out to SEM and PHON occurs whenever the next phase head is merged. These operations are carried out at the same point in a cycle, and all operations are simultaneous. The model can be shown by (6).

(6) a. LA (lexical array)



b. Simultaneous Spell-out



(Σ :semantic component, Φ :phonological component,)

In addition, there is a Phase Impenetrability Condition (PIC), given in (7), which states that once Spell-out happens, each spelled out domain becomes an impenetrable chunk and no further operations can affect any element in that domain.

(7) Phase Impenetrability Condition (Chomsky 2004 (6))
 The domain of H (Phase head) is not accessible to operations, but only the edge of HP (HP=[α [H β]])

Assuming PIC, any element with uninterpretable features must be checked before Spell-out or must move to the edge of the phase head (escape hatch) where the operations are still accessible, otherwise the derivation would fail because of non-convergence. This is stated by (8).

1 TRANSFER hands D-NS over to Φ and to Σ . (Chomsky 2004 (4)).

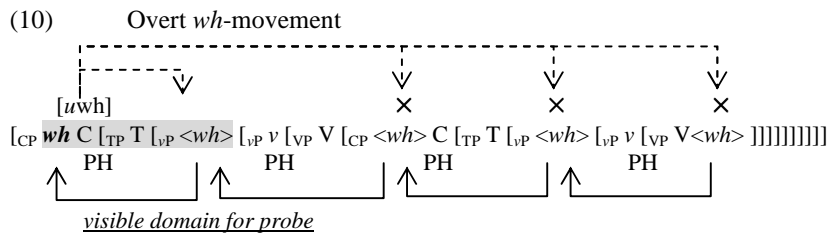
- (8) PH=[α [H β]]
 β must be spelled out but not the edge of PH, which allows only cyclic computation (Escape Hatch).

The assumptions of phase-based approach can be summarized in (9).

- (9) Assumptions in phase-based approach
- Derivation proceeds by phase and the TRANSFER (to LF and PF) must be convergent.
 - CP and ν P are phases (ϕ complete) and TRANSFER occurs whenever the next phase head is merged.
 - PH= [α [H β]]
 β must be spell out but not the edge of PH, which allows cyclic computation (Escape Hatch).
 - Phase Impenetrability Condition (PIC)
 - Simultaneous multiple spell-out model

3.2.2 Overt Movement in Phase-Based Approach

Based on the assumptions shown in (9), the derivation of overt *wh*-movement can be shown in (10).



The *wh*-element is base-generated in external merged position and must move upward successively to the position where its uninterpretable features can be checked. Following Fox (1999), A'-movement leaves copies and PF deletion applies in each spelled-out domain; and furthermore assuming Chomsky (2004), there is only a copy left in the original position, rather than a trace. This indicates that there is no need to think about the trace, which, according to GB theory, would have needed to be properly bound.

If the derivation is built from the bottom-up, as is commonly assumed, then *wh*-elements cannot know where the checker is and when to get its uninterpretable feature checked from the beginning. Nor can a probe search for its goal through each spelled-out phase, since all copies after Spell-out become invisible to the probe at the point of merging probe. Just as Chomsky (2004) mentions, the probe should search the smallest domain to find the goal: its c-commanding domain. Therefore, as (10) shows, only the closest copy within the probe's c-commanding domain is visible to the probe and can get its uninterpretable features checked. The last step of movement is due to the edge-feature EF of C, and only the *wh*-copy at the edge of ν P is accessible to

that operation. Not only is successive cyclic movement theoretically compatible with the PIC, it also has been supported by much empirical data, e.g., its interaction with binding theory (Condition C) (Legate. 2003, Quicoli 2008). As a result, I adopt all the assumptions shown above, and assume that the derivation in (10) is the derivation for overt *wh*-movement in English.

In this subsection, I have introduced Copy Theory which is generally suggested as an explanation for overt *wh*-movement. Contrary to overt *wh*-movement, non-overt *wh*-movement is not visible so that it is controversial whether non-overt *wh*-movement undergoes movement or not. In the following sections, I will introduce three approaches about non-overt *wh*-movement: covert movement, operator movement and unselective binding. I assume (9) in and discuss how these non-overt *wh* movement approaches can be reanalyzed in phase-based approach.

3.3 Covert Phrasal Movement and Overt Operator Movement

3.3.1 Covert Movement (Huang 1982)

As for non-overt *wh*-movement, several hypotheses have been suggested to explain how a *wh*-element gets its scope interpretation in *wh*-in-situ languages. Huang (1982) and Watanabe (2001) claim that there is movement in covert syntax (LF), and suggest that this kind of covert movement is not sensitive to subjacency effects. Despite this, Huang and Watanabe have different assumptions for *wh*-in-situ languages such as Chinese and Japanese, because of variation in *wh*-island sensitivity: *wh*-island effect is absent in Chinese but present in Japanese.

Huang (1982) claims that Chinese *wh*-in-situ closely parallels overt *wh*-movement in English: C^0 has [+*wh*] feature and *wh*-element undergoes phrasal movement to [Spec, CP] covertly, at which it can determine the scope. The derivation is shown in (11).

- (11) Zhangsan renwei [Lisi mai-le *sheme*]?
 Zhangsan think Lisi buy-ASP what
 'What did Zhangsan think that Lisi bought?'
 LF: [_S [_{COMP} [+WH] *sheme*_i] [_S zhangsan renwei [_S [_{COMP} [-WH] [_S Lisi mai-le *t_i*]]]]]

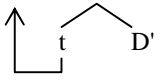
Renwei 'think' is the verb which does not select [+*wh*] C^0 in its COMP, therefore *sheme* 'what' must move to matrix CP where C^0 is [+*wh*]. The lack of *wh*-island effect is explained by the assumption that covert movement (movement at LF) is not subject to the Subjacency Condition. In (12), *xiang-zhidao* 'wonder' selects [+*wh*] C^0 in its COMP where *wh*-element must move to that position at LF and then forms a *wh*-island. Despite this *wh*-island, one of *wh*-elements in the embedded clause must be interpreted in the matrix clause, that is, the *wh*-element undergoes successive cyclic movement to matrix [Spec, CP]. This kind of movement occurs at LF and is assumed not to be sensitive to the Subjacency Condition.

- (12) a. [ni xiang-zhidao [shei mai-le sheme]]?
 you wonder who bought what
 "Who do you wonder bought what?"
 i. I wonder what Lisi bought .
 ii. I wonder who bought books.
- b. LF(i): [_{S'} [_{COMP} [+WH] shei_i] [_S zhangsan xiang-zhidao [_{S'} [_{COMP} [+WH] sheme_j] [_S t_i mai-le t_j]]]]
 LF(ii): [_{S'} [_{COMP} [+WH] sheme_j] [_S zhangsan xiang-zhidao [_{S'} [_{COMP} [+WH] shei_i] [_S t_i mai-le t_j]]]]

3.3.2 Operator Movement (Watanabe 2001)

Watanabe (2001) tries to account for the observed *wh*-island effects in Japanese shown in (13), which are absent in Chinese even though these two languages have *wh*-in-situ in common. He suggests that *wh*-movement in Japanese involves operator movement, instead of phrasal movement. As (14) shows, it is assumed that Q operator is base-generated in [Spec, DP] and Q operator undergo invisible movement in overt syntax. Since movement is in overt syntax, the subadjacency effect is predicted.

- (13) ??John-wa [Mary-ga nani-o katta kadooka] Tom-ni tazuneta no?
 John-Top Mary-Nom what-Acc bought whether Tom-Dat asked Q
 'What did John ask Tom whether Mary bought?'
 (Watanabe 2001(16))

- (14) [CP OP [IP DP] Q] (Watanabe 2001 (19))


Watanabe also observes that *wh*-island effects can be obviated when there is another *wh*-element in matrix clause, as shown in (2c), repeated in (15).

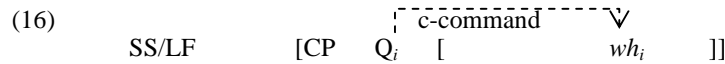
- (15) John-wa [Mary-ga nani-o katta kadooka] dare-ni tazuneta no?
 John-Top Mary-Nom what-Acc bought whether who-Dat asked Q
 'Who did John ask whether Mary bought what?'

Watanabe (2001) analyzes the absence of *wh*-island effects in (15) with the suggestion that [Spec, CP] in the matrix clause must be filled by one *wh*-element in overt syntax. The *wh*-element in the matrix clause undergoes invisible overt movement to matrix [Spec, CP] to meet the requirement, and the rest of the *wh*-elements in the embedded clause undergo covert movement (operator movement at LF). Watanabe (2001) further assumes that covert movement is not sensitive to Subadjacency Condition, as Huang (1982) suggests, and therefore the fact of the absence of *wh*-island effects in (15) can be explained. Contrary to (15), the *wh*-element *nani* 'what' in (13) is the only one *wh*-elements in the embedded clause, and thus it must undergo invisible operator movement at overt

syntax, according to the requirement of the matrix [Spec, CP]. The movement at overt syntax is sensitive to Subjacency Condition, and therefore the fact of the existence of *wh*-island effect shown in (13) can be captured.

3.4. Unselective Binding (Cheng 1991, Tsai 1994, 1997)

Contrary to the movement analysis, Tsai (1994, 1997) suggests that the lack of subjacency effects can be explained by assuming unselective binding, which does not involve movement at any level. Tsai assumes that the Q operator in Chinese, different from Japanese, is base-generated in [Spec, CP], and the *wh*-elements are like variables and must be unselectively bound by an operator Q. The scope is determined by the position of operator Q. It can be illustrated in (16).



This unselective binding approach is compatible with Cheng's (1991), who claims that *wh*-elements in Chinese are like indefinites without inherent quantificational force and their interpretation depends on what binder binds them. As (17a) shows, Q-particle *ne* or null Q licenses interrogative reading of *wh*-element, and (17b) shows that negation *meiyou* 'not' can license existential reading of *wh*-element.

- (17) a. *hufei chi-le sheme (ne)?* (Cheng 1991, 112(1))
 Hufei eat-ASP what Qwh
 'What did Hufei eat?'
 b. *guojing mei-you mai sheme.* (Cheng 1991, 113(5))
 Guojing not-have buy what
 i. 'Guojing didn't buy anything.'
 ii. 'What didn't Guojing buy?'

If we assume that the *wh*-element in Chinese does not function like a quantifier, it therefore is not an operator and movement is obviated. The interpretation of *wh*-elements and their triggers/binders are summarized by Cheng (1991) in (18), where the *wh*-element is interpreted to be interrogative when co-occurring with either Qwh-particle or Neg, polarity/existential (e.g. *some*-NP) when co-occurring with either Qyes/no particle or Neg, or universal when co-occurring with universal marker *dou*.

- (18) The interpretation of *wh*-elements and their triggers/binders
 (i) Qwh.....wh (interrogative reading)
 (ii) Qyes/no...wh (polarity/existential reading)
 (iii) Neg.....wh (interrogative or polarity/existential reading)
 (iv) wh.....dou (universal reading) (Cheng 1991:122 (24))

If in-situ *wh*-elements do not undergo movement, then we need no *ad hoc* explanation for the lack of subjacency effect. Nor do we need the assumption that covert movement is not sensitive to the Subjacency Condition.

3.5. Summary

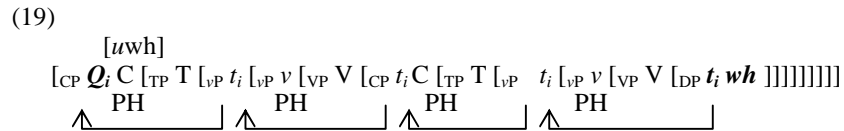
In this section I reviewed three approaches discussed in previous studies to see how *wh*-elements get their interpretation and scope domain in covert *wh*-movement languages. Those approaches to *wh*-in-situ phenomena still remain controversial: whether there is covert *wh*-movement or overt *wh*-movement, phrasal movement or feature movement, or even no movement at all (as in the unselected binding approach) is still not certain. Supposing that these approaches are all valid for analyzing *wh*-in-situ languages, my question here is how these analyses can be reformulated in a phase-based approach.

In the next section, I will discuss *wh*-in-situ based on the same assumptions, while bringing into the discussion certain insights from phase theory.

4. *Wh*-in-situ in Phase-Based Approach

4.1 Operator Movement

As introduced in 3.2.2, Watanabe (2001) suggests that in situ *wh*-elements in Japanese undergo invisible overt movement and therefore are sensitive to *wh*-island effects. This kind of invisible operator movement is like visible operator movement in English, but differs in that it moves with only the Q operator part, instead of moving with a whole phrase or *wh*-word. Q-operator in Japanese is assumed to be inserted into [Spec, DP] and hence it needs to move to [Spec, CP] to check the uninterpretable feature, which is in Pesetsky's (2000) sense. Unlike in Japanese, the *wh*-element in English is itself assumed to be an operator and to undergo phrasal movement in overt syntax. Both Q operator movement and phrasal movement are assumed to occur in overt syntax, and therefore the derivation of invisible operator movement in Japanese would be almost the same as overt *wh*-movement in English under a phase-based approach. The derivation is shown in (19).



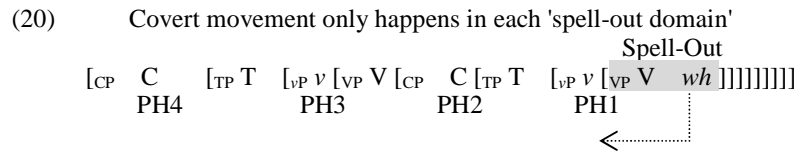
In (19), the Q-operator undergoes invisible successive cyclic movement from [Spec, DP] to [Spec, CP]. Since the Q-operator moves to the edge of the phase before being spelled out, it is possible for such an in-situ *wh*-element to take sentential scope without violating PIC.

Watanabe (2001) further assumes covert movement in multiple-*wh*

questions: only one *wh*-element undergoes invisible overt movement, and the remaining *wh*-elements undergo covert movement at LF. The next questions needing consideration is what the covert movement is like. This is because the conception about LF under the phase-based approach is different from that under the past Y model (which is similar to (6a)). The next subsection will deal with this question.

4.2. Where Does Covert Movement Occur?

It is important to know how the notion of 'covert movement' in minimalist framework differs from that of past theories. If *wh*-elements in *wh*-in-situ languages involve covert movement, then supposing 'covert movement' means 'movement at LF', the question is at what point in the derivation movement would be allowed to occur. Chomsky (2004:107) states that the computation maps LA (Lexical Array) to <PHON, SEM> piece by piece, cyclically, and therefore there are no LF properties and no interpretation of LF. Strictly speaking, Σ (SEM) and Φ (PHON) interpret units that are part of something like LF in a noncyclic conception. Assuming LF (= Σ) and PF (= Φ) are transferred piece by piece, and each piece is part of LF, then the movement at LF would only occur in the part that transferred. It follows straightforwardly that the 'movement at LF' in the phase-base approach would mean that an element moves in a piece of phase domain which has been transferred to LF. The derivation would be like the one in (20).



In (20), *wh*-element in VP internal position will be spelled out when second phase head C (PH2) is merged by assuming Chomsky (2004), then the domain allowing the *wh*-element to move at LF would be limited to the inside of VP. There is no problem with this operation; however, the moved element cannot move out of each piece of spelled-out domain because each spelled-out domain during the derivation becomes a chunk. No elements are allowed to move out of the chunk, or PIC (Phase Impenetrability Condition) will be violated. The derivation can be shown in (21). The *wh*-element (goal) after spelling-out is invisible to the probe (C^0) which is in a different phase domain.²

² '✓' represents 'Spell-out' domain.

- (21) [CP C [TP T [vP v [VP V [CP C [TP T [vP v [VP V *wh*]]]]]]]]]]
 (Spell-out 1) PH2 [VP V *wh*]
(*wh* can only move in this single domain)
 (Spell-out 2) PH3 PH2 [TP [vP v [✓]]]
 (Spell-out 3) PH4 PH3 [VP V [CP C [✓]]]
 (Spell-out 4) PH4 [TP T [vP v [✓]]]

Therefore, if we consider 'LF' under this phase-based approach, the problem is that the 'covert movement' should be limited in each single spelled-out domain, and a *wh*-element can only get interpreted in that given domain instead of at any other domain. Chomsky (2004) suggests that there is no LF but there is covert movement. As has been mentioned in 3.1, covert movement differs from overt movement in different ordering of operations, which are MOVE and TRANSFER. Move is considered to be an operation of internal merge and internal merge can apply either before or after TRANSFER, according to Chomsky (2004, 111). The former case yields overt movement, while the latter case yields covert movement with the displaced element spelled out in-situ. If this is the case, covert movement is the output of TRANSFER MOVE, instead of movement occurring at 'LF'. The derivation is supposed to be that the *wh*-element moves after TRANSFER and it realizes its phonological features only in original position. However, this analysis seems to conflict with the PIC, as I have mentioned earlier. Once the in-situ *wh*-element gets transferred, movement out of the spelled-out domain is impossible because of the PIC if simultaneous spell-out model is still assumed. Under this view, as we assume that no syntactic operation occurs after TRANSFER, it follows that the only possible derivation is still to assume that MOVE occurs before TRANSFER whether the movement is overt or covert.

4.2.1. 'Covert Movement' Occurs in Narrow Syntax

Since any kind of movement must occur before the TRANSFER to LF and PF by assuming PIC, in-situ *wh* must move out cyclically to its scope position before TRANSFER. The derivation of *wh*-in-situ undergoing successive cyclic movement can be shown in (22), which is based on Chomsky's Copy Theory.

- (22) Covert movement (copy and PF deletion) in a phase-based approach³

- [CP C_[+wh] [TP T [vP [vP v [VP V [CP C [TP T [vP [vP v [VP V *wh*]]]]]]]]]]]]
 PH2 <*wh*> PH1 [VP V *wh*]
 PH3 <*wh*>PH2[TP T [vP <*wh*> [vP v [✓]]]
 PH4 <*wh*>PH3 [VP V [CP <*wh*> [✓]]]
 <*wh*>PH4[TP T [vP <*wh*> [✓]]]
 <*wh*>[CP C [✓]]

In-situ *wh* undergoes cyclic movement and leaves copies in the edge of phase;

3 The <*wh*> in (22) represents the copy of *wh*, and <*wh*> means the copy undergoes PF deletion, i.e., <*wh*> loses its phonological feature.

additionally, a particular PF deletion rule must apply after spell-out, that is, to delete all the copies except the one in original position. 'Covert movement' phenomena are actually a consequence of 'overt movement' in narrow syntax, and the combination of copy theory and a particular PF deletion rule. The PF and LF representation of *wh*-in-situ can be represented as (23a).

- (23) a. *Wh*-in-situ (Covert *wh*-movement)
- | | | | | | | | |
|------|---|-------------------------|------------------------|------------------------|------------------------|-------------------------|--|
| NS | [| <i><wh></i> C | [PH4 <i><wh></i> | [PH3 <i><wh></i> | [PH2 <i><wh></i> | [PH1 <i>wh</i>]]]]] | |
| PHON | | — | — | — | — | { <i>wh</i> } | |
| SEM | | [<i>wh</i>] | — | — | — | — | |
| | | [| [| [| [| []]]]] | |
| | | ↑ | | | | ↑ | |
| | | Interpret [<i>wh</i>] | | | | Pronounce { <i>wh</i> } | |
- b. Overt *wh*-movement
- | | | | | | | |
|------|---|---|------------------------|------------------------|------------------------|------------------------------|
| NS | [| <i>wh</i> C | [PH4 <i><wh></i> | [PH3 <i><wh></i> | [PH2 <i><wh></i> | [PH1 <i><wh></i>]]]]] |
| PHON | | { <i>wh</i> } | — | — | — | — |
| SEM | | [<i>wh</i>] | — | — | — | — |
| | | [| [| [| [| []]]]] |
| | | ↑ | | | | |
| | | Interpret [<i>wh</i>] + Pronounce [<i>wh</i>] | | | | |

Comparing (23b) with the representation of overt *wh*-movement shown in (23a), it is easy to see that in-situ *wh* under the phase-based approach can be regarded as a copy whose phonology feature is pronounced in the original position, and whose [*wh*] feature is interpreted in the operator position. Under these assumptions, it becomes possible for an in-situ *wh* to be interpreted outside its PF spell-out domain without violating PIC.

If an in-situ *wh* undergoes movement in narrow syntax, the operation is very similar to Watanabe's (2001) analysis, as has been mentioned in 3.2.2. However, it seems unnatural to think that the difference between covert *wh*-movement language and overt *wh*-movement language is only in their phonetic realization. In fact, an idea similar to this one has already been suggested by Pesetsky (2000), which states that the overt movement and covert movement are more or less identical; the distinction between these two movements is purely a phonological one. Pesetsky (2000) gave the data of multiple questions in Bulgarian and English as evidences to show the symmetry between overt and covert movement. The data are shown in (24) and (25). Particular pronunciation rules are assumed for each language: in English, only the first moved *wh*-element is pronounced in its new position and the rest of *wh*-elements are pronounced in their trace positions, as (24b) shows; whereas in Bulgarian, all of the moved *wh*-elements are pronounced in the new positions, as (25b) shows. (cf. Pesetsky 2000, 28)

- (24) English multiple questions: LF and pronunciation
- a. Who gave what to whom? (Pesetsky 2000, 6 (10))
 - b. [who ~~what whom~~ [who gave what to whom]]

- (25) Bulgarian multiple questions: LF and pronunciation
- a. Koj kakvo na kogo dade? (Pesetsky 2000, 6 (11))
 who what to whom gave
 'Who gave what to whom?'
- b. [koj kakvo na kogo [koj dade kakvo na kogo]]

Therefore, the analysis of generalizing covert movement and overt movement only by different phonological rules is not a theoretically new and impossible approach. With regard to covert movement in a phase-based approach, the derivation must be that in (23a), where the movement is successively cyclic and also subject to PIC, the *wh*-element is pronounced its copy in the original position, instead of the new position.

However, I have to point out two associated predictions from this covert movement approach here. One is that an in-situ *wh* must be an operator and thus is able to undergo movement. The other is that subjacency effects should appear since both covert movement and overt movement occur in narrow syntax. These predictions are not problematic to English, but they are problematic to capture Chinese data adequately, in particular the case of *wh*-arguments, I will discuss this in the next subsection.

4.2.2. Lack of Subjacency Effects

After showing the possible derivation for covert movement under phase-based approach, a problem arises with respect to (non-)existence of the island effects. If movement only occurs in narrow syntax, there should not be syntactic difference between overt movement and so-called 'covert movement', because they only differ in their phonological realizations. However, comparing (26a) with (26b) again, *wh*-island effect appears in (26a) where the *wh*-element in English undergoes overt movement, but no *wh*-island effect is observed in (26b) where the *wh*-element in Chinese undergoes 'covert movement', based on Huang (1982).

- (26) a. = (2a)
 *[What did you ask [who bought ____]]?
 b. = (2b)
 [ni xiang-zhidao [shei mai-le sheme]]?
 you wonder who buy-Asp what
 "For which person x, you wonder what x bought. "
 "For which thing x, you wonder who bought x. "
 (Answers)
 i. I wonder what Lisi bought.
 ii. I wonder who bought books.

If we assume that the movement only occurs in narrow syntax, the symmetry between English multiple question in (24) and Bulgarian multiple question in (25) can be well captured, as well as the symmetry between the invisible overt operator movement in Japanese and English overt movement.. Nevertheless, we fail to capture the asymmetry in terms of island effect shown in (26b).

The existence of the island effects seems to be crucial to determine whether there is movement or not under GB theory. If movement is assumed but no island effect is observed in empirical data, such as (26b) shows, an extra assumption must be made in order to keep the movement analysis and also solve the conflict between the movement and the absence of island effects. For instance, assumptions like the Pied-piping mechanism (Nishigaushi 1986 & 1999, Fiengo et al. 1988, Lasnik and Saito 1992) which has been mentioned above, CP/IP-absorption language hypothesis (Richard 2001), subjacency tax analysis (Pesetsky 2000, Richard 2001) and Huang's (1982) ECP (Empty Category Principle) can be raised. Richard (2001) suggests that subjacency must be obeyed whether it is overt movement or covert movement. He considers the absence of *wh*-island effects to be related to the properties of CP-absorption language. That is, a language which has multiple specifiers in CP where an escape hatch is offered for long-distance *wh*-movement could allow the violation of *wh*-island condition. Chinese is assumed to be a CP-absorption language and therefore the *wh*-element could be able to move to [Spec, CP] without skipping a CP projection (the 'island'), and hence the island effect can be avoided. In addition, subjacency tax analysis is also assumed to capture the other CP-absorption languages, such as Bulgarian and English (following Richard 2001), which exhibit island effects but only for the first moved *wh*-element. Even though subjacency tax analysis could also capture Japanese data which are shown in (13) and (15), the analysis is obviously not so applicable in Chinese.

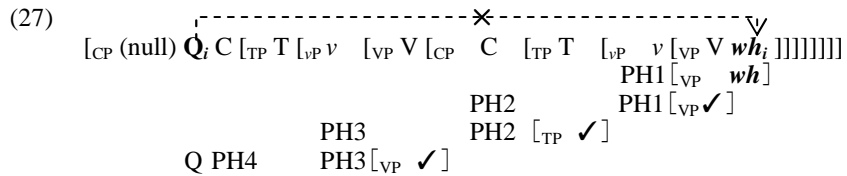
As a result, due to those insufficient explanations dealing with the movement analysis and the lack of subjacency effects in Chinese, non-movement analysis becomes to be a more reasonable approach to capture the property of Chinese *wh*-in-situ. I will turn to discuss non-movement approach, unselective binding approach, based on the assumptions of phase-theory in the next subsection.

4.3. Unselective Binding in Phase-Based Approach

Non-movement approaches, such as Tsai's (1994) unselective binding approach to *wh*-arguments in Chinese as discussed in 3.3, and Aoun and Benmamoun's (1998) analysis about *wh*-phrases related to clitics can be raised. The former suggests that in-situ *wh* does not undergo movement and is bound by a Q binder which is base generated in [Spec, CP]; the latter suggests the *wh*-element is base generated in [Spec, CP] and co-indexes with a clitic in its gap position. These two analyses obviously have one thing in common, that is, the operator, whether Q operator or *wh*-operator, stays in operator position [Spec, CP] and binds something (such as a variable or clitic) in its θ position. In the sense of Aoun and Benmamoun (1998), an in-situ *wh*-argument behaves like a pronoun, and therefore no movement is involved. The lack of island effects is then nicely captured.

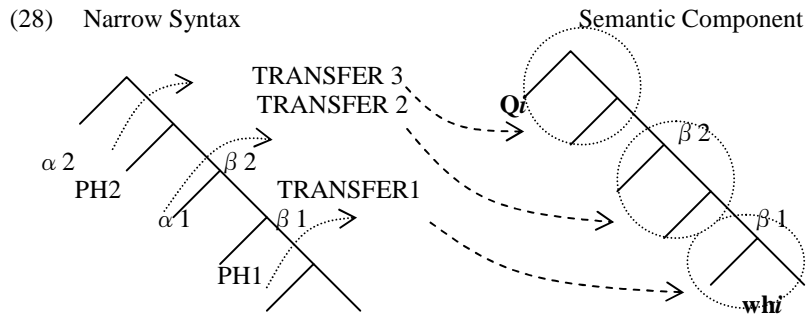
As we have seen, unselective binding is another approach to replacing covert movement and explaining why there is no subjacency effect in *wh*-in-situ languages such as Chinese. However, there is also a problem with unselective binding in the phase-based approach. In-situ *wh* under unselective binding

analysis is supposed to be bound by its binder Q, which is assumed to external merge to C. If that is the case, then in-situ *wh* should not be visible to the binder Q according to PIC. As (27) shows, in situ *wh* must be spelled out when the second phase head (PH2) is merged, but Q can only be merged after the fourth phase head (PH4). Therefore, it is impossible for the Q-operator to see where the *wh*-element is and bind it.



As a result, the licensing of *wh*-indefinite won't happen until the merger of the binder Q (matrix [Spec, CP]). If VP spells out when PH2 merges, the *wh*-element in VP will still be an indefinite, and the interpretation of *wh* would be undetermined in phase domain PH1. Therefore, in-situ *wh* would remain unlicensed in the first single domain.

The question here is how a binder targets its bindee if the spelled-out domain is assumed to be impenetrable. Binding relation is defined by the concept of c-command and co-indexing rule, which apply to LF representation instead of to the narrow syntax, if we assume that merge is the only operation in the narrow syntax. Under this view, the unselective binding, if it exists, must apply to a representation which is after the spell-out. I suggest that the way to maintain the long-distance relationship between a binder and a bindee is to assume that each spelled-out phase to LF maps to the semantic component and merges into a full tree, where the binding relation can be confirmed and without violating PIC. This idea can be illustrated as follows:



Assuming the existence of the semantic component, each piece of phase which spelled out from narrow syntax to LF does not just disappear, as the PIC might lead us to believe: spelled out phases become invisible, but it is still possible to assume that those spelled out phases form a structure outside of narrow syntax. Since PIC is only sensitive to narrow syntax but not to other components, such as the semantic component assumed in (28), it is fair to assume that unselective binding does not need to be subject to PIC, and therefore the required binding

relation could consequently be achieved there. This idea seems to go back to the conception of LF component; however, the derivation by phase is still different from the one in the Y model. Each piece of LF phase is transferred in a small unit, and all of the operations in narrow syntax before Spell-out should be done in that phase domain.

Following Cheng (1991), *wh*-elements in Chinese are polarity items and hence must be licensed in a certain syntactic environment to get proper interpretation. Since such kind of *wh*-elements does not have inherent quantificational forces, either *wh*-interrogative force or existential/universal force, it is reasonable to assume that *wh*-elements do not have inherent [*wh*] feature. Here I develop this assumption and assume that *wh*-elements in Chinese only have semantic feature [SOME]. The semantic feature [SOME] is an interpretable feature, and thus it can be spelled out without any problem (meet the requirement of convergence). I assume that a Q_{wh} -particle is the element which is associated with [*wh*] feature. See the data shown in (29). All of the sentences are formed from a *Q* particle *ne* and a noun phrase or a gerund phrase.

- (29) a. ni ne?
 you Q
 'What about you?'
 b. xiezi ne?
 shoes Q
 'What about the shoes?' or 'where are the shoes?'
 c. Likai de hua ne?
 leave DE saying Q
 'What if leaving?'
 d. na, qu taibei ne?
 then go Taipei Q
 'Then, how about going to Taipei?'

Note that even there is no *wh*-element in each sentence; the sentence must be interpreted to be *wh*-interrogative question, asking *what kind of the situation* that an individual or an event undergoes is. This kind of interpretation is introduced by *ne* *Q*-particle with [*wh*] feature, instead of other *Q*-particles, such as *ma*, which bears no [*wh*] feature. Compare (30) with (29). The sentences with *Q*-particle *ma*, can only be interpreted as yes/no questions.

- (30) a. ni ma?
 you Q
 'Is that you?'
 b. xiezi ma?
 shoes Q
 'Are they shoes?'
 c. *Likai de hua ma?
 leave DE saying Q
 d. na, qu taibei ma?
 then go Taipei Q
 'Then, will you go to Taipei?'

Therefore, Q particle *ne* can be assumed to associate semantic feature [*wh*] and it is the Q particle to check uninterpretable feature [*uQ*:] in C^0 , and value [*wh*] to it, following Cheng (2002). The derivation can be shown in (31).

$$(31) \quad [{}_{CP} Q[wh] [C^0[{}_{\#}Q:wh] [{}_{TP/AspP} \quad]]]$$

This assumption is fair because of the fact that in-situ *wh* must correlate with a clause final question particle Q associated with [*wh*], even it can be null⁴. Q particle is considered as a licenser in many *wh*-in situ languages such as Chinese and Japanese, according to Cheng's (1991, 2003) Clausal Typing Hypothesis. If Q particle in *wh*-in situ language functions like a *wh*-element with [*wh*] in English and is able to check the uninterpretable feature in C^0 , then it is not necessary for an in-situ *wh* to move out of the phase and into the smallest domain to C^0 . Furthermore, since *wh*-elements do not have uninterpretable feature, *wh*-elements being spelled out in the early derivation are still convergent. But it follows that the *wh*-element at that point of derivation does not have any *wh*-interrogative force. I suggest that the licensing of *wh*-interrogative force of *wh*-elements, in particular *wh*-arguments, applies to semantic component, instead of to narrow syntax. Consequently, the problem of unselective binding with respect to PIC is not a problem anymore if we assume the existence of semantic component and consecutive merging of each phase into a whole tree.

Non-movement of *wh*-arguments in in-situ languages is related to the property of *wh*-elements, which associate with [SOME] feature, instead of [*wh*], and the correlated Q particles associated with [*wh*] must be required. Q particle with [*wh*] does not just type the clause, but also plays a significant role in licensing in-situ *wh*-elements and checking the [*uwh*] in C^0 for in-situ *wh*-elements.

4.4. Summary

In this section I have reanalyzed three previous analyses of *wh*-in-situ phenomena, and also pointed out some problems with each. The problems relate to different theoretical assumptions and also related to the properties of each particular language. Chinese *wh*-elements, in particular, *wh*-arguments, seem to not undergo movement, but it is still problematic if we assume binding approach under phase theory. In order to solve this problem, I suggest that there is a semantic component after narrow syntax, where PIC is not valid there. The licensing of *wh*-interrogative force of *wh*-elements (specifically *wh*-arguments) occurs in that semantic component, instead of in narrow syntax. It is also noticed that these analyses is not applicable to in-situ *wh*-adjuncts because of the existence of island effects. I will discuss the asymmetry between *wh*-arguments and *wh*-adjuncts in the next section.

4 The null Q particle should be distinguished from *ne* Q particle. If a null Q particle is *ne* Q particle but lost its phonetic feature {*ne*}, then (i) should be all grammatical as (29) shows. But (i) are ungrammatical. This shows that null Q particle is only allowed when there are *wh*-elements in the sentence.

(i) ni *(ne)/xiezi *(ne)/ likai de hua *(ne)/ na, qu taibei *(ne)?

5 Asymmetries between *Wh*-argument and *Wh*-adjunct

5.1. Subjacency Effects

After seeing non-movement analysis to in-situ *wh*, it is noticed that this analysis can only be used to explain *wh*-arguments, instead of *wh*-adjuncts. It is because *wh*-adjuncts show different syntactic behaviors from those of *wh*-arguments. One is that *wh*-adjuncts exhibit the island effects, which are not observed in *wh*-arguments. The data are shown in (32) and (33).

- (32) (Chinese)
- a. ni xiang-zhidao [*shei weisheme* da Zhangsan]?
you wonder who why beat Zhangsan
i. 'For which person x, you wonder why x beat Zhangsan.'
ii. *'For which reason x, you wonder who beat Zhangsan for x.'
- b. *Zhangsan yudao [[*e_i weisheme* mai nei ben shu] de pengyoui]?
Zhangsan meet why buy that CL book DE friend
'For which reason x, Zhangsan met a friend who bought that book for x?'
- (33) (Japanese)
- a. John-wa [Mary-ga *naze nani-o* katta ka] dare-ni tazuneta-no?
John-Top Mary-Nom why what-Acc bought Q who-Dat ask Q
i. For which person x, for which thing y, John asked x why Mary bought y.
ii. *For which person x, for which reason y, John asked x what Mary bought for y.
- b. *John-wa [*naze* hon-o katta] tomodachi-ni atta no?
John-Top why book-Acc bought friend-Dat met Q
'For which reason x, John met the friend who bought a book for x.'

(32a) and (33a) show that the *wh*-island effects appear in both languages, where *wh*-adjuncts *weisheme* 'why' in Chinese and *naze* 'why' in Japanese cannot be interpreted in matrix clause, but in embedded clause. (32b) and (33b) also show the DP island effects for *wh*-adjuncts, in contrast to the case of *wh*-argument shown in (3b) and (3c). If there are multiple specifiers in CP in Chinese, according to Richard (2001), *wh*-adjuncts can move to that position without crossing a CP node, and then there should be no *wh*-island effect. But there is an island effect in (32a-ii) just the same as in the Japanese data shown in (33a-ii). Japanese is an IP-absorption language and there is only one specifier in CP (Richards 2001). If Chinese is a CP-absorption language and should allow the violation of subjacency, it follows that there must be some additional constraints on the movement of *wh*-adjuncts.

This kind of asymmetry between *wh*-arguments and *wh*-adjuncts has already been discussed in many previous studies (Huang 1982, Tsai 1994, Reinhart 1998, Soh 2005). Two kinds of approaches had been assumed to capture this asymmetry: one is to assume that both *wh*-arguments and *wh*-adjuncts undergo the same syntactic operation (move α), but the

representations are constrained by some extra conditions such as ECP (Empty Category Principle). The other is to assume that *wh*-arguments and *wh*-adjuncts undergo different syntactic operations respectively, and consequently leads to those asymmetries. I suggest that the two types of *wh*-elements must undergo different operations. I will argue ECP effect and point out its empirical and theoretical problems first.

5.2. ECP

If we assume that all *wh*-elements undergo movement at LF, according to Huang (1982), then only *wh*-adjuncts must be local, and *wh*-arguments can be free from this requirement. If the covert movement of *wh*-adjuncts in Chinese are just like the overt *wh*-movement in English except for the realization of the phonological features, as shown in (23a), then those island effects are all predictable. Both overt and covert movements are the outcomes of more general operations of copy theory and deletion rule under phase-based approach.

Nevertheless, there remains the more significant problem of how non-locality of *wh*-arguments can be explained under the same movement approach. In Huang (1982), he assumes ECP and claims that ECP can account not only for superiority effects, but also for the asymmetry between arguments and non-arguments. According to ECP, every trace must be properly governed: the trace of a *wh*-argument can be properly governed by lexical categories, such as verb and INFL, but not the trace of a *wh*-adjunct because it is assumed to adjoin VP and is governed neither by a verb nor by an INFL (Huang 1982:524). Therefore, the trace of a *wh*-argument does not need to be locally controlled by its antecedent, a *wh*-operator, but is able to be lexically governed by lexical categories. In contrast to *wh*-arguments, since the trace of a *wh*-adjunct cannot be head governed by lexical categories, the operator of a *wh*-adjunct (also other operators like A-not-A and focus operator) must be subject to a stricter locality requirement, that is, the trace must be locally controlled by its antecedent and there cannot be any intervening node (S') between them. According to Huang and assuming ECP, LFs of (32a) can be considered as (34) below.

- (34) a. LF of (32a-i)
 $[_{S'} shei_i [_{S} ni \quad xiang-zhidao [_{S'} [_{comp} t_i weisheme_j [_{S} t_i t_j da \quad Zhangsan]]]]]?$
 who you wonder why beat Zhangsan
- b. LF of (32a-ii)
 $[_{S'} weisheme_j [_{S} ni \quad xiang-zhidao [_{S'} [_{comp} t_j shei_i] [_{S} t_i t_j da \quad Zhangsan]]]]]?$
 why you wonder who beat Zhangsan

In (34a), the *wh*-adjunct *weisheme* 'why' moves to the embedded [Spec, CP] and locally antecedent governs its trace t_j . On the other hand, the *wh*-argument *shei* 'who' cannot locally antecedent govern its trace t_i because of the intervening node S'. However, the trace can be head governed by INFL which is assumed to be a lexical category in Chinese. Therefore both traces in (34) are appropriately governed, and ECP permits the derivation. Obviously, the unwanted derivation of (34b) can also be captured by ECP in an analogous way. *Shei* 'who' in (34b)

moves to embedded [Spec, CP] and its trace can be either locally antecedent governed or head governed by a lexical category INFL. However, *weisheme* 'why' in (34b) appearing in matrix [Spec, CP] does not locally antecedent govern its trace in embedded clause, the trace is head governed by any lexical category either. Hence, the trace of *weisheme* 'why' violates the ECP and the derivation in (34b) is not permitted.

Under the ECP analysis, the absence of subjacency effects (or it could be rephrased to be ECP effects with respect to the asymmetry between *wh*-arguments and *wh*-adjuncts) on *wh*-arguments seems to be explainable in terms of the proper government of the traces. However, there are empirical problem as well as theoretical problem with ECP analysis. Firstly, the *wh*-adjunct *weisheme* 'why' does not always behave exactly the same as the operator of A-not-A does. The data are shown in (35). (35a) is ungrammatical, while (35b) is grammatical. Their LF configurations are shown in (36) respectively, based on the assumptions of Huang (1982).

- (35) a. **shei* xi-bu-xihuan Lisi? (Huang 1982, 566 (56))
 who like-not-like Lisi
 b. *shei weisheme* xihuan Lisi?
 who why like Lisi
 For which person x, for which reason y, x likes Lisi for y.

- (36) a. [_S [_{Comp} *shei*_i A-not-A_j] [_S t_i t_j xihuan Lisi]] (Huang 1982, 567 (58))
 b. [_S [_{Comp} *shei*_i *weisheme*_j] [_S t_i t_j xihuan Lisi]]

According to Huang (1982), the configuration shown in (36a) could be excluded by the ECP at LF since the trace of A-not-A cannot be antecedent governed. The COMP cannot be identified with either the index *i* or the index *j* because the COMP-identification applies only in SS level, instead of LF level. As a result, the index *j* of A-not-A is not identifiable with S' and it follows that the operator of A-not-A fails to locally control its trace t_j. Therefore (36a) is ungrammatical. It is true that ECP captures the ungrammaticality of (36a); however, it also rules out the grammaticality of (36b), which is the case of a *wh*-adjunct *weisheme* 'why'. The configuration shown in (36b) must be excluded under the same assumption of ECP: *weisheme* 'why' cannot locally control its traces and the sentence is predicted to be ungrammatical. Contrary to the prediction, it is grammatical and the pair-list answer is required, such as Zhangsan likes Lisi because Lisi is smart, Xiaoming likes Lisi because Lisi is friendly and so on. But the ECP indeed fails to account for this fact.

The other problem is a theoretical inconsistency, that is, the assumption that 'the trace' is no longer applicable in the minimalist framework. As Chomsky (2004) suggests, a copy is left in the original position, instead of a trace. The question is how ECP could be reconsidered in the phase-based approach. Assuming that there is no trace but a copy in the original position, the necessity of licensing the trace in GB theory would be that of licensing the copy in the original position. In addition, we must also answer the question why a copy in the original position needs to be licensed. It seems that there is no syntactic reason to assume the dependency of a copy to be that of a pronoun or a variable. There is no binding relation between the copies in the representation. Instead,

there should be some syntactic constraints among the copies during the derivation (e.g. Locality Condition, which constrains the movement to be cyclically successive, also constrains the copies). How does the copy of a *wh*-argument differ from the copy of a *wh*-adjunct? I suggest that the difference between these two types of copies is not in the copy itself, but in its syntactic position. These syntactic positions lead different type of licensing process of *wh*-elements. I have argued the non-movement approach (unselective binding) for *wh*-arguments in 4.3, I will discuss how *wh*-adjuncts derive its scope interpretation in the later subsection.

5.3. Chinese *Wh*-adjunct as an Operator?

Tsai (1994) and Reinhart (1998) suggest that *wh*-adjuncts (adverbial *wh*) cannot be variables, but operators which must move to the specifier of CP and determine its scope. However, that suggestion is possible in *wh*-movement languages where the *wh*-element includes *wh*-operator, such as English and Japanese: *wh*-elements in English undergo phrasal movement, whereas *wh*-elements in Japanese undergo operator movement (assuming Watanabe, 2001). However, unlike English and Japanese, Chinese is considered to be a language in which *wh*-elements are indefinites and the forces of *wh*-elements are determined by binders (Cheng, 1991). If the assumption that the asymmetry between *wh*-arguments and *wh*-adjuncts is due to the different properties, such as a variable or as an operator, and then we need to assume that Chinese is a *wh*-in-situ language where some *wh*-elements are variables and some are operators. Furthermore, we must also allow that a *wh*-adjunct like *weisheme* 'why' can be an operator in one syntactic environment and a variable in another.

Weisheme 'why' in (37a) is interpreted as interrogative and takes matrix clause as its scope. Let us suppose that *weisheme* is on the one hand an operator, as (37a) shows, but it can be interpreted as an existential 'any reason' on the other hand, as (37b) shows. (37b) is a bare conditional sentence, in which *wh*-elements are variables, instead of operators (also see Li 1992).

- (37) a. Xiaoming renwei Zhangsan *weisheme* taoyen Lisi?
 Xiaoming think Zhangsan why hate Lisi
 'For which x, x a reason, Xiaoming think that Zhangsan hate Lisi for x?'
 b. Zhangsan *weisheme* taoyen Lisi, wo jiu *weisheme* taoyen Lisi.
 Zhangsan why hate Lisi I then why hate Lisi
 ' $\exists x, x$ a reason, if Zhangsan hates Lisi for x, then I would hate Lisi for x.'

Assuming Cheng (1991) and Li (1992) again, a *wh*-element and its licenser are in bindee and binder relation, then *wh*-adjunct is therefore an indefinite and a binder is needed. That is, a null Q-operator is needed when a *wh*-element is interpreted as interrogative. Then the question would be that if Q-operator exists, and if there is no movement, why do we get the island effects, as (32) shows? This conflict needs to be explained that a *wh*-adjunct intrinsically is a variable, just like other *wh*-elements in Chinese, but at the same time, it could also undergo movement. In this section I questioned the operator analysis of

wh-adjuncts; in the next subsection I will discuss why and how *wh*-adjuncts function differently from *wh*-arguments, and suggest that *wh*-adjuncts behave differently because of the licensing process.

5.4. *Wh*-adjunct Licensed in Narrow Syntax

I assume that *wh*-adjuncts and *wh*-arguments are both indefinites in Chinese and licensors are needed (Cheng 1991, Li 1992). Such an assumption is based on the facts shown in (37). Moreover, I suggest that the different behaviors of *wh*-arguments and *wh*-adjuncts depend on how they get to be bound by Q particles. *Wh*-arguments, must be licensed within *vP* because it is selected inside *vP*, and they will be spelled out in earlier derivation before the merger of Q binder. This means that the licensing of the *wh*-interrogative force of *wh*-arguments does not happen in narrow syntax (or alternatively that unselective binding does not occur in narrow syntax). Therefore *wh*-arguments cannot be licensed to have *wh*-interrogative reading before Spell-Out. Since *wh*-arguments before Spell-out only have a semantic feature [SOME], which cannot do anything to trigger any movement, it follows that there is no movement in narrow syntax for *wh*-arguments.

Contrary to *wh*-arguments, *wh*-adjuncts are not licensed inside *vP*, but by some higher functional projection. I suggest that *wh*-adjuncts are licensed by a clause which is related to event structure rather than argument structure, the functional projection (FP) that *wh*-adjuncts merge might be something like Aspect or Tense. This assumption is supported by the facts that *wh*-adjuncts such as *weishenme* /*zenme* 'why' cannot appear inside the infinite clause or small clause, the data are shown in (38) and (39).

- (38) a. Ta *weisheme/zenme* xiang/dasuan [qu Taipei]?
 He why/why want/intend go Taipei
 'For x, x a reason, he want/intend to go to Taipei for x.'
 b. *Ta xiang/dasuan *weisheme/zenme* [qu Taipei]?
 He want/intend why/ why go Taipei
- (39) a. Ta *weisheme* turan taoyan Zhangsan chidao.
 He why/why suddenly hate Zhangsan late
 'For what reason x, for x, he suddenly hates that Zhangsan is late.'
 b. *Ta turan taoyan Zhangsan *weisheme* chidao.
 He suddenly hate Zhangsan why late
- (40) [CP Q [*wh*-adjunct [TP/AspP [_{vP} [VP]]]]]

Since *wh*-adjuncts must be structurally higher than *vP*, licensing of *wh*-adjuncts is different from that of *wh*-arguments. Let's suppose that Q binder merges to C⁰ and *wh*-adjuncts can wait till the merger of Q binder before Spelled-out, unlike *wh*-arguments. At that point, *wh*-adjuncts can be licensed by Q for its quantificational force with [wh]. That is, a *wh*-adjunct is licensed to have *wh*-interrogative force in narrow syntax, whereas a *wh*-argument is licensed

outside of narrow syntax, as has been illustrated in (28). If this logic is correct, a Chinese *wh*-adjunct licensed to have *wh*-interrogative force in narrow syntax will behave like an operator like English, and the movement to scope position is predicted. If this is the case, not only can the well-known fact of the island sensitivity in the case of *wh*-adjuncts be captured, but also we can explain why the asymmetry between *wh*-arguments and adjuncts exists in the first place. This asymmetry can be illustrated in (41).

- (41) a. *wh*-argument
 NS Q C [FP F [vP v [VP V *wh*-argument]]] [SOME]
 SM-C Q_i C [FP F [vP v [VP V *wh*-argument_i]]]
 [wh] is licensed after NS
- b. *wh*-adjunct
 NP Q_i C [FP *wh*-adjunct_i[WH] [FP F [vP v [VP V]]]]
 [wh] is licensed in NS

Wh-arguments and *wh*-adjuncts are originally variables and Q binders are required. As (41a) shows, the *wh*-argument spells out when C⁰ merges with FP in narrow syntax (NS). The merger of Q not only types the clause, but also unselectively binds the *wh*-argument in the semantic component after spell-out, where the interrogative force of *wh*-arguments is licensed. On the other hand, as (41b) shows, the *wh*-adjunct is bound by Q binder locally in narrow syntax, the *wh*-interrogative force of a *wh*-adjunct is licensed there and locality is required due to PIC.

Lastly, I want to mention a special case of *wh*-arguments in subject position. That is, a subject *wh*-argument is also at the edge of the phase head and should be able to be licensed by Q before it spells out. Then the subject *wh*-argument must undergo the same operation as *wh*-adjuncts do, and island effects should be predicted. However, no island effect is observed. The data are shown in (42).

- (42) a. [*shei* mai] de shu zui pianyi?
 who buy DE book most cheap
 'For which person x, the book x bought is the cheapest one.'
 b. *[Ta *weisheme* mai] de shu zui pianyi?
 he why buy DE book most cheap

I have to say that it may be a problem to the analysis I show above, but it is also important to notice that there is asymmetry between subject position and object position. The interesting data shown in (43) are that intervention effects are observed in *wh*-adjuncts and subject *wh*-arguments, but not in object *wh*-adjuncts. Compare (42a-ii) with (42b-ii, c-ii). Only the *wh*-argument in object position is allowed to have *wh*-interrogative reading when there is negation in the matrix clause.

- (43) a. ta bu renwei [Zhangsan taoyan shei]?
 he not think Zhangsan hate who
 i. 'He doesn't think that Zhangsan hates anybody.'
 ii. 'For which person x, he doesn't think that Zhangsan hates x.'
- b. *ta bu renwei [Zhangsan weisheme taoyan Lisi]?
 he not think Zhangsan why hates Lisi
 i. *'He doesn't think that Zhangsan hates Lisi for any reason.'
 ii. *'For which reason x, he doesn't think that Zhangsan hates Lisi for x.'
- c. ta bu renwei [shei taoyan Lisi]?
 he not think who hates Lisi
 i. 'He doesn't think that there is anybody who hates Lisi.'
 ii. *'For which person x, he doesn't think that x hates Lisi.'

This fact shows there is also an asymmetry between subject position and object position. The crucial difference between these two is that one position is inside VP and the other is outside of VP (at the edge of vP). It is possible to consider their syntactic positions as a factor to contribute to the asymmetry. Meanwhile, *wh*-arguments in subject position do share a very similar syntactic behavior to *wh*-adjunct with respect to intervention effects. It seems that *wh*-arguments in subject position also undergo some syntactic operations in narrow syntax. I have no full idea about the licensing of *wh*-arguments in subject position yet. One thought is to assume the licensing to occur after spell-out but no intervention elements is allowed there, the other thought is to assume that the licensing can occur in narrow syntax, but there must be other way to avoid islands. I will leave this problem for the future studies.

6. Conclusion

In this paper, I reviewed several previous studies about *wh*-movement and *wh*-in-situ phenomena. In particular, I focused on *wh*-in-situ languages such as Chinese and Japanese, and introduced three approaches, covert movement, operator movement and unselective binding, which have been proposed in previous studies. I discussed how each approach could be reanalyzed in a phase-base approach under a minimalist framework, in addition, I also pointed out some theoretical problems about PIC and covert movement proposed in Chomsky (2004).

I went on to discuss the asymmetries between Chinese *wh*-argument and *wh*-adjunct and assumed that they are basically indefinites, which are variables instead of operators. Their different syntactic behaviors, such as the island sensitivity and how their scope gets interpreted, are reflexes of their structural properties and of how a Q binder binds them. I also suggested that there is semantic component after spell-out to which all pieces of LF phases map and form a connected structure by merge. *Wh*-arguments are bound by Q binder in semantic component, which is outside of narrow syntax, and the scope interpretation is determined there. This assumption provides a solution for the conflict between unselective binding and PIC without undermining the assumption that the derivation precedes by phase. *Wh*-adjuncts, on the other

hand, are bound by Q binder in narrow syntax and become operators, which must undergo movement to the scope position.

The distinction between *wh*-arguments and *wh*-adjuncts in Chinese has been a major issue in the literature. It is usually assumed that the two are different in the binding properties (i.e. ECP) or quantificational properties (operator or variable), which is not the ultimate reason behind the distinction. In this paper, I argue that the different syntactic behavior basically lies in syntactic position which leads to a difference in the licensing process of *wh*-elements. I will leave the verification of this hypothesis for a future research.

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