1. Introduction

It is generally observed that $wh$-movement exhibits Superiority effect:

(1) a. $Who_i \text{ bought } what$

b. *$What_i \text{ did } who \text{ buy } i$

Huang’s (1982) ECP account can account for the superiority effect above. (1b) is out because the subject trace is not properly governed (neither head-governed nor antecedent-governed) as illustrated in (2b):

(2) a. $[\text{what} \ i \text{ [who] \ I} \ [t_i \text{ buy } t_j ]$

b. *$[\text{who} \ i \text{ [what] \ I} \ [t_i \text{ buy } t_j ]$

ECP can also account for the in-situ $wh$-adjuncts cases in (3), since as illustrated in (4) the adjunct trace $t_j$ is not properly governed:

(3) a. *Who arrived why? \hspace{1cm} \text{(Reinhart 1998)}

b. *Who fixed the car how? \hspace{1cm} \text{(Bošković 2000)}

(4) a. *$[\text{why} \ i \text{ [who] \ I} \ [t_i \text{ left } t_j ]$

b. *$[\text{how} \ i \text{ [who] \ I} \ [t_i \text{ fixed the car } t_j ]$

Yet, ECP cannot explain the following superiority cases since both the $wh$-traces will be properly head governed after LF-movement:

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(5)  a. */?Whom did Lucie discuss what with e? (Reinhart 1998)
    b. */?Who did Lucie persuade who [PRO to visit e]? (Reinhart 1998)

Similarly, the crossing effect in (6) cannot be accounted for by ECP since both wh-traces are properly head-governed:

(6)  a. ?Which book, do you know who, to persuade t, to read t,
    b. *Who, do you know which book, to persuade t, to read t.


(7)  Attract (Richards 2001)

An attractor K attracts a feature F, creating a copy $\alpha'$ of an element $\alpha$ containing F, and Merging $\alpha'$ with K. The relations between $\alpha'$, K, and F must all obey Shortest.

The basic idea of Attract Closest is that the attractor will always attract the closest element first. The Attract Closest directly rules out the standard Superiority effect as in (1b) and the puzzling ECP case for Huang in (5) since in these examples what are attracted first by the C-head are not the closest wh-words.

Meanwhile, the crossing effect in (6) is nicely accounted for. As one can see from the derivation in (8) (= (6a)), when the sentence is built up to the embedded C, the highest wh-word who is attracted first to check the relevant [+Q] feature (8b). Later when the sentence hits the matrix C, the second wh-word which book is attracted (8d) since the first wh-word who has checked its uninterpretable feature and thus remains inert to the matrix C-head.

(8)  a. Step 1
   [Q [ to persuade who to read which book]]
   b. Step 2
   [who, to persuade t, to read which book]]
   c. Step 3
   [Q [you know who, to persuade t, to read which book]]
   d. Step 4
   [Which book, [you know [who, to persuade t, to read t,]]]

Also, some cases of wh-argument/adjunct interaction can be explained by Attract Closest,
assuming the wh-adjectun why a VP adverbial. (9a) is ruled out simply because the wh-object who is not the closest element to C.


    However, if we turn back to the other in-situ wh-adjectun cases in (3) (repeated below), Attract Closest is of no help here.

    b. *Who fixed the car how? (Bošković 2000)

Both Reinhart (1998) and Saito (2003) suggest that why in English should not remain in-situ. For Reinhart, in-situ wh-adverbs do not denote first order Choice function variables; for Saito why should always check the primary sub-feature of Q. Simply put, why should move first in English. This accounts for (3) and (9) above.

    But still when how/why interacts with the wh-subject as exemplified in (10), the why-move-first approach (Reinhart 1998, Saito 2003) demands more explanation since both why and how have moved first:

(10) a. *Why did who leave?

It seems that none of the above mentioned approaches can provide a satisfactory account.

Now, turning to relevant Chinese examples, one will find that they exhibit even more interesting phenomena. Generally speaking, Chinese simplex sentences allow multiple occurrences of wh-nominal as in (11).

(11) Shei mai-le shenme?
    who buy-Prf what

    ‘Who bought what?’

Since Chinese is a language without overt wh-movement, it is not easy to observe the superiority effect. To see this, we can only embed the multiple wh-clause with the matrix interrogative predicate like wonder as exemplified in (12). Yet, no superiority effect is observed because either the wh-subject or the wh-object can take the matrix scope (Huang 1982:267(198)):\n
\[1\]

\[1\] Richards (2001:245) suggests that Chinese wh-words do obey Superiority (contra Huang (1982)). That is, Attract Closest seems to also apply at LF:
(12) Ni xiang-zhidao [shei mai-le shenme]? you want-know who buy-Prf what
   a. Lit. ‘Who do you wonder ___ bought what?’
   b. Lit. ‘What do you wonder who bought ___?’

More interestingly, in Mandarin Chinese a wh-nominal generally cannot co-occur with a wh-adverb:²

(13) a. *Shei weishenme likai? (Chen & Rooryck 2002: (49b), Hunag 1982:545(57))
   who why leave
   ‘Who left why?’

   b. *Weishenme R shei hui cizhi? (Tsai 2004: (77))
   why who will resign
   ‘Why will who resign?’

Please note that in this paper the wh-adverbs are limited to the reason-why weishenme ‘why’ and the manner-how zenme(yang) ‘how’. Both the reason-why and the manner-how are the genuine wh-quantifiers subject to island constraints at LF (Tsai 1994, 1999, see also Reinhart 1998). A superscript is added to indicate the reading of the wh-adverbs, i.e., weishenmeR referring to the reason-why, zenme(yang)M, the manner-how.

ECP and Attract Closest cannot explain (13a) while the why-move-first approach cannot explain (13b). In section 2, I will illustrate a general paradigm of the wh-nominal/adverb interaction in simplex and complex sentences in Mandarin Chinese. Section 3 lists potential accounts for the paradigm illustrated in section 2 and shows that none of them can account for

(1) Jingcha xiang-zhidao [shei sha-le shei]? police want-know who kill-Prf who
   a. ‘Who are the police trying to find out who killed ___?’
   b. *‘Who are the police trying to find out who ___ killed?’

According to my informants, including myself, both readings in (i) are acceptable. Even though (ia) is more prominent, (ib) is still fine. In other words, there is no apparent superiority effect in such an example. Our judgment is therefore akin to Huang’s (1982:267(198)) judgment.

² We use the term wh-nominal and wh-adverb in this study instead of the traditional term wh-argument and wh-adjunct because according to Tsai (1994, 1999) wh-nominals refer to both wh-arguments and nominals-encoded wh-adjuncts, e.g. purpose-why and method/instrument-how, both of which are subject to unselective binding, whereas wh-adverbs, e.g. reason-why and manner-how are genuine wh-operators/quantifiers which have to undergo LF-movement to take their scopes. In this study, all the wh-adverbs interacting with wh-nominals are limited to the LF-moving operators/quantifiers.
this paradigm. Section 4 provides a plausible analysis involving intervention effect. Section 5 concludes this study with possible theoretical implications and consequences.

2. More observations

In what follows, I will show that in simplex sentences, a wh-nominal cannot co-occur with a wh-adverb/A-not-A-operator in Mandarin Chinese, regardless of the ordering. On the other hand, When embedded with an interrogative matrix predicate like ‘wonder’, the wh-nominal can co-occur with the wh-adverb/A-not-A-operator. Meanwhile, only the wh-nominal can take the matrix scope at LF.

2.1 The simplex sentence

Let’s look at the simplex sentences first. The examples in (14-17) suggest that a wh-adverb cannot co-occur with a wh-nominal.

(wh-subject vs. why)


c. ??Shei weishenmeR hui cizhi? who why will resign ‘Who will resign why?’

d. *WeishenmeR shei hui cizhi? why who will resign ‘Who will resign why?’

(wh-object vs. why)


---

3 Ochi (2003) provides an example, due to J. Huang, where why can co-occur with what in Chinese:
b. *Ni weishenm$^R$ hui kangjian shei?
you why will see whom

‘Why will you see whom?’

c. *Ni weishenm$^R$ hui pa shei?
you why will afraid whom

‘Why are you afraid of whom?’

(wh-subject vs. how)

(16) a. *Shei zenme(yang)$^M$ duen nurou?
who how stew beef

‘Who stewed beef how?’

b. *Shei zenme(yang)$^M$ pa Zhangsan?
who how fear Zhangsan

‘Who fears Zhangsan how?’

(i) Ni weishenme mai-le shenme?
you why bought what

‘Why did you buy what?’

For me, this sentence can only denote, if any, the purpose-why reading which according to Tsai (1999b) is due to the purpose-why being merged in VP-adjoined position. The sentence thus only has the reading akin to ‘For what purpose did you buy what?’

The following tests from Stepanov and Tsai (2006) can prove my claim. They suggest that the sentient verb and the locative-existential predicate require the non-agentive subjects which in turn are only compatible with the reason-why. Now, the weishenme ‘why’in the following example is restricted to the reason-why reading and the sentence is not acceptable.

(transitive sentient verb)

(ii) *Ni weishenme pa shenme?
you why fear what

‘Why did you fear what?’

(locative-existential predicates)

(iii) *Chuang-shang weishenme tang-le shenme-ren?
bed-o why lie-Prf what-person

Lit. ‘On the bed why lies who?’
(wh-object vs. how)

(17) a. *Zhangsan  \text{zenme(yang)}^M \text{xiu shenme}?
   Zhangsan how fix what
   ‘How did Zhangsan fix what?’

   b. *Zhangsan  \text{zenme(yang)}^M \text{pa shei}?
   Zhangsan how fear who
   ‘How does Zhangsan fear who?’

Meanwhile, since Huag (1982) the A-not-A question in Chinese has been patterned with wh-questions where the A-not-A operator undergoes LF-movement and is subject to island constraints. Interestingly, the A-not-A operator simply cannot co-occur with a wh-nominal:

(wh-subject vs. A-not-A)

(18) a. *Shei \text{xi-bu-xihuan Lisi}? (Huang 1982:545)
   who like-not-like Lisi
   Lit. ‘Who likes Lisi or not?’

   b. *Hui-bu-hui shei xihuan Lisi?
   will-not-will who like Lisi
   Lit. ‘Will it be the case or not that who likes Lisi?’

(wh-object vs. A-not-A)

(19) *Ni \text{xi-bu-xihuan shei}?
   you like-not-like whom
   Lit. ‘You like whom or not?’

A general pattern is illustrated below where either ordering of the wh-nominal and the wh-adverb/A-not-A-operator is ruled out:

(20) a. *[\text{‘who/what’} \ldots \text{‘why/how/A-not-A’} \ldots]

   b. *[\text{‘why/how/A-not-A’} \ldots \text{‘who/what’} \ldots]

2.2. The complex sentence

Let’s look at the complex sentences now. As first observed by Huang (1982), when embedded as interrogative clauses, the above mentioned sentences in Chinese turn out to be good. The wh-nominals can co-occur with the wh-adverbs reason-why or manner-how or the A-not-A operator. Meanwhile, only the wh-nominals in question can take the matrix scope.
\textit{(wh-subject vs. ‘why’/‘how’/A-not-A)}

(21) a. Ni xiang-zhidao \textit{[shei weishenme$^R$ mai-le shu]} (Huang 1982:525)$^4$
you want-know who why buy-Prf book

?Lit. ‘Who do you wonder \underline{\_} why bought books?’
#Lit. ‘Why do you wonder who \underline{\_} bought books?’

b. Ni xiang-zhidao \textit{[shei zenme(yang)$^M$ mai-le shu]} (Huang 1982:526)
you want-know who how buy-Prf book

?Lit. ‘Who do you wonder \underline{\_} how bought books?’
#Lit. ‘How do you wonder who \underline{\_} bought books?’

c. Ni xiang-zhidao \textit{[shei xi-bu-xihuan ni]} (Huang 1982:530)
you want-know who like-not-like you

?Lit. ‘Who do you wonder \underline{\_} likes you or not?’
#Lit. ‘Is it the case or not that you wonder who likes you?’

\textit{(wh-object vs. ‘why’/‘how’/A-not-A)}

(22) a. Ni xiangzhidao \textit{[Lisi weishenme$^R$ mai-le shenme]} (Huang 1982:526)
you wonder Lisi why buy-Asp what

?Lit. ‘What do you wonder why Lisi bought \underline{\_}?’
#Lit. ‘Why do you wonder Lisi \underline{\_} bought what?’

b. Ni xiangzhidao \textit{[Lisi zenme(yang)$^M$ mai-le shenme]} (Huang 1982:526)
you wonder Lisi how buy-Asp what

?Lit. ‘What do you wonder how Lisi bought \underline{\_}?’
#Lit. ‘How do you wonder Lisi \underline{\_} bought what?’

c. Ni xiangzhidao \textit{[Lisi xi-bu-xihuan shei]}
you wonder Lisi like-not-like who

?Lit. ‘Who do you wonder whether Lisi likes \underline{\_} or not?’
#Lit. ‘Is it the case or not that you wonder Lisi likes who?’

A general pattern is illustrated below where only the \textit{wh}-nominal can take the matrix scope at LF.

---

$^4$ Still the matrix reading of \textit{who} is not so natural. My informants would have to parse the sentence for a while to get it. Yet, it has a sharp contrast with the unacceptable matrix \textit{why} reading. I therefore put a “?” to the matrix \textit{who} reading and a “*” to the matrix \textit{why} reading.
(wh-subject vs. ‘why’/’how’/A-not-A)

\[(23)\]  
S-S: [... ‘wonder’ ['who/what’ ... ‘why/how/A-not-A’ ...]]

a. LF: ?['who/what,'] [... ‘wonder’ [ t_i ... ‘why/how/A-not-A’ ...]]

b. LF: *[‘why/how/A-not-A,’] [... ‘wonder’ [ ‘who/what’ ...t_j...]]

(wh-object vs. ‘why’/’how’/A-not-A)

\[(24)\]  
S-S: [... ‘wonder’ ['why/how/A-not-A’ ... ‘who/what’ ...]]

a. LF: ?['who/what,'] [... wonder ['why/how/A-not-A’ ... t_i ...]]

b. LF: *[‘why/how/A-not-A,’] [... wonder [ t_j ... ‘who/what’ ...]]

Summary:

- In Simplex sentences, a wh-nominal CANNOT co-occur with a wh-adverb/A-not-A operator, regardless of the ordering.
- When embedded with the interrogative matrix predicate ‘wonder’, the wh-nominal CAN co-occur with the wh-adverb/A-not-A-operator. Meanwhile, only the wh-nominal can take the matrix scope at LF.

3. Potential accounts

The following accounts can only partially explain the paradigm illustrated above.

3.1. Subjacency account

Although the complex sentences in (21-22) seem to exhibit the weak island effect, we do not know why the simplex sentences in (14-18) are ruled out since there is no way for any of the wh-elements to violate Subjacency.

3.2. ECP account

ECP cannot explain why (15), (17) and (19) involving wh-objects are out since obviously the wh-object trace, t_j, is properly head-governed as illustrated in the general structure (25), even if we assume Comp-indexing (Aoun, Hornstein, & Sportiche 1981) at LF and Huang’s (1982) LF-movement of in-situ wh-words.

\[(25)\]  
[‘what,’ ['why/how/A-not-A,’]_[IP t_i ...[VP V t_j ] (= the LF of (15), (17) and (19))

Meanwhile, as Bošković (2000:(24)) points out, the ECP account cannot explain the overt wh-nominal/adverb interaction in the overt wh-fronting languages such as Bulgarian (see also Haider 1986). In (26) the wh-adjunct trace is not properly governed after Comp-indexing.
3.3. Superiority account

The superiority account cannot explain why the wh-nominal/adverb interactions in simplex sentences as in (14-19) are ruled out since they do not violate the Superiority condition (even if we adopt mechanisms like Attract Closest and Fewest Steps (Chomsky 1995, Bošković 1997, Kitahara 1997, Richards 2001)). On the other hand, even though we may treat the complex sentences in (22) as the crossing phenomenon like the English case in (6), we do not know why the same phenomenon disappears in (21) where the higher wh-subject presumably can be fixed in the embedded CP while the lower wh-adverb/A-not-A-operator takes the matrix scope.


For Stepanov & Tsai (2006), they can explain Chinese examples in (14d) and (15) (general structure illustrated below) by assuming the Unselective Binding analysis (Tsai 1994) since the slot for merging a Q-operator at CP has already been taken by wheishenme ‘why’ rendering the Unselective Binding unavailable.

\[
(27) \quad *[\text{CP} \{\text{why}\} \{\text{IP} \ldots \text{who/what}\} \ldots ]
\]

Yet, they are vague in the examples like (14a-c) and (21a) (general structure illustrated below as (28)) where they suggest that it is “the wh-subject that renders an intervention effect for a potential LF movement/Agree of the reason why”. This seems to suggest that the wh-adverb why is adjoined to IP and undergoes subsequent LF-movement to CP, instead of being merged at CP.

\[
(28) \quad *[\text{CP} \{\text{who}\} \{\text{why}\} \{\text{IP} \ldots \}]
\]

For Ko (2003, 2006), she judges the paradigm in (14d) and (15) to be grammatical, which, as already shown in footnote 3, can be acceptable only with the purpose-why reading. What we are discussing here is the reason-why reading with which the paradigm in (14d) and (15) can not be grammatical.

For the paradigm in (14a-c) (general structure illustrated in (28) above), she suggests that wh-topicalization is never possible in Chinese, contrary to fact (see Jianxin Wu 1999 for a detailed illustration on Chinese wh-topicalization (or focus movement)). Even so, she still cannot explain why (21a) (repeated below) is acceptable.
(21) a. Ni xiang-zhidao [shei weishenme\^{} mai-le shu] (Huang 1982:525)
you want-know who why buy-Prf book

?Lit. ‘Who do you wonder ___ why bought books?’
#Lit. ‘Why do you wonder who ___ bought books?’

Furthermore, the “merging-why-at-CP” approach cannot be extended to constructions involving the other wh-adverb manner-how and the A-not-A operator, which exhibit the same pattern as the wh-adverb reason-why with respect to the wh-nominal/adverb interaction in Mandarin Chinese.

4. An intervention effect account

In this section I would like to propose that the paradigm illustrated in section 2 can be explained by the intervention effect (de Swart 1992, Beck 1996, Beck and Kim 1997, Pesetsky 2000, Ko 2003). More specifically, the ungrammatical sentences/readings in the paradigm in section 2 are attributed to the intervention effects on the LF-moving wh-adverbs/A-not-A-operator. On the other hand, the grammatical sentences/readings in the same paradigm are simply due to the fact that Chinese wh-nominals generally do not exhibit intervention effect. Before we move on to the analysis, a brief introduction to intervention effect is necessary.\(^5\)

\(^5\) What is under discussion in this paper is different from the “strong” notion of intervention effect developed by Kim (2002, 2005) and Beck (2005). They limit their discussions to a core set of intervention effect, i.e., focus effect, since it enjoys a stable blocking phenomenon across languages.

(i) \([\text{CP} Q_i [\text{FocP} [... \text{wh} \ldots]]]\) (Kim 2002, 2005)

By “strong” I mean that even in Mandarin Chinese the wh-nominals are also ruled out by the focus effect as exhibited in (ii) where shi (focus marker similar to English cleft construction), zhiyou ‘only’, lian ‘even’ are focus markers.

(ii) a. *Shi Zhangsan chi-le shenme?
    SHI Zhangsan eat-ASP what
    ‘What was x such that it was Zhangsan that ate x?’

b. ?*Zhiyou Zhangsan chi-le shenme?
    only Zhangsan eat-ASP what
    ‘What did only Zhangsan eat?’

c. ?*Lian Zhangsan dou chi-le shenme?
    even Zhangsan all eat-ASP what
    ‘What did even John ate?’

In this paper, what is served as the diagnostics on covert movement is the “weak” notion of intervention effect to which only the wh-adverbs are sensitive as already exhibited in the contrast
4.1. Intervention effect in Mandarin Chinese

Generally speaking, the intervention effect may serve as a diagnostics on covert wh-movement. As illustrated in (29), a scope-bearing element X blocks the LF-movement of a wh-word:

(29) Intervention effect

*whi... X ... whi ...

where X is a scope-bearing element, and the wh-dependency is created by LF movement of a wh-word (adapted from Ko 2003)

The German example below shows that LF-movement of the in-situ wh-word wen ‘whom’ or wo ‘where’ is blocked by an intervening scope-bearing element niemand ‘nobody’. Hence the sentences are ruled out.

(German, Beck 1996:3)

(30) a. ??Was glaubt niemand wen Karl gesehen hat?
what believes nobody whom Karl seen has

‘Who does nobody believe that Karl saw?’

b. ??Wen hat niemand wo gesehen?
whom has nobody where seen

‘Where did nobody see whom?’

In Mandarin Chinese, wh-nominals are not sensitive to intervention effect whereas wh-adverbs/A-not-A-operator are sensitive to it (Cheng & Rooryck 2002, Tsai 2004, Soh 2005, ):

(wh-nominal)

(31) a. Suoyou de xuesheng dou jian-guo shei?
all DE student all meet-EXP who

‘Who has all the students meet?’

b. Ta mei jian-guo shei?
he NEG meet-EXP who

‘Who has he not meet?’

between (31) and (32). (See Yang 2006 for the discussion on the strong/weak contrast in intervention effect.)
On Wh-nominal/adverb Interaction and the Left Periphery (B. C.-Y. Yang)

(wh-adverb)

(32) a. Ta weishenmeR/zenme(yang)M da Lisi?
    he why/how beat Lisi
    ‘Why/how did he beat Lisi?’

    b. *Bingfei ta weishenmeR/zenme(yang)M da Lisi?
       not he why/how beat Lisi
       Lit. ‘Why/how was it not the case that ___ he beat Lisi?’

    c. *Suoyou de xuesheng dou weishenmeR/zenme(yang)M da Lisi?
       all DE student all why/how beat Lisi
       ‘Why/how did all the students beat Lisi?’

(A-not-A operator)

(33) a. Ta hui-bu-hui jian Lisi?
    he will-not-will meet Lisi
    ‘Will he or not meet Lisi?’

    b. *Bingfei ta hui-bu-hui jian Lisi?
       not he will-not-will meet Lisi
       Lit.’It is not the case that he will meet Lisi or not?’

    c. *Suoyou de xuesheng dou hui-bu-hui jian Lisi?
       all DE student all will-not-will meet Lisi
       ‘Will all the students meet Lisi or not?’

Meanwhile, it is suggested in the literature that that Chinese wh-nominals should involve no movement at all whereas wh-adverbs do undergo covert movement (or feature movement) (Tsai 1994, 1999, Reinhart 1998, Cheng & Rooryck 2002). It is therefore safe to investigate into the intervention effect of these LF-moving wh-adverbs/A-not-A-operator which, as will be clear later, in turn leads to the ungrammatical sentences/readings discussed in the paradigm in section 2.

4.2. Attract Closest revisited

I will maintain Attract Closest in my analysis. Though at first sight it seems not to be able to account for the language paradigm in section 2, I propose that by assuming Tsai’s (1994) unselective binging (or Reinhart’s (1998) Choice Functional approach) and Rizzi’s left periphery system of CP, the Attract Closest may remain intact while the paradigm under discussion is well accounted for.

Let’s recapitulate the problems of Attract Closest first. As one can tell from example (12)
(repeated below) which involves two *wh*-nominals, Attract Closet would predict it to exhibit crossing phenomenon as in (6), contrary to fact (see also footnote 1).

\[(12) \] Ni xiang-zhidao [she] mai-le shenme?  
\[\text{you want-know who buy-Prf what} \]

a. Lit. ‘Who do you wonder ___ bought what?’  
b. Lit. ‘What do you wonder who bought ___?’

On the other hand, as already mentioned in section 3.3, Attract Closet cannot explain why all the simplex sentences in (14-19) involving *wh*-nominal/adverb interaction are ruled out. Also, with respect to crossing effect in the complex sentences in (21) and (22), there is no knowing why only the *wh*-nominal takes the matrix scope since at least in (21) the higher *wh*-subject presumably can be fixed in the embedded CP while the lower *wh*-adverb/A-not-A-operator takes the matrix scope in the same vein as (6).

For the constructions involving two *wh*-nominals like (12), the unselective binding approach (Tsai 1994, see also Reinhart 1998) comes in handy. The unselective binding is generally assumed to be insensitive to locality effect. Therefore, either *wh*-nominal can be bound by either Q-operator as illustrated in (34). Hence, no crossing effect is observed.

\[(34) \] Ni xiang-zhidao [she] mai-le shenme?  
\[\text{you want-know who buy-Prf what} \]

a. Qx [you wonder Qy[who(x) bought what(y)]]  
b. Qy [you wonder Qx[who(x) bought what(y)]]

For the constructions involving *wh*-nominal/adverb interaction, I will adopt Rizzi’s (1999) “Split-CP” system where C\text{FOC} is the merging site for a Q-operator binding the *wh*-nominals and C\text{INT} is the landing site for the LF-moving *wh*-adverbs/A-not-A-operator. Simply put, what is traditionally assumed to be one C-head as the attractor for both *wh*-nominals and *wh*-adverbs is now split into two independent C-heads, C\text{FOC} and C\text{INT}, attracting their corresponding *wh*-elements.

\[(35) \] [C\text{INT} … C\text{FOC} [IP … ]]  
\[\text{where C\text{INT} = the landing site for *wh*-adverbs/A-not-A-operator; C\text{FOC} = the merging site} \]
\[\text{for a Q-operator binding the *wh*-nominals ‘who/what’} \]

The basic idea to account for the *wh*-nominal/adverb interaction is this. Since Chinese *wh*-nominals do not exhibit intervention effect while *wh*-adverbs/A-not-A-operator do exhibit so, what leads to the ungrammatical sentences/readings in the *wh*-nominal/adverb interaction is then the intervention effect of the LF-moving *wh*-adverbs/A-not-A-operator. Namely, these LF-moving elements are the intervenes. Meanwhile, the Q-operator responsible for licensing *wh*-nominals in Chinese serves as the intervener.
(36) [C_{INT} … C_{FOC} Q-OP_x [IP … wh(x)… ‘why/how/A-not-A’ … ]] (order irrelevant)

In this sense, Attract Closest remains intact. On the one hand C_{FOC} is responsible for the wh-nominals only. The Q-operator merged at C_{FOC} unselectively binds its corresponding wh-nominals regardless of a higher wh-adverb or A-not-A operator because the wh-nominals and the wh/adverbs/A-not-A-operator are of different type (Tsai 1994, Reinhart 1998). On the other hand the C_{INT} attracts its corresponding wh-adverbs/A-not-A-operator, only that the subsequent LF-movement of the wh-adverb/A-not-A-operator may be blocked by an intervening Q-operator merged at C_{FOC}.

In what follows, I will illustrate in detail the derivations for the wh-nominal/adverb interactions in the left periphery of CP.

4.3. Simplex sentence

Recall that in Chinese simplex sentences a wh-nominal generally cannot co-occur with a wh-adverb, regardless of the ordering of these two types of wh-elements. In this section I show that such a phenomenon results from the intervention effect on the LF-moving wh-adverbs/A-not-A-operator. Let’s start from the general structure (20a) (repeated below) where ‘who/what’ precedes ‘why/how/A-not-A’.

General structure I:
(20a) *[‘who/what’ … ‘why/how/A-not-A’ …]

Derivations:
(37) a. Structure before LF-operation
   [C_{INT}[+Q] … C_{FOC}[+Q] [‘who/what’ … ‘why/how/A-not-A’ …]

   b. Step 1: Merging a Q-operator at C_{FOC}[+Q] to bind who/what (Tsai 1994)
      [C_{INT}[+Q] … C_{FOC}[+Q] Q-OP [‘who/what’ … ‘why/how/A-not-A’ …]]

      [C_{INT}[+Q] … C_{FOC}[+Q] Q-OP [‘who/what’ … ‘why/how/A-not-A’ …]]

As one can tell from (37c), the Q-operator merged at C_{FOC} serves as a scope-bearing element which in turn blocks the LF-movement of ‘why/how/A-not-A’, an obvious intervention effect.

Now, let’s try the other ordering (20b) where ‘why/how/A-not-A’ precedes ‘who/what’:
General structure II:

(20b) *[‘why/how/A-not-A’ … ‘who/what’ …]

Derivations:

(38) a. Structure before LF-operation

\[
[C_{\text{INT}[+Q]} \ ... \ C_{\text{FOC}[+Q]}] [\ldots ‘why/how/A-not-A’ \ ... \ ‘who/what’ \ldots]
\]

b. Step 1: Merging a Q-operator at C_{\text{FOC}[+Q]} to bind who/what

\[
[C_{\text{INT}[+Q]} \ ... \ C_{\text{FOC}[+Q]} Q-OP] [\ldots ‘why/how/A-not-A’ \ ... \ ‘who/what’ \ldots]
\]

c. Step 2: C_{\text{INT}[+Q]} attracts why/how/A-not-A, triggering intervention effect

\[
[C_{\text{INT}[+Q]} \ ... \ C_{\text{FOC}[+Q]} Q-OP] [\ldots \text{why/how/A-not-A} \ldots \text{who/what} \ldots]
\]

Note that in (38b) the ‘why/how/A-not-A’ does not block the unselective binding of the wh-nominal ‘who/what’ from the Q-operator merged at C_{FOC} since on the one hand unselective binding does not follow locality constraint, while on the other hand what the O-operator needs is the wh-nominal serving as a variable, instead of the quantifier-/operator-like wh-adverbs/A-not-A-operator. Meanwhile, (38c) exhibits the same intervention effect as in (37c).

In this section, I have shown that the reason why in Chinese simplex sentences a wh-nominal generally cannot co-occur with a wh-adverb/A-not-A-operator is because of the intervention effect on the LF-moving wh-adverb/A-not-A-operator. In the next section, I will show that in Chinese complex sentences, where a wh-nominal interacts with a wh-adverb/A-not-A-operator in the embedded clause, it is still the intervention effect that filters out the ‘why/how/A-not-A’ reading.

4.4. Complex sentence

Recall that when the ungrammatical sentence in the previous section is further embedded with a matrix interrogative predicate like ‘wonder’, the whole complex sentence turns out to be grammatical and only the wh-nominals can take the matrix scope reading. This section works on such derivations in detail. I will show that the matrix ‘why/how/ A-not-A’ reading is ruled out due to the intervention effect.

Let’s start from the general structure (23a) and in the following derivations (39) I show how the matrix ‘why/how/A-not-A’ reading is ruled out:

General structure III:

(23a) [… ‘wonder’ [‘who/what’ … ‘why/how/A-not-A’ …]] (matrix who/what reading only)
Derivations: (*matrix ‘why/how/A-not-A’ reading)

(39) a. Structure before LF-operation

\[ \text{[C}_{\text{FOC}}^{+Q}] \ldots \text{‘wonder’ [C}_{\text{INT}}^{+Q}] \quad \text{[‘who/what’ … ‘why/how/A-not-A’ …]} \]

b. Step 1: Merging a Q-operator at C_{FOC}^{+Q} to bind who/what

\[ \text{[C}_{\text{INT}}^{+Q}] \ldots \text{‘wonder’ [C}_{\text{FOC}}^{+Q}Q-OP \quad \text{[‘who/what’ … ‘why/how/A-not-A’ …]} \]

c. Step 2: C_{INT}^{+Q} attracts why/how/A-not-A y (intervention effect))

\[ \text{[C}_{\text{INT}}^{+Q}] \ldots \text{‘wonder’ [C}_{\text{FOC}}^{+Q}Q-OP \quad \text{[‘who/what’ … ‘why/how/A-not-A’ …]} \]

(39a) is the structure before LF-operation. Due to principles of economy, only the necessary head for interpretation is projected. Here we want ‘why/how/A-not-A’ to take the matrix scope while ‘who/what’, the embedded scope, so the C_{INT} is projected at the matrix CP while the C_{FOC} is projected at the embedded CP.\(^6\) In (39b) a Q-operator is merged at C_{FOC} binding ‘who/what’. Nothing goes wrong with this step. In (39c), however, the subsequent LF-movement of ‘why/how/A-not-A’ is blocked due to the intervening Q-operator. Therefore, the matrix ‘why/how/A-not-A’ reading is never possible.

Now, I show how the matrix ‘who/what’ reading is derived. To yield the desired reading, the C_{FOC} is projected at the matrix CP whereas the C_{INT} is projected at the embedded CP (40a). In (40b) the embedded C_{INT} attracts the closest corresponding wh-element ‘why/how/A-not-A’. Nothing goes wrong with this step. In (40c), a Q-operator is merged at the C_{FOC} of the matrix CP. The Unselective Binding relation is built up between the Q-operator and it corresponding ‘who/what’. No intervention effect is observed and the matrix ‘who/what’ reading is successfully derived.

Derivations: (matrix ‘who/what’ reading)

(40) a. Structure before LF-operation

\[ \text{[C}_{\text{FOC}}^{+Q}] \ldots \text{‘wonder’ [C}_{\text{INT}}^{+Q}] \quad \text{[‘who/what’ … ‘why/how/A-not-A’ …]} \]

b. Step 1: C_{INT}^{+Q} attracts why/how/A-not-A

\[ \text{[C}_{\text{FOC}}^{+Q}] \ldots \text{‘wonder’ [C}_{\text{INT}}^{+Q}] \quad \text{[‘who/what’ … ‘why/how/A-not-A’ …]} \]

\(^6\) Even if both the C_{INT} and C_{FOC} are projected in the embedded CP to avoid the cyclicity violation, the derivations still work as (39) suggests, only that the intervention effect occurs at the embedded CP when ‘why/how/A-not-A’ first lands at the embedded C_{INT} crossing the intervening Q-operator at the embedded C_{FOC}.
c. Step 2: Merging a Q-OP at matrix C_{FOC+Q} binding the in-situ who/what (no intervention effect)

\[ C_{FOC+Q} \text{Q-OP} \ldots \text{‘wonder’} \ [ C_{INT+Q} \text{‘why/how/A-not-A’} \ [\text{who/what} \ldots t_i \ldots] \]

Similar derivations can also be observed in the general structure (24a) (repeated below) where ‘why/how/A-not-A’ precedes ‘who/what’ in the embedded clause. Following my illustration above, one can easily tell only the matrix ‘who/what’ reading is possible whereas the matrix ‘why/how/A-not-A’ reading is ruled out by the intervention effect.

General structure IV:
(24a) […] ‘wonder’ [‘why/how/A-not-A’ … ‘who/what’ …] (‘who/what’ reading only)

Derivations: (*matrix why reading)
(41) a. Structure before LF-operation
\[ C_{INT+Q} \ldots \text{‘wonder’} \ [ C_{FOC+Q} \ldots [‘why/how/A-not-A’ … ‘who/what’ …]] \]

b. Step 1: Merging a Q-OP at embedded C_{FOC+Q} binding the in-situ ‘who/what’
\[ C_{INT+Q} \ldots \text{‘wonder’} \ [ C_{FOC+Q} \text{Q-OP} \ldots [‘why/how/A-not-A’ … ‘who/what’ …]] \]

c. Step 2: C_{INT+Q} attracts ‘why/how/A-not-A’ (intervention effect))
\[ C_{INT+Q} \ldots \text{‘wonder’} \ [ C_{FOC+Q} \text{Q-OP} \ldots [‘why/how/A-not-A’ … ‘who/what’ …]] \]

Derivations: (matrix ‘who/what’ reading)
(42) a. Structure before LF-operation
\[ C_{FOC+Q} \ldots \text{‘wonder’} \ [ C_{INT+Q} \ldots ‘why/how/A-not-A’ … ‘who/what’ …]] \]

b. Step 1: C_{INT+Q} attracts why/how/A-not-A
\[ C_{FOC+Q} \ldots \text{‘wonder’} \ [ C_{INT+Q} \ldots ‘why/how/A-not-A’ … ‘who/what’ …]] \]

c. Step 2: Merging a Q-OP at matrix C_{FOC+Q} binding the in-situ ‘who/what’
\[ C_{FOC+Q} \text{Q-OP} \ldots \text{‘wonder’} \ [ C_{INT+Q} \text{‘why/how/A-not-A’} \ [‘who/what’ \ldots t_i \ldots] \]

5. Theoretical implication and consequence

At first sight, the Attract Closest adopted in this paper seems to be selective in the sense that different C-heads attract their corresponding wh-elements (C_{FOC} attracts ‘who/what’ and C_{INT} attracts ‘why/how/A-not-A’). Yet, such a concern can be eased with the checking theory where different elements are checked by their corresponding checking heads. The attractor
only attracts the elements of the relevant features corresponding to the attractor. Therefore, the Attract Closest remains virtually intact.

Meanwhile, as Dylan Tsai (p.c.) points out, assuming two independent C-heads within the same CP would lead to the situation where the wh-elements attracted by the higher C command and thus scope over those attracted by the lower C. For the wh-nominals, in this study the wh-nominals are unselectively bound by a Q-operator merged at C\textsubscript{FOC}, which is on a par with the Baker-style “absorption”. Therefore, the wh-nominals take the same scope within one CP. For the wh-adverbs/A-not-A operator, there is no knowing if they, i.e., ‘why/how/A-not-A’ at C\textsubscript{INT}, do scope over ‘who/what’ at C\textsubscript{FOC} within one CP domain since in Mandarin Chinese these two types of wh-elements cannot co-occur in a simplex sentence. We may simply assume that the whole CP is one general scope domain for wh-elements even if the CP is split into two or more layers. I will leave the issue open.

The analysis addressed in this study may have the following typological prediction. In a CP-prominent language, such as Chinese, wh-nominals and wh-adverbs have their independent positions/projections at CP respectively. Attract Closest thus attracts the wh-elements of the same kind/feature as the attractor, i.e., C\textsubscript{FOC} attracts wh-nominals while C\textsubscript{INT} attracts wh-adverbs. On the other hand, in a non-CP-prominent language, such as English, there is only one C-head. Attract Closest simply attracts the closet wh-element regardless of its type.

With such a typological prediction, let’s go back to the English cases (3) and (9), repeated below, and try to account for the distribution with an intervention account.

\begin{enumerate}
\item b. *Who fixed the car how? \hfill (Bošković 2000)
\item (9) a. *Who, did \textsubscript{IP} you \textsubscript{VP} see t\textsubscript{1} why? \hfill (Lasnik \& Saito 1984:242)
\item b. Why, did you buy what t\textsubscript{1}? \hfill (Huang 1982, Saito 2003)
\end{enumerate}

Suppose English is a non-CP-prominent language where, unlike Chinese, only one C-head is projected for the wh-movement. In (3) the wh-subject who is attracted first due to Attract Closest. Yet, subsequent LF-movement of why/how would cross the intervening who, triggering intervention effect.\footnote{I assume multiple specifier approach for the single C-head in English so that the first wh-word is attracted to the lower SpecCP while the second wh-word, the higher SpecCP.} (9a) is out simply because what is attracted first is not the higher VP-adjunct why, a violation of Attract Closest. On the other hand, (9b) is acceptable because the wh-object undergoes covert phrasal movement which according to Pesetsky’s (2000) characterization does not induce intervention effect.
(43) Intervention effect (universal characterization)
   A semantic restriction on a quantifier (including *wh*) may not be separated from that
   quantifier by a scope-bearing element. (Pesetsky 2000:67)

The same reasoning extends to the sentence ‘Who bough what?’ in English where the
*wh*-object *what* undergoes covert phrasal movement. Hence, no intervention effect is
observed.

How about (44)? We may have two possible solutions. The first one is that they both
violate Attract Closest since *why/how* is lower than the *wh*-subject *who*. The second one is
that the *wh*-subject in these sentences undergo feature movement (Pesetsky 2000) so that
following Pesetsky’s characterization above, these sentences are ruled out due to intervention
effect.8

(44) a. *Why did who buy the books?* (Huang 1982:559(92b))
    b. *How did who fix the car?* (Cheng & Demirdash 1990:(18b), Pesetsky 2000: fn. 95)

References:
of Linguistic Research 1, 69 - 95.

8 As pointed out by Yuji Takano (p.c.), the first solution, Attract Closest approach, is not the
determining factor since the following sentence is still out:

(i)  *Why did John think who bought the book?

In the above sentence "why" is obviously the closest *wh*-element to the matrix C-head, whereas the
sentence is still ruled out. Therefore, the first possible solution doesn't seem to work.

The following argument suggests that the second solution inspired by Pesetsky's (2000) notion of
intervention effect may be the right one. Pesetsky's reasoning is this. He suggests that the following
wrong sentences are due to the intervention effect where the *wh*-phrase ‘*which person*’ undergoes
feature movement so that the semantic restriction of it and its Q/wh feature is intervened by a negation
marker:

(ii)  *Which book didn't which person read?* (Pesetsky 2000:60)
     (cf. Which book did which person not read?)

(iii) *Which book didn't John think which person read?*
     (cf. Which book did John think which person didn't read?)

Following Pesetsky, we may judge the in-situ *wh*-subject ‘*which person*’ here above as undergoing
feature movement, sensitive to intervention effect. With this reasoning, we may account for the
ungrammaticality in (44) and (1) above at the same time. That is, both the *wh*-subject ‘*who*’ in (44)
and (1b) undergo feature movement, which then is sensitive to intervention effect.
On *Wh*-nominal/adverb Interaction and the Left Periphery (B. C.-Y. Yang)


Beck, Sigrid. 2005. Intervention Effects Follow from Focus Interpretation, ms.


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