SUO in Chinese and Phase Edges

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Abstract: According to Chomsky (2000, 2001, 2005), syntactic derivations proceed in phases. A key component of phase-based computation is the Phase Impenetrability Condition (PIC). The PIC states that in order for material in the complement domain of the phase head (*v* or C) to remain accessible for movement, it must be moved into the edge of the phase. To make this movement possible, the phase head is endowed with an (optional) EPP feature, which enables raising of the relevant element. Thus successive cyclicity emerges.

In this paper, I argue that Chinese provides empirical evidence for the EPP feature enabling movement at the *v*P level. Specifically, I propose that in Chinese, *SUO* is a reflex of EPP-feature enabled successive-cyclic A-bar movement through the *v*P-phase, or more accurately, that it signals the 'activator' of the EPP features of the head of *v*P. I also argue that Chinese provides empirical evidence for the view that defective (unaccusative/passive) *v* is a phase head (Legate 2003) and a specific version of the PIC (Chomsky 2001). If my proposal is correct, the analysis provides direct empirical evidence for the specifier of *v*P as an intermediate landing site, thus strengthening phase theory.

1. Introduction

According to Chomsky (2000, 2001, 2005), syntactic derivations proceed in phases. A key component of phase-based computation is the Phase Impenetrability Condition (PIC). The PIC states that in order for material in the complement domain of the phase head (*v* or C) to remain accessible for further operations, it must be moved into the edge domain of the phase. To make this movement possible, the phase head is endowed with an (optional) EPP feature, which enables raising of the relevant element. Thus successive cyclicity emerges.

In this paper, I argue that Chinese provides empirical evidence for the EPP feature enabling movement at the *v*P level. Specifically, I propose that in Chinese, *SUO* is a reflex of EPP-feature enabled successive-cyclic A-bar movement through the *v*P phase, or more accurately, it signals the 'activator' of the EPP feature. Most languages do not have morphological reflex of successive cyclic A-bar movement through the edge of *v* and C. In the literature, the empirical evidence for intermediate landing sites is mainly confined to the CP level (Boeckx 2008), and similar evidence for movement through *v*P is relatively rare. If my proposal is correct, it provides direct empirical evidence for *v*P as an intermediate landing site, thus strengthening phase theory. This paper is organized in the following way: Section 2 provides background information on *SUO* including previous analyses and their problems. In section 3, after sketching out the fundamental conceptions of phase theory developed by Chomsky (2000, 2001, 2005), I present my phase theory based analysis of *SUO*. I further argue that Chinese provides empirical evidence for defective *v* being a phase head (Legate 2003) and a specific version of the PIC (Chomsky 2001). Section 4 shows how the proposed approach accounts for previously established facts and how it makes correct predictions for the two previously unreported circumstances in which *SUO*

can occur. The usage of *SUO* in passives is discussed in this section as well. Section 5 presents some consequences and residual issues. Finally, section 6 draws a conclusion.

2. *SUO* in Chinese and previous analyses

2.1 Background of SUO

Chinese has a functional particle *SUO[1]*, which can only participate in two structures. The first structure involving *SUO* is relative clauses. As observed in previous studies, *SUO* can optionally occur before a transitive verb in relatives (Chao (1968), Li (1947), Tang (1977), among others), illustrated in (1).

(1)   Lisi (**suo**) ai   de ren

        Lisi SUO   love DE man

        'the man that Lisi loves'

However, *SUO* is licensed only where the relativization site is a direct object position (2), not where the site is a subject (3a) or adjunct position (3b) (Chiu 1995).

(2)   [Lisi (**suo)** mai [e]] de   na-xie shu

         Lisi   SUO buy   DE those book

        'those books that Lisi bought'

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[1] *SUO* is a historical residual use of anOld Chinese noun, meaning 'place'.

(3) a. [[e] (**suo)** mai naxie shu]   de   na ge ren

                SUO buy those book DE that CL man

     'the man who bought those books'

     b. [Lisi (*/?**suo)** piping   Zhangsan [e]] de   yuanyin/fangfa/shijian

         Lisi   SUO criticize Zhangsan   DE reason/method/time

     'the reason/method/time that Lisi criticized Zhangsan'

Ting (2003) provides three more specific circumstances in which *SUO* can occur. First, it is possible for *SUO* to appear before an unaccusative verb in relatives, as shown in (4).

(4) [na tiao xiaoxi   zhong (**suo**) piaoguo [e]] de   ku-yie

     that CL small-stream middle SUO float-past   DE withered-leaf

     'the withered leaves that floated in the river'

Secondly, *SUO*'s occurrence is also allowed when a locative head noun is relativized, exemplified in (5).

(5) [Lisi (**suo**) fuwu/gongzuo] de   jigou/difang

     Lisi SUO serve/work   DE organization/place

     'the organization/place that Lisi serves/works at'

Thirdly, it seems to be possible for *SUO* to appear where the relativization site is the indirect object in a double object construction, demonstrated in (6):

(6) ?[wo (**suo**) song-le [e] yiben shu   de] na ge ren

     I   SUO give-Asp   one   book DE that CL man

   'the man to whom I gave one book'

The only other construction with *SUO* and an accompanying empty object position is the passive construction. It has been observed that so-called long passives[2] can optionally contain the particle *SUO*, while short passives cannot (Ting 1998, Huang 1999, An and Kuo 2007). The contrast is given in (7a) and (7b).

(7) a. zhe-xie shiqing bu neng bei <u>tamen</u> (**suo**) liaojie.

     these   thing   not can BEI they   SUO understand

     'These things cannot be understood by them.'

   b. zhexie shiqing   bu neng bei ___ (***suo**) liaojie.

     these   thing   not can   BEI   SUO understand

     'These things cannot be understood.'

Sentence in (7a) is a long passive sentence, with the agent *tamen* 'they' overtly expressed (marked with an underscore), and the occurrence of *SUO* is allowed in this sentence. In contrast, (7b) is a short passive sentence with the agent not overtly shown but just implied, and this sentence is not acceptable with *SUO*.

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[2] In long passives, the agent follows *bei*, while in short passives, the agent is not expressed but implied.

2.2 Previous analyses on SUO and problems

SUO is rarely discussed in the literature, and the syntactic status of *SUO* is not commonly agreed upon. As shown by Ting (2003), *SUO* has variously been claimed to be an adverb (Chao (1968)), a relative pronoun (Ma (1898)), and a "construction particle" (Zhu (1983)), among other proposals.The first detailed investigation of the distribution of *SUO* under the theoretical linguistic framework was undertaken by Chiu (1995, cf. 1993). Given that accusative Case is assigned in object position but not in subject or adjunct position, and based on the paradigm in (2) and (3), Chiu argues that *SUO* heads an accusative Case projection. However, Ting (2003) shows that Chiu's analysis is challenged by the cases in which *SUO* occurs but the relativized element does not receive accusative Case, such as examples in (4)—(6). Ting (2003, 2010) proposes that *SUO* is an A'-bound pronominal clitic base-generated as the head of the NP in the complement of the verb. According to Ting, *SUO* is A-bar bound by a null operator base-generated in Spec CP which is co-indexed with the relativized NP. Because of some morphological requirement, *SUO* undergoes head movement out of the NP and adjoins to I. Ting claims that this N-to-I movement is on a par with the Romance syntactic cliticization in the sense of Kayne (1989a), which is a sub-case of head movement. Ting's approach accounts well for the new data presented in her paper (i.e., (4)-(6)) as well as the subject/object extraction asymmetry in (2) and (3). Ting claims that her analysis also provides an explanation for the fact that *SUO* may occur either in the matrix clause or the embedded clause of an ECM predicate or an object control predicate, noticed by Chiu (1995). Examples are given in (8a) and (8b). Ting argues that this phenomenon, which she calls as 'climbing', is subject to the same type of tense-related constraints as clitic climbing in Romance (Kayne 1975).

(8) a. [wo bipo Zhangsan (**suo)** goumai] de shu

    I   force Zhangsan SUO buy   DE book

    'the book that I force Zhangsan to buy'

  b. [wo (**suo)** bipo Zhangsan goumai] de shu

    I   SUO   force Zhangsan buy   DE book

    'the book that I force Zhangsan to buy'

Ting's analysis faces several problems. First, if *SUO* is a syntactic clitic, one should expect it never to appear in the phrase where the subject is relativized. As Ting states in her paper, there are no syntactic subject clitics, only object/dative clitics (Kayne 1983, Rizzi 1986). Ting uses this subject-object asymmetry in syntactic cliticization as an argument for analyzing *SUO* as a clitic given that the same asymmetry is also found in *SUO*-relatives. However, as noticed in this paper for the first time, though *SUO* normally cannot appear with subject relativization, it can occur with long-distance subject relativization, illustrated in (9).

(9) zhe jiu   shi ZS **suo** xuancheng [[e] mai le   shi dong fangzi] de na ge ren

    this exactly is ZS SUO claim   buy Asp ten CL   house   De that CL man

    'This is the man who ZS claimed bought ten houses.'

Another newly discovered fact, namely that *SUO* can appear multiple times in relative clauses also casts doubt on Ting's analysis. As shown by Ting, once the clitic undergoes head movement to the finite I position, it cannot move out of this clause (Kayne 1975). Ting assumes that the

tense-related constraint for the clitic climbing phenomenon in Romance also applies to Chinese. Consequently, her analysis predicts that once *SUO* moves to adjoin to the finite I, it cannot move out of this clause. The possibility of the occurrence of multiple *SUO* therefore is excluded from her analysis. However, Chinese does allow multiple *SUO*, as exemplified in (10).

(10) zhe shi [[wo (**suo**) yiwei]   ZS (**suo**) xihuan [e]] de na   ge ren.

    this is   I   SUO mistakenly-thought   ZS SUO like   De that Cl man

    'This is the man that I mistakenly thought that ZS likes.

In (10), *SUO* can appear both in the matrix clause and the embedded clause. Crucially, the matrix verb *yiwei* 'mistakenly-thought' categorically select a clause as its complement not an NP[3].

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[3] One reviewer gave an example in which 'yi wei' seems to take a NP as its complement:

(i)   yansu bu shi women suo   yi wei de sheng ren

    Jesus not is   we   SUO yi wei De saint

    'Jesus is not what we thought to be a saint.'

This is not a real counter-example to what I have claimed. The verb *yiwei* in (i) is not the same verb as the one that I use in the paper. The one that I use means 'mistakenly-thought', and takes two arguments. The internal argument cannot be NPs (as in (ii) and (iii)) but only clauses, either CPs or IPs, (as given in (iv)).

(ii)   *women <u>yiwei</u>   [NPshengren]

    we   mistakenly-thought   saint

(iii)   *women <u>yiwei</u>   [NPyansu]

    we   mistakenly-thought   Jesus

(iv)   women <u>yiwei</u>   [CPyesu shi shengren]

    we   mistakenly-thought   Jesus is saint

    'We mistakenly-thought Jesus is a saint.'

However, the 'yi wei' in (i) is another verb which means 'regard….as'. It takes three arguments, and the second argument appears between *yi* and *wei*, as we can see in (v).

Accordingly, it is hard to believe that the higher *SUO* is also a pronominal clitic moved from the base position as Ting (2003) has proposed. Likewise, (10) cannot be viewed as involving two separate relative clauses since the matrix verb cannot take an NP but a CP as its complement. If we embedded more clauses in (11), more *SUO*s can appear in the structure, as shown in (11).

(11) zhe shi [[[wo (**suo**) yiwei] ZS (**suo**) ganjue] LS (**suo**) xihuan [e]] de na   ge ren.

  this is   I   SUO thought ZS SUO feel   LS SUO like   De that Cl man

  'This is the man that I mistakenly thought that ZS feels that LS likes.

Furthermore, if *SUO* is a clitic similar to a resumptive pronoun as Ting suggests, this analysis is problematic since no language has multiple pronounced resumptive pronouns.

  Last but not least, manner adverbials in Chinese, which are sensitive to subject agentivity and syntactically modify *v*P (Tsai 1999b), appear to the left of SUO. This suggests that *SUO* is in the *v*P domain not the IP domain as Ting proposes.

(v)   women yi   yesu wei shengren

    we   regard Jesus as   saint

    'We regard Jesus as a saint.'

This three-place predicate 'yi wei' a residual use of Old Chinese and is less commonly used nowadays. An example from Old Chinese is given below:

(vi) Tianzi   yi   gong   wei fuxin.   (*New Book of Tang*, A.D. 1060)

     emperor regard master as   confident

     'The emperor regards the master as a confidant.'

(12) wo jiao-jin-nao-zhi   suo zai[4]   (*jiao-jin-nao-zhi)   jiejue de wen-ti

   I   twist-finish-brain-juice SUO Progress   twist-finish-brain-juice solve De problem

   'the problem that I am solving by racking my brain'

An and Kuo (2007) propose that *SUO* is located in Spec AgroP position and is derived by overt operator movement passing through this position to check Case. According to An and Kuo, after *SUO* checks its Case in the Spec AgroP position, one should not expect *SUO* to further move to higher Spec AgroP positions to check Case multiple times because this will violate the Activity Condition. Multiple *SUO* structures therefore are also excluded by their analysis. However, as shown above, Chinese does allow multiple *SUO* structures. Ou (2007) proposes two roles for *SUO*: one in which it serves as a relative pronoun for the object, and the other in which it serves as an intensifier for non-subjects in relative clauses. Ou argues that the pronoun *SUO* is merged as the Head nominal with the relativized DP to form an [antecedent, suo] DP cluster. This cluster moves from the complement position of the verb to a functional projection(FP) between the IP and *v*P, which she claims to be some information structure like FocusP. In this A-bar position, the antecedent DP splits from *SUO,* moving into the Spec CP position, while *SUO* stays behind. Given that *SUO* does not undergo any further movement after arriving in Spec FP, this analysis also excludes the occurrence of multiple *SUO*. In addition, since the DP-*SUO* cluster is only base generated in the complement position of the verb, Ou's approach also predicts that subject

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[4] That manner adverbials appear higher than the preverbal aspectual element *zai* suggests that *zai* is inside of the vP. Although Huang, Li and Li (2009) suggest that *zai* occupies the head of the AspP position higher than the *v*P, they do not provide arguments for this proposal. However, they do argue that all other postverbal Asp markers should appear within the *v*P, I suggest treating *zai* the same as other aspect makers. As for why *zai* differs from other postverbal Asp markers in that it appears in the preverbal position, I suggest that it is related to the preverbal status of the adjunct PP headed by the preposition *zai*.

extractions with *SUO* are always bad, which wrongly excludes long-distance subject extractions with *SUO*, shown to be good in (10).

Turning to the semantic contribution of *SUO*: Chiu (1995) and Ting (2003) claim that no semantic differences exist between phrases with *SUO* and phrases lacking *SUO*. Ou (2007), on the other hand, suggests that *SUO* functions an intensifier relating to a non-subject in relative clauses. However, the fact that *SUO* is able to extract subjects across long-distances casts doubts on the non-subject intensifier role of *SUO*. I agree that some difference between phrases containing *SUO* and phrases without it does exist. For Chinese speakers, *SUO* is usually not used in spoken Chinese, but in formal (or written) Chinese, as a residual use of Old Chinese. Observe that these previous analyses only discuss *SUO* in relative clauses, not *SUO* in passives. After sketching out the fundamental conceptions of phase theory developed by Chomsky (2000, 2001, 2005), I will, in the next section, propose an alternative account for both *SUO*-relatives and *SUO*-passives under the assumptions of phase theory. The new account is expected to be free from the empirical problems involved in the previous studies. I argue that *SUO* can be seen to signal the 'activator' of the EPP feature of the phase head of *v*P which triggers successive-cyclic A-bar movement through the *v*P phase, required if the relativization targets an element inside the complement domain of *v*. The new account provides a straightforward explanation of the otherwise puzzling properties of *SUO* which I have just noted.

3. A new account: *SUO* as the reflex of the EPP feature on *v*

3.1 Phase theory and the PIC

Chomsky (2000, 2001, 2005) proposes that syntactic computations proceed in incremental

'chunks', called phases. According to Chomsky, *v* and C are phase heads, which are surrounded by non-phase heads V and T. The *v*-VP domain corresponds to full argument structure, and the C-TP domain is responsible for tense and force (Richards 2007). Each phase is divided to two sub-domains— the complement domain (sister of the phase head) and the edge domain (the phase head and specifier(s)/adjuncts), shown as below:

(13) [$_{HP}$ ___ [$_{H'}$ H^o [___]]]

        Phase edge   Phase complement
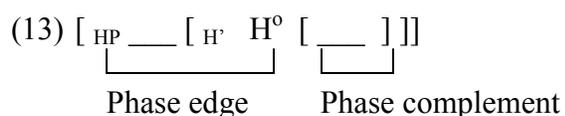
(Figure from Boeckx 2010)

A key component of phase-based computations is the Phase Impenetrability Condition (PIC), one formulation of which is given in (14).

(14) Phase Impenetrability Condition (Chomsky 2000)

    In phase α with head H, the domain of H is not accessible to operations outside α; only H and its edge are accessible to such operations.

The PIC states that once a phase has been completed, its internal domain is spelled out and becomes syntactically opaque; therefore this domain is inaccessible to further derivations. On the other hand, the edge of the phase remains accessible to material outside the phase and is syntactically transparent. This means that in order for material in the phase complement domain to remain accessible for further operations, it must move to the edge of that phase.

    Besides the lexically specified selectional properties (semantic (s-) selectional properties)

that phase heads have, another property can be added optionally on the phase head to allow an extra Spec beyond its s-selection. The property of allowing an extra Spec is called the EPP-feature in Chomsky (2000), and it is taken to be generated on the phase head when needed or when movement has an effect on interpretation (the Effect on Output Condition, in Chomsky 1995, Fox 1999, Reinhart 2006). This feature enables raising without a matching feature on the moving element. Take *wh*-movement and the *v*P phase as an example. In the case of object extraction, the phase head *v* is added with the EPP feature in the numeration. The EPP feature enables the *wh*-object to move to the extra Spec position of *v*P that it creates so that the *wh*-object will not be sent to Spell-Out. In the case of subject/adjunct extraction, the EPP feature is not added when *v* is selected for the numeration since the *wh*-subject/adjunct is already at the *v*P edge and no movement takes place from within the *v*P complement to its edge. In a sense, the EPP feature added to *v* differentiates object extraction from subject/adjunct extraction. Since syntactic derivations proceed phase by phase, the optional EPP feature on phase heads can be said to enable successive cyclic movement to proceed through the phase edge.

Given the current Minimalist perspective on phases and EPP-features outlined above, I propose that *SUO* can be viewed as the reflex of EPP feature-enabled successive-cyclic A-bar movement through the *v*P phase. Syntactically, *SUO* is one kind of *v* head, lexically specified with the EPP-feature, existing alongside other lexical *v* heads; it is required if extraction targets an element inside the complement domain of *v*[5]. When *SUO* is disallowed, this gives a signal that there is no operation taking place from within the *v*P complement domain to its edge, which is

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[5] Another alternative analysis could treat *SUO* as the morphological realization of the EPP feature. This alternative analysis predicts that *SUO* will also be able to show up on C since the EPP feature is be added on phase heads (C and *v*). However, *SUO* never shows on C but only *v*. This fact lends support to treat *SUO* as a *v* head, lexically specified with the EPP feature.

the case of the subject/adjunct relativization. If *SUO* is allowed to appear, it tells us that an element in the *v*P complement domain has moved to the *v*P edge, and this is the object relativization with *SUO*. Crucially, when *SUO* is absent from the object relativization, I assume that *SUO* is realized in a null form since the *v* still has the EPP feature which enables the object to move to the *v*P edge.

Notice that the optional occurrence of *SUO* in object relativization does contribute to a semantic difference—the phrases with the pronounced *SUO* is a formal/written form of Chinese, while the phrases with the null *SUO* is a informal/oral form, as shown in section 2.1. I suggest that this difference can be analyzed along the same line as the French Past Participle Agreement (Kayne 1989b).

In French, no Past Participle Agreement appears on the verb in subject *wh*-extraction and object in-situ case. In object *wh*-extraction, the Past Participle Agreement may or may not occur—it occurs in formal/written French but not in informal/colloquial French. Kayne(1989b) assumes an Agr element which heads AgrP, taking VP as its complement. The *wh*-object moves to adjoin AgrP, and the agreement is established between Agr and the *wh*-object through a government relation. Two important consequences of Kayne's analysis are—it supports an Agr position intervening between I and V and establishes an Agree relation between Agr and the *wh*-object. Now let us 'translate' Kayne's analysis into minimalist terms. As Agr is eliminated from the inventory and the notion 'government' is abandoned in the Minimalist Program (Chomsky 1995, 2000), the I-Agr-V structure can be replaced by I-*v*-V, and the Agree relation between *v* and the *wh*-object can be established through Spec-head Agreement[6]. The optional occurrence of Agreement can be explained as the lexical entry difference—if the *v* is added with the Agree

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[6] If we abandon Spec-Head Agreement as proposed in Chomsky 2004, the Agreement can be established through the strong condition on the overt realization of Agree (D'Alessandro and Roberts 2008)

feature in the numeration, an Agree relation will be established between the *v* (Probe) and the moved *wh*-object (Goal); if *v* does not have the Agree feature, no Agreement shows up between *v* and the moved wh-object.

I propose that the semantic difference led by the optional *SUO* in the object relativization can be explained along the same line as the French Past Participle Agreement. Specifically, if the *v* is added with the Agree feature, an Agree relation will be established between *v* and the moved object. As a result, the pronounced *SUO* occurs as the reflex of the Agree relation (in addition to the EPP feature). If the *v* is not with the Agree feature, no Agreement holds between *v* and the moved object, and a null *SUO* is used.
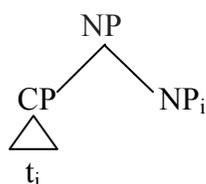
In short, the pronounced *SUO* is specified with the EPP feature and Agree feature, and the null *SUO* only has the EPP feature; in cases where *SUO* cannot occur at all, the *v* heads have no EPP features or Agree features. If what I propose is correct, Chinese provides empirical evidence for the specifier of *v*P as an intermediate landing site, thus strengthening phase theory. Additionally, I propose that Chinese provides empirical evidence for the view that defective *v* is also a phase (Legate 2003) and for a specific version of the PIC (Chomsky 2001).

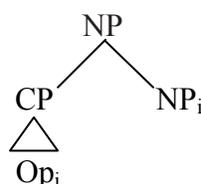*3.2 Analyzing the Extraction Asymmetry in Relatives*

Before going into the analysis of the extraction asymmetry in *SUO*-relatives, I want to introduce the adjunction view of Chinese relative clauses (Aoun and Li 2003) that I adopt in this paper. Aoun and Li (2003) argue for an adjunction structure and against a complementation structure for Chinese relative clauses. They propose that argument relativization and adjunct relativization both involve relative clauses adjoining to head nouns and movements within the relative clauses.

Argument and adjunct relativization differ based on whether the head noun is base generated. For adjunct relativization, the head noun is base-generated, and an operator within the relative clauses moves to Spec CP position, getting bound by the head noun. On the other hand, the head noun in argument relativization is raised from the relative clause.[7] Aoun and Li use this difference to account for the different reconstruction effects in Chinese relatives: reconstruction is possible in argument relativization but not in adjunct relativization. The structures of Chinese argument and adjunct relatives that they provide are shown below.

(15) a. Argument relativization   b. Adjunct relativization

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        NP                                          NP
       /  \                                        /  \
     CP    NP_i                                  CP    NP_i
     /\                                          /\
    /__\                                        /__\
     t_i                                         Op_i
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Now consider the instance in which *SUO* shows up under the relativization of objects ((2), repeated in (16)). The extracted NP *na-xie shu* 'those books' is merged with the verb within the *v*P phase complement domain. In order for this NP to be accessible to further derivation, the EPP feature is required on the *v*P head to make the NP move into the *v*P edge first, which validates the occurrence of *SUO*. After moving to the *v*P edge, the extracted NP further moves to the Spec CP position and eventually moves to the head noun position, as illustrated in (17).

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[7] Aoun and Li (2003) assume that the condition on movement applies derivationally, so NP-raising relativization operating on an adjunct is licit—it does not violate island constraints. For detailed discussion on NP-relativization and Adjunct relativization, see pp.158-190 in Aoun and Li 2003.

(16) [Lisi (**suo**) mai [e]] de   na-xie shu

    Lisi SUO buy   DE those   book

    'those books that Lisi bought'

(17)[[$_{CP}$ t$_i$ …[$_{TP}$ Lisi$_j$ …[$_{vP}$ t$_i$ [$_{vP}$ t$_j$ **suo** [$_{VP}$ mai   t$_i$]]]]] de [$_{Head}$ na-xie shu $_i$]]

Notice that, even if *SUO* is not pronounced in (17), the *v*P head still has the EPP feature, and the movement still needs to stop at the *v*P phase edge, or the extracted NP will be spelled out when the *v*P is completed and will not be accessible for further derivation given that syntactic computations proceed in phases.

The pronounced *SUO* and the null *SUO*, as suggested in the previous section, differ in that the pronounced *SUO* is specified with the EPP feature and Agree, but the null *SUO* is only specified with the EPP feature. The difference between phrases containing *SUO* (formal style) and phrases without it (informal style) is captured by whether or not an Agree relation is established between *v* and the moved object, along the same line as Past Participle Agreement in French (Kayne 1989b).

Under the lens of the PIC, now consider the other case in which subject extraction with *SUO*'s occurrence is blocked ((3a), repeated in (18)). The extracted NP *na ge ren* 'that man' is presumably merged in Spec, *v*P according to the VP-internal subject hypothesis, and, thus, its displacement proceeds unproblematically from the edge of the *v*P phase without the need of the EPP feature on the phase head *v*. Given that the *v* in subject extraction does not have the EPP feature, the occurrence of *SUO* is not allowed as a result[8]. This is illustrated in (19).

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[8] One reviewer asked what the proposed analysis can say about the possibility of *SUO* in causer-relativization given that causers are also base generated at the edge of *v*P. My analysis predicts that *SUO* cannot appear in the causer-relativization sentence. The reason is that no matter what thematic roles (Agent or Causer) subjects bear, since subjects are in the *v*P edge which are

(18) [[e] (***suo**) mai naxie shu] de   na   ge ren

       SUO buy   those book DE   that   CL man

   Intended reading: 'the man that bought those books'

(19) [[$_{CP}$ t$_i$ …[$_{TP}$ t$_i$ …[$_{vP}$ t$_i$ ***suo** [$_{VP}$ mai   t$_i$]]]]] [$_{Head}$ na-ge-ren $_i$]]

In the case of adjunct extraction (cf. (3b)), according to Aoun and Li (2003), an operator is merged in Spec *v*P, and moves to Spec CP of the relative clause, getting bound by the base-generated head noun. Since the operator is already in the *v*P edge, the EPP feature is not required on *v*, and the appearance of *SUO* is disallowed as a consequence.

3.3 SUO provides evidence for defective v being a phase head

In this section, I show that Chinese provides an empirical argument supporting the phasehood of unaccusative and passive *v* as proposed by Legate (2003), contra Chomsky's (2000) view that only transitive/active *v* is a phase. As shown by Ting (2003), besides occurring before a transitive verb in relatives, *SUO* also occurs when extracting the internal argument of unaccusative verbs, as in (4) (as repeated in (20)).

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accessible for further derivation; as a result, no EPP features are required on *v* and *SUO* is forbidden. The fact shown below confirms the prediction.

(i)   [[e] (*suo) dapo   yi   ge huaping] de na ge ren

         SUO break-broken one CL vase   De that Cl man

    'The man who broke a vase'

(20) [na tiao he   zhong **(suo)** chen [e]] de   chuan bu-ji-qi-shu

       that CL   river middle   SUO   sink   DE   boat   countless.

        'Boats that sank in that river are countless.'

Furthermore, as mentioned above, the only other construction with *SUO* and an accompanying

empty object position is the passive (Ting 1998, Huang 1999), as in (7a) (repeated in (21)).

(21) zhe-xie   shiqing   bu neng bei   tamen **(suo)** liaojie.

       these   thing   not can   BEI   they   SUO understand

        'These things cannot be understood by them.'

What (20) and (21) show is that *SUO* appears with extraction of internal arguments irrespective

of verb types. Thus, no matter whether the main verb is unaccusative/passive (20-21) or

transitive/active (16), the occurrence of *SUO* is possible with the extraction of elements inside *v*P

complements.

    If one adopts Chomsky's (2000) view that only phi-complete (transitive/active) *v** is a phase

but defective (unaccusative/passive) *v* is not, one should expect that no EPP features should be

on the defective *v* and that *SUO* cannot occur in (20) and (21). However, this is not the case. The

implication drawn from these data is that Chomsky's defective (unaccusative/passive) *v* must be

a phase no less than the phi-complete (transitive/active) *v**. Chinese therefore provides empirical

evidence supporting Legate's (2003) view that defective *v* is a phase.

    With the view that defective *v* is also a phase, let us look at the derivation of (20). Since the

NP *chuan* 'boat' is merged within the *v*P phase complement domain, the EPP feature is needed

on *v* to make it move into the *v*P edge for further derivation. *SUO* therefore is allowed to occur in the sentence, illustrated in (22) (for simplification, in the rest of the paper I only show the relevant derivation within the relative clause).

(22) [$_{CP}$ chuan$_i$ …[$_{TP}$ …[$_{v\text{P}}$ t$_i$ [$_{v\text{P}}$ t$_j$ **suo** [$_{VP}$ chen   t$_i$]]]]]
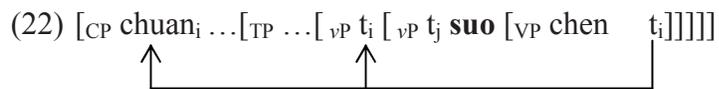
In addition to providing an argument for treating defective *v* as a phase head, the fact that *SUO* also shows up in unaccusative and passive contexts implies that *SUO* is not a realization of phi-features on *v* if we assume the feature inheritance mechanism proposed by Chomsky (2007, 2008).

Non-phase head T no longer has the phi-features in the analysis proposed by Chomsky (2007, 2008); it is the phase head C that accommodates the phi-features (and Agree-features) and assigns these features to the non-phase head T. Richards (2007) shows that it is necessary to extend feature inheritance in a parallel fashion to *v** and V, which means that *v** assigns phi-features to V. Given that in extraction of internal arguments, *SUO* shows up not only with transitive/active verbs but also with unaccusative/passive verbs, which lack phi-features, *SUO* cannot be viewed as a realization of phi-features on *v*.

3.4 SUO provides evidence for PIC₂

In section 3.1, I introduced the definition of the PIC, but that definition was only the first version of the PIC proposed by Chomsky (2000). In Chomsky (2001), a second version of the PIC is proposed. In this section, I am going to show that Chinese provides empirical evidence for the

second version of the PIC. The first PIC and the second PIC are stated as below in (23) and (25) (I follow Müller's (2004) convention, by which the first version of the PIC is referred to as PIC_1 and the second is referred to as PIC_2):

(23) PIC_1:

In phase α with head H, the domain of H is not accessible to operations outside α; only H and its edge are accessible to such operations.

Based on Müller (2004) and Richards (2007), if we have a structure like (24), where phase heads are underlined, the domain of the phase head H (=YP) is spelled out as soon as HP is complete. Accordingly, elements inside the complement domain of the phase head H are neither accessible to the phase head Z nor to the non-phase head X. The non-phase head X in (24) can only see into the HP phase edge domain but not into the HP phase complement domain.

(24) Search space available to non-phase head X under PIC_1

$\underline{Z}$ [$_{XP}$… X [$_{HP}$ … $\underline{H}$ [$_{YP}$ … Y [$_{WP}$ … $\underline{W}$ …]]]]
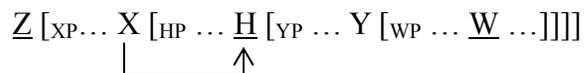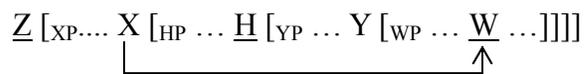
(Figure from Richards 2007)

PIC_2, stated in (25), yields a different search space for the non-phase head.

(25) PIC_2:

The domain of a head H of a phase HP is not accessible to operations at ZP (the next phase); only H and its edge are accessible to such operations.

Noticed by Richards (2007) for the first time, the search space for the head Z remains unaffected from PIC_1 to PIC_2; however, the range of the probe on the non-phase head X is changed—it has been extended in PIC_2 when compared with PIC_1, illustrated in (26).

(26) Search space available to non-phase head X under PIC_2

$\underline{Z}$ [$_{XP}$.... X [$_{HP}$ … $\underline{H}$ [$_{YP}$ … Y [$_{WP}$ … $\underline{W}$ …]]]]

Although elements in the complement domain of the phase HP are still not accessible to operations in the next phase ZP edge, they are available to the non-phase head X, which differs from the case in (25).

The difference between PIC_1 and PIC_2 leads to different predictions about A-movement and A-bar movement. According to PIC_1, no matter whether it is A-movement to Spec TP or A-bar movement to Spec CP that an element undergoes, if this element is inside the vP complement, it must move to the vP phase edge first, or it will get spelled out once the vP phase is completed. However, according to PIC_2, if an element undergoes A-movement to Spec TP from within the vP complement domain, it can move directly to Spec TP without stopping in the vP phase edge because it is accessible to the non-phase head T. When A-bar movement is involved, the element inside the vP complement domain is not accessible to the next phase head C; in order to move to Spec CP, this element needs to move into the vP edge first to avoid being spelled out.

Now let us look at two examples—one involving A-bar movement and the other involving A-movement. *SUO* is allowed in the A-bar movement case (27) but banned in the A-movement case

(28). This contrast is predicted by PIC$_2$ but not PIC$_1$.

(27) [na tiao he   zhong (**suo**) chen [e]] de   chuan bu-ji-qi-shu

     that CL river middle SUO sink   DE boat countless.

     'Boats that sank in that river are countless.'

(28) chuan (***suo**) chen le.

     boat   SUO sink Asp

     'the boat sank.'

As shown in section 3.3, defective (unaccusative/passive) *v* is also a phase, so both of the two sentences above involve raising an element (*chuan* 'boats') from inside the *v*P phase complement. (27) raises it to the Spec CP position in the relative clause; (28) raises it to Spec TP position. However, why is *SUO* allowed in one sentence but disallowed in the other?

    PIC$_1$ and PIC$_2$ both correctly predict that (27) is grammatical. In (27), the extracted NP *chuan* 'boats' is base merged inside the *v*P complement and undergoes A-bar -movement to the Spec CP position. In order to avoid being spelled out when the *v*P phase is completed and keep accessible to the next phase head C, the extracted NP needs to move to the outer Spec *v*P. Therefore the *v* head requires the EPP feature to make this movement possible, and *SUO* is allowed accordingly. However, PIC$_1$ and PIC$_2$ make different predications about the grammaticality of (28).

    According to PIC$_1$, The search space for T is limited to the phase head of *v*P. Elements inside *v*P's complement therefore are not accessible to T, as in (29). In order for the NP *chuan* 'boats' in the *v*P complement to be accessible to T, the EPP feature needs to be added on *v* to enable the NP move into the *v*P edge to avoid being spelled out. PIC$_1$, therefore, predicts that *SUO* is possible

in (28). However, this prediction is wrong.

(29) [$_{TP}$ chuan$_i$ T   [$_{vP}$ **suo** [$_{VP}$ chen le t$_i$]]]   (wrong prediction under PIC$_1$)
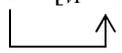
Turning to PIC$_2$, the search space for T under PIC$_2$ is extended to the VP domain, demonstrated

in (30). The NP *chuan* 'the boat' is accessible to T already, so it can move directly to the Spec TP

position without stopping in the *v*P phase edge. Consequently, the *v*P phase head doesn't need the

EPP feature, and *SUO* is disallowed in the sentence as a result[9]. PIC$_2$ correctly predicts that (28)

is ungrammatical with the occurrence of *SUO*.

(30) [$_{TP}$ chuan$_i$ T [$_{vP}$ ***suo** [$_{VP}$ chen   t$_i$]]]   (correct predication under PIC$_2$)
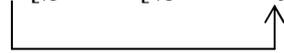
This contrast shows that *SUO* only shows up with A-bar movement targeting the next phase edge

domain (27), not with A-movement (28). This contrast is predicted by PIC$_2$ but not PIC$_1$. Thus,

Chinese provides empirical evidence for the second version of the PIC (Chomsky 2001).

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[9] A reviewer pointed out a potential problem here, namely, how the decision as to whether the EPP feature is added can be made locally at the relevant stage of the derivation since it is not yet known whether the relevant further movement will be to Spec TP or Spec CP. To answer this question, I would like to appeal to the Effect on Output Condition (EoO) (Chomsky 1995, Chomsky 2001), according to which the optional EPP feature can only be added if it is has an effect on the output that is not available in the input. This condition ensures that adding the EPP feature will give rise to the surface semantic interpretation which is determined by the configuration created by A-bar movement to the edge of the phase head. Based on this condition, if adding the EPP feature in (28)/(30) doesn't have an effect on outcome in this sense, though the derivation will be well-formed, the interpretation will fail, which means that the derivation will not converge. Moreover, EoO also restricts numerations, which gives the consequence that the selection of an element must have an effect on the outcome. If in the numeration, the selection of *SUO* is decided, when entering the derivation, whether *v* has the EPP feature is already determined.

A question arises as to whether we can find *SUO* with other A-bar object movements, such as sentences in which objects are topicalized, focused, or bear a *wh*-feature. The following examples show that *SUO* is disallowed in all these structures, which seems to pose a problem for the proposed analysis.

(31) Lisi <u>na-xie shu</u>   (***suo)** mai [e] le

     Lisi those   book   SUO buy   Asp

     'Lisi bought those books already.'

(32) <u>na-xie shu</u>   Lisi (***suo)** mai [e] le

     those   book Lisi   SUO buy   Asp

     'As for those books, Lisi bought them already.'

(33) Lisi (***suo**) mai le   <u>shenme</u>?

     Lisi   SUO buy Asp what

     'What did Lisi buy?'

(34) <u>Shenme yinliao</u>   Zhangsan meitian   dou (***suo**) he   [e] ?

     what   beverage Zhangsan everyday all   SUO drink

     'What kind of beverage does Zhangsan drink everyday?'

(31) involves object movement ('those books') to the preverbal position; (32) has a topicalized object 'those books'; (33) is a wh-in-situ question with the *wh*-object 'what'; (34) contains a focused/topicalized wh-object in sentence initial position. All of these sentences disallow the occurrence of *SUO*. The question now is why this is so.

Before I provide the explanation, let me show three circumstances where *SUO* is predicted

not to appear. According to PIC$_2$, the EPP feature is not needed on *v* if no movement takes place from within the *v*P complement, or if A-movement instead of A-bar movement is involved, or if A-bar movement not targeting next phase CP edge is engaged. If sentences above fall into one of these three circumstances, the reason why *SUO* is not allowed in these cases is clear.

For object movement, Qu (1994) systematically argues that Chinese object movement to the right of the subject is A-movement; Shyu (2001) also proposes a uniform A-chain approach to bare object movement and *lian*-focalization. Following their analyses, if it is A-movement and not A-bar movement which is involved in object movement, *SUO* is expected not to be able to appear in (31).

With regard to topicalization, three possible ways can explain why *SUO* is banned. First, one can argue that topics are not derived by movement but base generated in Chinese. If no movement is involved, *SUO* will be banned. Tsao (1977, 1990), Li and Thompson (1981), and Xu and Liu (1998) hold this view. However, Huang (1982) and Huang, Li, and Li (2009) show that island effects are exhibited in some topicalization sentences, which suggests that at least some topicalization sentences involve movement, and *SUO* should be allowed in these sentences. Nevertheless, even if movement does exist in some topic sentences, as long as the movement does not target the edge of CP, the EPP feature still will not be needed on *v*, which makes the occurrence of *SUO* impossible. And indeed, two available explanations of the sentences above both involve arguing that topicalization targets domains lower than C. Paul (2005) and Hsu (2009) argue that the sentence-internal domain in Chinese (between IP and *v*P) can license a Topic under distinct functional projections. Ting (2003) suggests that an IP-adjunction analysis (Lasnik and Saito 1992) applies to topicalization in Chinese. If movement for topicalization in Chinese does not target the edge of CP as suggested above, *SUO* cannot occur accordingly.

Turning to the *wh*-object in (33), two possible explanations can be provided to account for the impossibility of *SUO* in this sentence. Huang (1982) argues that *wh*-movement in Chinese does not happen in the syntactic derivation but applies covertly after spell-out at LF in Chomsky 2007, 2008). Given that the EPP feature is the property on phase heads which enables internal merge to the phase edge and it is uninterpretable, it should not be a part of LF. Though in LF the *wh*-element does move for the purpose of interpretation, if no movement in the syntactic derivation is involved, the EPP feature on the *v*P phase head will not be needed since there is no element moving into the extra Spec position. This can explain why *SUO* cannot show up with a *wh*-object, as in (33). Another way to explain why *SUO* is banned in *wh*-object sentences is to assume that movement is not responsible for the wh-dependency in the Chinese. Indeed, Aoun and Li (1993a, 1993b) and Tsai (1994, 1999a) claim that Chinese wh-in-situ arguments do not exhibit movement at any level by making use of the unselective binding in the sense of Heim (1982). No matter which explanation one chooses, if no movement occurs in the syntactic derivation, the EPP feature on *v* will not be added and as a result, it will not be possible for *SUO* to show up in these cases.

The case involving focused/topicalized *wh*-objects in (34) is a combination of the two cases (topicalization and *wh*-objects) above. As long as the fronted *wh*-object does not target the edge of CP, proposed by Ting (2003), Paul (2005), and Hsu (2009) as I have shown above, the *v*P phase head will not need the EPP feature since the extracted element is accessible to T based on PIC$_2$. As a result, *SUO* cannot occur in this sentence.

4. Accounting for additional facts

In this section I will discuss other cases of relatives containing *SUO* presented in previous research. More importantly, I will present two pieces of new data that have not been discussed before—relative clauses with multiple *SUO* and long-distance subject extractions with *SUO*. I show that the new data follow naturally from the proposed analysis.

4.1 Analyzing previously-noticed facts

Ting (2003) shows that *SUO*'s occurrence is also allowed in the relativization of a locative head noun and an indirect object in double object constructions. With regard to the locative, there are two possible ways to analyze it. One way is to treat it as the complement of the main verb, and the other is to view it as the complement of the head of the PP which adjoins to VP. Ting (2003) has explored these two possibilities, and I am going to provide some additional arguments for these two analyses of locatives.

Lin (2001) discusses verbs' unselectiveness of objects in Chinese. He shows that in Chinese, objects can be adverbial expressions such as location, instrument, time, and reason, none of which falls into the selection domain of the main verb. By adopting Lin's analysis of Chinese objects, the locative in (5) (repeated in (35)) can be treated as the object of the main verb.[10] Since the locative is in the *v*P complement domain, the EPP feature is required on *v* to move it to the

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[10] It is acceptable to have locatives as the complement of verbs:

(i)   wo fuwu/gongzuo zhe ge jigou/difang,   ni   fuwu/gongzuo na ge   jigou/difang.

        I   serve work   this CL organization/place, you serve/work   that CL organization/place.

        'I serve for this organization; you serve for that organization/ I work at this place; you work that place.'

outer Spec vP, and *SUO*'s appearance is permitted, as in (36).

(35) [Lisi **suo** fuwu/gongzuo] de jigou/difang

    Lisi SUO serve/work   DE organization/place

      'The organization/place that Lisi serves/works at'

(36) [$_{CP}$ difang$_i$ … [$_{vP}$ [$_{vP}$ Lisi **suo** [$_{VP}$ gongzuo t$_i$]]]]

The other way to analyze the locative expression in (35) is to treat it as the complement of the head of the PP which adjoins to the VP. Tsai (2008) argues that in some languages locative expressions are merged with vP and in some languages they are merged with VP. Assuming that locative expressions in Chinese are merged with VP, which is within the vP phase complement domain, the EPP feature on v is required to allow an extra specifier position for the extracted locative NP to move into. The occurrence of *SUO* is therefore allowed (37).

(37) [$_{CP}$ difang$_i$ ... [$_{vP}$ [$_{vP}$ Lisi **suo** [$_{VP}$ [$_{PP}$ t$_i$] [$_{VP}$ gongzuo]]]]]

Notice that the locative expression can occur to the right of *SUO* (38), which suggests that the locative can be lower than vP.[11]

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[11] One reviewer doesn't like the sentence in (38) and thinks that the locative expression *zai-Ouzhou* 'in Europe' should occur to the left of *SUO*. My informants and I accept sentences with the locative expression either occurring to the right or to the left of *SUO*. This could be an issue of dialectal variation.

(38) Lisi **suo** zai Ouzhou mai [e] de shu

Lisi SUO at Europe buy   De book

'the book that Lisi bought in Europe'

For the relativization of an indirect object in double object constructions, Ting (2003) points out that this type of relative with *SUO* is not always acceptable. Crucially, the acceptability of this construction is the same as that of their counterparts without *SUO*. The example that Ting gives is given in (39).

(39) [wo (**suo)** *song/?song-le [e] yi ben shu   de] na ge ren

I   SUO   give   give-Asp one CL book DE that CL man

'the man to whom I gave one book'

This sentence is not acceptable to me, either with or without *SUO*. And it is recognized in the literature (Li and Thompson 1981) that when an indirect object is relativized in Chinese, a resumptive pronoun is required. When a resumptive pronoun is added, (39) does get better; however, it is not possible to add *SUO*, as shown in (40).

(40) [wo (***suo)** song/song-le ta yi   ben shu   de] na   ge ren

I   SUO give/give-Asp he one CL book DE that CL man

'the man to whom I gave one book'

Chiu (1995) notices that *SUO* and the resumptive pronoun are incompatible. She regards this as

evidence in support of the view that the occurrence of *SUO* is triggered by syntactic movement. Aoun and Li (2003) also argue that if a resumptive pronoun occurs in relative clauses, the relativized NP is not moved from inside VP but base-generated in the head noun position. Given the occurrence of the resumptive pronoun in (40), no movement should be involved from within the *v*P complement. The *v* in (40) should not be added with the EPP feature, and *SUO* is disallowed to appear as a result. However I have found some examples in which *SUO* co-occurs with a resumptive pronoun (for detailed discussion, see the appendix).

4.2 Multiple **SUO** *and long-distance subject relativization with* **SUO**

In addition to accounting for the previously established data, the proposed approach, which treats *SUO* as a reflex of EPP-feature-enabled successive-cyclic A-bar movement through the *v*P-phase, makes correct predictions for two additional circumstances in which *SUO* occurs. One is multiple *SUO* with long-distance object relativization, and the other is long-distance subject relativization with *SUO*, neither of which has been discussed before.

I gave two examples of multiple *SUO* in section 2.2 ((11) and (12)). Here are more examples.

(41) zhe shi [wo (**suo**) ganjue ZS (**suo**) anlian   [e]] de na ge nvsheng.

　　this is   I   SUO feel   ZS   SUO secretly-admire   De that Cl girl

　　'This is the girl who I feel that ZS secretly admires.

(42) zhe shi [wo (**suo**) renwei ZS (**suo**)   fuwu/gongzuo [e]] de   jigou/difang.

　　this is   I   SUO think ZS SUO serve/work   De organization/place

　　'This is the organization/place that I think that ZS serves/works at.

(43) zhe jiu   shi [wo (**suo**) qiangpo ta (**suo**) maidiao [e]] de na xie jia-ju.

　　this exactly is   I   SUO force   he SUO   sell   De that CL furniture

　　'These are the pieces of furniture that I forced him to sell.'

All of these three sentences involve long-distance object relativization, and *SUO* can appear in both matrix clauses and embedded clauses. In (41) the direct object of the embedded verb is relativized, in (42) the locative in the lower clause is extracted, and in (43) the object of the embedded verb is moved. The matrix verbs in the first two sentences can only take CPs as their complements. The matrix verb in (43), which is claimed to be an ECM predicate[12] by Chiu (1995), also only takes CP[13] as its complement. Given that the matrix verbs in these examples do not take NPs but only clausales as their complements, these sentences cannot be viewed as involving two separate relative clauses which together modify the head NP.

　　By adopting the proposed approach, the occurrence of multiple *SUO* is predicted: as long as successive cyclic A-bar movement through the *v*P level is involved, the EPP feature is required on all *v*P phase heads along the parth of long-distance extraction. This predicts that *SUO* is

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[12] A reviewer asked why with multiple *SUO*, the matrix verb cannot be a persuade-type verbs such as *quan* 'persuade' and *bipo* 'force'. Notice that, in the multiple *SUO* sentence in (43), the matrix verb is in fact a persuade-type verb *qiang-po* 'force'. As for why there are such differences among persuade-type verbs, the reason could be along the same line as what Ting (2003) argues for the differences among unaccusative verbs. Chiu (1995) points out that *SUO* cannot appear with unaccusatives in relatives, but Ting (2003) provides some examples in which *SUO* can co-occur with unaccusative verbs. Ting claims that the class of unaccusative verbs may further divided into semantically coherent subsets which do not necessarily pattern alike (Levin and Rappoport Horvav 1995, cited from Ting 2003), and this could be the reason why unaccusative verbs do not all behave alike. Likewise, the same reason could contribute to the different behaviors of different persuade-type verbs with multiple *SUO*. A remaining question is how to characterize these two types of verbs where one allows multiple *SUO* and the other does not. I don't have an answer now and will leave it open for further research.

[13] I adopt Richards' (2007) and Chomsky's (2008) view that Raising and ECM infinitivals must be projections of $C_{(def)}$ not $T_{(def)}$.

allowed to appear in all *v*P phase head positions, which has been proved to be correct by the examples in (41)-(43). Take (43) for example: the NP *na-xie-jiaju* 'these pieces of furniture' moves from inside the lower *v*P phase complement to the higher CP phase edge, and there is a higher *v*P phase in between. In order for the extracted NP to be accessible for the following derivation, the lower *v* needs an EPP feature to make the NP move into its edge; the higher *v* also requires an EPP feature to enable the extracted NP to successively move into its edge. After moving to the higher *v*P edge, the extracted NP continues moving to the CP edge. Since EPP features are added on both lower *v*P and higher *v*P phase heads, *SUO* is allowed to appear twice in the sentence (44).

(44) [$_{CP}$ na-xie-jiaju$_i$ ..[t$_i$ [$_{vP}$ wo **suo**[$_{VP}$ qiangpo [$_{CP}$ t$_i$ ..[t$_i$ [$_{vP}$ ZS **suo** [$_{VP}$ maidiao t$_i$]]]]]]]]]

Observe that, since *SUO* is optional, it is also acceptable for it to occur only once in these sentences—either appearing in the lower *v*P or in the higher *v*P. The fact that *SUO* may occur either in the matrix clause or in the embedded clause of an ECM predicate or an object control predicate as in (9), noticed by Chiu (1995) and referred as 'climbing' by Ting (2003, 2010), can also be explained.

Crucially, besides providing an explanation for the occurrence of multiple *SUO*, the proposed approach makes a unique prediction: even though normally *SUO* cannot appear with subject relativization, as in (45), this should in fact become possible once movement through a higher *v*P layer is involved, i.e. when we have long-distance subject relativization. The proposed analysis thus predicts the long-distance subject relativization with *SUO* to be possible in (46), and it is so.

(45) *[[e] **suo**   mai   le   shi dong fangzi] de na   ge   ren

           SUO buy   Asp ten CL   house   De that CL man

    Intended: 'the man who bought ten houses.'

(46) zhe jiu   shi ZS **suo**   xuancheng [[e] mai le   shi dong fangzi] de na   ge   ren

    this exactly is ZS SUO claim   buy Asp ten CL   house De that CL man

    'This is the man who ZS claimed bought ten houses.'

The phrase in (46) should not be viewed as two separate relative clauses modifying the head NP because the matrix verb, *xuancheng* 'claim', only takes CPs as its complements, so the matrix clause cannot be treated as a relative clause modifying the extracted NP.

    For the derivation of (46), since the relativized element *na ge ren* 'the man' in (46) is originally merged inside the lower vP phase edge, the EPP feature is not needed on the lower v, which explains why *SUO* cannot appear in the lower vP. After the extracted NP moves to the lower CP domain, it is now in the complement domain of the higher vP phase head, which is not accessible to the higher CP phase head. Consequently, the EPP feature is required on the higher vP phase head to enable the NP to move to its edge. This explains why *SUO* can occur in the matrix clause. The relevant derivation is illustrated in (47).

(47)[$_{CP}$ na ge ren$_i$… [$_{vP}$ ZS **suo** [$_{VP}$ xuancheng[$_{CP}$ t$_i$ ... [$_{vP}$ t$_i$ (***suo**) [$_{VP}$ mai le ...]]]]]

4.3 SUO, Passives, and Sub-Extraction of Passives

4.3.1 SUO in Passives

The only other construction with *SUO* and an accompanying empty object position is the passive construction. I show in this section that the proposed analysis not only accounts for *SUO* relatives but also *SUO* passives[14]. As shown in (7a) and (7b), *SUO* only occurs in long passives and not in short passives. The contrast is repeated in (48) and (49).

(48) zhexie shiqing bu neng bei   tamen (**suo**) liaojie.

    these   thing   not can   BEI they   SUO understand

    'These things cannot be understood by them.'

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[14] One reviewer pointed out that Zhang (2001) observed a difference between *SUO*-relatives and *SUO*-passives: negation (*meiyou*) can separate *SUO* and the verb in relatives but not in passives, as exemplified in (i) and (ii).

(i) Zhangsan (<u>meiyou</u>) bei biaomian-xianxiang   suo (*<u>meiyou</u>) mengbi.

    Zhangsan Neg   Bei surface-phenomenon SUO Neg   deceive

    'Zhangsan was (not) deceived by the superficial phenomenon.'

(ii) Zhangsan (*<u>meiyou</u>) suo   (<u>meiyou</u>) kan-guo de shu

    Zhangsan Neg   SUO Neg   read-Asp de book

    'the books that Zhangsan (did not) read'

As for the position of negation in *SUO* sentences, Chiu (1995) claims that *SUO* must be higher than negation; apparently, this is not the case in passives (i) though it is true in relatives (ii). I do not have an answer for why the position of negation is different in *SUO*-relatives and *SUO*-passives. Ting (2006) argues against the analysis of having the negation particles *bu* and *mei* project their own independent category NegP in Chinese, but she has not provided the exact structural position of the negation particles. I can only suggest that why negation does not appear in a fixed position is an independent issue which is beyond the scope of the discussion of this paper. I will leave this question open for future research.

(49) zhexie shiqing bu   neng bei __ (**suo) liaojie.

   these   thing   not can BEI   SUO understand

   'These things cannot be understood.'

Based on PIC$_2$ and the view that defective (unaccusative/passive) *v* is also a phase head as argued in section 3, the ungrammaticality of (49) with *SUO* is predicated. Since the A-movement in (49) does not 'initiate' the EPP feature on *v*, it is illicit for *SUO* to appear in the sentence. However, the grammaticality of (47) is quite unexpected because *SUO* should also be impossible here, just like with other kinds of defective *v* (i.e. unaccusatives, as in (28) and short passives as in (49)).

This contrast can be accounted for by my proposal of *SUO* together with the non-uniform analysis of Chinese passives proposed by Ting (1998), Huang (1999), and Huang, Li and Li (2009). This analysis argues that long passives involve A-bar movement while short passives involve A-movement.

Feng (1995) first proposes that Chinese passives should be analyzed on a par with the *tough* construction in English, involving both movement and predication, unlike *be*-passives in English which involve NP-movement only. Chiu (1995), Ting (1998), Huang (1999), and Huang, Li and Li (2009) provide more evidence supporting Feng's analysis. Following the analysis of the English *tough* construction by Chomsky (1981), the object of the embedded clause in *tough* constructions is a null category that moves to the Spec CP position, from where it is predicated on the matrix subject, as shown in (50).

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(50) The thing$_i$ is easy [$_{CP}$ NOP$_i$ [$_{IP}$ for you to understand t$_i$]].

predication   movement

The non-uniform approach argues that long passives and short passives have different means of derivation. The long passive involves the main verb *bei* with a clausal category,[15] in which a null operator undergoes A-bar movement to the clause periphery and gets predicated on the subject NP. The derivation of the long passive (48) is illustrated in (51).

(51) Zhexie shiqing$_i$ bu neng bei [$_{CP}$ NOP$_i$ [$_{TP}$ tamen liaojie t$_i$]].

predication   A-bar movement

The short passive, on the other hand, involves an auxiliary-like *bei* with a VP complement whose PRO object is NP-moved and controlled by the subject NP. (52) shows the derivation of the short passive in (48).

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[15] Ting (1998) and Huang (1999) assume that the *bei* in long passives takes an ECM clause which they assume to be a TP. The null operator moves from the complement position and adjoins to the embedded TP. Thought whether the clausal category is a TP or CP could just be a technical problem (Huang, pc), I argue that this clausal category should indeed be a CP rather than a TP, and I am going to use CP throughout this paper. First, in Richards (2007) and Chomsky (2008), Raising and ECM infinitivals are argued to be projection of C(defective) not T(defective). Based on this, if the clausal category that *bei* takes is a ECM clause, the clause is still a CP. Secondly, empirically speaking, the clausal category of ECM verbs should be a CP even under the GB framework. In the following sentence (i), if there is no CP serving as an escape hatch, there would be two TPs in sentence, which would violate Subjacency (Huang, pc). The same fact holds in Chinese, as in (ii).

(i) [$_{CP}$ Who$_i$ do [$_{TP}$ you believe [$_{CP}$ t$_i$ [$_{TP}$ John to have killed t$_i$]]]]

(ii) zhe jiu   shi [$_{NP}$ [$_{CP}$ t$_i$ [$_{TP}$ ZS bei [$_{CP}$ t$_i$ [$_{TP}$ LS jie-zou   le   t$_i$]]]] de [$_{NP}$ na-ben-shu$_i$]]

  This exactly is   ZS Bei   LS borrow-away Asp   De   that-CL-book

  'This is the book that was borrowed by LS from ZS.'

(52) zhexie shiqing$_i$ bu neng bei [$_{VP}$ PRO$_i$ [$_{V'}$ liaojie   t$_i$]]

                  predication   A-movement

With the non-uniform analysis of Chinese passives, let us look at how the proposed analysis accounts for *SUO*-passives. Since it is A′-movement that is involved in long passives, the operator that is merged inside the lower *v*P complement domain is not accessible to the CP phase head. Therefore the EPP feature is required on the lower *v* to enable the operator to move to its edge, which permits the appearance of *SUO*. After the operator moves to the Spec CP position from within the lower *v*P edge domain, it is now accessible to the non-phase head T based on PIC$_2$, and it can be predicated on the matrix subject. The derivation is demonstrated in (53).

(53) [$_{TP}$ zhexie shiqing$_i$ T bu neng ..[$_{VP}$ bei [$_{CP}$ OP$_i$ [$_{TP}$ tamen [$_{vP}$ [$_{vP}$ **suo** [$_{VP}$ liaojie t$_i$]]]]]]]

                                     A′-movement

In short passives, the PRO undergoes NP movement to the Spec *v*P position. Since it is A-movement that is involved, the EPP feature on *v* is not required, which forbids the occurrence of *SUO*. Now PRO is located in the *v*P edge, which is accessible to the non-phase head T, and it is controlled by the surface subject. The derivation is shown in (54).

(54) [$_{TP}$ zhexie shiqing$_i$ T bu neng [$_{AuxP}$ bei [$_{vP}$ PRO$_i$ (*suo) [$_{VP}$ liaojie   t$_i$]]]]]]

                                  A-movement

In the following section, I examine *SUO*'s occurrence in cases in which elements inside passives are extracted.

4.3.2 SUO and Sub-extraction of Passives

Chomsky (2008) discusses some examples that violate the Subject-island condition. Examples are given in (55):

(55) a. *It was the car (not the truck) of which [the driver caused a scandal]

   b. It was the car of which [the driver was found].

Both of the moved elements in the above sentences are sub-extracted from the surface subject, which seems to be a violation of the Subject-island Condition; however, only (55a) is ungrammatical. The distinction between the two cases lies in their base structures—(55b) raises the surface subject 'the driver of the car' from the verb phrase, while the surface subject in (55a) is in its base-generated position.

   Chomsky's account for this asymmetry is based on the assumption that passive/unaccusative *v* is not a phase head, feature inheritance from C to T, and derivational simultaneity. Specifically, T in (55b) is not the probe that triggers A-movement until C is merged and percolates its Agree-feature to T. After the feature percolation, C probes the *wh*-phrase (*of which*) inside the complement of the passive verb and raises it to Spec CP, and T probes the containing NP (*the drive of which*) and moves it to Spec TP. These two movements take place at the same time. Under the assumption that passive/unaccusative *v* is not a phase head, this account allows *wh*-extraction to Spec CP directly without stopping in the outer Spec *v*P. In contrast, in (55a), the

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base position of the transitive subject is in Spec *v*P, which is a freezing position for extraction, so this explains why (55a) is bad.

Chomsky's account of this asymmetry seems not to work if defective *v* is also a phase head. However, by adopting the Counter-Cyclic Derivation account proposed by Kuno (2010), this asymmetry can be explained with the assumption that the defective *v*P is a phase. The Counter-Cyclic Derivation account does not depend on derivational simultaneity; it allows for the *wh*-element to move to the Spec CP through the *v*P edge first (56a-b) and then for the NP to move to the Spec TP afterwards (56c).

(56) a. [*v*P of which [*v*P was found [DP the drive of which]]]]]

b. [CP of which [TP [*v*P of which [*v*P was found [DP the drive of which]]]]]

c. [CP of which [TP [DP the drive of which] [*v*P of which [*v*P was found [DP the drive of which]]]]]

Chinese, on the other hand, does not exhibit the same subject-object sub-extraction asymmetry as English because subjects in passives are also base-generated in the Spec TP position, as shown in section 4.3.1. Sub-extraction is permitted from within subjects[16] in active, short passive and long

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[16] A reviewer asked how one can know that the relativized NP in (57) is from within the subject instead of from the subject position since Chinese allows 'multiple subject' construction, as exemplified in (i), with the two 'subjects' underlined.

(i) Daxiang, bizi chang

elephant nose long

Literally 'Elephants, noses are long.'

'As for elephants, (their) noses are long.'

Note that, in order to appear in this 'multiple subject' construction, the first NP (NP$_1$) and the second NP (NP$_2$) need to satisfy a semantic constraint--NP$_1$ ('elephant') needs to have either a possessor-posessee relation or whole-part relation with NP$_2$ ('nose'),

passive sentences, as in (57)[17]. However, when putting *SUO* inside these sentences, a contrast emerges: with *SUO*, the first two sentences are bad; the third one is good.

(57) a. zhe jiu   shi [[e] si-ji   (**suo**) zhuang le   ren] de na   liang che

      this exactly is   driver SUO hit   Asp man De that Cl   car

      'This is the car of which the driver hit a man.'

  b. zhe jiu   shi [[e] si-ji   bei (**suo**) zhao-dao le]   de na liang che

     this exactly is   driver Bei   SUO find   Asp De that Cl   car

     'This is the car of which the driver was found.'

  c. zhe jiu   shi [[e] si-ji   bei jing-cha (**suo**) zhao-dao le] de na   liang che

     this exactly is   driver Bei police   SUO find   Asp De that Cl   car

     'This is the car of which the driver was found by the police.'

With regard to the grammaticality of the three sentences above without *SUO*, though these sentences seem to violate the Subject condition, their grammaticality can be explained if the relativized head NP does not move from within the subjects in (57). According to Huang (1982),

as discussed in Chao (1968) and Dong (2009). However, the sentences given in (57) do not satisfy this semantic constraint. The first NP ('the car') and the second NP ('driver') in (57) have a possessee-possessor relation, opposite to the possessor-possessee relation required for the 'multiple subject' construction, which leads to the ungrammaticality in (ii).

(ii) *<u>na liang che</u>, <u>si-ji</u>   zhuang le   ren

     that Cl car,   driver hit   Asp person

Accordingly, the relativized noun in (57) cannot be viewed as being extracted from the first subject position of the ungrammatical sentence in (ii) but should be viewed as being moved from within the subject ('the driver of the car') position.

[17] People do not agree on the judgment of the three sentences without *SUO* in (56)—some people don't like (56a) that much, some don't like (56b) and (56c) that much. However, people do agree on the contrast of these three sentences when *SUO* is involved.

island constraints do apply to Chinese; however, Chinese employs a strategy to avoid island constraint violations. Huang argues that Chinese allows an empty *pro* in subject position which is subject to an identification condition: a *pro* must be identified by the most local c-commanding antecedent. If assuming a *pro* in (57), the most local c-commanding antecedent will be the relative head. Since there is no movement from inside an island involved, these three sentences in (57) are good. Take (57a) for example. The derivation of the relative clause is shown in (58):

(58)[$_{CP}$ na liang che$_i$ …[$_{TP}$ [*pro*$_i$ si-ji] ...[$_{vP}$ …[$_{VP}$ zhuang-le ren]

Turning to the contrast in the three sentences introduced by the occurrence of *SUO*, though none of these three sentences exhibits movement from inside the subjects, they behave differently at the *v*P level. No movement happens inside the vP complement in (57a), but both (57b) and (57c) do involve moments—(57b) contains an A-movement in the complement of *bei* and (57c) shows an A-bar movement within the complement of *bei*, both of which are shown in the previous section. These differences lead to the contrast in (57): if no movement is involved, *SUO* is not allowed (59); if A-movement is involved, *SUO* cannot appear either (60); if A-bar movement targeting next phase edge is involved, *SUO* is permitted (61). The contrast is shown below.

(59)[$_{CP}$ na liang che$_i$ ..[$_{TP}$ [*pro*$_i$ si-ji] ... [$_{vP}$ ***suo** [$_{VP}$ zhuang-le ren]]]]

(60)[$_{CP}$ na-liang-che$_i$ [$_{TP}$ [*pro*$_i$ si-ji]$_j$ ..[$_{AuxP}$ bei [$_{vP}$ PRO$_j$ ***suo** [$_{VP}$zhao-dao le t$_j$]]]]]

(61)[$_{CP}$ na-liang-che$_i$ ..[$_{TP}$ [*pro*$_i$ si-ji]$_j$…[$_{vP}$ bei [$_{CP}$ OP$_j$ [$_{TP}$ jingcha [$_{vP}$ t$_j$ [$_{vP}$ **suo** [$_{VP}$ zhaodao t$_j$]]]]]]]
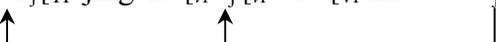
Observe that, in long passives, *bei* is analyzed as a main verb taking a clausal complement as shown above; therefore there are two verbs in the sentence. *SUO* is allowed to appear before the lower verb *zhaodao* 'find' but not before the higher verb *bei* (62a). The reason is quite straight-forward: the subject is in the higher *v*P phase edge and is accessible to T already, so the higher *v* does not need the EPP feature, as in (62b).

(62) a. *zhe jiu   shi [si-ji   **suo** bei <u>jing cha</u> zhao-dao le] de na   liang che.

this exactly is   driver SUO Bei police   find   Asp De that Cl   car

b. [$_{CP}$ na liang che$_i$ ...[$_{vP}$ [*pro*$_i$ si-ji]$_j$ ***suo*** [$_{VP}$ bei [$_{CP}$ OP$_j$ [$_{TP}$ jingcha [$_{VP}$ ... t$_j$]]]]]]

5. Consequences and Residual Issues

As mentioned by Ting (2003), the acceptability of extracting adjuncts with *SUO* varies.

(63) [Lisi **suo**   gongzuo] de ??shijian/?*fangfa/*yuanyin

Lisi SUO work   DE   time/method/reason

'the time/method/reason that Lisi works'

I did find some good cases of extraction of adjuncts with *SUO* in the corpus of Modern Chinese from Peking University. In (64), *SUO* extracts *fang-shi* 'manner'; in (65) *SUO* extracts *shi-jian* 'time'.

(64) ta-men **suo** rongyi jieshou de fang-shi

      they   SUO easy   accept De manner/way

      'the manner that they can easily accept'

(65) ji-suan ta-men **suo** ting-liu de shi-jian

      caculate they   SUO stay   De time

      'to calculate the time that they stay.'

To explain the examples above, I would like to adopt Lin's (2001) analysis of verbs' unselectiveness of objects in Chinese as I have introduced in section 4.1. In Lin's work, Chinese surface objects can be time, manner, and reason adverbials which do not fall into the selection domain of the main verb. Following this view, these 'adjuncts' in the examples in (63)-(65) are 'fake' adjunct and should be analyzed as complements.[18] The reason why some people found these phrases acceptable could be that those people treat the *v*P 'adjuncts' as complements.

Whilst the examples stated above can be viewed as complement extraction with *SUO*, I found an example of reason extraction with *SUO* which is difficult to analyze as complement extraction. In (66), the relativized element is *yuanyin* 'reason' and the complement of the verb is also present. Observe that, a *SUO*-like element *zhi-SUO-yi* 'Gen(itive)-therefore' can also optionally appear in relative clauses. In (66), some people don't like the occurrence of *SUO*, but they have no problem with the occurrence of *zhi-SUO-yi*.

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[18] One reviewer suggests that the manner expression can also be analyzed as the adjunct of VP, which is still in the complement of v. The reason for me not doing so is because manner adverbials in Chinese are sensitive to subject agentivity as shown in Tsai (1999b). Tsai argues that, syntactically, manner in Chinese modifies *v*P, which is in the phase edge.

(66) zhe shi wo (?**suo/zhi-suo-yi)**   peifu ta de yuanyin

    this is I   SUO/Gen-therefore admire her De reason.

    'this is the reason why I admire her.'

zhi-SUO-yi cannot replace *SUO* in other types of relative clauses and long passives, as shown below.

(67) *Lisi **zhi-suo-yi**   mai de   na-xie shu

    Lisi Gen-therefore buy DE those   book

(68) *ta-men **zhi-suo-yi**   rongyi jieshou de fang-shi

    they   Gen-therefore easy   accept De manner/way

(69) *zhe-xie shiqing bu neng bei tamen **zhi-suoyi**   liaojie.

    these   thing   not can BEI they   Gen-therefore understand

I suggest that the *SUO* in (66) is the abbreviated form of *zhi-suo-yi* 'Gen-therefore'—a residue of Old Chinese, which means 'therefore'[19]. The *SUO* in (66) is a different word from the *SUO* that I discuss throughout this paper, which is a *v* head, lexically specified with the EPP-feature.

    Observe that the abbreviated form *SUO* 'therefore' is not always interchangeable with *zhi-SUO-yi* 'Gen-therefore'—it can only be used in place of *zhi-SUO-yi* in headed relative clauses (66), not headless relatives (70).

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[19] Huang (2009) discusses how Old Chinese *SUO*, which originally means 'place', gains the meaning of 'therefore' and becomes *SUO-yi* 'therefore'.

(70) wo (**zhi-suo-yi**/***suo**) cheng-gong   bu-shi yinwei wo hen   xinyun.

  I   Gen-therefore// SUO succeed/successful not   because I   very lucky

  '(The reason) why I succeed is not because I am lucky.'

Huang (2008) proposes that Old Chinese exhibits a phenomenon similar to Ga/No conversion in Japanese. Huang proposes that *zhi* is the genitive marker in Old Chinese, similar to the genitive form -*no* in Japanese, and that *zhi* makes a clause a nominal expression. If we adopt Huang's analysis, the contrast between (66) and (70) can be explained. *Zhi* in (70) makes the clause a nominal phrase meaning 'my being successful,' and even if the head noun is absent, the sentence is still good. However, without *zhi*, the abbreviated form *SUO* 'therefore' alone cannot nominalize the clause, which leads to ungrammaticality. Given that *zhi-suo-yi* and the abbreviated form—*SUO* are less discussed and studied in the literature and that discussion of them is beyond the scope of this paper, I omit further discussion and leave it for future research.

　　Another issue that I want to discuss is *SUO* and the relativization of other adverbials, such as frequency. Given that V-modifying adverbs are merged with VP (Bowers 2002, Huang, Li, and Li 2009), which is in the *vP* complement domain, one might think that the extraction of frequency adverbials should be compatible with the occurrence of *SUO*. However, it is not the case. As we can see in (71), *SUO* is not permitted in a frequency-extraction sentence.

(71) ta (*suo) kan shu   de pinglv

   he   SUO read book De frequency

   'the frequency that he read books'

The puzzle raised by (71) can be solved if the relativized adverbial NP is externally merged in the Spec CP position instead of moving from inside the relative clause. Indeed, Aoun and Li (2003) have argued that in adjunct relativization, the head noun is base generated and binds a variable in the relative clause rather than moving from the relative clause. Tsai (2008) argues that this is one of two major strategies used to relativize an adverbial. The first strategy is for the target of relativization to merge high in the syntactic projection, presumably well beyond the *v*P phase. The other strategy is for the target to appear either as a nominal operator or a nominal variable. Since the frequency adverbial is lower than *v*P, it can only employ the second strategy, to appear as a nominal operator or variable and to be bound by the base generated head noun. If the relativized NP *ping-lv* 'frequency' in (71) is not derived from movement, the appearance of *SUO* will not be expected.

6. Conclusion

In this paper, I argue that Chinese provides empirical evidence for the EPP feature enabling movement at the *v*P phase level. I propose that *SUO* can be seen as one kind of *v* head, lexically specified with the EPP feature and exiting alongside other lexical *v* heads. *SUO* is required if extraction targets an element inside the complement domain of the *v*P phase. *SUO*, therefore, can be viewed as a reflex of successive-cyclic A-bar movement through the *v*P, or more accurately, it 'signals' the EPP feature on the phase head *v*. I also argue that Chinese provides empirical evidence for defective (unaccusative/passive) *v* being a phase (Legate 2003), based on the fact that *SUO* occurs with relativization of internal arguments irrespective of verb types. Furthermore, I also argue that *SUO* shows up only with A-bar movement that targets next phase edge but not

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with A-movement. Chinese, therefore, provides empirical evidence for a specific version of the PIC (Chomsky 2001). The proposed analysis not only provides an account for previously established data but also makes correct predictions about newly discovered data that have not been discussed before. Most importantly, if the proposed approach is correct, it provides direct empirical evidence for *v*P as an intermediate landing site, thus strengthening phase theory.

Appendix

Chiu (1995) notices that *SUO* and the resumptive pronoun *ta* 'he' are incompatible. (1) is a relative clause with the resumptive pronoun *ta* 'he,' and (2) is a relative clause with *SUO*—both of them are good. However, when the resumptive pronoun and *SUO* co-occur in the relative clause, the sentence turns out to be unacceptable, as in (3).

(1) [wo ai-le   **ta**   san   nian] de na ge ren

   I love-ASP he   three year   DE that Cl man

   'the man I loved for three years'

(2) [wo **suo**   ai   le   san   nian] de na ge ren

   I   SUO love ASP three year   DE that Cl man

   'the man I loved for three years'

(3) *[wo **suo**   ai   le   **ta** san   nian] de na ge ren

    I   SUO love ASP he three year DE na ge ren

It is generally assumed that relative clauses containing a resumptive pronoun do not involve

syntactic null operator movement. According to Chiu, the ungrammaticality of (3) supports the analysis that *SUO*'s occurrence is triggered by syntactic movement. Since *SUO* is licensed by syntactic movement, the environment with a resumptive pronoun disallow *SUO*'s occurrence, and that is why (3) is bad. I agree with Chiu's analysis of (1)—(3). But I did find some cases in which SUO and resumptive pronoun do co-occur. Let us look at the following example.

(4)   wo **suo**   ti   guo [ZS ai   le   **ta**   san   nian] de na ge ren

      I   SUO mention Asp ZS love ASP he   three year DE that Cl man

      'the man that I mentioned that John loved for three years'

In (4), the object in the embedded clause has been relativized. *SUO* appears before the matrix verb *ti* 'mention', and the resumptive pronoun *ta* 'he' occurs in the object position of the embedded clause. In contrast to (3), (4) is acceptable. If there is no movement involved in sentence (4) given the appearance of the resumptive pronoun *ta*, *SUO* should not be able to appear. This sentence seems to raise a problem forthe proposed analysis in this paper.

To solve the puzzle raised in (4), I want to introduce the 'mixed chain' phenomenon discussed in McChoskey (2002). I suggest that (4) can be viewed as a case of a 'mixed chain' which still falls under the prediction of the proposed approach to *SUO*. McChoskey's (2002) work on mixed chain is concerned with successive cyclic A-bar connections in Irish. In Irish, when movement out of a finite clause targets an A-bar position, the finite clause is introduced by a particle written as *aL*, illustrated in (5) and exemplified in (6) (as (4) and (5b) in McChoskey (2002)).

(5) XP$_i$ [$_{CP}$ *aL* … [$_{CP}$ *aL* … [$_{CP}$ *aL* … t$_i$…]]]]

(6) cuid den fhilíocht **a** chualaís ag do sheanmháthair á rá   **a**

some of-the poetry   *aL* heard [S2] by your grandmother   being-said *aL*

cheap   an sagart úd

composed the priest Demon

'some of the poetry that you heard your grandmother saying that that priest composed'

McChoskey claims that the complementizer *aL* is the spell out of [C, +EPP, +Op]. When there is a resumptive pronoun, Irish uses a different complementizer, *aN*, which associates with the binding of the resumptive pronoun, and this *aN* appears in the topmost specifier of CP position. All the lower C head positions are occupied by still another complementizer, *go*.

(7) DP [$_{CP}$ *aN* … [$_{CP}$ *go* …*pro*…]]

aL cannot be used with the resumptive pronoun within the same single clause (8). However Irish does allow some 'mixed chain' in which a pronoun is in the lower clause, the complementizer *aN* which binds the resumptive pronoun is in the intermediate C position, and *aL* signals movement in the higher C position, demonstrated in (9) and exemplified in (10).

(8) *DP [$_{CP}$ aL … [$_{CP}$ aL …*pro*…]]

(9) [$_{CP}$ *aL*[TP … [$_{CP}$ *aN* [$_{TP}$ … *pro* …]]]]

(10) an galar   **a** chuala me **ar** cailleadh bunadh an oileain   leis

the disease *aL* heard I   *aN* died   people the isand [Gen] with-it

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'the disease that I heard that the people of the island died of (it)'

McChoskey proposes that an element is in the intermediate Spec CP position binding the resumptive pronoun and that moves into the higher Spec CP. Since this element moves into the higher Spec CP position from the lower Spec CP, the appearance of *aL* is triggered. Finer (1997) also suggests a similar analysis for Selayarese.

By adopting McChoskey's analysis of mixed chains, the puzzle raised in (4) can be solved in the same way. Specifically, the relativized NP in (4), *na-ge-ren* 'the man' can be viewed as being base-generated in the lower Spec CP position and binding the resumptive pronoun. In order for this NP to move to the higher Spec CP position, it has to first move into the edge of *v*P. The EPP feature on *v* therefore is needed and *SUO* is allowed to appear in the higher clause as a result, demonstrated in (11).

(11) [$_{CP}$ na-ge-ren$_i$… [$_{vP}$ wo **suo** [$_{VP}$ tiguo [$_{CP}$ t$_i$ …[$_{vP}$ ZS [$_{VP}$ ai le him$_i$ san nian]]]]]

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