

A UNIFIED ANALYSIS FOR MANDARIN PARASITIC GAPS AND TRUE EMPTY POSITIONS*

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ABSTRACT

Parasitic gaps refer to a specific type of empty category, whose presence relies on that of another empty category. Mandarin Chinese is a *pro*-drop language, yet it is claimed that this language has parasitic gaps in the literature. I first argue that the empty object position in an adjunct clause cannot be labeled as a parasitic gap, since the existence of this empty category does not need to be accompanied by A'-movement; it can co-occur with A-movement or even appear in sentences with no overt movement at all. Therefore, the empty object position should be merely viewed as a trace left by null operator movement. Second, I extend the proposed analysis to the sentences which are said to have True Empty Positions (Li 2007), proposing that the grammatical contrast that leads Li to postulate True Empty Positions can be boiled down to whether the null operator movement involved in the formation of relevant sentences violates the Subjacency condition or not. This study, thus, provides a more economical way to deal with two seemingly unrelated but in fact highly similar constructions.

Keywords: *pro*, null operators, parasitic gaps, True Empty Positions

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1. INTRODUCTION

Parasitic-gap constructions are sentences that contain two empty categories, both of which stand in a close syntactic and semantic relationship with each other.

(1) (Engdahl 1983)

- a. Which document did John file *e* without reading *pg*?
- b. Which boy did Mary's talking to *pg* bother *e* most?

In (1), *e* and *pg* are coreferential with the sentence-initial *wh*-phrase, and they stand for different types of empty categories: *e* is a gap or empty position from which the *wh*-phrase is extracted, and *pg* is the parasitic gap, whose presence is said to depend on the existence of the real gap *e*. The dependent relationship between these two empty categories is evidenced by the following sentence, in which there is no available gap for the parasitic gap to rely on.

(2) *Who filed which document_i [without reading *pg*_i]?

Unlike what we saw in (1), the *wh*-phrase *which document* remains in its base-generated position; as a result, no corresponding empty category is created to license the parasitic gap, giving rise to a degraded sentence. Engdahl (1983) further notes that although overt movement is crucial for constructing parasitic-gap sentences, not all movements have the same effect.

(3) (Engdahl 1983)

- a. *John_i was killed t_i by a tree falling on *pg*.
- b. *Mary_i seemed t_i to disapprove of John's talking to *pg*.

The two sentences above are passive and raising constructions, in which *John* and *Mary* raise from one argument position to another. If we compare the two sentences in (3) with those in (1), we can see that only A'-movement, but not A-movement, can license parasitic gaps in

English.¹

Wu (1999) and Lin (2005) note a similar phenomenon in Mandarin Chinese.

(4) Slightly modified from (30) in Wu (1999):

- a. *?Zhangsan [zai meiyou kanjian pg_i zhiqian]
 Zhangsan at not see before
 jiu aishang-le shei?
 then love-ASP who
 ‘Who did Zhangsan fall in love with without seeing?’
- b. Shei_i Zhangsan [zai meiyou kanjian pg_i
 who Zhangsan at not see
 zhiqian] jiu aishang-le t_i ?
 before then love-ASP
 ‘Who did Zhangsan fall in love with without seeing?’²

¹ Nissebaum (2000) argues that covert movement can also license parasitic gaps, but this is only allowed in a situation in which overt movement takes place first.

² The original example discussed in Wu (1999) is the following one:

- (i) a. *?Zhangsan [zai meiyou kanjian shei_i zhiqian]
 Zhangsan at not see who before
 jiu aishang-le e_i ?
 then love-ASP
 ‘Who did Zhangsan fall in love with without seeing?’
- b. Shei_i Zhangsan [zai meiyou kanjian t_i zhiqian]
 who Zhangsan at not see before
 jiu aishang-le e_i ?
 then love-ASP
 ‘Who did Zhangsan fall in love with without seeing?’

Wu claims that (ia) can be turned acceptable by preposing the *wh*-phrase to the sentence-initial position so that the parasitic gap, which is labeled e_i , can be licensed, as shown in (ib). However, a parasitic gap is an empty position located in an adjunct clause. The position labeled e_i in (i) is the complement position of the verb *aishang* ‘love’ in a root clause. As a result, I slightly modified this pair of sentences, making them structurally parallel to those discussed in Lin (2005).

(5) Lin (2005):

- a. *Laowang [zai huijian pg_i zhiqian] jiu
 Laowang at meet before then
 kaichu-le shei?
 fire-PERF who
 ‘Who did Laowang fire before meeting?’
- b. Shei_i Laowang [zai huijian pg_i zhiqian] jiu
 who Laowang at meet before then
 kaichu-le t_i ?
 fire-PERF
 ‘Who did Laowang fire before meeting?’

The contrast between (4a) and (4b) as well as (5a) and (5b) appears to be the same as the one between (1a) and (2) in the sense that an in-situ *wh*-phrase cannot license a parasitic gap. Since topicalization, which is an instance of A'-movement, needs to take place in (4) and (5), Wu (1999) and Lin (2005) analyze (4b) and (5b) on a par with (1), viewing the empty category in the adjunct clause as a parasitic gap.

The analysis that (4b) and (5b) are parasitic-gap constructions seems to gain support from the fact that they satisfy another licensing condition for parasitic gaps: the anti-c-command condition.

- (6) a. *Which article t got filed by John without him reading pg ?
 b. *Who t sent a picture of pg ?

Parasitic gaps cannot be c-commanded by the trace left by *wh*-movement (Engdahl 1983; Haegeman 1984, among others). (1a) and (1b) satisfy this requirement, since e does not directly c-command pg in these constructions; likewise, t does not c-command pg in (4b) or (5b), either. By contrast, in (6a) and (6b) t directly c-commands pg , which generates ungrammatical sentences.³

³ See Culicover (2001) for a detailed discussion on the licensing conditions for parasitic gaps and the challenges facing earlier analyses.

Based on what we discussed above, we might schematize the parasitic-gap constructions in English and Mandarin Chinese seen above as follows.

- (7) a. Structure of parasitic-gap sentences in English:
[CP *wh*-phrase_i [IPt_i [Adjunct clause*ec*]]]?
b. Structure of parasitic-gap sentences in Mandarin Chinese:
[CP *wh*-phrase_i [IP[Adjunct clause*ec*],.....t_i]]]?

In (7a), it is *wh*-movement that licenses the empty category in the adjunct clause, and in (7b), what licenses the empty category in the adjunct clause is topicalization. Since the empty category in (7a) is analyzed as a parasitic gap, it is tempting to call the same empty category in (7b) a parasitic gap. However, Mandarin Chinese fundamentally differs from English in that it is a *pro*-drop language that allows not only subjects but also objects to be dropped, while English is not such a language. This difference casts doubt on the validity of analyzing the empty category in the adjunct clause in Mandarin sentences like (4b) and (5b) as a parasitic gap. Engdahl's work explores the connection between language type and the availability of parasitic gaps:

"The characterization of parasitic gaps rules out gaps that arise as the result of a pronoun deletion rule. In languages like Japanese and Turkish, which have rules of optional *pro* drop, a gap may act just like a deictic pronoun and be interpreted as referring to something salient in the context. In languages like English and Swedish..., optional *pro* drop does not occur and gaps are controlled sentence internally (Engdahl 1983:5)."

As illustrated by the contrast between (1a) and (2), the adjunct clause containing a parasitic gap in English can only appear in sentences in which a corresponding empty category created by A'-movement is available. Given the fact that Mandarin Chinese is a *pro*-drop language, we cannot exclude the possibility that what at first looks like a parasitic gap might not be as 'parasitic' as it appears to be, which means that the adjunct clause in which the object position is empty in Mandarin Chinese

is likely to be embedded in a sentence which is not derived via A'-movement. This possibility has been exploited in Xu (1990) and Lai & Sun (2018), both of which attempt to argue that Mandarin Chinese does not have parasitic gaps. However, as we will see shortly, the evidence they provide is not strong enough to support their claim. The goal of this paper is to argue that the empty object position under discussion should not be labeled as a parasitic gap, and then extend the proposed analysis to sentences containing True Empty Positions (Li 2007). This paper is organized as follows.

The first part of Section 2 addresses the failure of Xu (1990) and Lai & Sun (2018) to argue against the idea that Mandarin Chinese has parasitic gaps, and the second part provides novel observations to substantiate the claim that genuine parasitic gaps do not exist in Mandarin Chinese. I will show that the sentences containing this empty category do not satisfy the crucial licensing conditions that their English counterparts meet: in Mandarin Chinese, the presence of 'parasitic gaps' does not have to be accompanied by A'-movement; it can co-occur with A-movement or even appear in sentences whose formation does not involve overt syntactic movement at all. Thus, this type of empty category should not be labelled as a parasitic gap. Later, I turn to investigate sentences that not only begin with a *wh*-phrase, but also contain an adjunct clause in which the object position is empty. Given the fact that these interrogative sentences do not observe weak crossover effects and scopal ambiguity, unlike Wu (1999) and Lin (2005), I propose that the pre-subject *wh*-topics in these sentences do not reach their surface position via movement or topicalization; rather, they are base-generated sentence-initially. In Section 3, I argue that the empty object position discussed in this work should be analyzed as a trace left by null operator movement, since this empty category exhibits unbounded dependencies and its movement is constrained by the Subjacency condition. Although this analysis is not new, I would like to emphasize one important property of the structure containing this empty category: it is the moved null operator that needs to be 'licensed', i.e. finding an appropriate constituent as its antecedent, rather than the empty object position itself. Lastly, I apply the current analysis to the sentences that are said to contain a True Empty Position (Li 2007). After

examining the sentences that lead Li to propose such an analysis in detail, I propose that A TEP is also a position from which a null operator moves. This analysis, coupled with the one proposed in Section 2, amounts to saying that the so-called parasitic gaps and TEPs in Mandarin Chinese should be treated uniformly: they are in fact a trace created by null operator movement. This unified analysis, thus, provides a more economical way to capture the syntactic properties of the empty object positions discussed in this work. Section 4 concludes the paper.

2. APPARENT PARASITIC GAPS IN MANDARIN CHINESE

In this section, we first look at how earlier studies argue against the idea that Mandarin Chinese has parasitic gaps and then point out the problems of their analyses. In the second subsection, based on the novel observations that adjunct clauses in which the object position is empty can be embedded in sentences in which no A'-movement takes place, I propose that the empty category under discussion should not be analyzed as a parasitic gap. Lastly, we turn to sentences that begin with a *wh*-topic such as (4b) and (5b). I will show that topicalization that drives the movement of the *wh*-phrase to the sentence-initial position does not take place; instead, these *wh*-phrases are base-generated sentence-initially in the topic position.

2.1 Earlier Studies

Xu (1990) claims that an adjunct clause that contains an empty category can be embedded in a sentence that is derived via A-movement.

(8) (Xu 1990:456)

- a. Naben shu [du wan e yiqian] yijing bei
 that book read ASP before already by
 ta huan le t.
 he return ASP
 ‘That book was already returned by him before reading.’

- b. Nage ren [wo qu jiu e yiqian] yijing
 that man I go rescue before already
 bei ren sha le t.
 by man kill ASP
 ‘That man was already killed before I went to rescue.’

Xu assimilates Mandarin passive sentences to their English counterparts, proposing that the subject of each sentence in (8) moves from the object position of the main verb to the subject position. Since this movement is A-movement, Xu argues that the empty category in the adjunct clause cannot be a parasitic gap.⁴ However, as proposed in Ting (1998) and Huang (1999), Ting & Y.-C. Huang (2008) point out that the two examples in (8) are long passive sentences and thus should be analyzed differently from their counterparts in English.

- (9) Ting & Y.-C. Huang (2008:35)
- a. [Zhangsan_i bei [VP PRO_i piping-le t_i]].
 Zhangsan BEI criticize-ASP
- b. [Zhangsan_i bei [IP OP_i [IP Lisi piping-le t_i]]].
 Zhangsan BEI Lisi criticize-ASP
 ‘Zhangsan was criticized by Lisi.’

According to Huang (1999), *bei* serves as a verb in Mandarin Chinese, which selects a VP as its complement in short passives, but it takes an IP as its complement in long passives. In short passives, a PRO is base-generated in the object position of the main verb within the VP and then raises to the Spec of the same VP, which is an instance of A-movement. By contrast, in long passives a null operator moves from an object position to adjoin to the IP in which it is base-generated. As we can see in (9b), what is moved is a null operator, and the subject *Zhangsan* is base-generated in its surface position and remains there throughout the derivation. In other words, it is A'-movement that is responsible for the formation of long passives in Mandarin Chinese. Given this analysis, Ting & Y.-C. Huang reanalyze (8a) and (8b) as

⁴ Xu (1990) considers the empty category in the adjunct clause in the two sentences in (8) a Free Empty Category (FEC).

follows.

- (10) a. Naben shu_i [du wan e yiqian] t_i yijing
 that book read ASP before already
 bei (ta) huan le t_i.
 by he return ASP
 ‘That book was already returned by him before reading.’
- b. Nage ren_i [wo qu jiu e yiqian] t_i yijing
 that man I go rescue before already
 bei (ren) sha le t_i.
 by man kill ASP
 ‘That man was already killed before I went to rescue.’

Ting & Y.-C. Huang (2008) do not relate the felicitous use of the adjunct clause that contains an empty object position in (10) to the formation of a long or short passive sentence; rather, they argue that it is topicalization, which raises the subject to the sentence-initial position, that licenses the empty category in the adjunct clause. Due to the presence of the A'-movement in (10), they consider the empty category in the adjunct clause a parasitic gap. This analysis, nevertheless, raises more concerns than it appears to allay.

- (11) Ting & Y.-C. Huang (2008:36)
 Henshao renzhi_i [zai jingcha qu jiu e yiqian]
 few hostage at police go rescue before
 hui bei (ren) shifang t_i.
 will bei person release
 ‘Few hostages will be released before the police went to rescue them.’

Ting & Y.-C. Huang note that sentences like (11) are grammatical in Mandarin Chinese, in which the subject is a *henshao* ‘few’ NP. Given Ko (2005) and Tsai’s (2007) observation that this type of NP cannot be topicalized, Ting and Y.-C. Huang claim that *henshao renzhi* ‘few hostages’ in (11) is not located in a topic position and argue that the empty category in the adjunct clause is a True Empty Position in the

sense of Li (2007), rather than a parasitic gap. However, it seems ad hoc to label the same empty category differently just because it is surrounded by different constituents. The dilemma that Ting and Y.-C. Huang (2008) run into seems to suggest that some syntactic properties of the empty object position in an adjunct clause have not been captured.

A more recent work, Lai & Sun (2018), use the following example to argue that the empty category in an adjunct clause cannot be called a parasitic gap.⁵

- (12) Shenme wenzhang_i, Lisi [zai du-guo *e_i* zhihou]
 what article Lisi at read-EXP after
 jiu piping-le nei-ge fuze jiaodui de ren?
 then criticize-PFV that-CL charge proofread DE person
 ‘Which article did Lisi criticize the person who is responsible for
 proofreading after reading?’

According to Lai and Sun, given the fact that (i) the main clause of this sentence does not contain any empty categories and (ii) the entire sentence is grammatical, the empty category labeled *e* in the adjunct clause cannot be considered a parasitic gap. However, this argument is flawed, since *jiaodui* ‘proofread’ is frequently used as a transitive verb in Mandarin Chinese.

- (13) Zhangsan fuze jiaodui na-pian wenzhang.
 Zhangsan responsible proofread that-CL article
 ‘Zhangsan is responsible for proofreading that article.’

In (13), *jiaodui* ‘proofread’ takes the NP *na-pian wenzhang* ‘that article’ as its complement, which suggests that (12) could be reanalyzed as follows.

⁵ Lai & Sun (2018) also use a long passive sentence starting with a *henshao* ‘few’ NP to argue that the empty category in the adjunct clause is not a parasitic gap.

- (14) Shenme wenzhang_i, Lisi [zai du-guo e_i zhihou]
 what article Lisi at read-EXP after
 jiu piping-le [DP[CP OP_i [C' nei-ge fuze jiaodui
 then criticize-PFV that-CL charge proofread
 t_i]] de ren]?
 DE person

Assuming that there is a null operator originating in the object position of *jiaodui* ‘proofread’, we can account for the grammaticality of (12) by proposing that this null operator moves to the edge of the CP within the complex NP and leaves a trace in its base-generated position. Since A’-movement takes place, the empty object position in the adjunct clause still can be considered a parasitic gap.⁶

Although the above discussion illustrates the failure of earlier studies to argue against the idea that Mandarin Chinese has parasitic gaps, this fact does not amount to saying that Mandarin Chinese really has this unique type of empty category. In the next subsection, I will provide novel evidence to demonstrate that the empty category under discussion here should not be labeled as a parasitic gap.

2.2 Novel Observations

As mentioned in Section 1, Mandarin Chinese is known as a *pro*-drop language, which means that if we can find sentences that are not formed by A’-movement while simultaneously being able to accommodate an adjunct clause in which the object position is empty, then we should not view the empty category in the adjunct clause as a parasitic gap. The first piece of evidence that I would like to provide here is modal constructions in Mandarin Chinese.

Huang (1988) and J.-W. Lin & Tang (1995) classify modals in Mandarin Chinese into two types: raising modals and control modals. *Keneng* ‘possible’, for instance, is a raising modal.

⁶ As we will see shortly, Lai & Sun (2018) do provide one licit example which casts doubt on the claim that Mandarin Chinese has parasitic gaps.

- (15) a. Ta keneng chi-guo fan le.
 he possible eat-ASP rice PAR
 ‘It is possible that he has eaten his meal.’
 b. [ta_i [keneng [t_i chi-guo fan le]]].

As we can see in (15), the subject *ta* ‘he’ raises from a VP-internal position to its surface subject position, which is an A-position. Raising modals are compatible with adjunct clauses in which the object position is empty.

- (16) a. Lisi_i [zai Zhangsan huijian *ec* zhiqian] keneng
 Lisi at Zhangsan meet before possible
 t_i jiu xian chi-bao fan le.
 then first eat-full meal SFP
 ‘Lisi was likely to have finished a meal before Zhangsan met him.’
 b. Lisi_i [zai Zhangsan huijian *ec* zhiqian] keneng
 Lisi at Zhangsan meet before possible
 t_i jiu xian jian-guo jingli le.
 then first see-ASP manager SFP
 ‘Lisi was likely to see the manager first before Zhangsan met him.’

The two sentences in (16) differ from (15) in that they contain an adjunct clause in which the object position is left empty, and they are still grammatical. Given the fact that the formation of raising constructions involve A-movement rather than A’-movement, viewing the *ec* in (16a) and (16b) as a parasitic gap is therefore not tenable.

Adjunct clauses that contain an empty object position can even appear in sentences that do not have movement at all.

- (17) [Ta_i [gan/yuanyi/neng [PRO_i chi fan]]].
 he dare/willing/able eat rice
 ‘He dares/is willing to/is able to eat his meal.’

Huang (1988) and J.-W. Lin & Tang (1995) consider *yuanyi* ‘willing’ a control modal, meaning that sentences with this modal have a subject base-generated in the surface position which controls a PRO located lower in the same sentence. We can insert an adjunct clause that contains an empty object position into such sentences.

- (18) Zhangsan_i [zai gongsi pinyong *ec* zhihou]
Zhangsan at company hire after
yuanyi PRO_i xian bu ling xinshui.
willing first not receive salary
‘Zhangsan is willing to give up the salary after being hired by
the company.’

A control relationship is formed between Zhangsan and PRO in (18), the former of which controls the latter. Overt movement is not involved in the formation of this sentence, yet the object position in the adjunct clause can still be left empty.

So far, we have seen that adjunct clauses in which the object position is empty can appear in raising constructions whose formation involves A-movement as well as in control constructions that do not involve any syntactic movement derivationally. In Mandarin Chinese, there is one construction which employs both A-movement and the control mechanism in its derivation, namely short passive constructions.

As mentioned earlier, Huang (1999) proposes that unlike their English counterparts, subjects in Mandarin short passive constructions are selected by the verb *bei* and base-generated in the subject position. In this construction, there exists a PRO that moves from the object position to the Spec of VP, which is then controlled by the subject. Such short passive constructions can accommodate an adjunct clause that contain an empty object position.

- (19) Lisi_i [PP zai Yuehan huijian *ec* zhiqian] jiu
 Lisi at John meet before already
 bei PRO_i ma-le t_i.
 BEI scold-PERF
 ‘Lisi was scolded before John met him.’

Under Huang’s (1999) framework, in (19) the PRO is raised from the object position to the Spec of VP, which later is controlled by *Lisi* that is base-generated in the subject position. Although only A-movement rather than A’-movement is involved in the derivation of this sentence, an adjunct clause that contains an empty object position can still be incorporated into it.⁷ Lai & Sun (2018) also provide a short passive sentence to demonstrate the fact that the empty category in an adjunct clause can co-occur with A-movement.⁸

- (20) Na-ge xiaotou_i [vP [zai jianchaguan zhenxun e_i hou]
 that-CL thief at DA interrogate after
 [vP bei vP PRO_i turan daibu-le _____i]]].
 BEI suddenly arrest-PFV
 ‘That thief was suddenly arrested after DA’s interrogating.’

The sentence in (20) is similar to the one in (19) in that it is also a short passive sentence, in which the PRO moves from its base-generated position to the Spec of VP. Since no A’-movement takes place in this sentence, (20) can also be viewed as one piece of evidence arguing against the idea that the empty category in the adjunct clause is a

⁷ Tsai (1997) notes that in-situ D-linkd *wh*-phrases such as *na-yi-ge ren* ‘which person’ in Mandarin Chinese can license parasitic gaps.

(i) Akiu [jian-ye-mei-jian e_i] jiu gu-le [na-yi-ge ren]_i?
 Akiu without interviewing immediately hire-PRF which-one-CL person
 ‘Which person did Akiu hire immediately without interviewing?’

As we will see shortly, the empty object position in the adjunct clause in (i) should not be considered a parasitic gap.

⁸ This sentence is modified from one of the sentences discussed in Ting & Y.-C. Huang (2008).

parasitic gap.

The fact that the subjects in (16) and (18)-(20) are definite NPs might lead someone to wonder if these sentences are formed via topicalization that raises the subject NP from the Spec of IP further to a topic position in the left periphery of the clause. If this is really what happens in these sentences, (16a), (18) and (19) would have the following structures.

- (21) a. Raising-modal construction:
 [CP Lisi_i [IP t'_i [zai Zhangsan huijian *ec* zhiqian]
 Lisi at Zhangsan meet before
 keneng t_i jiu xian chi-bao fan le]].
 possible then first eat-full meal SFP
 'Lisi was likely to have finished a meal before Zhangsan met him.'
- b. Control-modal construction:
 [CP Zhangsan_i [IP t'_i [zai gongsì pinyong *ec*
 Zhangsan at company hire
 zhihou] yuanyi PRO_i xian bu ling xinshui]].
 after willing first not receive salary
 'Zhangsan is willing to give up the salary after being hired by the company.'
- c. Short passive sentence:
 [CP Lisi_i [IP t'_i [zai Yuehan huijian *ec* zhiqian]
 Lisi at John meet before
 jiu bei PRO_i ma-le t_i]].
 already BEI scold-PERF
 'Lisi was scolded before John met him.'

Assuming that the adjunct clause in the sentences in (21) adjoins to the intermediate projection V', the subject of each of these sentences can be taken to raise from its original position to a topic position, leaving a trace in the Spec of IP. Since A'-movement occurs in these constructions, the empty object position in the adjunct clause might be considered a parasitic gap. This analysis, however, has two problems.

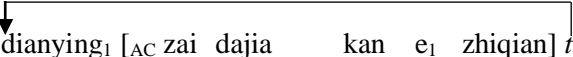
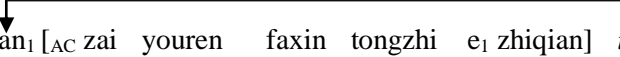
First, recall that in Section 1, we saw that one of the licensing conditions for parasitic gaps is the anti-c-command condition, which

requires that traces left by A'-movement not c-command parasitic gaps. The structures shown in (21) violates this anti-c-command condition, since the trace t_i resulting from topicalization c-commands the empty category in the adjunct clause. If this empty category were a parasitic gap, the entire sentence should be ungrammatical, which is contra the fact.

Second, for advocates that favor the claim that Mandarin Chinese has parasitic gaps, the 'problem' mentioned above could be solved by assuming that the adjunct clause containing the empty category adjoins to IP, rather than V'. Thus, the three sentences in (21) can be reanalyzed as follows.

- (22) a. Raising-modal construction:
 [CP Lisi_i [IP [zai Zhangsan huijian *ec* zhiqian]
 Lisi at Zhangsan meet before
 [IP t'_i keneng t_i jiu xian chi-bao fan le]]].
 possible then first eat-full meal SFP
- b. Control-modal construction:
 [CP Zhangsan_i [IP [zai gongsi pinyong *ec*
 Zhangsan at company hire
 zhihou] [IP t_i yuanyi PRO_i xian bu ling
 after willing first not receive
 xinshui]]].
 salary
- c. Short passive sentence:
 [CP Lisi_i [IP [zai Yuehan huijian *ec* zhiqian]
 Lisi at John meet before
 [IP t_i jiu bei PRO_i ma-le t_i]]].
 already BEI scold-PERF

In each of these sentences, the subject NP is raised to a topic position from the Spec of IP and leaves a trace there. The anti-c-command condition is satisfied here, so it seems that the empty category in the adjunct clause in these sentences can be viewed as a parasitic gap. Law (2014) adopts this strategy to support her viewpoint that the empty category under discussion is a parasitic gap.

- (23) a.  Zhe-xie dianying₁ [_{AC} zai dajia kan e₁ zhiqian] t₁
these-CL movie at everyone watch before
jiu yijing hen maizuo le.
then already very popular SFP
'These movies have already been popular before people
watched (them).'
- b.  Zhangsan₁ [_{AC} zai youren faxin tongzhi e₁ zhiqian] t₁
Zhangsan at someone mail notify before
jiu yijing qu mianshi le.
then already go interview SFP
'Zhangsan went for the interview before someone informed
(him).'

Law assumes that the adjunct clause adjoins to IP, and the sentence-initial NP reaches the surface topic position by moving from its base-generated position within the IP. Given the fact that A'-movement takes place and the trace this movement leaves does not c-command the empty category located in the adjunct clause, Law thus considers the empty category e₁ in (23a) and (23b) a parasitic gap.

The argument mentioned above embraces topicalization as a means to license parasitic gaps in Mandarin Chinese. However, the topic-hood of the sentence-initial NPs in the aforementioned sentences is not substantiated by the following sentences.

- (24) a. Raising-modal construction:
[_{IP} Henshao mianshizhe_i [zai Zhangsan huijian
few interviewee at Zhangsan meet
ec zhiqian] keneng t_i jiu xian jian-guo
before possible then first see-ASP
zhongjingli le].
general.manager SFP
'Few interviewees are likely to see the general manager first
before Zhangsan meet them.'

- b. Control-modal construction:
 [IP Henshao ren_i [zai gongsi pinyong *ec*
 few people at company hire
 zhihou] yuanyi PRO_i xian bu ling xinshui].
 after willing first not receive salary
 ‘Few people are willing to give up the salary after the
 company hires them.’
- c. Short-passive sentence:
 [IP Henshao toudou_i [zai Yuehan zhidao *ec*
 few pitcher at John instruct
 zhiqian] jiu bei PRO_i wajiao t_i].
 before already BEI headhunt
 ‘Few pitchers are headhunt before John instructs them.’

If the analysis that *henshao* ‘few’ NPs cannot be topicalized is on the right track, then the grammaticality of the sentences in (24) suggests that these sentences should have the same internal structures as those in (16a), (18) and (19), in which the sentence-initial NPs occupy the canonical subject position, the Spec of IP, rather than a clause-peripheral position. Given the fact that A’-movement does not take place in these sentences, the empty category in the adjunct clause should not be considered a parasitic gap.

Law’s (2014) examples can also be turned into sentences in which the subject is a *henshao* ‘few’ NP.

- (25) a. Henshao dianying [_{AC} zai Zhangsan guankan *ec*
 few movie at Zhangsan watch
 zhiqian] jiu yijing hen maizuo le.
 before then already very popular SFP
 ‘Few movies have already been popular before Zhangsan
 watches them.’

- b. Henshao shenqingzhe [_{AC}zai xuexiao tongzhi *ec*
 few applicant at school notify
 zhiqian] jiu yijing qu canjian mianshi le.
 before then already go attend interview SFP
 ‘Few applicants go for attending the interview before the
 school notifies them.’

The subject of the two sentences in (25) is *henshao dianying* ‘few movies’ and *henshao shengqinzhe* ‘few applicants’, respectively. If they are only allowed to appear in the Spec of IP, then the empty category in the adjunct clause is unlikely to be a parasitic gap, since the main clause of these sentences does not contain any empty category.

Another piece of evidence illustrating the non-topic-hood of the sentence-initial NP in relevant sentences comes from sentences in which a nonspecific NP is used as a subject.

(26) (Tsai 2008:481)

- a. *Liu-ge ren tai-qi-lai na-kuai shitou.
 six-CL person lift-up-PRF that-CL rock
 ‘Six persons have lifted that rock.’
 b. Liu-ge ren tai-de-qi na-kuai shitou.
 six-CL person lift-can-up that-CL rock
 ‘Six persons can lift that rock.’
 c. Liu-ge ren keyi tai-qi na-kuai shitou.
 six-CL person can lift-up that-CL rock
 ‘Six persons can lift that rock.’

According to Tsai (2008), nonspecific NPs can only appear in the subject position of modal constructions; therefore, (26b) and (26c) are grammatical while (26a) is not. Sentences in which the subject position is filled with a nonspecific NP can accommodate adjunct clauses in which the object position is left empty.

- (27) a. San-ge ren [zai Zhangsan zhidao *ec* hou]
 three-CL person at Zhangsan instruct after
 jiu keyi tai-de-chi na-kuai shitou.
 then can lift-can-up that-CL stone
 'Three people can lift up that stone after Zhangsan instructs them.'
- b. Yi-ge xiaoxue-sheng [zai Zhangsan zhidao
 one-CL elementary.school-student at Zhangsan instruct
ec hou] jiu keyi huida na-ge shuxue
 after then can answer that-CL math
 nan ti.
 difficult question
 'One elementary school student can answer that difficult math question after Zhangsan instructs him/her.'

Given the fact that nonspecific NPs cannot serve as topics, the grammaticality of the two sentences in (27) suggests that A'-movement that raises the sentence-initial NP in (27a) and (27b) to a topic position does not take place, which amounts to saying that the subject NPs in these two sentences are located in the Spec of IP. Since no additional empty category is created for the one in the adjunct clause to rely on, we cannot call the empty category in the adjunct clause a parasitic gap.

One of the reviewers points out that the contrast shown below seems to suggest that Mandarin Chinese does have genuine parasitic gaps.

- (28) Ting & Y.-C. Huang (2008:28)
- a. *[Wo [zai laoshi tichu t de shihou] han
 I at teacher raise DE time with
 tongxue liaotian] de wenti.
 classmate chat DE question
 'the question which I was chatting with classmates when the teacher raised it'

- b. [Wo [zai laoshi tichu e de shihou] da
I at teacher raise DE time answer
bu chulai t] de wenti.
not out DE question
'the question which I could not answer when the teacher
raised it'

Ting & Y.-C. Huang attribute the ungrammaticality of (28a) to the unavailability of an empty category in the main part of the phrase and argue that in (28b) since there is a gap created by relativization in it, the entire construction is well-formed. However, this analysis is challenged by the following considerations.

First, the ungrammaticality of (28a) does not result from the absence of an empty category in the main part of the phrase; rather, it is the phrase itself that is ungrammatical.

- (29) *Wo han tongxue liaotian de wenti
I with classmate chat DE question
'the question which I was chatting with classmates'

The phrase shown in (29) is not an acceptable nominal phrase in Mandarin Chinese. The corresponding one in (28b), on the other hand, is fully grammatical.

- (30) Wo da bu chulai de wenti
I answer not out DE question
'the question which I could not answer'

Second, the adjunct clause shown in (28), in which the object position is empty, can be embedded in sentences in which no other empty categories are available.

- (31) [Henshao wenti [zai laoshi tichu *ec* de shihou]
 few question in teacher raise DE time
 neng nan-dao Yuehan].
 can difficult-beat John
 ‘Few questions can beat John when they are raised by the
 teacher.’

As we can see above, the adjunct clause that is present in (28) can appear in a sentence in which the subject is a *henshao* ‘few’ NP. Since this subject occupies the Spec of IP and cannot raise to a clause-peripheral A’-position, no empty category created by A’-movement exists in the main clause; consequently, considering the empty category in the adjunct clause a parasitic gap is not appropriate.

In addition to the sentences that have been discussed, adjunct clauses in which the object position is empty in Mandarin Chinese can be embedded in the following type of construction as well.

- (32) a. (Tang 1979)
 [Lulu tan gangqin] de shengyin
 Lulu play piano DE sound
 ‘the sound which is produced by Lulu’s playing the piano’
 b. (Zhang 2008)
 [mama chao cai] de weidao
 Mother fry vegetable DE smell
 ‘the smell from Mom’s vegetable-frying’

The constructions in (32) are called gapless relative clauses in the literature. According to Zhang (2008), these constructions do not contain any syntactic gaps related to the head noun derivationally (see also Cha 1999). If Mandarin Chinese really has parasitic gaps, adjunct clauses in which the object position is empty should be incompatible with gapless relative clauses. This prediction, nevertheless, is not borne out.

- (33) Mali [zai laoshi zhidao *ec* zhihou] chui
Mary at teacher instruct after play
changdi de shengyin bian hao ting le.
flute DE sound become good listen SFP
'The sound of Mary's playing flute becomes better after the teacher
instructed her.'

The main clause of (33) consists of a gapless relative clause. If such a construction does not have a gap at all, calling the empty category in the adjunct clause a parasitic gap cannot be on the right track.

Based on what we have discussed, we can see that in English, the empty category in an adjunct clause can only become licit when it is accompanied by another empty category created by A'-movement, while it is illicit elsewhere. By contrast, the corresponding empty category in Mandarin Chinese does not behave in the same way: it can appear in an adjunct clause embedded in sentences that are not derived via A'-movement. As a result, we should not call this empty category a parasitic gap, since the requirement to license parasitic gaps in English is not met in Mandarin Chinese. Nevertheless, the fact that the sentence-initial NPs seen in the aforementioned sentences are not topics does not mean that *wh*-phrases like the one present in (4b) and (5b) are not topics, either. In the next subsection, we will discuss sentences beginning with *wh*-phrases in Mandarin Chinese and examine if these sentence-initial *wh*-phrases reach their surface position by movement.

2.3 Base-Generated *Wh*-Topics

Recall that both Wu (1990) and Lin (2005) claim that a *wh*-phrase needs to be topicalized so that a grammatical sentence that embeds an adjunct clause in which the object position is empty can be generated. Their sentences are repeated below.

(4) Slightly modified from (30) in Wu (1999):

- a. *?Zhangsan [zai meiyou kanjian pg_i zhiqian] jiu aishang-le shei?
 Zhangsan at not see before
 then love-ASP who
 ‘Who did Zhangsan fall in love with without seeing?’
- b. Shei_i Zhangsan [zai meiyou kanjian pg_i zhiqian] jiu aishang-le t_i ?
 who Zhangsan at not see before then love-ASP
 ‘Who did Zhangsan fall in love with without seeing?’

(5) Lin (2005):

- a. *Laowang [zai huijian pg_i zhiqian] jiu kaichu-le shei?
 Laowang at meet before then
 fire-ASP who
 ‘Who did Laowang fire before meeting?’
- b. Shei_i Laowang [zai huijian pg_i zhiqian] jiu kaichu-le t_i ?
 who Laowang at meet before then
 fire-ASP
 ‘Who did Laowang fire before meeting?’

The contrast between (4a) and (4b) as well as (5a) and (5b) clearly indicates the need of a *wh*-phrase in the sentence-initial position in these two sentences.

There are two possibilities of analyzing the sentence-initial *wh*-phrase in (4b) and (5b): one is, like Wu (1999) and Lin (2005), to consider it a moved constituent, which raises from its original position following the main verb to a higher position, and the other view this constituent as a *wh*-phrase base-generated in the left periphery of a clause. If (4b) and (5b) are derived via fronting the *wh*-phrase to the beginning of the sentence, a problem will arise.

- (34) a. Shei_i Zhangsan [zai meiyou kanjian ta_i
 who Zhangsan at not see her
 zhiqian] jiu aishang-le t_i?
 before then love-ASP
 ↑
 ‘Who did Zhangsan fall in love with without seeing?’
- b. Shei_i Laowang [zai huijian ta_i zhiqian]
 who Laowang at meet him before
 jiu kaichu-le t_i?
 then fire-PERF
 ↑
 ‘Who did Laowang fire before meeting him?’

The sentences shown above differ from (4b) and (5b) in that the empty category in the adjunct clause is replaced with an overt pronoun *ta* ‘him/her.’ If we follow Wu (1999) and Lin (2005), claiming that the sentence-initial *wh*-phrases in (34a) and (34b) reach their surface positions via topicalization, weak crossover (WCO) effects should arise, since the *wh*-phrase *shei* ‘who’ has moved across the co-indexed pronoun *ta* ‘him/her.’ However, these sentences are grammatical, which suggests that the sentence-initial *wh*-topic is base-generated sentence-initially, rather than being topicalized to its surface position.⁹

⁹ The lack of WCO effects can also be observed in sentences in which the subject is a *wh*-phrase.

- (i) Shei_i [zai laoban huijian ec/ta zhiqian] jiu xian
 who at boss meet him/her before then first
 bei zong-jingli piping ec le?
 BEI general-manager criticize SFP
 ‘Who was criticized by the general manager first before the boss met him/her?’

In this long passive sentence, the sentence-initial *wh*-phrase is co-referential with the empty category in the adjunct clause. Such co-referentiality still exists even if we substitute this empty category with an overt pronoun *ta* ‘him/her.’ This fact suggests that the subject of the long passive sentence in (i) does not raise from the position following *piping* ‘criticize’ to the Spec of IP, but should be said to originate in its surface position, which lends support to Huang’s (1999) analysis proposed for Mandarin long passive sentences.

The analysis that a *wh*-topic is base-generated sentence-initially is further evidenced by the unavailability of scope ambiguity in the following sentences.

- (35) a. Meigeren dou mai-le shenme?
everyone all buy what
'What did everyone buy?'
(i) For every x for which y, x bought y
(ii) For which y, for every x, x bought y
- b. Shenme_i meigeren dou mai-le t_i?
What everyone all buy
'What did everyone buy?'
(i) *For every x for which y, x bought y
(ii) For which y, for every x, x bought y

Wu (1999) notes that once a *wh*-phrase is topicalized, the sentence containing it is no longer ambiguous. In (35b), *shenme* 'what' takes scope over *meigeren* 'everyone', rather than vice versa. By contrast, questions formed by *wh*-movement observe scope ambiguity.

- (36) Who does everyone like?
(i) For which x for every y, y likes x?
(ii) For every y, for which x, y bought x?

In the question sentence given in (36), the *wh*-phrase can take either narrow scope or wide scope. Li (2000) also notes that sentences containing a sentence-initial *wh*-topic lack scope ambiguity in Mandarin Chinese.

- (37) a. Ambiguous:
 Ta gei meige haizi zuo le shenme
 he for every child make ASP what
 dongxi?
 thing
 ‘What did he make for every child?’
 (answered by ‘he made a horse for Billy, a dragon for Jill...’
 or ‘he made toys for every child’)
- b. Unambiguous:
 Shenme dongxi, ta gei meige haizi zuo
 what thing he for every child make
 le?
 ASP
 ‘What is it that he made for every child?’
 (answered by ‘toys, he made for every child’)

Compared to (37a) in which *shenme dongxi* ‘what thing’ can take either narrow scope or wide scope, (37b) is unambiguous, in which the same *wh*-phrase can only be interpreted as taking wide scope. Given this fact, Li claims that the *wh*-phrase in (37b) is base-generated sentence-initially and thus does not need to reconstruct to the position following the verb *zuo* ‘make.’

If we add an adjunct clause to the sentences seen above, the lack of scope ambiguity still persists.

- (38) a. Shenme dongxi, ta [zai na chu-lai *ec* zhihou]
 what thing he in take out-come after
 gei meige haizi wan?
 for every child play
 ‘What is the thing x such that he let every child to play with x
 after taking x out?’

- b. Na-yi shou ge, meigeren [zai tingguo *ec*
which-one CL song everyone in listen
zhihou] yiding hui xihuan-shang?
after must will like-on
'What is the song x such that everyone must love x after
hearing x?'

The question in (38a) is unambiguous and can only be answered by phrases like *yi-liang wanju qiche* 'a toy car.' Likewise, (38b) is also unambiguous and can be responded with answers like The Beatles' "Hey Jude". Thus, the interaction between a *wh*-topic and a quantifier phrase in the sentences discussed above constitutes a piece of evidence supporting the analysis that the *wh*-topic is base-generated sentence-initially, i.e. a topic position, which thus makes reconstruction unavailable in this type of construction.¹⁰

To sum up, this section provides several pieces of evidence to demonstrate that an adjunct clause in which the object position is left empty can be embedded in sentences whose derivation involves A-movement or even no syntactic movement at all. Given this fact, the empty category in the adjunct clause should not be called a parasitic gap. Second, in sentences that start with a *wh*-phrase preceding the subject of the sentence, the *wh*-phrase cannot be said to reach its surface position via topicalization, since the expected WCO effects and scopal ambiguity are not observable. Therefore, I propose that the *wh*-phrase under discussion here is a topic base-generated sentence-initially. This analysis, nevertheless, raises several issues, one of which concerns how we should analyze the empty object positions in the adjunct as well as the main clause in the sentences discussed above. In the next section, we will deal with this issue.

¹⁰ Wu (1999: 87) accounts for the presence/absence of scope ambiguity in (35b) and (36) by saying that in *wh*-topicalization sentences, "it is the [pro] portion of a *wh*-NP that needs to raise for feature checking, the [wh] portion goes along for PF-convergence. In *wh*-movement, it is the [wh] portion that raises for feature checking and the [pro] portion goes along for PF convergence. The consequence of this is that in *wh*-movement the [pro] portion can be, or is preferably, reconstructed at LF." This analysis, nevertheless, still fails to account for why reconstruction can take place in *wh*-movement sentences while it cannot in *wh*-topicalization.

3. ANALYZING THE EMPTY OBJECT POSITION WITHIN AN ISLAND

Based on what we discussed in the previous section, this section starts with the question regarding how we should analyze the empty object position in an adjunct clause. Given the fact that (i) island effects surface in certain ungrammatical sentences and (ii) unbounded dependencies are observable in this type of sentence, I propose that the empty category under discussion should be analyzed as a trace left by null operator movement. Although this analysis can be viewed as reminiscent of earlier works that study Mandarin null objects in the literature, I would like to emphasize that what is crucial for the adjunct clause that contains an empty object position is not the null object itself, but the null operator that moves from this position. In addition, I extend this analysis to cases which are said to have a True Empty Position (Li 2007), arguing that this type of constituent should be analyzed as a trace bound by a moved null operator as well.

3.1 A Null-Operator Movement Analysis

Contreras (1984) analyzes the sentence in (1a) as having the following structure.

- (39) [Which articles]_i did John file t_i [_{PP} without [_S OP_i [_S PRO reading e_i]]]?

According to Contreras (1984), the operator is base-generated in the object position of the verb *reading*, which later moves to the edge of the adjunct clause. In other words, the gap itself is a variable bound by a moved A'-constituent. This analysis gains support from the fact that island effects arise in certain unacceptable parasitic-gap sentences.

(40) (Chomsky 1986:55)

this is the man John interviewed *t* before _____

- a. expecting us to tell you to give the job to *e*
- b. expecting us to ask you which job to give to *e*
- c. asking you which job to give to *e*
- d. wondering who to ask which job to give to *e*
- e. telling you that you should give the job to *e*
- f. reading the book you gave to *e*
- g. hearing about the plan you proposed to *e*
- h. announcing the plan to speak to *e*
- i. hearing about the plan to speak to *e*
- j. expecting you to leave without meeting *e*
- k. meeting the man in the office near *e*

Chomsky (1986) notes that (40h&i) seem more acceptable than (40g&h), and (40j) is better than most of the sentences in (40). As a result, he sides with Contreras (1984) and proposes a structure similar to the one in Contreras (1984) for parasitic gap sentences.

(41) (Chomsky 1986:56)

What did you file *t* [before [O [reading *e*]]]?

O stands for a null operator in (41), which raises from its base-generated position following *reading* to a higher position.

As for Mandarin Chinese, we can also find unacceptable sentences that have the same behavior.

- (42) a. *Lisi_j [PP zai Zhangsan tingdao [NP laoban bu yuanyi
 Lisi at Zhangsan hear boss not willing
 huijian t_i de chuanwen] zhiqian] keneng t_j
 meet DE rumor before possible
 jiu xian likai le.
 then first leave SFP
 'Lisi was likely to leave first before Zhangsan heard the
 rumor that the boss was not willing to see him.'

- b. *Zhangsan_j [PP zai laoban xuanbu [NP gongsi
 Zhangsan at boss announce company
 jijian pinyong t_i de xiaoxi] zhihou] yuanyi
 soon hire DE news after willing
 PRO_j xian bu ling xinshui.
 first not receive salary
 ‘Zhangsan is willing to give up the salary after the boss
 announced the news that the company was going to hire him.’
- c. *Lisi_i [PP zai Yuehan zhidao [NP laoban hui huijian
 Lisi at John know boss will meet
 t_i de xiaoxi] zhiqian] jiu bei PRO_j
 DE news before already BEI
 ma-le t_j.
 scold-PERF
 ‘Lisi was scolded before John knew the news that the boss
 would meet him.’

If we assume that a null operator is base-generated in the empty object position within the complex NP embedded in the adjunct clause, the ungrammaticality of the sentences in (42) can be attributed to island effects, which result from the movement of the null operator out of the complex NP.

Another piece of evidence supporting the analysis that null operator movement is involved in the formation of the type of adjunct clause under discussion concerns unbounded dependencies.

- (43) a. Na-ge qiangfei [zai jianchaguan pai jingcha
 that-CL robber at prosecutor send police
 daibu *ec* zhiqian] jiu yijing likai Taiwan le.
 arrest before then already leave Taiwan SFP
 ‘That robber has left Taiwan before the prosecutor sent the
 police to arrest him.’

- b. Na-ben shu [zai wo jiao Yuehan qing Bier
that-CL book at I tell John ask Bill
tuo ta gege huan *ec* gei tushuguan zhiqian]
request his brother return to library before
jiu yijing bujian le.
then already disappear SFP
'That book has disappeared before I told John to ask Bill
to request his brother to return it to the library.'

These two sentences differ from those seen earlier in that the internal structure of the adjunct clause that they have is more complex. We can attribute the well-formedness of (43a) and (43b) to the analysis that in the adjunct clause there exists a null operator that moves from its original position following the verb *daibu* 'arrest' and *huan* 'return' to a higher position, which crosses one or several clausal boundaries.

Based on what we have discussed, I propose to analyze some of the grammatical sentences mentioned earlier as follows.

- (44) a. Raising-modal construction:
[_{IP} Lisi_j [_{PP} OP_i [_{PP} zai Zhangsan huijian t_i zhiqian]]
Lisi at Zhangsan meet before
keneng t_j jiu xian chi-bao fan le].
possible then first eat-full meal SFP
'Lisi was likely to have finished a meal before Zhangsan met him.'
- b. Control-modal construction:
[_{IP} Zhangsan_j [_{PP} OP_i [_{PP} zai gongsi pinyong t_i
Zhangsan at company hire
zhihou]] yuanyi PRO_j xian bu ling xinshui].
after willing first not receive salary
'Zhangsan is willing to give up the salary after being hired by the company.'

- c. Short passive sentence:
 [IP Lisi_i [PP OP_i [PP zai Yuehan huijian t_i zhiqian]]
 Lisi at John meet before
 jiu bei PRO_j ma-le t_j].
 already BEI scold-PERF
 ‘Lisi was scolded before John met him.’

Following Lasnik & Stowell (1991), I propose that the moved null operator adjoins to the edge of the adjunct clause in which it is base-generated, after which the null operator is controlled by the subject of the sentence. Since the null operator movement does not cross an island boundary, the grammaticality of these sentences is expected. Likewise, we can analyze sentences in which the subject is not a definite NP in a similar way.

- (45) a. [IP Henshao xianyifan_i [PP OP_i [PP zai jianchaguan
 few suspect at prosecutor
 zhenxun t_i hou]] mashang taopao].
 interrogate after immediately escape
 ‘Few suspects immediately run away after the prosecutor
 interrogates them.’
 b. [IP San-ge ren_i [PP OP_i [PP zai Zhangsan zhidao
 three-CL person at Zhangsan instruct
 t_i hou]] jiu keyi tai-de-chi na-kuai shitou].
 after then can lift-can-up that-CL stone
 ‘Three people can lift up that stone after Zhangsan instructs
 them.’

The subjects in (45a) and (45b) are a *henshao* ‘few’ and an indefinite nonspecific NP, and we can also analyze the empty category in the adjunct clause in these sentences as a trace left by null operator movement.

As for sentences that begin with a *wh*-phrase, I propose that null operator movement takes place in the adjunct clause in these sentences as well, since island effects arise in the following examples.

- (46) a. *Shei_i Zhangsan [zai kanjian [Lisi yaoqing
 who Zhangsan at see Lisi invite
ec_i de xin] zhiqian] jiu aishang-le *ec_i*?
 DE letter before then love-ASP
 ‘Who is the person x such that Zhangsan fell in love with x
 before he saw the letter by which Lisi invited x?’
- b. *Shei_i Laowang [zai tingjian [Intel yuanyi
 who Laowang at hear willing
 guyong *ec_i* de xiaoxi] zhiqian] jiu kaichu-le
 hire DE news before then fire-PERF
ec_i?
 ‘Who is the person x such that Laowang fired x first before he
 heard the news that Intel was willing to hire x?’

Compared to (4b) and (5b), the two sentences in (46) are much degraded, which can be attributed to the violation of the Subjacency condition. Let us take (46a) as an illustration.

- (47) *Shei_i Zhangsan [PP OP₁ [PP zai kanjian [Complex NP Lisi
 who Zhangsan at see Lisi
 yaoqing *t_i* de xin] zhiqian] jiu...?
 invite DE letter before then

The trace *t_i* following *yaoqing* ‘invite’ is left by the moved operator adjoining to PP. Since the movement of this null operator to the edge of the adjunct clause crosses the complex NP boundary, island effects surface, which render this sentence unacceptable. Based on this analysis, coupled with the fact that the sentence-initial *wh*-phrase is base-generated high in the structure, sentences like (4b) and (5b) should be analyzed as follows.

- (48) a. Shei_i [IP OP₂ [IP Zhangsan [PP OP₁ [PP zai...kanjian t₁...]]
 who Zhangsan at see
 jiu aishang-le t₂]]?
 then love-ASP
- b. Shei_i [IP OP₂ [IP Laowang [PP OP₁ [PP zai...huijian t₁...]]
 who Laowang at meet
 jiu kaichu-le t₂]]?
 then fire-PERF

In each of these constructions, there are two null operator movements: one takes place in the main clause, which reflects the fact that the sentence-initial *wh*-phrase does not reach this position via topicalization but is base-generated there; the other null operator movement, which occurs in the adjunct clause, adjoins the moved null operator to the edge of the same adjunct clause. Both movements leave a trace in the object position. One advantage of this analysis is that it accounts for the lack of WCO effects mentioned earlier.

- (49) a. *Who_i does his_i mother like t_i?
 b. Shei_i tade_i muqing hen xihuan t_i?
 who his mother very like
 'Who does his mother like?'

Wu (1999) notes that WCO effects only arise in (49a) but not in (49b), the former of which is not grammatical with the subscripts labeled, while the latter Mandarin sentence is acceptable. This fact can be captured by the following analysis.

- (50) a. Shei_i [IP OP_i [IP tade_i muqing hen xihuan t_i]]?
 who his mother very like
 ‘Who does his mother like?’
- b. Shei_i [IP OP_i [IP Zhangsan [zai meiyong kanjian ta_i
 who Zhangsan at not see her
 zhiqian] jiu aishang-le t_i]]?
 before then love-ASP
 ‘Who did Zhangsan fall in love with without seeing?’
- c. Shei_i [IP OP_i [IP Laowang [zai huijian ta_i
 who Laowang at meet him
 zhiqian] jiu kaichu-le t_i]]?
 before then fire-PERF
 ‘Who did Laowang fire before meeting him?’

If we consider an empty object position a trace left by null operator movement, the sentences in (49b) and (34) should be (re)analyzed as those in (50), in which the constituent that moves across the pronoun *ta* ‘him/her’ is not a *wh*-phrase, but a null operator. Since a null operator is not a true quantifier (Lasnik and Stowell 1991), the grammaticality of these sentences follows.^{11,12}

¹¹ Wu (1999:90) accounts for the contrast between (49a) and (49b) by saying that “the trace left by *wh*-movement is a syntactic as well as semantic variable, but the trace left by *wh*-topicalization is a pure syntactic variable.” However, what counts as a syntactic and/or semantic variable remains unclear in Wu’s work.

¹² Lasnik and Stowell (1991) note that WCO effects do not arise in the following sentences.

- (i) a. Who_i did you stay with t_i [before [his_i wife] had spoken to e_i?
 b. This book_i, I expect [its_i author] to buy e_i.

If we assume that what is moved from e_i to the sentence-initial position is *who* and *this book* in (ia) and (ib), respectively, WCO effects are supposed to arise. Nevertheless, this is contra the fact. In order to account for this phenomenon, Lasnik and Stowell propose that only movement of *wh*-phrases and quantifier phrases might induce WCO effects; by contrast, movement of null operators across a co-indexed pronoun does not. In other

The analysis that considers the empty object position in an adjunct clause a variable bound by a moved null operator can also be found in Lin (2005) and Ting & Y.-C. Huang (2008).¹³ However, the fact that the empty object position under discussion is viewed as a null-operator bound variable does not amount to saying that it is a parasitic gap. Recall that in the previous section, I demonstrated that the presence of an empty object position in an adjunct clause is independent of A'-movement; that is, this empty category can co-occur with another empty category created by A-movement or even appear in sentences with no movement at all, neither of which is observable in English parasitic gap sentences. In addition, analyzing an empty object position as a trace bound by a null operator in Mandarin Chinese is not unprecedented; Huang (1984, 1989, 1999) proposes that an empty object position in Mandarin active and long passive sentences should be analyzed in this way. Therefore, the current analysis illustrates that all we need is one type of empty category that has been identified in the literature, which in fact enables us to account for the derivation of a variety of sentences. The proposed null operator movement analysis further sheds light on another property of Mandarin Chinese: its being a topic-comment language.

Note that although the sentences in (44) are not entirely identical to those in (45) in every aspect on syntactic grounds, what they have in common is that the moved null operator can always find a constituent as its antecedent in the same sentence and be controlled by it. This fact suggests that if no appropriate antecedent appears in the same sentence, then the moved null operator cannot get controlled, which consequently renders the entire sentence uninterpretable. Let us look at the contrast between (4a) and (4b) as well as (5a) and (5b) again. (5) is repeated below as (51).

words, movement does take place in (i), but what is moved is not an overt constituent, but a null operator. As a result, they call sentences like (ia) and (ib) *weakest crossover constructions* and claim that *wh*-phrases and quantifier phrases as true quantifiers while null operators are not.

In this work, I also attribute the lack of WCO effects in (50) to null operator movement, arguing that the sentence-initial *wh*-phrase in these sentences does not reach its surface position via topicalization.

¹³ Lin (2005) points out this analysis in a footnote.

- (51) a. *Laowang [_{PP} OP_i [_{PP} zai huijian *t_i* zhiqian]] jiu
 Laowang at meet before then
 kaichu-le shei?
 fire-PERF who
 ‘Who did Laowang fire before meeting?’
- b. Shei_j Laowang [_{PP} OP_i [_{PP} zai huijian *t_i* zhiqian]]
 who Laowang at meet before
 jiu kaichu-le *t_j*?
 then fire-PERF
 ‘Who did Laowang fire before meeting?’

Under the current analysis, the grammatical contrast exhibited between (51a) and (51b) should be attributed to whether or not the moved null operator can find an appropriate antecedent in the same sentence: in (51a), the subject *Laowang* cannot serve as the antecedent, while in (51b) the *wh*-topic *shei* ‘who’ can. In other words, the need to have a sentence-initial *wh*-topic in sentences like (51b) has nothing to do with the empty category in the adjunct clause per se; rather, the grammaticality of this sentence lies in whether or not an appropriate antecedent that can control the moved null operator is available in the same sentence. In sentences like (44) and (45), the subject of the sentence can serve as the felicitous antecedent for the moved null operator, and in sentences like (4b) and (5b), it is the sentence-initial *wh*-topic that functions as the antecedent for the moved null operator and controls it. Since Mandarin Chinese is a *pro*-drop as well as a topic-prominent language, it is expected that the empty category in the adjunct clause might have a discourse topic as its antecedent, as long as this topic is salient enough. This prediction is borne out by the following example.

- (52) Context: Recently, John is spending a lot of time gambling, and everyone in the company knows that he borrowed twenty thousand dollars from his colleagues. When the general manager of this company, Laowang, heard this news, he was mad at John. As a result,...
- Laowang jue ding [zai huijian ec_i zhiqian] jiu
 Laowang decide at meet before then
 kaichu ta_i ,
 fire him
 Intended meaning: ‘Laowang decides to fire John before meeting him.’

The above sentence can be felicitously used in the context indicated above, and the empty category in the adjunct clause is understood as *John*. The acceptability of this sentence not only illustrates that the use of an adjunct clause in which the object position is empty does not need to rely on the existence of another empty category in the same sentence, but also highlights the importance of the availability of an appropriate antecedent in the same construction. Based on what we have discussed, the sentence in (52) is analyzed as follows.

- (53) John_{TOPIC}...Laowang jue ding [PP OP_i [PP zai huijian t_i
 Laowang decide at meet
 zhiqian]] jiu kaichu ta_i ,
 before then fire him

Since the NP *John* is established as a prominent discourse topic in the context, the moved null operator can have it as the antecedent, which in turn makes the entire sentence interpretable. This fact confirms Engdahl’s (1983) prediction that “in languages like Japanese..., a gap may act just like a deictic pronoun and be interpreted as referring to something salient in the context” cited on pages 3 and 4 of this work.

Given what we have discussed, we can conclude that Mandarin null objects in adjunct clauses are better analyzed as a trace of a moved null operator, which depends on either a sentence-internal constituent or a sentence-external discourse topic for interpretation. In the next

subsection, I will investigate the possibility of applying the null operator movement analysis to a seemingly unrelated constituent, True Empty Positions (Li 2007).

3.2 Revisiting True Empty Positions

As mentioned earlier, Ting & Y.-C. Huang (2008) analyze certain empty object positions in adjunct clauses as parasitic gaps while viewing others as a TEP. By contrast, I consistently consider this empty category a trace of a moved null operator. One advantage of this analysis is that it can help us solve some problems unsettled in the literature.

- (54) a. Zhe-ben shu_i, [Lisi kan t_i] zui heshi].
this-CL book Lisi read most appropriate
'This book, that Lisi reads it is most appropriate.'
b. Zhe-ge xiaohai_i, [Lisi zhaogu e_i] zui heshi].
this-CL child Lisi care most appropriate
'The child_i, that Lisi takes care of [him_i] is most appropriate.'

Li (2007) and Huang et al. (2009) note that the null object in (54a) and (54b) can be co-referential with the sentence-initial topic across the subject contained within an island. Huang et al. (2009) propose that the null object has to be topicalized first, yielding a construction that looks like the following.

- (55) (Huang et al. 2009:211)
- | | | | | |
|----------------------|------------------------------|------------------|-------|-------------------------|
| Topic _i , | [_{clause} [Subject | pro _i | | t _i]].....] |
| | | | | |
| | GCR | | Move | |

According to Huang et al. (2009), the moved null object ends up becoming a *pro* when it reaches a higher position via topicalization. Consequently, the GCR connects the *pro* with the sentence-initial topic, giving rise to the desired interpretation. This analysis, however, fails to provide an explanation for the following unacceptable sentences noted by Li (2007).

(56) (Li 2007:6)

- a. *Zhangsan_i, [[Lisi piping e_i de taidu] hen
Zhangsan Lisi criticize DE attitude very
bu-hao].
not-good
'Zhangsan, the attitude with which Lisi criticized him is very
bad.'
- b. *Zhangsan_i, [[Lisi kanjian e_i de difang]
Zhangsan Lisi see DE place
li zheli hen jin].
to here very near
'Zhangsan, the place where Lisi saw him is very near here.'

The sentences in (56) are structurally similar to those in (54), but they are not grammatical.

What the sentences in (54) and those in (56) have in common is that they all have a sentence-initial topic, but the former is grammatical while the latter is not. If we assume that the sentence-initial topics in these sentences reach their surface positions by moving from the object position within the subject island, there would be no principled way for us to explain why island effects do not cause any ungrammaticality in (54) while they do in (56). Thus, it must be some other factors that are responsible for the contrast shown above.

In order to deal with this phenomenon, Li (2007) proposes that an empty object position in an island cannot be a null pronominal element or a variable left by movement; rather, she argues that such an empty position can only be considered a True Empty Position (TEP), which needs to meet the following conditions.

(57) Subcategorization Requirements on True Empty Positions (TEP):

- a. If a head subcategorizes for an E, E must be present in the syntactic structure
b. An E exists only in subcategorized positions.

In other words, a TEP, which only carries a categorial feature,

functions to fulfill the subcategorization requirement of a verb; Li uses the following structure to illustrate what a TEP looks like.

- (58)  (Li 2007:11)

According to Li, a TEP cannot be thought of as any of the empty categories discussed in the literature; it is neither a *pro* nor a Free Empty Category (Xu 1986). Instead, it is “truly empty” in the sense that it does not contain any overt or covert constituent and can be interpreted “by copying at LF the materials from a linguistic antecedent or the discourse/pragmatic context, if a linguistic antecedent is not available in the sentence (Li 2007:11).” Thus, if LF-copying is applied to (54a) and (54b), we will end up with the following representations at LF.

- (59) a. Zhe-ben shu, [Lisi kan zhe-ben shu] zui
 this-CL book Lisi read this-CL book most
 heshi].
 appropriate
 ‘This book, that Lisi reads it is most appropriate.’
 b. Zhe-ge xiaohai, [[Lisi zhaogu zhe-ge xiaohai]
 this-CL child Lisi care this-CL child
 zui heshi].
 most appropriate
 ‘The child_i, that Lisi takes care of [him_i] is most appropriate.’

(59a) and (59b) are the LF representations of (54a) and (54b), respectively, in which a copy of the sentence-initial topic, which is italicized and underlined, is placed in the object position that was empty at the beginning of the derivation. Along the same lines, we might have the following LF representations for (56a) and (56b) after LF-copying.

- (60) a. Zhangsan, [[Lisi piping Zhangsan de taidu]
 Zhangsan Lisi criticize Zhangsan DE attitude
 hen bu-hao].
 very not-good
 ‘Zhangsan, the attitude with which Lisi criticized him is
 very bad.’
- b. Zhangsan, [[Lisi kanjian Zhangsan de difang] li
 Zhangsan Lisi see Zhangsan DE place to
 zheli hen jin].
 here very near
 ‘Zhangsan, the place where Lisi saw him is very near
 here.’

If LF-copying could help us generate (59a) and (59b) from (54a) and (54b), the unacceptability of (56a) and (56b) is mysterious, since their LF representations in (60) appear to be interpretable. The LF-copying analysis, thus, still cannot account for the grammatical contrast between (54) and (56).

Another concern raised by the application of the LF-copying analysis to the Mandarin sentences mentioned above is that it does not specify which constituent can be copied into the empty object position and which cannot. Williams (1977) devises LF-copying as a means to recover the content of a missing VP in English.

- (61) A: Who can do it?
 B: John can.

Williams (1977) argues that for sentences like (61B), they should be analyzed as the following structure, in which no overt constituents follow the modal in the underlying structure.

- (62) [_S John can [[Δ]_v][[Δ]_N]_{NP}]_{VP}]_S.

Therefore, Williams proposes a LF-copying mechanism, called *the VP Rule*, to deal with this phenomenon.

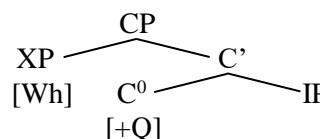
- (63) A: Who $[[t]_{NP} \text{ can } [[do]_v [[it]_N]_{NP}]_{VP}]_S$?
 B: $[_S \text{ John can } [[do]_v] [[it]_N]_{NP}]_{VP}]_S$.

As we can see here, after undergoing the VP Rule, the VP of the sentence in (63B) is supplied with a copy of the VP in the antecedent question sentence in (63A), which consequently gives rise to an interpretable structure.

Chung et al. (1995) also adopt LF-copying, but they use it to account for the derivation of sluicing constructions in English; one example of sluicing discussed in Chung et al. (1995) is reproduced below.

- (64) Joan ate dinner with someone, but I don't know who (with).

According to Chung et al. (1995), a sluicing construction underlyingly has a structure that only contains a *wh*-sluice followed by an empty IP.

- (65)  (Chung et al. 1995:242)

They propose that when this structure is sent to LF, a process called *IP-recycling* operates, which copies the logical form of the IP in the antecedent clause into the empty IP position in the second conjunct. Given this analysis, (64) has the following representation at LF.

- (66) Joan ate dinner with someone, but I don't know $[_{CP} \text{ who (with)} [_{IP}$
Joan ate dinner with someone]].

In (66), the italicized words in the IP position following *who (with)* is a copy of the IP in the antecedent clause, and the entire structure thus becomes interpretable.¹⁴

¹⁴ This is a simplified version of Chung et al.'s proposal. Please refer to their work for more details.

Although Chung et al. (1995) differ from Williams (1977) in that they focus on sluicing rather than VP-ellipsis constructions, what they have in common is that structural parallelism is respected in their LF-copying analyses. In their studies, a missing VP can only be associated with the VP in the antecedent clause, and a missing IP can only be connected to the IP that appears in the clause uttered earlier. However, such a parallelism is absent in the examples that lead Li (2007) to propose the existence of TEP in Mandarin Chinese. The sentences in (54) are not preceded by any other sentences, yet they are still grammatical. If LF-copying could be implemented in the way suggested by Li (2007), one major theory-internal concern arises: why can structural parallelism or syntactic identity be ignored when an empty position retrieves its content via LF-copying in Mandarin Chinese, while it has to be respected in other languages? Given the fact that there is one empirical and one theoretical problem that result from the application of LF-copying to relevant Mandarin sentences, I propose not to use this approach to account for the syntactic properties of the empty object position in an adjunct clause.

The analysis advocated in this paper can be used to deal with the contrast between (54) and (56). Note that there is one significant structural difference between these two pairs of sentences: in (54a) and (54b), the constituent occupying the subject position of the entire sentence is not an island by itself: [*Lisi kan t_i*] and [*Lisi zhaogu e_i*] are not islands, and their island-hood in (54) comes from where they are located: the subject position of the sentence. By contrast, both [*Lisi pipíng e_i de taidú*] in (56a) and [*Lisi kanjian e_i de difang*] in (56b) are complex NPs, which means that they are intrinsically islands. In addition, their island-hood is reinforced by being placed in the subject position of the sentence. If a null operator can move to the edge of an adjunct island, as discussed earlier, we could also assume that there exists a null operator that moves to the edge of the subject island in sentences like (54) and (56). Thus, the contrast between (54) and (56) can be accounted for as follows.

- (67) a. Zhe-ben shu_i, [_{subject} OP_i [_{subject} Lisi kan t_i]] zui
 this-CL book Lisi read most
 heshi.
 appropriate
 'This book, that Lisi reads it is most appropriate.'
- b. Zhe-ge xiaohai_i, [_{subject} OP_i [_{subject} Lisi zhaogu t_i]]
 this-CL child Lisi care
 zui heshi.
 most appropriate
 'The child_i, that Lisi takes care of [him_i] is most appropriate.'

(54a) and (54b) can be analyzed as (67a) and (67b), in which the null operator originating in the object position moves to the edge of the subject island. Since such movement does not cross island boundaries, island effects do not arise. Contrastively, island effects do surface in the following examples.

- (68) a. *Zhangsan_i, [_{subject} OP_i [_{subject} [Complex NP Lisi piping t_i
 Zhangsan Lisi criticize
 de taidu]]] hen bu-hao.
 DE attitude very not-good
 'Zhangsan, the attitude with which Lisi criticized him is very bad.'
- b. *Zhangsan_i, [_{subject} OP_i [_{subject} [Complex NP Lisi kanjian t_i
 Zhangsan Lisi see
 de difang]]] li zheli hen jin.
 DE place to here very near
 'Zhangsan, the place where Lisi saw him is very near here.'

The sentences in (56) differ from those in (54) in that the subject is composed of a complex NP. If we propose that a null operator base-generated in an object position needs to move to the edge of the subject island of the entire sentence, it has to cross the embedded complex NP island first, which inevitably yields island effects. Unbounded dependencies can be observed in sentences like (54) as well.

- (69) Zhe-ge xiaohai_i, [_{subject} Lisi jiao ta taitai qing na-wei
 this-CL child Lisi ask his wife invite that-CL
 baomu zhaogu *ec_i*] zui heshi.
 babysitter take.care most appropriate
 ‘It is the most appropriate for Lisi to ask his wife to invite that
 babysitter to take care of that child.’

The grammaticality of this sentence suggests that a null operator, which is base-generated in the object position following *zhaogu* ‘take care’, crosses several clausal boundaries to reach the edge of the subject island. Thus, given the fact that island effects and unbounded dependencies are observed in sentences that contain a subject island in which the object position is empty, we should apply the null operator movement analysis to this construction, viewing the empty object position as a trace left by null operator movement, rather than calling it a TEP.

4. CONCLUSION

This paper starts with the argument that the null object in an adjunct clause should not be called a parasitic gap in Mandarin Chinese, since the presence of such an empty category does not rely on the existence of another empty category created by A’-movement: it can appear in sentences whose derivations involve A-movement or even no movement at all. By contrast, none of these phenomena can be found in English. The analysis that the empty object position in an adjunct clause is analyzed as a trace left by null operator movement can be further extended to sentences that are said to embed a True Empty Position in the literature. Given the fact that the grammaticality of such sentences is still pertaining to whether island effects arise or not, I propose that this empty position should also be analyzed as a trace left by null operator movement. This unified analysis, thus, captures the fact that the sentences that are said to have parasitic gaps in Mandarin Chinese behave similarly to those that are claimed to have TEPs, since they all need to respect the Subjacency condition; the former only differs from

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the latter in that its formation involves an adjunct island while the latter a subject island. The finding of this paper not only reflects the fact that Mandarin Chinese is a pro-drop as well as a topic-prominent language, but also shows that we can stick to the same number of empty categories in Mandarin Chinese without sacrificing the ability to account for the syntactic properties of sentences containing empty object positions.

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對於漢語寄生缺口和真實空位的一致性分析

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寄生缺口指的是一種必須依附在另一個空語類存在之上的空位。漢語是一個空代詞省略的語言，然而在文獻上它也被視為是具有寄生缺口的語言。我首先提出出現在狀語子句中的空賓語並不能被視為是一個寄生缺口，因為此空賓語的出現並不需要伴隨著非論元移位的發生：此空賓語可以跟論元移位一起存在，或是出現於完全沒有句法移位的句子中。因此，此空賓語應僅是一個因空運符移位而留下的遺跡。其次，我把這分析的觀點運用到被視為擁有真實空位（李艷惠 2007）的句子；我提出那些讓李提出真實空位分析的句子事實上可以從牽涉其中的空運符移位是否違反鄰接條件這角度來分析。因此，此研究提出了一個更經濟的方式來處理兩個看似無關但實則高度類似的結構。

關鍵字：空代詞、空運符、寄生缺口、真實空位