Deriving Head-Final Order in the Peripheral Domain of Chinese

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This article proposes a unified analysis of the peripheral projections in Chinese, which does not rely on a head-directionality parameter. Each of these projections constitutes a phase and its head bears an EPP feature, which must be satisfied. Chinese peripheral projections demonstrate four different ways to satisfy the EPP. Importantly, sentence-final particles project phases, and their complements obligatorily move to the specifier as a last resort to satisfy the EPP. Movement of the complement to the phase edge would postpone the transfer of phrases embedded in the complement, allowing these phrases to move later. When the phase edge is not available for the moved complement, phrases embedded in the complement are not able to be extracted in the later stage, after the complement is transferred. This constitutes a strong argument in favor of the obligatory complement-to-specifier raising analysis for sentence-final particles in Chinese.

Keywords: sentence-final particles, left periphery, final head, phase, Chinese

1 Introduction

1.1 Peripheral Projections in Chinese

Under the split-CP hypothesis (see Rizzi 1997, Cinque 1999, Cinque and Rizzi 2008), the sentence-peripheral domain contains different types of functional projections. Chinese is a very interesting case in terms of cartography: on the one hand, Chinese has different types of topics and foci, which are located in the left periphery; on the other hand, it also possesses a rich system of sentence-final particles (SFPs). Previously, Chinese SFPs have been treated as head-final Cs taking their complements on the left side (see Lee 1986). Detailed discussion of the syntactic and semantic properties of SFPs can be found in B. Li 2006, Paul 2014, 2015, Deng 2015, V. J. Pan and Paul 2016, Paul and Pan 2017. In V. J. Pan 2015, 2019a, I propose a fine-grained architecture

of CP containing SFPs, null operators, and topic projections. Crucially, core projections are distinguished from optional ones (e.g., topics and foci) (also see Rizzi 1997, Boeckx 2008).

(1) *The hierarchy of the core projections in the Chinese periphery*[1]
AttP (speaker's attitude) > **SQP** (special questions) > **iForceP** (illocutionary force) > **OnlyP** (exclusive-focus particles) > **S.AspP** (sentential aspects) > TP . . .

Importantly, SFPs in Chinese are located in four different layers. The S.Asp particles are related to sentential aspects; examples are *laizhe* (indicating an action or a state in the recent past), *le* (indicating a change of state), and *ne* (indicating a progressive action or state). Particles such as *eryi*, paraphrased as 'only', head an *only*-type of exclusive-focus projection, *Only*P. The iForce SFPs are related to illocutionary force; examples are the *yes/no* question particle *ma*, the confirmation-request particle *ba*1, and the imperative particle *ba*2. SFPs expressing the speaker's subjective opinion or attitude are Att heads, located in the highest position in the left periphery; examples are *ne*, *la*, *ba*3, *bei*. To illustrate:[2]

(2) a. [$_{S.AspP}$ [$_{TP}$ Zhangsan qu-guo Bali] [$_{S.Asp}$ *le*]].
     Zhangsan go-EXP Paris   LE
     'It is now the case that Zhangsan has visited Paris.'

   b. [$_{OnlyP}$ [$_{TP}$ Zhangsan bu   he   Faguo kafei] [$_{Only}$ *eryi*]].
      Zhangsan NEG drink French coffee   ERYI
      'It is just the case that Zhangsan does not drink French coffee. (Nothing serious!)'

   c. [$_{iForceP}$ [$_{TP}$ Ni   mingtian fei Beijing] [$_{iForce}$ *ma*]]?
      you tomorrow fly Beijing   Q$_{yes/no}$
      'Will you fly to Beijing tomorrow?'

   d. [$_{AttP}$ [$_{TP}$ Wo xiuxi-le   zhengzheng yi-ge   yue] [$_{Att}$ *ne*]]!
      I   rest-PERF full   one-CL month   NE
      'Look, I had a rest for a whole month!'

   e. Hierarchy: iForceP (*ma*) > *Only*P (*eryi*) > S.AspP (*le*) > TP
      [$_{iForceP}$ [$_{OnlyP}$ [$_{S.AspP}$ [$_{TP}$ Ta zhibuguo   bu he   ying   shi hongcha]
                                  she no.more.than NEG drink English style red.tea
      [$_{S.Asp}$ *le*]] [$_{Only}$ *eryi*]] [$_{iForce}$ *ma*]]?
          LE   ERYI   Q$_{yes/no}$
      (Lit.) 'Is it just the case that she no longer drinks English black tea?'
       = 'Does she only no longer drink English black tea?'

In (2e), three SFPs occur in a fixed order. The lowest, the sentential aspect particle *le*, is paraphrased as 'no longer' (with negation). The middle one is the *only*-type exclusive-focus particle

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[1] The symbol ">" indicates the hierarchical height among different projections; "XP > YP" means that XP is syntactically higher than YP.

[2] The abbreviations used in the glosses are as follows: CL: classifier; DE: the structural particle placed between an NP and its determiner; DECL: declarative; EXP: experiential aspect; NEG: negative element; PERF: perfective aspect marker; PL: plural form; Q: question particle.

Table 1
Peripheral projections in Chinese

Projections	Status of the projection	Relative position of heads	Realization of heads
	Core or optional?	Initial or final?	
TopP	Optional	Initial	No
SQP	Core	Initial	No
iForceP: *wh-*	Core	Initial	No
AttP	Core	Final	Yes
iForceP: *yes/no* questions	Core	Final	Yes
imperatives	Core	Final	Yes
*Only*P	Core	Final	Yes
S.AspP	Core	Final	Yes

eryi, paraphrased as 'it is just the case'.[3] The highest is the *yes/no* question particle *ma*. Since *ma* takes wide scope, the entire sentence can only be interpreted as a root *yes/no* question. The particle *le* takes narrow scope over the TP. The particle *eryi* 'only' takes medium scope: it scopes over the S.AspP headed by *le*, but falls under the scope of *ma*.

   Optional projections such as TopP can intervene between any two of the core projections, and their positions in the hierarchy are relatively free. The proposals I entertain in V. J. Pan 2015 are couched in the Principles-and-Parameters framework and assume the existence of a head parameter. Namely, the Top head is an initial head, and it takes its complement on the right side; by contrast, SFPs in Chinese are identified as final C heads, taking their complements on the left side. Table 1 summarizes the distribution of these peripheral projections. The second column of the table indicates a projection's status (i.e., core or optional). The third column indicates the head directionality for each projection (i.e., head-initial or head-final). The fourth column indicates the realization of the head of each projection (i.e., whether the projection has an overt head realized by an SFP, or just a null head). As the table shows, the assumed head-final projections in Chinese are S.AspP, *Only*P, iForceP (for *yes/no* questions and imperatives), and AttP.

1.2 Organization of the Argument

Section 2 outlines the main proposals of the article, which do not rely on a head-directionality parameter. Sections 3 and 4 show in detail how the proposed analysis applies to simple and complex cases. Section 5 discusses remaining issues, and section 6 concludes the article.

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   [3] I make a distinction between the adverb *zhi* 'only' and the SFP *eryi* 'only'. An anonymous reviewer correctly points out that as a focus operator, *zhi* 'only' must be associated with a constituent inside its scope. Conversely, *eryi* 'only' does not focus on one specific element in a given sentence; instead, it scopes over the entire sentence and is interpreted as 'it is only the case that . . . ' or 'it is just the case that . . . '.

   (i) Ta chu-men qu wan-le   yihuir   eryi.
       she go.out   go play-PERF a.moment ERYI
       (Lit.) 'It is only the case that she went out for a while. (Nothing to be worried about!)'

2 Main Proposals

In section 1, I presented the head-final analysis of SFPs proposed in previous studies, which relies on the existence of a directionality parameter. Alternatively, it has been argued that the final order of SFPs is derived by raising the complement TP to Spec,C (see, e.g., Tang 1998, Sybesma 1999, Julien 2002, Simpson and Wu 2002, Takita 2009, Hsieh and Sybesma 2011). Although the analysis proposed here is sympathetic to this general idea, the motivation for such raising and the technical details of the derivation do differ, as I will show in section 3. My proposal relies on the assumption that each peripheral projection in Chinese constitutes a phase and that each peripheral head has an EPP feature, which must be satisfied. As a result, the specifier of these projections must be projected.[4]

2.1 Phasehood of Peripheral Projections

Phases define derivational units, which are transferable units for semantic interpretation at the conceptual-intentional (C-I) interface and for phonological realization at the articulatory-perceptual (A-P) interface (see Chomsky 2000, 2001). In other words, phases are syntactic objects, which form units for computation and for Transfer. These objects are phonologically isolable and semantically propositional. In the current model, a verb phrase where all θ-roles are assigned and a full clause including tense and force are considered phases. Therefore, transitive vP and CP are phases. Citko (2014:87) has proposed formal diagnostic tests for phasehood. Take CP as an example.

(3) *PF phasehood diagnostics*
   a. Does C trigger Spell-Out? Yes, because VP-internal elements are inaccessible.
   b. Does CP determine phonological domains? Yes.
   c. Can the complement of C be elided? Yes, for instance, sluicing.[5]

(4) *LF phasehood diagnostics*
   Can an element moving out of CP be interpreted in the edge position? Yes, this can be seen under scoping effects.

(5) *Syntactic phasehood diagnostics*
   a. Can an element moving out of CP be pronounced (partially or completely) at the edge? Yes, for instance, preposition stranding, *wh*-copying, scope marking.
   b. Is CP a domain for feature valuation? Yes, at least this is true for root *wh*-questions.
   c. Is C the source of uninterpretable features? Yes, for uninterpretable φ and the interrogative feature.

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[4] My proposal is in the framework of the Minimalist Program (see Chomsky 2000, 2001, 2004, 2008, 2012, 2019, Chomsky, Gallego, and Ott 2019). The derivations will follow Bare Phrase Structure, and notations such as *C head*, *complement*, and *specifier* are used for convenient demonstrative purposes only. Merge is the only derivational mechanism, and Move is treated as internal Merge.

[5] However, this is not so obvious. In fact, even in English, not every CP allows deletion of its complement—for instance, in *yes/no* questions. We do not expect deletion of TP in a *yes/no* question in which C hosts an auxiliary, such as *[CP C-Did [TP you go to school today]]?* Similarly, the subject must appear in a tag question, such as *You didn't go to school, did you?*

In this article, I propose that each peripheral projection in Chinese is a phase: S.AspP, *Only*P, iForceP, NegQP, AttP, and TopP. All these peripheral projections are phonologically isolable, they are all semantically propositional, and they define Transfer points, as I will detail in section 4. Importantly, the head of each peripheral projection can take a TP as its complement, and each peripheral projection itself corresponds to an independent sentence. For instance, iForceP, hosting interrogative and imperative particles, corresponds to a root sentence with force, which satisfies the criteria for phasehood. Under the split-CP hypothesis as in Rizzi 1997, Spec,TopP is a locus for Ā-movement. In Chomsky 2008, Ā-movement takes place to satisfy the requirement of the edge feature (EF) associated with phase heads (i.e., transitive v, intermediate C, and the highest C). In other words, only phase heads bear an EF, and Ā-movement only targets the edge of phases. If Spec,TopP is a locus for Ā-movement, then it is natural that TopP is a phase. As for SQP (special questions), I will demonstrate in detail that it must be a phase; otherwise, the derivation crashes (see section 4.4.3). Specifically, the attitude-related projection AttP in the sense of V. J. Pan 2015 and Paul 2015 corresponds to the Speech Acts Projection, which is treated as a phase by scholars like Sheehan et al. (2017:chap. 9).

Let us apply Citko's (2014) phasehood tests to AttP.

(6) *PF phasehood diagnostics*
 a. Does an Att head trigger Spell-Out? Yes, an attitude-related SFP triggers Spell-Out and Transfer. The complement of Att is a transferable unit. This point will be demonstrated in detail in sections 3 and 4.
 b. Does an AttP determine phonological domains? Yes, both AttP and its complement are phonological units.

(7) *LF phasehood diagnostics*
 Can an element moving out of an AttP be interpreted in the edge position? Yes, as will be shown in section 4.4.

(8) *Syntactic phasehood diagnostics*
 a. Can an element moving out of an AttP be pronounced (partially or completely) at the edge? Yes, this is the case where an AttP and a TopP cooccur (see section 4.4).
 b. Is an AttP a domain for feature valuation? Is Att the source of uninterpretable features?

The results in (6)–(7) support the claim that AttP constitutes a phase. However, (8b) raises interesting questions that need to be addressed. Crosslinguistically, SFPs exhibit agreement in many languages; for instance, SFPs can Agree with either the object, the subject, or the speaker in Jingpo (see Dai 2010; (9a–b) are cited from Miyagawa 2017:30).

(9) a. Jongma du   hkum   **ma-s-ai**.
   student arrive complete PL-PERF-3:DECL
   'The students have all arrived.' (subject agreement, neutral)
 b. Jongma du   hkum   **sa-ga-ai**.
   student arrive complete PERF-1PL-DECL
   'The students have all arrived.' (speaker agreement, bonding)

SFPs in these two sentences are C heads, and they encode declarative force. The SFP ϕ-agrees with the subject in (9a) but with the speaker in (9b). Miyagawa further proposes that C transmits its ϕ-features to T in Chinese even though ϕ-features are not overtly manifest on T in Chinese. Therefore, at least in certain languages, projections headed by SFPs indeed constitute a domain for feature valuation and agreement, and SFPs are the source of unvalued features. I thus conclude that the diagnostic tests support the phasehood of SFPs in Chinese. In the system proposed in V. J. Pan 2015, 2019a, Paul 2015, V. J. Pan and Paul 2016, and Paul and Pan 2017, all of the peripheral projections "split" from the CP are above TP. In other words, these peripheral heads are Cs. In this system, even the low S.AspP (sentential aspect) is above TP.[6] Here, I follow the view that low peripheral projections, such as S.AspP and *Only*P, are in the periphery domain, thus above TP. Here is an example:

(10) Wo xihuan jueshiyue **le**.
     I   like   jazz.music LE
     (Lit.) 'It is the case now that I like jazz.' → 'I did not like jazz before.'

Without the sentence-final *le*, (10) can only have a present tense reading: 'I like jazz'. However, when *le* is merged, as shown in (10), the change-of-state reading becomes available. In other words, such a reading is only available when *le* is present. This suggests that *le* has its own semantic interpretation and that its presence is obligatory when the change-of-state reading is needed. This is precisely the point that V. J. Pan and Paul (2016) argue for: the presence of SFPs in Chinese is never optional because each specific interpretation can only be assigned to a sentence when the corresponding SFP is present. In addition, when Citko's (2014) diagnostic tests for phases are applied to low SFPs such as *le*, they show exactly the same syntactic behavior as high attitude particles such as *ne* and *a.* Crucially, in section 4.4.1 I will show that if low projections of SFPs are not phases, the derivation crashes. To my mind, this constitutes a strong and convincing argument in favor of their status as phases.

2.2 Specifiers and the EPP

Following the general assumption regarding phase heads, I assume that the head of each peripheral projection in Chinese should also bear an EPP feature and that its specifier must be projected. The

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[6] An anonymous reviewer points out that it is not straightforward why lower peripheral projections, such as S.AspP, can also constitute phases. Actually, there are two different aspectual projections in Chinese. TP is higher than AspP. The hierarchy is S.AspP > TP > AspP > vP > VP . . . In the Principles-and-Parameters framework, aspectual suffixes attached to verbs are treated as heads of the projection AspP. Verbs move from V to join Asp to form a complex head by head movement, as in (i). Unlike AspP, the sentential S.AspP is headed by aspect-related SFPs, which take the entire TP (including AspP and vP) as complement.

(i) [$_{S.AspP}$ [$_{TP}$ Zhangsan [$_{Asp'}$ [$_{Asp}$ [$_{V}$ qu] [$_{Asp}$ -guo]] [$_{VP}$ t$_{qu}$ Bali]]] **le**].
          Zhangsan   go   -EXP   Paris   LE
     'It is now the case that Zhangsan has been in Paris.'

Erlewine (2017) proposes that final aspectual particles and the sentence-final *eryi* 'only' are peripheral elements of vP. However, Zhang (2019) specifically shows that "low" sentence-final aspectual particles always have a wide scope reading and take TP as a complement. In addition, I show in V. J. Pan 2019a,b that the main empirical facts supporting the low scope of SFPs discussed by Erlewine (2017) are not related to the scope of SFPs and that the "apparent" low scope of particles is derived.

EPP can be satisfied by external Merge or by internal Merge (i.e., Move). Chinese demonstrates the following four strategies to satisfy the EPP feature attached to peripheral phase heads. The choice among these strategies partially depends on the availability of a syntactic object that can be merged (either externally or internally) with the phrase headed by the peripheral phase head.

(11) a. If there is an XP with an overt phonetic or morphological form, which can satisfy the EPP of the phase head C, externally merge the XP with the CP.[7]
      b. Otherwise, externally merge a null operator (one that has no overt phonetic or morphological form) with the CP to satisfy the EPP feature on C.[8]
      c. Otherwise, internally merge an XP functioning as a goal with the CP after an Agree relation is established between the probe C and the goal XP.
      d. Otherwise, internally merge the entire complement of the phase head C with the CP as a last resort to satisfy the EPP.

In (11a), an XP is assembled in an independent workspace, and it is then externally merged with the phase to satisfy the EPP feature on the phase head.[9] In (11b), a null operator is assumed to be available in the Lexicon. Under the hypothesis that a lexical item is composed of a feature bundle (e.g., phonetic features, semantic features, and syntactic features), a null operator contains semantic features but lacks phonetic features. Cases (11a) and (11b) involve external Merge, which can also be referred to as the base-generation strategy, whereas cases (11c) and (11d) involve internal Merge. In the case of internal Merge, the matched goal XP in (11c) is already present in the structure resulting from the previous Merge operations. The statement in (11) expresses two preferences: (a) that Merge is preferred over Move, and (b) that moving a matched goal from within the phasal complement is preferred over moving the entire complement XP. Note that the second preference is not due to considerations of economy. Instead, whether a goal located inside the complement can be moved depends on the result of the minimal search: this option is only available if a goal is found bearing features that match those of an active probe (i.e., the phase head); otherwise, the entire complement is moved as a last resort. Crucially, the final order of an SFP at the surface is derived by raising the complement to the specifier to satisfy the EPP feature associated with this SFP.

The assumption that each peripheral phase head has an EPP feature needs further justification. For one thing, intermediate C may have an edge feature (EF) (see Chomsky 2008), but EFs are

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[7] Under the view that Merge operates freely, any XP can be merged in Spec,SFP to satisfy the requirement of the EPP feature. However, merging just any XP will result in deviant structures. According to Chomsky (2008, 2020), syntax only takes care of Merge (external and internal) and the elimination of uninterpretable features; it does not ensure that all of the resulting structures are nondeviant. Syntax can generate deviant structures containing no uninterpretable features and then transfer them to the C-I interface. The C-I interface determines whether any specific interpretation can be assigned to a deviant structure.

[8] Two types of semantically related operators are distinguished from each other: (a) pure semantic operators that have no position in syntax, such as the λ-operator, and (b) those that can contribute concrete interpretation to a syntactic structure, such as the *wh*-operator. Merging a λ-operator in narrow syntax violates the Inclusiveness Condition, which should be avoided; however, merging a *wh*-operator should be allowed given that it satisfies legibility conditions at the interfaces, which is in accordance with the Strong Minimalist Thesis.

[9] The definition of *workspace* is based on "active memory" in Chomsky 2000. In Chomsky, Gallego, and Ott 2019, Merge is assumed to work on syntactic objects placed in a workspace, and in Chomsky 2019, Merge is assumed to work on the workspace itself.

still different from EPP features in that EFs are not always satisfied. In the case of successive *wh*-movement, a *wh*-phrase passes through every phase edge. Under the copy theory of movement, we can imagine that the EPP feature/EF associated with the phase edge is satisfied by the copy of the *wh*-phrase. However, this does not explain declarative sentences without Ā-movement. Another case is related to the sentence-initial particles found in many languages (e.g., Haegeman 2014, Cardinaletti 2015, Sheehan et al. 2017:chap. 9). If an initial particle is also assumed to be a C, then it is clear that its specifier is not projected. There are two ways to look at this problem. One is that the EPP feature is not systematically available for all phase heads in all languages and that its availability is subject to variation. The other is based on the Feature Inheritance Hypothesis (Chomsky 2008, Ouali 2008). Each phase can still have an EPP feature but a phase head can transmit its EPP feature (among other features) to the head that it selects. Whether a given phase head retains a copy of the EPP feature after transmission is subject to variation. In fact, both possibilities strongly rely on the variation of functional heads. For SFPs, we can assume that each of them retains a copy of its EPP feature after transmitting it to T, as shown in (12a). The external argument (EA) is moved from Spec,vP to Spec,TP to satisfy the EPP feature on T. In (12b), the entire TP raises to Spec,CP to satisfy the EPP feature on C.

(12) *Derivation of final particles*
　　a. [CP   C   [TP EA [TP   T   [vP ~~EA~~ [vP v [vP V IA]]]]]]
　　　　　　EPP   →   EPP
　　b. [CP [TP **EA** [TP **T** [vP ~~**EA**~~ [vP **v** [vP **V IA**]]]]] [CP C ~~[TP EA [TP T [vP EA [vP v [vP V IA]]]]]~~]]

In the case of initial particles, we can assume that C does not keep a copy of the EPP feature after transmitting it to T. In (13), the EA raises to Spec,TP to satisfy the EPP. Since C no longer has an EPP feature, TP does not raise.

(13) *Derivation of initial particles*
　　[CP   C   [TP EA [TP   T   [vP ~~EA~~ [vP v [vP V IA]]]]]]
　　　　~~EPP~~   →   EPP

In sum, I assume that inheritance of the EPP feature is subject to variation. The difference between being an initial particle and being a final particle reduces to "not keeping" versus "keeping" a copy of the EPP feature. For Chinese, SFPs systematically keep a copy of the EPP feature after transmitting it to T, which is why all of the SFPs are head-final.

3 A Unified Account for the Split CP in Chinese

This section illustrates, with concrete examples, the four ways to satisfy the EPP feature.

3.1 Externally Merge an XP with CP to Satisfy the EPP Feature on C

As stated in (11a), an XP is externally merged with the phase CP, and the EPP feature on C is therefore satisfied. This is illustrated in (14).

(14) [$_{CP}$ XP [$_{CP}$ C   [WP . . . [YP [ZP]]]]]
            ↑   [~~EPP~~]
        Merge

This situation corresponds to base-generated topics in Chinese, which are also referred to as dangling topics, Chinese-style topics, or Aboutness topics (C. N. Li and Thompson 1976, Badan 2007, H. Pan and Hu 2008). In such a construction, the Top head is analyzed as C and no probe-goal relation is involved.[10] In the concrete example (15), the dangling topic DP *zhe-ke shu* 'this-CL tree' is externally merged with TopP and as a result, the EPP feature associated with the Top head is satisfied.

(15) *Base-generated topic*
      [$_{TopP}$ Zhe-ke shu [$_{TopP}$ Top [$_{TP}$ yezi   hen da]]].
            this-CL tree   leaves very big
      'As for this tree, (its) leaves are big.'

Another case involves resumptive left-dislocation structures, as shown in (16).

(16) *Resumptive left-dislocation structure*
      [$_{TopP}$ Lu Xun$_i$ [$_{TopP}$ Top [$_{TP}$ wo du-guo [$_{DP}$ [$_{CP}$ *(ta$_i$) xie   de] xiaoshuo]]]].
            Lu Xun   I   read-EXP   he write C   novel
      'Lu Xun$_i$, I read the novels that he$_i$ wrote.'

The base-generated topic phrase *Lu Xun* corefers with the resumptive pronoun *ta* 'he' embedded in a strong island constituted by a relative clause. This type of resumptive pronoun is described as a saving device to redeem a sentence from a potential violation of locality constraints (see V. J. Pan 2016 for further discussion of Chinese).

Let us turn to negative *wh*-questions in Chinese (see Cheung 2008, Tsai 2008, V. J. Pan 2015, 2019a).

(17) *Negative* wh-*questions (NegQP)*[11]
      [$_{NegQP}$ *Shenme* [$_{NegQP}$ NegQ [$_{TP}$ ta   hui tan   gangqin]]]?!
            what   she can play piano
      'She can play piano?!' = 'She cannot play piano at all!'

The sentence-initial *shenme* 'what' located in Spec,NegQP is interpreted not as an ordinary *wh*-phrase but as a negative operator, which provides the sentence with a strong negative force. As a result, the sentence is interpreted as a strong negative assertion. At the level of semantics, *shenme* 'what' takes scope over the entire sentence without binding any individual variable. At

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[10] Generally, topicalization involves an operator-variable dependency in the sense of semantics. H. Pan and Hu (2008) argue that this type of topic involves a predication relation in a broad sense (i.e., the predicate takes the so-called dangling topic as its argument at the semantic level).

[11] This type of negative question with sentence-initial *shenme* 'what' is only produced in spoken Chinese, with a strong stress on *shenme.* The acceptability of this type of question varies among speakers from different regions in China.

the level of syntax, *shenme* 'what' externally merges with the NegQP to satisfy the EPP feature on the NegQ head.

3.2 Externally Merge a Null Operator with CP to Satisfy the EPP Feature on C

A null operator can be merged in Spec,CP to satisfy the EPP feature, as shown in (18).

(18) [$_{CP}$ Op   [$_{CP}$ C   [WP . . . [YP [ZP]]]]]
          ↑   [~~EPP~~]
        Merge

The operator (Op) in (18) possesses no overt morphological form; however, it contributes a specific interpretation to the sentence. Chinese is a *wh*-in-situ language and *wh*-phrases do not overtly move to Spec,CP to derive a question; instead, they stay in their base position. Tsai (1994) proposes that an in-situ *wh*-argument is always unselectively bound by a null interrogative operator Op, which is generated in Spec,CP. In my system, it is important to maintain that Op is not an iForce head but is in Spec,iForceP, satisfying the EPP, as shown in (19). If Op were merged as an iForce head binding a *wh*-phrase, the latter would need to move to Spec,iForceP to satisfy the EPP feature on the iForce head, which would be contrary to fact as Chinese does not have *wh*-movement.

(19) [$_{iForceP}$ Op(x) [$_{iForceP}$ iForce [$_{TP}$ Xiaomei xihuan chi shenme(x)]]]?
                                          Xiaomei like   eat what
       'What does Xiaomei like eating?'

Example (20) involves two peripheral projections: TopP and iForceP. The *wh*-topic phrase *na-zhong shu* 'what kind of tree' in Spec,TopP satisfies the EPP feature on the Top head (see V. J. Pan 2014 regarding *wh*-topics). The null Op in Spec,iForceP satisfies the EPP feature on the iForce head. Both EPP features are satisfied by external Merge.

(20) *Base-generated* wh-*topic*
       [$_{iForceP}$ Op(x) [$_{iForceP}$ iForce [$_{TopP}$ Na-zhong   shu($_x$) [$_{TopP}$ Top [$_{TP}$ yezi   hen
                                          which-kind tree   leaves very
       da]]]]]?
       big
       'For what kind of tree is it the case that (its) leaves are big?'

3.3 Internally Merge an XP Functioning as a Goal with CP after an Agree Relation Is Established between the Probe C and the Goal XP

When the probe C Agrees with a goal XP, XP can be externally merged in Spec,CP to satisfy the EPP feature on C.

(21) [$_{CP}$ XP [$_{CP}$ C   [WP . . . [YP [~~XP~~]]]]]
              ↑   [~~EPP~~]

This case corresponds to structures involving overt Ā-movement such as topicalization derived by movement, as in (22). The Agree relation is established between the Top head (probe) and 'this novel' (goal), and the topic DP undergoes movement to Spec,TopP to satisfy the EPP.

(22) *Topicalization derived by movement*
    [$_{TopP}$ Zhe-bu xiaoshuo$_j$ [$_{TopP}$ Top [$_{TP}$ Xiaomei yijing   kan-wan-le   t$_j$]]].
       this-CL novel   Xiaomei already read-finish-PERF
    'This novel, Xiaomei has already finished reading.'

3.4 Internally Merge the Entire Complement of C with CP to Satisfy the EPP Feature on C as a Last Resort

As illustrated in (23), when there is no available XP or null operator that can be directly merged with the CP, and no potential goal that can be moved to Spec,CP, the entire complement of the phase head, [WP . . . [YP [ZP]]] in this case, raises to Spec,CP to satisfy the EPP feature on C, as a last resort.

(23) [$_{CP}$ **[WP . . . [YP [ZP]]]** [$_{CP}$ C ~~[WP . . . [YP [ZP]]]~~]]
                       Move

SFPs in Chinese can take a TP as complement and, importantly, they do not function as probes and do not require any goal to establish an Ā-dependency through Agree. Since no potential candidate can satisfy the EPP feature associated with these SFPs, the entire complement TP raises to the specifier as a last resort. Previously, analyses based on complement-to-specifier (comp-to-spec) movement have been proposed to derive the final order of SFPs in Chinese (see Tang 1998, Sybesma 1999, Julien 2002, Simpson and Wu 2002, Takita 2009, Hsieh and Sybesma 2011). Tang (1998:49) briefly discusses the possibility of raising the complement of C to its specifier so as to derive the final order of SFPs. However, even if the word order can be derived in this way, conforming with the Linear Correspondence Axiom (LCA) (see Kayne 1994), the motivation for such raising of the entire clause remains unclear. For Kayne (1994), linear order is determined by the LCA, a simplified version of which is as follows:

(24) *Linear Correspondence Axiom*
    Where X, Y, and Z are terminal elements (lexical items), X precedes Y if and only if X asymmetrically c-commands Y, or X is dominated by Z, and Z asymmetrically c-commands Y.

Importantly, a head X will precede its complement YP (because it asymmetrically c-commands the constituents of YP), unless YP moves higher. In the theory articulated in Chomsky 1995: chap. 4, 2000, 2001, and 2019, Merge does not determine linear order. Let us assume that an Att(itude) head merges with a TP to form a set labeled by Att: {Att, TP}. This set has an order (when spelled out): Att precedes TP. Under the present analysis, Att is a phase head and it has an EPP feature. Note that an attitude particle does not function as a probe and that it does not need a goal to establish an Agree chain. Since there is no probe-goal relation, there is no goal

that can be moved to satisfy the EPP feature on the Att head. As a result, the entire complement of the phase head Att raises to the specifier to satisfy the EPP. Therefore, TP is moved to Spec,Att: {TP, {Att, ~~TP~~}}. Given the LCA, TP is spelled out preceding Att, yielding the final order of the Att head.[12]

3.5 Crosslinguistic Evidence

Particles related to speech acts are referred to as discourse particles, which exist in many languages. These particles head independent functional projections (see Munaro and Poletto 2002 for Italian dialects; Hill 2007 for vocative particles; Haegeman 2014 for West Flemish particles; Haegeman and Hill 2013; Biberauer, Haegeman, and van Kemenade 2014). Munaro and Poletto (2002) propose that discourse-related sentence-final particles, as initial heads, attract their clausal complement to the specifier position. My analysis of Chinese SFPs shares this view. Crucially, my analysis offers a theoretical motivation for this comp-to-spec movement. As emphasized in the previous section, this movement is not systematic and it can only be required as a last resort when there is no other way to satisfy the EPP feature.

3.6 Summary

Results of the tests on each type of functional projection in the left periphery are presented in table 2. From the properties demonstrated by each type of projection, the following generalizations can be drawn. First, each peripheral head bears an EPP feature. Second, none of the derived head-final projections—for instance, S.AspP, *Only*P, iForceP (*yes*/*no* questions, imperatives), and AttP—involves a probe-goal relation; consequently, there is no candidate XP to satisfy the EPP feature in these projections. Their heads can take a TP as complement and can provide this TP with a specific interpretation. Semantically, they scope over the entire TP and syntactically, they do not Agree with any particular constituent inside the TP. As a result, the entire complement must raise to the specifier of each phase head to satisfy the EPP. Third, this comp-to-spec movement is only a last resort to satisfy the EPP.

4 Complex Cases

This section examines the derivation of cases where several peripheral functional projections cooccur in the same sentence. I will first examine the case involving projections hosting SFPs only, and then the case involving both the projections that require a comp-to-spec movement and those that do not.

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[12] As an anonymous reviewer notes, one should not have an impression that all pronounced C heads are final. There is a pronounced subordinate head-initial complementizer in many varieties of Chinese: *shuo* 'say' (see Simpson and Wu 2002, Su 2004, Hsieh and Sybesma 2011). For example:

(i) Wo xiang shuo Xiaomei mingtian kending hui lai.
    I   think say Xiaomei tomorrow certainly will come
    'I think that Xiaomei will certainly come tomorrow.'

Since *shuo* 'say' can only be a subordinate C, not a root C, it could be the case that it does not bear any EPP feature; instead, it has an EF, which is associated with any intermediate C head (see Chomsky 2008). In the case of successive-cyclic *wh*-movement, the relevant *wh*-word stops at the specifier of every intermediate C to satisfy the EF.
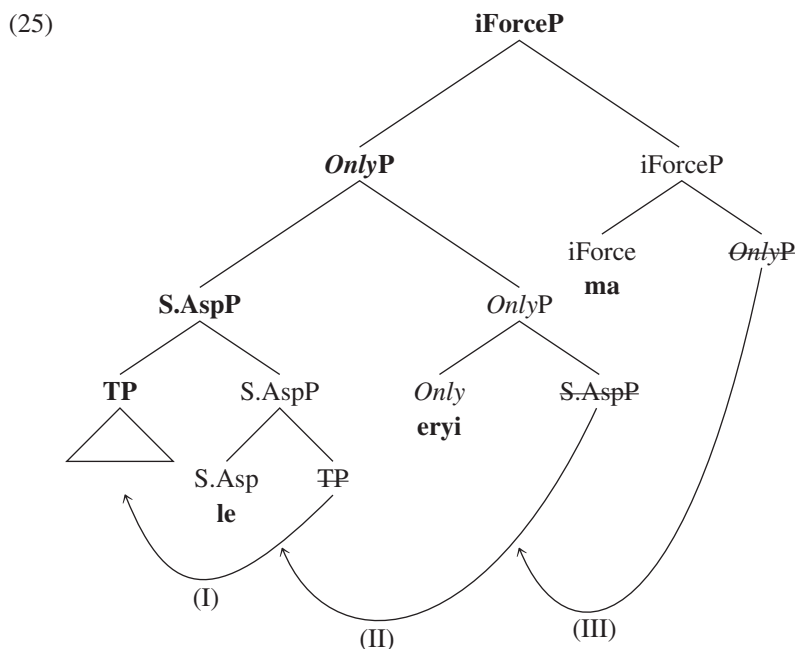
Table 2
Properties of peripheral projections

Projections		SFPs as heads?	Probe-goal relation?	Candidate for Spec?	
TopP	Gapless dangling topics	No	No	Yes	Merged XP
	Resumptive left-dislocation	No	Yes	Yes	Merged XP
	Topicalization	No	Yes	Yes	Moved XP
iForceP	*wh*-question	No	Yes	Yes	Null Op-*wh*
SQP	NegQP	No	No	Yes	*Shenme* 'what'
S.AspP	*laizhe*, *le*	Yes	No	No	
*Only*P	*eryi*, *bale*	Yes	No	No	
iForceP	*yes*/*no* question: *ma*	Yes	No	No	Complement-to-specifier raising
	imperative: *ba2*	Yes	No	No	
AttP	*ne*, *a*, *ya*, *ba3*, etc.	Yes	No	No	

4.1 Cases Involving a Cooccurrence of Several SFPs

Recall example (2e), which involves three SFPs. (25) presents the tree diagram for this example, followed by a step-by-step derivation.

(25)

Step 1: In the lowest cycle, S.Asp-*le* merges with TP-*ta zhibuguo bu he ying shi hongcha* 'she does not drink English black tea'. Since S.AspP does not involve any probe-goal relation and no suitable goal is available to satisfy the EPP feature on S.Asp-*le*, the entire complement—namely, TP—internally merges with S.AspP to satisfy the EPP.

(26) [_{S.AspP} [_{TP} ***she does not drink English black tea***] [_{S.AspP} S.Asp-***le*** [_{TP} *she does not drink English black tea*]]]

Step 2: The exclusive-focus head *eryi* 'only' merges with S.AspP. The lower phase is now S.AspP, and its domain (i.e., the lower copy of TP) is now transferred to the interfaces.[13]

(27) [_{OnlyP} *Only*-***eryi*** [_{S.AspP} [_{TP} ***she does not drink English black tea***] [_{S.AspP} S.Asp-***le*** [_{TP} *she does not drink English black tea*]]]]

Step 3: Again, like S.AspP, *Only*P does not involve a probe-goal relation and therefore no suitable candidate is available to satisfy the EPP feature on *eryi* 'only'. As a result, the entire complement, S.AspP, internally merges with *Only*P to satisfy the EPP feature on *eryi*.

(28) [_{OnlyP} [_{S.AspP} [_{TP} ***she does not drink English black tea***] [_{S.AspP} S.Asp-***le*** [_{TP} *she does not drink English black tea*]]] [_{OnlyP} *Only*-***eryi*** [_{S.AspP} [_{TP} *she does not drink English black tea*] [_{S.AspP} S.Asp-*le* [_{TP} *she does not drink English black tea*]]]]]

Step 4: In the highest cycle, the *yes/no* question particle *ma* merges with *Only*P; the complement of the *Only* head (i.e., the lower copy of S.AspP) is transferred to the interfaces.

(29) [_{iForceP} iForce-***ma*** [_{OnlyP} [_{S.AspP} [_{TP} ***she does not drink English black tea***] [_{S.AspP} S.Asp-***le*** [_{TP} *she does not drink English black tea*]]] [_{OnlyP} *Only*-***eryi*** [_{S.AspP} [_{TP} *she does not drink English black tea*] [_{S.AspP} S.Asp-*le* [_{TP} *she does not drink English black tea*]]]]]]

Step 5: Since no candidate can satisfy the EPP feature on the iForce-*ma* head, the entire complement, *Only*P, internally merges with iForceP to satisfy the EPP, yielding the final spelled-out order, TP < *le* < *eryi* < *ma*.

(30) [_{iForceP} [_{OnlyP} [_{S.AspP} [_{TP} ***she does not drink English black tea***] [_{S.AspP} S.Asp-***le*** [_{TP} *she does not drink English black tea*]]] [_{OnlyP} *Only*-***eryi*** [_{S.AspP} [_{TP} *she does not drink English black tea*] [_{S.AspP} S.Asp-*le* [_{TP} *she does not drink English black tea*]]]]] [_{iForceP} iForce-***ma*** [_{OnlyP} [_{S.AspP} [_{TP} *she does not drink English black tea*] [_{S.AspP} S.Asp-*le* [_{TP} *she does not drink English black tea*]]] [_{OnlyP} *Only*-***eryi*** [_{S.AspP} [_{TP} *she does not drink English black tea*] [_{S.AspP} S.Asp-*le* [_{TP} *she does not drink English black tea*]]]]]]]

Step 6: When the derivation reaches the end, the entire sentence is transferred to the interfaces.

A general derivation of the configuration involving several SFPs is presented in (31). α, β, and γ are three types of SFPs, each of which heads a phase. The surface order is TP < γ < β < α.

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[13] The elements with overstrikes are lower copies after movement rather than transferred elements.

(31)
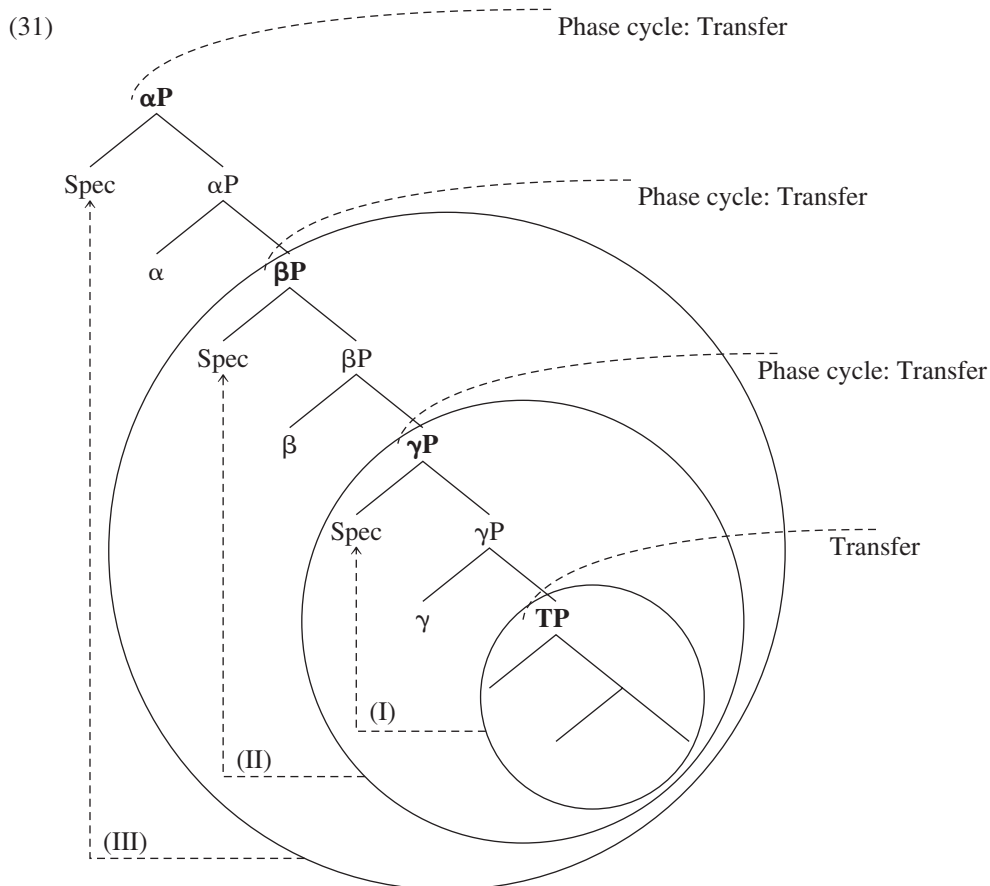
4.2 Cooccurrence of an Embedded SFP and a Root SFP

In V. J. Pan 2015, 2019a, I show that lower SFPs related to sentential aspect can be embedded, whereas higher particles related to the speaker's attitude or subjective opinion cannot appear in embedded clauses. Lower SFPs can head embedded clauses. This distinction is captured by the Subjectivity Scale Constraint: the higher a peripheral projection is located, the more subjective its interpretation becomes and the less likely it is to be embedded.

(32) Zhangsan xiangxin [wo bu   ai   ta   **le**] **ma**?
Zhangsan believe   I   NEG love him LE Q*yes/no*
'Does Zhangsan believe that I no longer love him?'[14]

---

[14] Another possible parsing is that both *le* and *ma* appear in the root clause, which yields the reading 'Does Zhangsan believe now that I do not love him?' with the assumption that Zhangsan did not believe it before.

In (32), the sentential aspectual particle *le* is embedded within a subordinate clause and takes the embedded TP *I don't love him* as its complement. The particle *le* provides the TP with a change-of-state reading, 'I no longer love him'. The *yes/no* question particle *ma* takes the matrix TP as its complement, which yields a root *yes/no* question reading. The major steps of the derivation are as follows:

Step 1: Merge S.Asp-*le* with the embedded TP, *I don't love him.* Then, internally merge TP with S.AspP to satisfy the EPP feature on S.Asp-*le.*

(33) [$_{\text{S.AspP}}$ [$_{\text{TP}}$ ***I don't love him***] [$_{\text{S.AspP}}$ S.Asp-*le* [$_{\text{TP}}$ *I don't love him*]]]

Step 2: Merge V-*believe* with S.AspP to form a VP. Then, merge v with VP to form a vP. Raise the verb *believe* to v. Externally merge *Zhangsan* with the vP. Then, merge the matrix T with vP. Make T Agree with *Zhangsan* in terms of φ-features and raise *Zhangsan* to Spec,TP to satisfy the EPP feature on T.

(34) [$_{\text{TP}}$ ***Zhangsan*** [$_{\text{TP}}$ T [$_{\text{vP}}$ *Zhangsan* [$_{\text{vP}}$ v-***believe*** [$_{\text{VP}}$ V-*believe* [$_{\text{S.AspP}}$ [$_{\text{TP}}$ ***I don't love him***] [$_{\text{S.AspP}}$ S.Asp-*le* [$_{\text{TP}}$ *I don't love him*]]]]]]]]

Step 3: Merge iForce-*ma* with the matrix TP, *Zhangsan believes that I no longer love him.* Then, internally merge the matrix TP with iForceP to satisfy the EPP feature on iForce-*ma.*

(35) [$_{\text{iForceP}}$ [$_{\text{TP}}$ ***Zhangsan*** [$_{\text{TP}}$ T [$_{\text{vP}}$ *Zhangsan* [$_{\text{vP}}$ v-***believe*** [$_{\text{VP}}$ V-*believe* [$_{\text{S.AspP}}$ [$_{\text{TP}}$ ***I don't love him***] [$_{\text{S.AspP}}$ S.Asp-*le* [$_{\text{TP}}$ *I don't love him*]]]]]]]] [$_{\text{iForceP}}$ **iForce-*ma*** [$_{\text{TP}}$ *Zhangsan* [$_{\text{TP}}$ T [$_{\text{vP}}$ *Zhangsan* [$_{\text{vP}}$ v-*believe* [$_{\text{VP}}$ V-*believe* [$_{\text{S.AspP}}$ [$_{\text{TP}}$ *I don't love him*] [$_{\text{S.AspP}}$ S.Asp-*le* [$_{\text{TP}}$ *I don't love him*]]]]]]]]]]

4.3 Cases with Overt and Covert Heads

In this section, I will examine cases with both overt heads and covert heads. The following example involves four different projections:

(36) Hierarchy: AttP (*a*) > NegQP (*shenme* 'what') > *Only*P (*eryi*) > S.AspP (*le*) > TP

    Shenme ta zuowan zhi qu he jiu **le eryi a**!
    what he last.night just go drink alcohol LE ERYI A
    'Oh, it is not true that it is not a big deal that he went to drink alcohol last night!
    (He is not supposed to go outside at all!)'

In this sentence, the NegQ head is linearly first. The sentence-initial *wh*-phrase *shenme* 'what', located in Spec,NegQ, provides the entire sentence with a strong negative meaning. Conversely, the S.Asp, *Only*, and Att heads are linearly last. In this case, word order cannot help us to determine the hierarchy between them; instead, we should examine the interpretation of these projections in terms of scope relations. The entire sentence is understood as a strong negative assertion, but this negative interpretation is still under the scope of the speaker's subjective attitude particle *a*. Therefore, Att-*a* necessarily takes wide scope over NegQP. It follows that the NegQ head scopes

over *Only*P and S.AspP. The tree diagram and step-by-step derivation for this example are as follows:

(37)
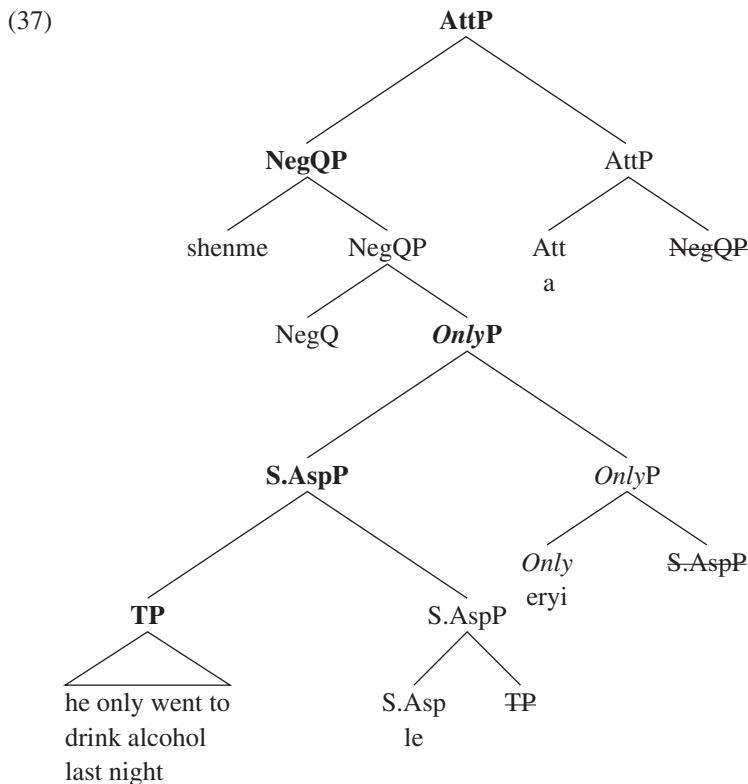
Step 1: Merge the head S.Asp-*le* with TP. Then, internally merge TP with S.AspP to satisfy the EPP feature on the head S.Asp-*le*.

(38) [S.AspP [TP **he only went to drink alcohol last night**] [S.AspP S.Asp-***le*** [TP ~~he only went to drink alcohol last night~~]]]

Step 2: Merge the head *Only-eryi* with S.AspP. Transfer the domain of the S.AspP phase (i.e., the lower copy of the TP) to the interfaces. Then, internally Merge S.AspP with *Only*P to satisfy the EPP feature on *Only-eryi*.

(39) [*Only*P [S.AspP [TP **he only went to drink alcohol last night**] [S.AspP S.Asp-***le*** [TP ~~he only went to drink alcohol last night~~]]] [*Only*P *Only*-***eryi*** [S.AspP [TP ~~he only went to drink alcohol last night~~] [S.AspP S.Asp-*le* [TP ~~he only went to drink alcohol last night~~]]]]]

Step 3: Merge the negative question head NegQ with *Only*P. The lower phase is now *Only*P; transfer the domain of *Only*P (i.e., the lower copy of S.AspP) to the interfaces.

(40) [$_{NegQP}$ NegQ [$_{OnlyP}$ [$_{S.AspP}$ [$_{TP}$ *he only went to drink alcohol last night*] [$_{S.AspP}$ S.Asp-*le* [$_{TP}$ *he only went to drink alcohol last night*]]] [$_{OnlyP}$ *Only-eryi* [$_{S.AspP}$ [$_{TP}$ *he only went to drink alcohol last night*] [$_{S.AspP}$ S.Asp-*le* [$_{TP}$ *he only went to drink alcohol last night*]]]]]]

Step 4: Shenme 'what' with its strong negative meaning is available. Externally merge it with NegQP to satisfy the EPP feature on the NegQ head. Since the EPP is satisfied, the complement of NegQ (i.e., *Only*P) no longer needs to raise.

(41) [$_{NegQP}$ *shenme* [$_{NegQP}$ NegQ [$_{OnlyP}$ [$_{S.AspP}$ [$_{TP}$ *he only went to drink alcohol last night*] [$_{S.AspP}$ S.Asp-*le* [$_{TP}$ *he only went to drink alcohol last night*]]] [$_{OnlyP}$ *Only-eryi* [$_{S.AspP}$ [$_{TP}$ *he only went to drink alcohol last night*] [$_{S.AspP}$ S.Asp-*le* [$_{TP}$ *he only went to drink alcohol last night*]]]]]]]

Step 5: In the highest cycle, merge the head Att-*a* with NegQP. Transfer the domain of the NegQP phase (i.e., *Only*P) to the interfaces. Since there is no potential candidate to satisfy the EPP feature on the head Att-*a*, internally merge the entire complement of Att (i.e., NegQP) with AttP to satisfy the EPP feature on Att-*a*, yielding the final order given the LCA: *shenme* 'what' < TP < *le* < *eryi* < *a*.

(42) [$_{AttP}$ [$_{NegQP}$ *shenme* [$_{NegQP}$ NegQ [$_{OnlyP}$ [$_{S.AspP}$ [$_{TP}$ *he only went to drink alcohol last night*] [$_{S.AspP}$ S.Asp-*le* [$_{TP}$ *he only went to drink alcohol last night*]]] [$_{OnlyP}$ *Only-eryi* [$_{S.AspP}$ [$_{TP}$ *he only went to drink alcohol last night*] [$_{S.AspP}$ S.Asp-*le* [$_{TP}$ he only went to drink alcohol last night*]]]]]]] [$_{AttP}$ Att-*a* [$_{NegQP}$ *shenme* [$_{NegQP}$ NegQ [$_{OnlyP}$ [$_{S.AspP}$ [$_{TP}$ *he only went to drink alcohol last night*] [$_{S.AspP}$ S.Asp-*le* [$_{TP}$ *he only went to drink alcohol last night*]]] [$_{OnlyP}$ *Only-eryi* [$_{S.AspP}$ [$_{TP}$ *he only went to drink alcohol last night*] [$_{S.AspP}$ S.Asp-*le* [$_{TP}$ *he only went to drink alcohol last night*]]]]]]]]

Step 6: Transfer the rest of the sentence to the interfaces.

4.4 Cases Involving Topics

4.4.1 TopP > S.AspP > TP   Cases involving topics derived by movement, as in (43), pose a potential problem. If a lower peripheral projection such as S.AspP were treated as a phase, it would block the movement of a topic from vP to the C domain. In fact, we need two assumptions to make the derivation work. First, we need the assumption that the outer Spec,vP is an Ā-position, which is an intermediate landing site for Ā-movement (see Chomsky 2000). Second, we need the version of the Phase Impenetrability Condition in Chomsky 2001.

(43) [$_{TopP}$ *Na-bi   jingfei*$_j$, [$_{S.AspP}$ [$_{TP}$ zhengfu   yao pi   t$_j$] **le**]].
     that-CL fund   government will approve   LE
     'As for the fund, the government will approve (it).'

The step-by-step derivation is as follows:

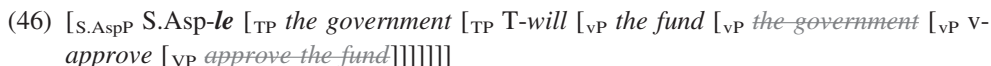*Step 1:* Merge v with the VP *approve the fund.* Then, raise the V *approve* to join v. Next, externally merge the subject *the government* with vP to satisfy the EPP feature on v. Note that the subject *the government* is in the inner specifier of vP. Establish Agree between the probe v and the goal *the fund*, and delete the Case feature on *the fund.* Then, internally merge *the fund* with vP. Note that the outer specifier position of v is an Ā-position.

(44) [$_{vP}$ **the fund** [$_{vP}$ *the government* [$_{vP}$ v-**approve** [$_{VP}$ *approve* *the fund*]]]]
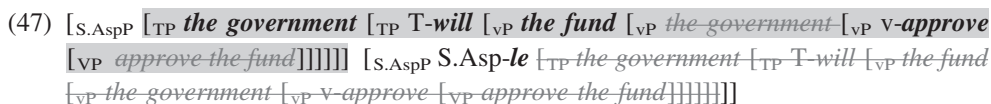
Probe   Goal

Agree

Move
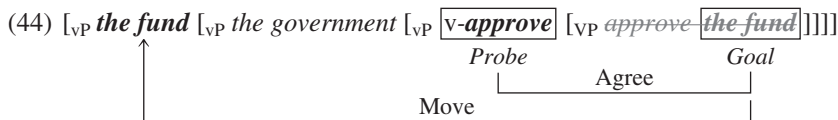
Step 2: Merge T-*will* with vP. Establish Agree between the probe T and the goal *the government*, and delete the Case on *the government.* Then, internally merge *the government* with TP to satisfy the EPP feature on T.

Move
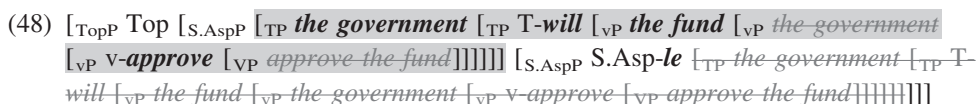
Agree

Probe   Goal

(45) [$_{TP}$ **the government** [$_{TP}$ **T-will** [$_{vP}$ *the fund* [$_{vP}$ *the government* [$_{vP}$ v-*approve* [$_{VP}$ *approve the fund*]]]]]]
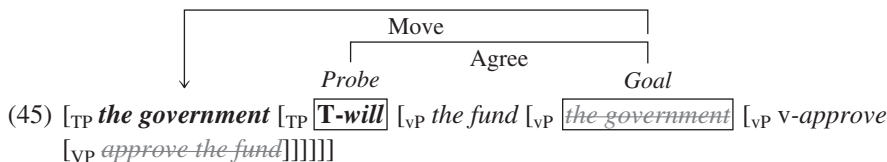
Step 3: Merge S.Asp-*le* with TP. Since S.Asp is a phase head, the lower phase is now vP. Transfer the domain of vP (i.e., VP) to the interfaces. Note that *the fund* is in the outer specifier of vP, which is an "escape hatch"; as a result, *the fund* is not transferred to the interfaces.
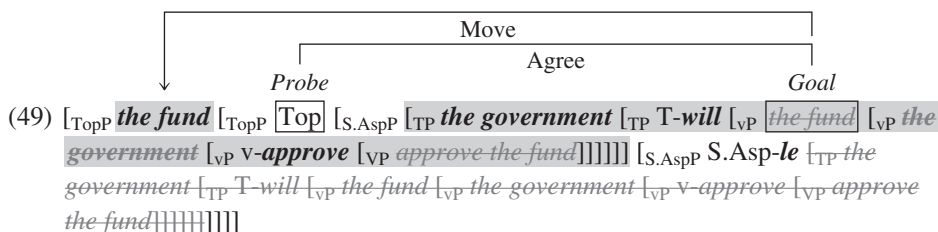
(46) [$_{S.AspP}$ S.Asp-*le* [$_{TP}$ *the government* [$_{TP}$ T-*will* [$_{vP}$ *the fund* [$_{vP}$ *the government* [$_{vP}$ v-*approve* [$_{VP}$ *approve the fund*]]]]]]]

Step 4: Internally merge TP with S.AspP to satisfy the EPP feature on S.Asp-*le* as a last resort.

(47) [$_{S.AspP}$ [$_{TP}$ **the government** [$_{TP}$ T-**will** [$_{vP}$ **the fund** [$_{vP}$ *the government* [$_{vP}$ v-**approve** [$_{VP}$ *approve the fund*]]]]]] [$_{S.AspP}$ S.Asp-*le* [$_{TP}$ *the government* [$_{TP}$ T-*will* [$_{vP}$ *the fund* [$_{vP}$ *the government* [$_{vP}$ v-approve [$_{vP}$ approve the fund*]]]]]]]]

Step 5: Merge the Top head with S.AspP. Since Top is also a phase head, it is at this moment that the complement of the phase head S.Asp (i.e., the lower copy of TP) is transferred. Importantly, the entire TP containing *the fund* is still in Spec,S.AspP, which is an "escape hatch"; as a result, *the fund* is not transferred to the interfaces.

(48) [$_{TopP}$ Top [$_{S.AspP}$ [$_{TP}$ **the government** [$_{TP}$ T-**will** [$_{vP}$ **the fund** [$_{vP}$ *the government* [$_{vP}$ v-**approve** [$_{VP}$ *approve the fund*]]]]]] [$_{S.AspP}$ S.Asp-*le* [$_{TP}$ *the government* [$_{TP}$ T-*will* [$_{vP}$ *the fund* [$_{vP}$ *the government* [$_{vP}$ v-approve [$_{vP}$ approve the fund*]]]]]]]]]

Step 6: Establish Agree between the probe Top and the goal *the fund.* Then, internally merge the goal *the fund* with TopP to satisfy the EPP feature on the Top head. This is a standard A-Ā-Ā movement.

                        Move
                 ┌───┐
            ┌────┤   Agree   │
          Probe   *Goal*

(49) [TopP ***the fund*** [TopP ⌐Top⌐ [S.AspP [TP ***the government*** [TP T-***will*** [vP ~~*the fund*~~ [vP ***the***
government [vP v-***approve*** [VP *approve the fund*]]]]]] [S.AspP S.Asp-***le*** [TP *the*
government [TP T-*will* [vP *the fund* [vP *the government* [vP v-*approve* [VP *approve*
the fund]]]]]]]]]]

Step 7: Transfer the rest of the sentence to the interfaces.

   Recall that in section 2.1, Citko's (2014) phasehood diagnostics were applied to test whether
projections headed by SFPs in Chinese constitute phases. We need to check whether an element
moving out of the XP in question can be pronounced (partially or completely) at the edge. Given
Step 6 (see (49)), the answer is yes. The moved TP is pronounced at the edge of S.AspP. More
importantly, this piece of evidence also supports the claim that lower peripheral projections such
as S.AspP are phases in Chinese, since they behave the same way as highest attitude particles
such as *ne* and *la*.

(50) Zhe-ben shu_j, wo du-guo   san-bian   t_j **ne/la**!
     this-CL book I   read-EXP three-times NE/LA
     'As for this book, I have already read (it) three times!'

   Another piece of evidence in support of the phasehood of S.AspP is based on the derivation
of a base-generated topic structure. Consider (51).

(51) Zhe-ke shu, yezi   bu   duo   [S.Asp **le**].
     this-CL tree leaves NEG many   LE
     '(As for) this tree, (its) leaves are no longer many.'

Let us start the derivation by assuming that S.AspP is not a phase. If S.AspP is not a phase, then
this tree and S.AspP should belong to the same phase (i.e., TopP).

Step 1: Merge S.Asp-*le* with TP, as in (52). If S.AspP is not a phase and has no EPP feature, the
correct order then cannot be derived since TP is located on the right side of *le*, given the LCA.
Let us further suppose that S.AspP has an EPP feature but still does not constitute its own phase
(i.e., S.AspP and *this tree* are still in the same phase). Then the specifier of S.AspP must be
projected. In (52), there is a perfect candidate, which can satisfy the EPP feature on the S.Asp
head: *this tree.* This is because *this tree* and S.AspP are in the same phase.[15] According to the
preference for Merge over Move, *the tree* will be merged, which will prevent TP from moving
to Spec,S.AspP.

(52) [S.AspP S.Asp-*le* [TP leaves are not many]]

─────────────────

   [15] Under the assumption that each phase corresponds to a sublexical array (see Chomsky 2000), *this tree* and S.AspP
belong to the same subarray.

Step 2: Merge *this tree* to satisfy the EPP feature on S.AspP.

(53) [$_{S.AspP}$ *this tree* [$_{S.AspP}$ S.Asp-*le* [$_{TP}$ *leaves are not many*]]]

Step 3: Merge the Top head.

(54) [$_{TopP}$ Top [$_{S.AspP}$ *this tree* [$_{S.AspP}$ S.Asp-*le* [$_{TP}$ *leaves are not many*]]]]

Step 4: Establish Agree between Top and *this tree*. Then, move *this tree* to Spec,TopP to satisfy the EPP feature on the Top head.

(55) *[$_{TopP}$ *this tree* [$_{TopP}$ Top [$_{S.AspP}$ *this tree* [$_{S.AspP}$ S.Asp-*le* [$_{TP}$ *leaves are not many*]]]]]

The derivation crashes. We are led to conclude that the correct derivation must rely on the assumption that *this tree* and S.AspP belong to different phases; in other words, S.AspP must be a phase itself.

The correct derivation is as follows:

Step 1: Merge S.Asp-*le* with TP.

(56) [$_{S.AspP}$ S.Asp-*le* [$_{TP}$ *leaves are not many*]]

Step 2: Since *this tree* is not available in the phase S.AspP, no candidate can satisfy the EPP feature on the S.Asp head; therefore, move TP to Spec,S.AspP to satisfy the EPP as a last resort.

(57) [$_{S.AspP}$ [$_{TP}$ **leaves are not many**] [$_{S.AspP}$ S.Asp-*le* [$_{TP}$ *leaves are not many*]]]

Step 3: Merge the Top head with S.AspP. Transfer the lower copy of the TP to the interfaces.

(58) [$_{TopP}$ Top [$_{S.AspP}$ [$_{TP}$ **leaves are not many**] [$_{S.AspP}$ S.Asp-*le* [$_{TP}$ *leaves are not many*]]]]

Step 4: Externally merge *this tree* to satisfy the EPP feature on the Top head.

(59) [$_{TopP}$ *this tree* [$_{TopP}$ Top [$_{S.AspP}$ [$_{TP}$ **leaves are not many**] [$_{S.AspP}$ S.Asp-*le* [$_{TP}$ *leaves are not many*]]]]]

Note that there is no essential difference between lower SFPs and higher SFPs in terms of syntactic properties: all can be displaced, all can be selected, and all are prosodically isolable, and they can be as big as CP in languages like English. The sentence remains fully grammatical when the lower particle *le* is replaced by higher attitude particles, such as *a*, *lei*, and *ou* (see (60)). This is a strong argument in favor of the assumption that all SFPs, lower or higher, project phases.

(60) Zhe-ke shu, yezi   bu   duo   [$_{Att}$ **a/lei/ou**]!
      this-CL tree leaves NEG many   A/LEI/OU
      '(As for) this tree, (its) leaves are not many!'

4.4.2 NegQP > TopP > S.AspP > TP   Let us examine another case in which a moved topic phrase lands between two core projections. One such example is (61), a continuation from the resulting TopP in (43): at the surface, the topic DP *the fund* is moved to a position between the S.AspP headed by *le* and the NegQP with the sentence-initial *shenme* 'what'.

(61) Hierarchy: NegQP (*shenme*) > TopP (*the fund*) > S.AspP (*le*) > TP

[$_{NegQP}$ **Shenme** [$_{TopP}$ *na-bi   jingfei*$_j$, [$_{S.AspP}$ [$_{TP}$ zhengfu   yao pi   t$_j$] **le**]]]!
　　　　 what　　　　　 that-CL fund　　　　　 government will approve　　 LE

'It is not true that the government will approve the fund!'

We can pick up the derivation from Step 6 (49).

Step 7: Merge the phase head NegQ with TopP. TopP is now the lower phase; transfer the domain of TopP (i.e., S.AspP) to the interfaces.

(62) [$_{NegQP}$ NegQ [$_{TopP}$ ***the fund*** [$_{TopP}$ Top [$_{S.AspP}$ [$_{TP}$ ***the government*** [$_{TP}$ T [$_{vP}$ *the fund* [$_{vP}$ *the government* [$_{vP}$ v-***approve*** [$_{VP}$ *approve the fund*]]]]]] [$_{S.AspP}$ S.Asp-***le*** [$_{TP}$ *the government* [$_{TP}$ T [$_{vP}$ *the fund* [$_{vP}$ *the government* [$_{vP}$ v-approve [$_{VP}$ *approve the fund*]]]]]]]]]]

Step 8: Merge the negative *wh*-word *shenme* 'what' with NegQP to satisfy the EPP feature on NegQ.

(63) [$_{NegQP}$ ***shenme*** [$_{NegQP}$ NegQ [$_{TopP}$ ***the fund*** [$_{TopP}$ Top [$_{S.AspP}$ [$_{TP}$ ***the government*** [$_{TP}$ T [$_{vP}$ *the fund* [$_{vP}$ *the government* [$_{vP}$ v-***approve*** [$_{VP}$ *approve the fund*]]]]]] [$_{S.AspP}$ S.Asp-***le*** [$_{TP}$ *the government* [$_{TP}$ T [$_{vP}$ *the fund* [$_{vP}$ *the government* [$_{vP}$ v-approve [$_{VP}$ *approve the fund*]]]]]]]]]]]]

Step 9: Transfer the rest of the sentence to the interfaces.

4.4.3 *TopP (Derived by Movement) > NegQP > S.AspP > TP   It is important to note that no topic phrase can be extracted from the complement of the NegQ head. This is because Spec,NegQP is occupied by the negative *wh*-phrase *shenme* 'what', so this position is no longer available as an escape hatch for any Ā-movement. This prediction is indeed borne out.

(64) Hierarchy: *TopP (*the fund*) > NegQP (*shenme*) > S.AspP (*le*) > TP

*[$_{TopP}$ *Na-bi   jingfei*$_j$, [$_{NegP}$ **shenme** [$_{S.AspP}$ [$_{TP}$ zhengfu   yao pi   t$_j$] **le**]]]!
　　　　 that-CL fund　　　　　 what　　　　　 government will approve　 LE

('As for the fund, it is not true that the government will approve (it)!')

We can pick up the derivation from Step 4 (47).

Step 5: Merge the phase head NegQ with S.AspP. S.AspP is now the lower phase; transfer the domain of S.AspP (i.e., TP) to the interfaces.

(65) [$_{NegQP}$ NegQ [$_{S.AspP}$ [$_{TP}$ ***the government*** [$_{TP}$ T [$_{vP}$ ***the fund*** [$_{vP}$ *the government* [$_{vP}$ v-***approve*** [$_{VP}$ *approve the fund*]]]]]] [$_{S.AspP}$ S.Asp-***le*** [$_{TP}$ *the government* [$_{TP}$ T [$_{vP}$ *the fund* [$_{vP}$ *the government* [$_{vP}$ v-***approve*** [$_{VP}$ *approve the fund*]]]]]]]]]

Step 6: Merge the negative *wh*-word *shenme* 'what' with NegQP to satisfy the EPP feature on the NegQ head. Note that Spec,NegQP is an Ā-position. I assume that each peripheral phase has

only one such position as an escape hatch.[16] Since Spec,NegQP has already been occupied by *shenme* 'what', it can no longer serve as an escape hatch for the topic DP *the fund*.

(66) [NegQP ***shenme*** [NegQP NegQ [S.AspP [TP ***the government*** [TP T [vP ***the fund*** [vP *the government* [vP v-***approve*** [VP *approve the fund*]]]]]] [S.AspP S.Asp-***le*** [TP *the government* [TP T [vP *the fund* [vP *the government* [vP v-approve [VP *approve the fund*]]]]]]]]]]

Step 7: Merge the Top head with NegQP. Since Top is a phase head, the lower phase is now NegQP. Transfer the domain of NegQP (i.e., S.AspP) to the interfaces. Crucially, the topic DP *the fund* located in the outer specifier of vP will also be transferred.

(67) [TopP Top [NegQP ***shenme*** [NegQP NegQ [S.AspP [TP ***the government*** [TP T [vP ***the fund*** [vP *the government* [vP v-***approve*** [VP *approve the fund*]]]]]] [S.AspP S.Asp-***le*** [TP *the government* [TP T [vP *the fund* [vP *the government* [vP v-approve [VP *approve the fund*]]]]]]]]]]]

Since the S.AspP containing *the fund* has been transferred, *the fund* cannot be moved out of the transferred portion. The derivation crashes.

4.4.4 TopP (Base-Generated) > NegQP > S.AspP > TP   A very interesting prediction is that the derivation should converge if the relevant topic phrase is not moved from the transferred portion but is base-generated in Spec,TopP. This prediction is also borne out.

(68) [TopP *Zhe-jia yinhang*, [NegP **shenme** [S.AspP [TP fuwu   taidu   bian   hao] **le**]]]!
       this-CL bank   what   service attitude become good LE
     'As for this bank, it is not true that the service has gotten better!'

Since no Ā-movement is involved in the derivation, nothing will be moved to the outer specifier of vP.

   The step-by-step derivation is as follows:

Step 1: Merge TP with the head S.Asp-*le.* Then, raise TP to Spec,S.AspP to satisfy the EPP feature on S.Asp. Since S.Asp is a phase head, the domain of the phase vP (i.e., VP) is transferred.

(69) [S.AspP [TP ***service has gotten better***] [S.AspP S.Asp-***le*** [TP *service has gotten better*]]]

Step 2: Merge the NegQ head with S.AspP. Then, merge the negative *wh*-phrase *shenme* 'what', to satisfy the EPP feature on NegQ. Transfer the domain of the phase S.AspP (i.e., TP) to the interfaces.

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[16] Intermediate C heads also have only one Ā-position as an escape hatch. For instance, *wh*-island effects are derived because the specifier of the intermediate C occupied by one of the two *wh*-phrases can no longer serve as an escape hatch for the other *wh*-phrase. If C had more than one Ā-position, then both *wh*-phrases would be able to escape from the island, contrary to the fact.

(70) [$_{NegQP}$ *shenme* [$_{NegQP}$ NegQ [$_{S.AspP}$ [$_{TP}$ *service has gotten better*] [$_{S.AspP}$ S.Asp-*le* [$_{TP}$ ~~service has gotten better~~]]]]]

Step 3: Merge the Top head with NegQP. Then, merge the topic DP *this bank* to satisfy the EPP feature on Top.

(71) [$_{TopP}$ *this bank* [$_{TopP}$ Top [$_{NegQP}$ *shenme* [$_{NegQP}$ NegQ [$_{S.AspP}$ [$_{TP}$ *service has gotten better*] [$_{S.AspP}$ S.Asp-*le* [$_{TP}$ ~~service has gotten better~~]]]]]]]

The derivation converges.

Another prediction is that a topic DP can be extracted in the case of multiple SFPs. This extraction is possible because the specifier of each SFP can serve as an escape hatch. This prediction is also borne out, as shown in (72).

(72) [$_{TopP}$ *Na-bi   jingfei*$_j$, [$_{AttP}$ [$_{S.AspP}$ [$_{TP}$ zhengfu   yao pi   t$_j$] **le**] **ne**]]!
      that-CL fund   government will approve   LE NE
     'As for the fund, look, the government will approve (it)!'

We can pick up the derivation from Step 4 (47).

Step 5: Merge Att-*ne* with S.AspP. The lower phase head is now S.Asp-*le*. Transfer the complement of S.AspP (i.e., the lower copy of the TP) to the interfaces. Then, raise S.AspP to Spec,AttP to satisfy the EPP feature on Att-*ne*.

(73) [$_{AttP}$ [$_{S.AspP}$ [$_{TP}$ *the government* [$_{TP}$ T-*will* [$_{vP}$ *the fund* [$_{vP}$ ~~the government~~ [$_{vP}$ v-***approve*** [$_{VP}$ ~~approve the fund~~]]]]]] [$_{S.AspP}$ S.Asp-*le* [$_{TP}$ ~~the government~~ [$_{TP}$ ~~T-will~~ [$_{vP}$ ~~the fund~~ [$_{vP}$ ~~the government~~ [$_{vP}$ ~~v-approve~~ [$_{VP}$ ~~approve the fund~~]]]]]]]] [$_{AttP}$ Att-***ne*** [$_{S.AspP}$ [$_{TP}$ ~~the government~~ [$_{TP}$ ~~T-will~~ [$_{vP}$ ~~the fund~~ [$_{vP}$ ~~the government~~ [$_{vP}$ ~~v-approve~~ [$_{VP}$ ~~approve the fund~~]]]]]] [$_{S.AspP}$ ~~S.Asp-le~~ [$_{TP}$ ~~the government~~ [$_{TP}$ ~~T-will~~ [$_{vP}$ ~~the fund~~ [$_{vP}$ ~~the government~~ [$_{vP}$ ~~v-approve~~ [$_{VP}$ ~~approve the fund~~]]]]]]]]]]

Step 6: Merge the Top head with AttP. The lower phase is now AttP. Transfer the domain of AttP (i.e., the lower copy of S.AspP) to the interfaces. Importantly, the entire S.AspP containing *the fund* is still in Spec,AttP, which is an "escape hatch"; as a result, *the fund* has not been transferred. Establish Agree between the probe Top and the goal *the fund*. Then, move *the fund* to satisfy the EPP feature on the Top head.

(74) [$_{TopP}$ ***the fund*** [$_{TopP}$ **Top** [$_{AttP}$ [$_{S.AspP}$ [$_{TP}$ ***the government*** [$_{TP}$ T-*will* [$_{vP}$ ~~the fund~~ [$_{vP}$ ~~the government~~ [$_{vP}$ v-***approve*** [$_{VP}$ ~~approve the fund~~]]]]]] [$_{S.AspP}$ S.Asp-*le* [$_{TP}$ ~~the government~~ [$_{TP}$ ~~T-will~~ [$_{vP}$ ~~the fund~~ [$_{vP}$ ~~the government~~ [$_{vP}$ ~~v-approve~~ [$_{VP}$ ~~approve the fund~~]]]]]]]] [$_{AttP}$ Att-***ne*** [$_{S.AspP}$ [$_{TP}$ ~~the government~~ [$_{TP}$ ~~T-will~~ [$_{vP}$ ~~the fund~~ [$_{vP}$ ~~the government~~ [$_{vP}$ ~~v-approve~~ [$_{VP}$ ~~approve the fund~~]]]]]] [$_{S.AspP}$ ~~S.Asp-le~~ [$_{TP}$ ~~the government~~ [$_{TP}$ ~~T-will~~ [$_{vP}$ ~~the fund~~ [$_{vP}$ ~~the government~~ [$_{vP}$ ~~v-approve~~ [$_{VP}$ ~~approve the fund~~]]]]]]]]]]]]

Step 7: Transfer the rest of the sentence to the interfaces.

In sum, the roll-up movement would postpone the transfer of phrases embedded in the rolled-up phrase, allowing them to move later. The cases discussed in this section convincingly show the following points:

- All the SFPs (lower and higher) in Chinese are phase heads.
- All the peripheral projections have an EPP feature, which must be satisfied.
- Comp-to-spec movement is obligatory when there is no other way to satisfy the EPP.
- Transfer must happen after comp-to-spec movement.

4.5 Cases Involving Topics Followed by Particles

The sentence in (75) has two analyses, corresponding to two different hierarchical relations. In the first reading, AttP is higher than TopP, whereas in the second reading, TopP is higher than AttP.

(75) a. [$_\text{AttP}$ [$_\text{TopP}$ Bali a, xia xue   de shihou hai zhen langman] **ne**]!
            Paris A fall snow DE moment still really romantic NE
    'Look, as for Paris, it is really romantic when it snows!' (AttP > TopP)

   b. [$_\text{TopP}$ Bali a, [$_\text{AttP}$ xia xue   de shihou hai zhen langman **ne**]]!
            Paris A   fall snow DE moment still really romantic NE
    'As for Paris, look, it is really romantic when it snows!' (TopP > AttP)

Paul (2015) and Paul and Whitman (2017) propose that particles following a topic phrase in Chinese are treated as topic markers occupying the head position of TopP. However, treating these particles as topic markers poses not only configurational problems but also interpretation problems, as I argue extensively in V. J. Pan 2017, 2019a. Instead, I show that these particles are Att heads. SFPs can take a DP as their complement. Under this analysis, what occupies Spec,TopP is the entire AttP [*Bali a*].

First, we derive the reading in which Att-*ne* takes wide scope.[17] The tree diagram for this reading is given in (76), followed by the step-by-step derivation.

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[17] Although the wide scope reading of *ne* is technically possible, it is a bit hard for some native speakers to obtain it.

(76)

```
                              AttP1
                     _____
                    /                        \
                 TopP                        AttP1
           _____            _____
          /                 \          /             \
       AttP2               TopP      Att1           T̶o̶p̶P̶
     _____          _____     ne
    /         \        /        \
   DP        AttP2    Top        TP
   Paris    _____            _____
          /       \           /              \
        Att2      D̶P̶     it is really romantic
         a                  when it snows
```
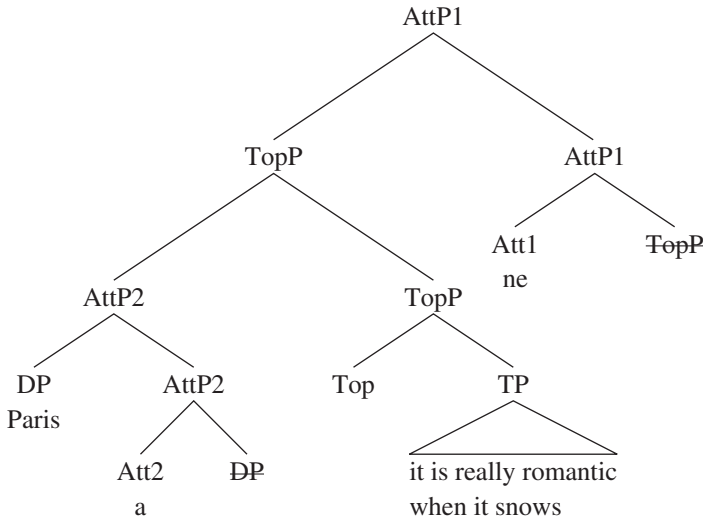
The AttP2 (*a*) is derived in an independent workspace parallel to the one in which {Top, TP} is merged.

• Workspace 1: to build the AttP2 (*a*).

Step 1: Merge Att2-*a* with the DP *Paris*. Since an AttP does not involve any probe-goal relation and no suitable goal is available to satisfy the EPP feature on the Att2 head, internally merge the entire complement, DP, with AttP2 to satisfy the EPP feature on Att2-*a*.

(77) [$_{AttP2}$ [$_{DP}$ ***Paris***] [$_{AttP2}$ Att2-***a*** [$_{DP}$ *Paris*]]]

• Workspace 2: to build the AttP1 (*ne*).

Step 1: Merge the Top head with TP. The lower phase is now vP. Transfer the domain of vP (i.e., VP) to the interfaces.

(78) [$_{TopP}$ Top [$_{TP}$ *it is really romantic when it snows*]]

Step 2: Externally merge AttP2 (built in Workspace 1) with TopP to satisfy the EPP feature on the Top head.

(79) [$_{TopP}$ [$_{AttP2}$ [$_{DP}$ ***Paris***] [$_{AttP2}$ Att2-***a*** [$_{DP}$ *Paris*]]] [$_{TopP}$ Top [$_{TP}$ *it is really romantic when it snows*]]]

Step 3: Merge the phase head Att1-*ne* with TopP. Transfer the domain of the TopP phase (i.e., TP) to the interfaces.
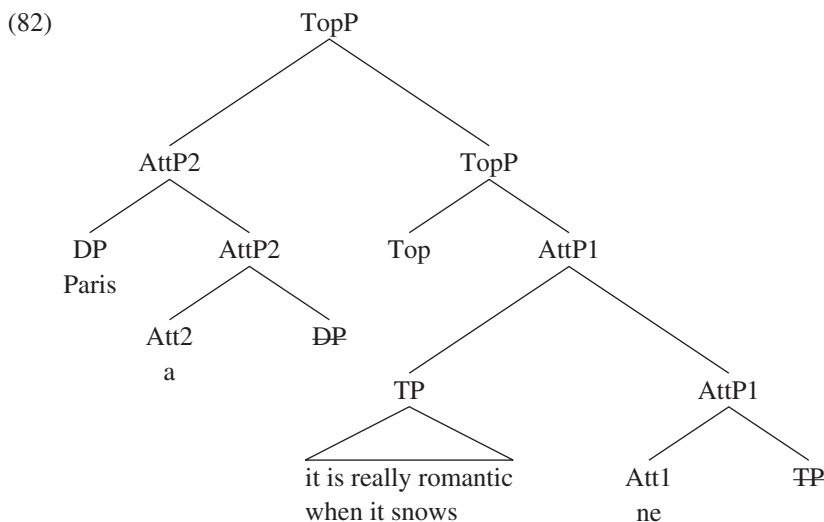
(80) [$_{AttP1}$ Att1-***ne*** [$_{TopP}$ [$_{AttP2}$ [$_{DP}$ ***Paris***] [$_{AttP2}$ Att2-***a*** [$_{DP}$ *Paris*]]] [$_{TopP}$ Top [$_{TP}$ *it is really romantic when it snows*]]]]

Step 4: Internally merge TopP with AttP1 to satisfy the EPP feature on Att1-*ne*.

(81) [_{AttP1} [_{TopP} [_{AttP2} [_{DP} ***Paris***] [_{AttP2} Att2-***a*** [_{DP} *Paris*]]] [_{TopP} Top [_{TP} *it is really romantic when it snows*]]] [_{AttP1} Att1-***ne*** [_{TopP} [_{AttP2} [_{DP} *Paris*] [_{AttP2} Att2-*a* [_{DP} *Paris*]]] [_{TopP} Top [_{TP} *it is really romantic when it snows*]]]]

Step 5: Transfer the rest of the sentence to the interfaces.

Second, we derive the reading in which TopP takes wide scope. The tree diagram for this reading is given in (82), followed by the step-by-step derivation.

(82)

- Workspace 1: to build the AttP2 (*a*).

   (83) [_{AttP2} [_{DP} ***Paris***] [_{AttP2} Att2-***a*** [_{DP} *Paris*]]]

- Workspace 2: to build the TopP.

Step 1: Merge the phase head Att1-*ne* with TP. The lower phase is now vP. Transfer the domain of vP (i.e., VP) to the interfaces.

   (84) [_{AttP1} Att1-*ne* [_{TP} *it is really romantic when it snows*]]

Step 2: Internally merge TP with AttP1 to satisfy the EPP feature on Att-*ne*.

   (85) [_{AttP1} [_{TP} ***it is really romantic when it snows***] [_{AttP1} Att1-***ne*** [_{TP} *it is really romantic when it snows*]]]

Step 3: Merge the Top head with AttP1. Then transfer the domain of the AttP1 phase (i.e., the lower copy of TP) to the interfaces.

   (86) [_{TopP} Top [_{AttP1} [_{TP} ***it is really romantic when it snows***] [_{AttP1} Att1-***ne*** [_{TP} *it is really romantic when it snows*]]]]

Step 4: Externally merge AttP2 (built in Workspace 1) with TopP to satisfy the EPP feature on the Top head.

(87) [$_{TopP}$ [$_{AttP2}$ [$_{DP}$ **Paris**] [$_{AttP2}$ Att2-**a** [$_{DP}$ ~~Paris~~]]] [$_{TopP}$ Top [$_{AttP1}$ [$_{TP}$ **it is really romantic when it snows**] [$_{AttP1}$ Att1-**ne** [$_{TP}$ ~~it is really romantic when it snows~~]]]]]

Step 5: Transfer the rest of the sentence to the interfaces.

A similar derivation applies to resumptive left-dislocation cases. For detailed discussion of such constructions in Chinese, see V. J. Pan 2016.

4.6 Summary

Let us assume that a phase head Z merges with its complement WP and that YP is a constituent inside WP, as shown in (88).

(88) Z [$_{WP}$ ... YP ...]

Table 3 summarizes different ways to satisfy the EPP feature on Z. As the table shows, peripheral functional heads can be roughly divided into two categories: those that depend on a probe-goal relation and those that do not. In the first category, under the probe-goal relation, a given phase head Z acts as a probe, which bears unvalued features. It could be the case that a minimal search finds a suitable goal—say, YP—inside the complement of Z, and as a result, an Agree relation can be established between the probe Z and the goal YP. If the probe Z bears an EPP feature, it must be satisfied. Whether the matched goal YP needs to internally merge with ZP to satisfy the EPP feature on the probe Z depends on the availability of a certain phrase constructed in a separate workspace, which can itself be externally merged with ZP to satisfy the EPP feature on Z. The goal YP does not need to move (a) if an XP constructed in a separate workspace can be merged with ZP, as in resumptive left-dislocation structures, or (b) if a null operator, such as the null *wh*-question operator Op in the sense of Tsai 1994, can be merged with ZP. By contrast, when neither of these two options is available, the goal YP internally merges with ZP to satisfy the EPP feature on the probe Z, as in topicalization cases derived by movement. All of these three strategies can satisfy the EPP.

In the second category, the relevant phase head Z does not function as an active probe and therefore does not enter any probe-goal relation. An XP, such as a hanging topic or the negative *wh*-word *shenme* 'what' in negative *wh*-questions, can be merged with ZP to satisfy the EPP feature on Z. In the extreme case, when there is no element that can be either externally or internally merged with ZP to satisfy the EPP feature on Z, the entire complement of Z—say, WP—raises to Spec,Z as a last resort to satisfy the EPP. This is precisely the case of SFPs in Chinese. To conclude, the surface "complement preceding head" order of SFPs in Chinese results from comp-to-spec movement, as a last resort, to satisfy the EPP.

Table 3
Different ways to satisfy the EPP feature on Z

Probe-goal relation?		Mechanisms	The relevant structures	
If there is a probe-goal relation between Z and YP	YP is an explicit goal	An available XP can be merged in Spec,Z.	Resumptive left-dislocation structures	
		A null operator can be merged in Spec,Z.	Null *wh*-question operator Op in *wh*-in-situ questions	
		The goal YP moves to Spec,Z.	Topic structures derived by movement	
If Z has no probe-goal relation	An available XP can be merged in Spec,Z.		Dangling topic structures	
			The negative *wh*-phrase *shenme* 'what' is generated in Spec,NegQP in negative *wh*-questions.	
	Neither an overt XP nor a null operator is available. The entire complement raises to Spec,Z.		S.AspP	*le*, *laizhe*, *ne*
			*Only*P	*eryi*
			iForceP for *yes*/*no* questions and imperatives	*ma*, *ba1*, *ba2*
			AttP	*ne*, *a*, *ba3*, *ya*, etc.

5 Remaining Issues

5.1 Violation of FOFC

The Final-over-Final Constraint (FOFC) (see Biberauer, Holmberg, and Roberts 2014, Sheehan et al. 2017) states that a head-final phrase αP cannot immediately dominate a head-initial phrase βP if α and β are members of the same extended projection, as shown in (89).

(89) *$[_{αP}$ $[_{βP}$ β γ] α], where β and γ are sisters and α and β are members of the same extended projection.

The head-final analysis of Chinese SFPs constitutes anti-FOFC evidence, as shown in (90), where the head-final CP hosting the SFP dominates a head-initial TP as its complement.

(90) a. $[_{CP}$ $[_{TP}$ EA $[_{TP}$ T $[_{vP}$ ~~EA~~ $[_{vP}$ v $[_{VP}$ V IA]]]]] $[_{C}$ SFP]]

b. [$_{CP}$ [$_{TP}$ Nimen yiqi   qu Beijing] [$_C$ **ma**]]?
            you   together go Beijing $Q_{yes/no}$
      'Do you go to Beijing together?'

Bailey (2012) shows that some of the apparently FOFC-violating final question particles in languages like Vietnamese may actually be initial negative disjunctions of an elided disjunct clause. Tang (2015) proposes a similar analysis to account for SFPs in Chinese. C is analyzed as a disjunctive head, which takes as arguments two TPs that are identical, except that one is positive and the other negative. The lower TP is deleted at PF, which gives rise to [$_{DisjP}$ TP [$_{DisjP}$ C-*OR* [TP]]]. If SFPs occupying C are analyzed as conjunction or disjunction heads, they do not c-select specific complements and they do not label; as a result, they are considered as acategorial elements. Therefore, FOFC does not apply to them (also see Biberauer, Holmberg, and Roberts 2014). Although the disjunction analysis of SFPs seems to resolve the conflict with regard to FOFC, it suffers from several derivational problems, as discussed in detail in V. J. Pan and Paul 2016. In addition, the disjunctive operator analysis applies to the *yes/no* question particle *ma* for semantic reasons; however, it is conceivable that all of the SFPs would be disjunctive operators, such as the imperative particle *ba* and the attitude particles *ya*, *la*, *ne*. Recall that FOFC as formulated in Biberauer, Holmberg, and Roberts 2014 holds only within "extended projections." This seems to provide a way to account for SFPs in Chinese. There is no doubt that vP and TP (and also ModalityP) can count as extended projections of V. However, whether CP is an extended projection of V is a controversial issue. C can have a [V]-feature, since a T head that hosts auxiliaries in English or verbs in Romance languages can be moved to C to derive subject-aux/verb inversion. In verb-second languages, V also raises to C. C seems to also have an [N]-feature, since CP can be complement of V, specifier of T (sentential subject), or complement of N. However, a crucial fact is that C in languages like English cannot take a nominal as its complement, which is drastically different from SFPs in Chinese. SFPs do not necessarily select TP; they can take DP or AdjP as their complement. For instance:

(91) a. (Kan!) Bingshan **ne/a/ei**!
            look   iceberg   NE/A/EI
          '(Look!) An iceberg!'
       b. Zhen man **a**!
           really slow A
          'Too slow!'

In (91a), the SFPs *ne*, *a*, and *ei* directly take a bare noun, *bingshan* 'iceberg', as their complement. In (91b), *a* takes an AdjP, [*really slow*], as its complement. In addition, I have presented cases in which several peripheral projections cooccur in a fixed hierarchical order. Importantly, a higher projection can take any lower projection as its complement without selecting a projection of a specific category. For instance, the highest attitude SFPs can take an SQP, an iForceP, an *Only*P, or an S.AspP as their complement (as shown in sections 3 and 4). These facts suggest that it is highly probable that a peripheral projection hosting an SFP is not necessarily an extended projec-

tion of V in Chinese. Along this line, SFPs not only each define a phase, but also define their own extended projections.[18] If this is the case, then FOFC does not apply to SFPs.

5.2 Violation of Antilocality

Following Abels (2003), comp-to-spec movement is generally excluded since the movement is "too local." First, under the assumption that movement must be triggered by a certain feature, the movement from complement to specifier is banned since no feature triggering is involved. Second, under the assumption that movement is allowed only if it has an effect on output, comp-to-spec movement does not seem to contribute to interpretation at the C-I interface. For the moment, there is no solution to the incompatibility between any analysis based on comp-to-spec movement and antilocality. However, note that examples (61), (64), and (68) are particularly convincing regarding the need for comp-to-spec movement, since without it these sentences cannot be derived.[19]

6 Conclusion

The Chinese periphery is composed of not only SFPs but also other types of projections, whose heads are not overt particles. I assume that all of the peripheral heads in Chinese are phase heads bearing an EPP feature. Different types of peripheral projections have different strategies at their disposal to fulfill the requirement of the EPP. The choice of strategy depends on whether a given phase head Z implies a probe-goal relation and on whether an XP or a null operator is available that can be merged with the ZP to satisfy the EPP feature on Z. Importantly, the complement of an SFP undergoes comp-to-spec raising. This type of movement can only be activated as a last resort strategy to satisfy the EPP feature attached to a phase head. Movement of the complement to the phase edge would postpone the transfer of phrases embedded in the complement, allowing these phrases to be moved later. When the phase edge is not available for the moved complement, phrases embedded within the complement will not be available for extraction in the later stage after the complement is transferred. This constitutes a strong argument in favor of the obligatory comp-to-spec raising analysis for SFPs in Chinese.

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[18] Sheehan et al. (2017:chap. 9) also propose that SFPs in Chinese exhibit strict "cluster-internal" ordering effects and that they derive from different phases. In this sense, Chinese can have four SFP clusters, V, vP, CP, and SAP (Speech Acts Projection), which constitute four different phasal domains.
[19] Ledgeway (2012, 2018) argues that head-finality is the output of a roll-up operation that raises the complement to the specifier to the left of its selecting head and that antilocality is not a universal condition on all instances of local movement but should be parameterized across languages.

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