Low sentence-final particles in Mandarin Chinese and the Final-over-Final Constraint

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Mandarin Chinese clausal syntax can be described as strictly head-initial, with the exception of certain "particles" which are linearized at the end of the clause. Previous work on these sentence-final particles (SFPs) has assumed that all SFPs are very high, in the CP periphery. In this paper I show that a subset of SFPs are in a lower, clause-medial position, based on the scopal interaction of these SFPs with negation, modals, quantificational subjects, and alternative question disjunction. I identify this position as coinciding with the lower (vP) phase edge.

As SFPs are head-final heads with head-initial complements, they have been discussed as an important apparent exception to the Final-over-Final Constraint (FOFC), a proposed universal on structure-building and linearization. The existence of exceptions to FOFC at the vP edge in addition to the CP edge teaches us that FOFC holds only within individual Spell-Out domains.

Keywords: Mandarin Chinese, sentence-final particles, scope, Final-over-Final Constraint, FOFC domain, phases, Spell-Out

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Contents

1 Introduction

The syntactic status of Sentence-Final Particles (SFPs) in Chinese has long been an area of active debate in Chinese linguistics. SFPs are a limited set of functional morphemes that appear at the right edge of the clause. The most famous example is the sentence-final yes/no question particle *ma*, as in (1) below.

(1) **The sentence-final yes/no question particle *ma*:**

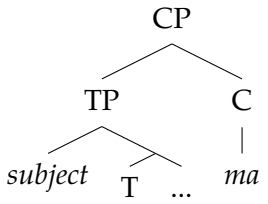
Nǐ xiǎng chī mùguā **ma**?
you want eat papaya MA

'Do you want to eat papaya?'

SFPs such as *ma* in (1) have been analyzed as C heads (Lee, 1986; Tang, 1988; Cheng, 1991; Paul, 2014, 2015, a.o.). Because Mandarin clause structure is generally rigidly head-initial (Huang, 1982, a.o.), the sentence-final position of these items is conspicuous. A common description has been to state that Chinese is head-initial within the TP, but allows a head-final CP projection.

This property has made Chinese SFPs recently gain broader theoretical interest as a possible exception to the Final-over-Final Constraint (FOFC; Holmberg 2000; Biberauer, Holmberg, and Roberts 2008, 2014; Biberauer, Newton, and Sheehan 2009; a.o.), a proposed universal constraint on structure-building and linearization. In brief, FOFC states that head-initial projections cannot be dominated by head-final projections. The structure in (1), for example, apparently involves a head-final CP dominating a head-initial TP (2), in violation of FOFC.

(2) **Head-final CP over head-initial TP, predicted to be ungrammatical by FOFC:**

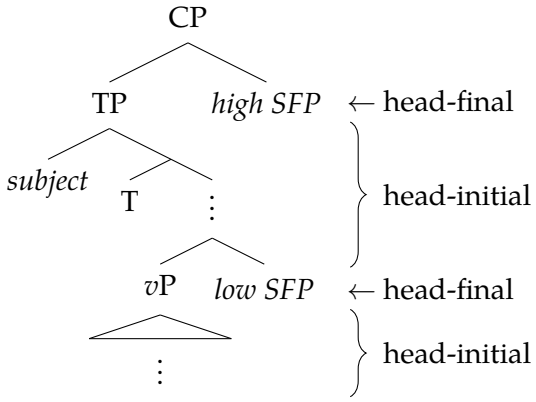


That Chinese SFPs apparently counterexemplify the proposed universal FOFC has been widely discussed (Biberauer, Holmberg, and Roberts, 2008, 2014; Biberauer, Newton, and Sheehan, 2009; Bailey, 2010; Paul, 2014; a.o.), and various proposals have been put forward to allow these C heads in Chinese to exceptionally violate FOFC.

In this paper I will show that the situation is more complicated, in that a certain subset of Mandarin SFPs—specifically, what Paul (2014, 2015) calls the "low" class of SFPs—is right above *v*P rather than in the CP periphery as commonly assumed. Unlike other SFPs, which encode clause type or attitude and therefore clearly correspond to CP-peripheral heads cross-linguistically, the low class that I describe is made up of temporal/aspectual and focus-sensitive operators.

The result is that there are two regions in the Mandarin clause which host SFPs: one is the (extended) CP domain—previously described as the locus of all SFPs—and the other is a position right at the *v*P edge. This proposal is illustrated in (3) below.

(3) **Proposal: low SFPs at the *v*P edge**



I will present both evidence from existing literature and new data which show that these low SFPs must be in a clause-medial position, in the extended *v*P, rather than in the CP domain as other SFPs are. Because of the otherwise head-initial character of the Chinese clausal spine, word order alone will generally not distinguish the structural position of the high and low SFPs. Instead, evidence will come primarily from the semantic scope of low SFPs: in particular, sentence-final *le* and *éryǐ* ONLY. The proposal is motivated by the interaction of these low SFPs with scope-bearing elements in the left hand side of the clause, whose structural height can be easily identified.

The availability of head-final heads at both the *v*P edge and in the CP domain—but not elsewhere in the Chinese clause—becomes an important data point in discussions of the Final-over-Final Constraint. It is no longer sufficient to somehow exempt CP in order to make FOFC compatible with Mandarin Chinese SFPs. Instead, this data motivates the generalization that *FOFC holds only within individual Spell-Out domains*. I will discuss how different specific proposals for FOFC can or cannot account for these facts and discuss why FOFC may apparently hold across the *v*P phase boundary in other languages.

I will begin in section 2 by presenting some background on the syntax and inventory of Chinese SFPs, with particular focus on low SFPs, which will be the object of study here. I will then develop my proposal in section 3. Finally in section 4 I will discuss the derivation of head-finality and implications of this analysis for Final-over-Final Constraint theory.

2 Background: three classes of SFPs

SFPs in Mandarin have traditionally been organized into three classes (Chao, 1968; Hu, 1981; Zhu, 1982, a.o.). Descriptively, I will refer to these classes here as SFP_1, SFP_2, and SFP_3. The listing in (4), based in part on Paul (2014, 2015), gives some representative members for each class:

(4) **Three classes of Mandarin Chinese SFPs:**

a. SFP_1: low SFP

i. *le* Li and Thompson's (1981) "currently relevant state" marker

ii. *láizhe* recent past (see Paul, 2015, p. 258–260)

iii. *ne* durative aspect (Constant, 2011)

iv. *éryǐ* exclusive ONLY (Erlewine, 2010)

b. SFP_2: clause-type

i. *ma* polar question

ii. *ba* imperative

iii. *ne* contrastive topic (Constant, 2014) or follow-up and constituent questions (Cheng, 1991)

c. SFP_3: attitude

i. *ou* impatience

ii. *a* softening

iii. *ei* gentle reminder

Of these three classes, I will refer to SFP_1 as *low* SFPs and SFP_2 and SFP_3 as *high* SFPs. This first-order split between low and high SFP has been well established in previous work for Mandarin Chinese.[1] This first-order dichotomy will be discussed and supported later in this section.

When a sentence has multiple SFPs, their order is fixed: $SFP_1 < SFP_2 < SFP_3$. These ordering restrictions are illustrated in the following contrasts, repeated here from Paul (2014, 2015):

(5) **SFP_1 *le* < SFP_2 *ma* (Paul, 2015, p. 264):**

a. ✓ Tā bù chōuyān **le ma**?
s/he NEG smoke LE MA
'Does s/he no longer smoke?'

b. * Tā bù chōuyān **ma le**?
he NEG smoke MA LE

(6) **SFP_2 *ba* < SFP_3 *ou* (Paul 2005, p. 253, based on Zhu 1982, p. 212):**

a. ✓ Jìn lái **ba ou** (>b'ou)!
enter come BA OU
'Hurry, come in!'

b. * Jìn lái **ou ba**!
enter come OU BA

The items within each class are in complementary distribution. Consider for example the complementary distribution of *le* and *láizhe* in (7) below, also from Paul (2014, 2015):

(7) **Complementary distribution of two SFP_1 (Paul, 2015, p. 253–254):**

a. ✓ Wǒ chī wǎnfàn {**le**, **láizhe**}.
I eat dinner LE LAIZHE
'I (just) ate dinner.'

[1] The classification has also been motivated for Cantonese. See Tang (1998), where the terms *inner* and *outer* particles are used, for a comparison and discussion.

b. * Wǒ chī wǎnfàn {**le láizhe**, **láizhe le**}.
I eat dinner LE LAIZHE LAIZHE LE

In some cases, the verification of such distributional facts is complicated by the existence of homophonous items. Consider for example *ne*. The most common use of sentence-final *ne* is as a marker of contrastive topic (Constant, 2014), which is also often used to mark follow-up and constituent questions (Cheng, 1991, a.o.).[2] However, there is also a sentence-final *ne* which indicates durative aspect (Chao, 1968; Chan, 1980). Constant (2011) shows convincingly that these two *ne*'s are structurally different: the aspectual *ne* is a low SFP_1 and therefore able to cooccur with an SFP_2 (8), whereas the contrastive topic marking *ne* is a higher SFP_2 and therefore cannot cooccur with other SFP_2 (9).

(8) **Durative *ne* (SFP_1) can cooccur with SFP_2 *ma* (Constant, 2011, p. 21):**

Nǐ dài-zhe yàoshi **ne** **ma**?
you carry-DUR key NE_1 MA

'Are you carrying your keys?'

(9) **SFP_2 *ne* is incompatible with SFP_2 *ma* (Constant, 2011, p. 22):**

Zhāngsān qù-guò Rìběn. Nǐ qù-guò (***ne**) **ma**?
Zhangsan go-EXP Japan you go-EXP NE_2 MA

'Zhangsan has been to Japan. Have you?'

See Paul (2014, 2015) and references therein for additional examples demonstrating the strict ordering of $SFP_1 < SFP_2 < SFP_3$ and the complementary distribution of particles of the same class.

Here I follow the common view that all Chinese SFPs are head-final heads in the clausal spine (Lee 1986; Tang 1988; Cheng 1991; Tang 1998; Paul 2014, 2015 and references therein; see also Chan 2013 for recent discussion). An alternative would be to analyze SFPs as right-adjoining adverbs. This approach is untenable for three reasons: (a) SFPs are a small, closed class; (b) uncontroversially adjoined adverbs are not linearized on the right in Mandarin clause structure, except low in the *v*P (Ernst, 2002); and (c) the items in each of the three classes of SFPs are in complementary distribution with other items in their class. Adjunction should be able to apply recursively, as long as the adjuncts are independently licensed in the position and they lead to a meaningful semantic interpretation. Given that some of the items in each class are semantically compatible with one another, their complementary distribution is unexpected under an adverb analysis.

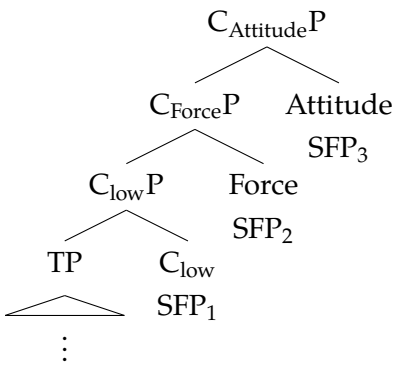
Paul (2014, 2015) analyzes all Mandarin SFPs as head-final heads, and proposes that each class of SFPs corresponds to a distinct head in a split CP system, following the work of Rizzi (1997) and others:[3] Based on the semantics of the particles involved, she proposes that SFP_2 realizes the head

[2] See Constant (2014) and references therein for extensive discussion of this SFP_2 *ne* as a marker of interrogative clause type or contrastive topic. The discussion here does not depend on the precise characterization of SFP_2 *ne*.

[3] Li (2006) similarly proposes a mapping of SFPs onto a Rizzian split CP, although Li's proposal only covers a subset of the SFPs discussed by Paul and does not adequately explain the complementary distribution of items within each class.

Force and SFP_3 realizes the head Attitude, both heads in Rizzi's extended CP periphery and cross-linguistically high in the clause. For the low SFPs (SFP_1), however, there is not a clear head in the CP periphery to be their host, leading to her proposing that SFP_1 realizes a head labeled "C_{low}."

(10) **Paul's (2014; 2015) proposal for Mandarin SFPs in a three-layer split CP:**



Paul's proposal explains the strict ordering of $SFP_1 < SFP_2 < SFP_3$ in sentence-final position, as well as the complementary distribution of items within each class. However, in section 3 I will argue that she is incorrect about the structural position of SFP_1. Specifically, I will show that low SFPs (SFP_1) are at the *v*P edge, lower in the clause. The fact that the items in SFP_1—many of which are temporal or aspectual operators—cross-linguistically occupy a position within the TP rather than in the CP domain is the first clue that the low SFPs (SFP_1) are fundamentally distinct from the high SFPs in SFP_2 and SFP_3.

Tang (1998) and Paul (2014, 2015) argue for a first-order distinction between SFP_1 on the one hand and SFP_2 and SFP_3 on the other, supporting the *low* vs *high* dichotomy that I discuss here. For example, Tang (1998) and Paul (2014, 2015) show that high SFPs are only available in root clauses, whereas low SFPs are not restricted to root contexts.[4] This contrast is illustrated below between example (11) with the sentence-final ONLY *éryǐ* (SFP_1) and example (12) with the yes/no question particle *ma* (SFP_2).

(11) **SFP_1 *éryǐ* ONLY can be part of the matrix or embedded clause (Erlewine, 2012):**

Wǒ gàosù-le yī ge háizi tā kěyǐ chī yī ge dàngāo **éryǐ**.
I told-PERF one CL child s/he can eat one CL cake ONLY

✓'I told one child [that he can **only** eat [one cake]$_F$].'
✓'I **only** told [one child]$_F$ [that he can eat one cake].'

(12) **SFP_2 *ma* must be part of the matrix clause (Li and Thompson, 1981, p. 557):**

Nǐ bù zhīdào tā lái **ma**?
you NEG know s/he come MA

[4] Paul (2014, 2015) also discusses items that may be analyzed as exclusively non-root SFP_1, such as the *dehuà* of conditional clauses and the particle *de* in relative clauses and the *shi...de* "cleft" construction. I will not discuss these constructions here.

✓'Do you not know that s/he's coming?'
* 'You don't know whether or not s/he's coming.'

In both of these examples (11–12), there is an embedded complement clause and a SFP at the end of the utterance. We observe an attachment ambiguity in (11): the sentence-final *éryǐ* ONLY could be attached to the matrix clause, associating with 'one child;' or it can be part of the embedded complement clause of 'tell,' associating with 'one cake.' In contrast, example (12) with sentence-final *ma* in a similar configuration exhibits no such ambiguity. The interrogative clause-typing *ma* must be part of the matrix clause, even though the embedding predicate 'know' can embed both declarative and interrogative clauses.

This difference between low and high SFP could be explained Paul's (2014; 2015) proposal that all SFPs are heads in a Rizzian split CP (10). It has been proposed that embedded clauses may have a "truncated" left periphery and that this explains the distribution of main/root clause phenomena (see Haegeman, 2006, and references therein). The root-only distribution of high SFP can be explained by hypothesizing that non-root clauses are truncated to include the C_{low} head (the proposed locus of SFP_1) but not the Force and Attitude layers.

Constant (2011) notes an additional difference between low and high SFPs, in their position with respect to question tags. Consider examples (13) and (14) below which involve the negative question tag *méiyǒu*.

(13) **Durative *ne* (SFP_1) precedes the question tag (Constant, 2011, p. 22):**

Yàoshi dài-zhe (**ne**) méiyǒu (**#ne**)?
key carry-DUR NE NEG NE

'Do you have the keys?'
Literally: 'Are you carrying the keys (NE) or not?'

(14) **Contrastive topic *ne* (SFP_2) follows the question tag (Constant, 2011, p. 22):**

Zhāngsān qù-guò Rìběn. Nǐ qù-guò (**#ne**) méiyǒu (**ne**)?
Zhangsan go-EXP Japan you go-EXP NE NEG NE

'Zhangsan has been to Japan. Have you?'
Literally: 'Have you been or not (NE)?'

The verb in (13) is in durational aspect and is therefore compatible with the low, aspectual *ne*. This *ne* necessarily precedes the question tag. In contrast, the verb in (14) is experiential and therefore incompatible with the durational *ne* SFP_1, but it is in a discourse context which licenses the use of the contrastive topic-marking, high *ne* SFP_2. In this case, *ne* necessarily follows the question tag.

Unfortunately, even in this rare case where we observe a clear word order difference between low and high SFPs, we do not learn much in terms of the precise structural position of the different

SFPs. Without a prior theory of the structural height of polarity tags in Mandarin Chinese,[5] the contrast in (13–14) only reinforces the view that high SFPs are outside and therefore higher than low SFPs, but does not clarify the precise height of different SFPs. This too is potentially compatible with the view that all SFPs—including the members of SFP_1—are in the CP domain.

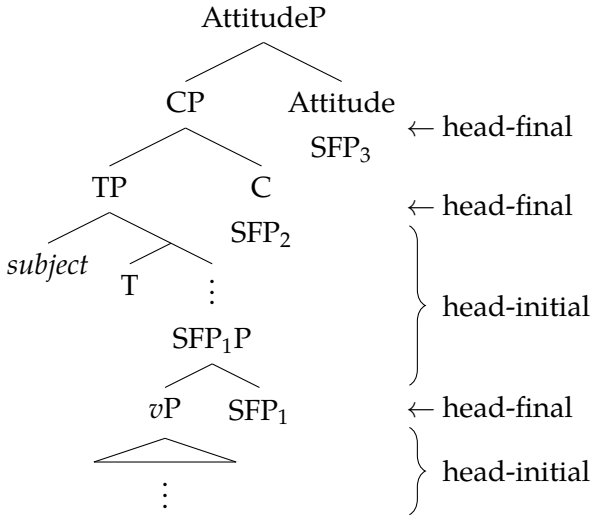
In the following section, I will present my proposal for the structural position of low SFPs (SFP_1). Although the linear position of low SFPs obscures their structural height, a careful look at their semantic scope shows that they are in a sentence-medial position at the *v*P edge.

3 Proposal and evidence

3.1 Proposal

I propose that the low SFPs (SFP_1) realize a dedicated head at the lower phase boundary, in the extended projection of *v*P.[6] Here I will label this head simply SFP_1. I analyze SFP_2 as the realization of C and follow Paul (2014, 2015) in locating SFP_3 in a high Attitude head. However, I diverge from the Rizzian split CP approach adopted by Paul (2014, 2015) in the status of Attitude: I view Attitude as part of the performative layer of matrix clauses (Ross, 1970, a.o.), not part of the CP extended projection (see footnote 21). These three heads—SFP_1, C, and Attitude—project the only three head-final projections in the Mandarin clausal spine. This structure is illustrated in (15).

(15) **Proposed structure:**



I will stay agnostic as to exactly how these three heads—SFP_1, C, and Attitude—are linearized to the right. The heads may directly result in head-final projections, as illustrated in (15), or may

[5] I am not aware of any concrete proposal for the structure of these question tags. Hagstrom (2005) provides a review of different polar question formation strategies in Mandarin Chinese, including polarity tags, but without a syntactic analysis.

[6] See discussion in section 2 above for arguments that SFPs are heads rather than adjuncts. See section 4 for the importance of SFP_1 being part of the extended projection of *v*P.

alternatively be head-initial but then obligatorily front their complements (Simpson and Wu, 2002; Lin, 2006; Takita, 2009; Hsieh and Sybesma, 2011, a.o.). These derivational options will be discussed in detail in section 4. The core proposal here, however, is not dependent on the specific implementation of head-finality.

This proposal is most similar to Paul's (2014; 2015) proposal, the first comprehensive theory for Mandarin Chinese SFPs which addresses all three classes of SFPs, reviewed and schematized in (10) above. The primary difference is the placement of SFP_1 in a position *inside TP*, above *v*P but below the CP domain. Note, however, that the proposal here accords structurally with many previous analyses of the SFP *le* as a head-final head below the CP-domain (Infl in Li 1992; T in Tang 1998; Asp for Hsieh 2001, Grano 2012).[7]

The identification of low SFP at the *v*P edge has important implications for the Final-over-Final Constraint, a proposed universal on structure-building and linearization (Holmberg, 2000; Biberauer, Holmberg, and Roberts, 2008, 2014; Biberauer, Newton, and Sheehan, 2009). As head-final heads selecting head-initial projections, SFP_1 and C (SFP_2) are apparent violations of FOFC. These issues will be discussed in detail in section 4, as will the importance of SFP_1 being at the lower phase edge.

In what follows, I will present arguments for this new proposal. As we saw in section 2, the linear placement of the low SFPs does not help us determine their structural height. Instead, my arguments will come from the *semantic scope* of low SFPs. The proposal here predicts that the low SFPs will take scope above *v*P-internal operators (16a), but under operators above *v*P (16b):

(16) **If low SFPs are at *v*P edge, we predict scope over some operators and under others:**

a. A lower operator (Op) inside *v*P:
[[$_{vP}$ ... Op ...] SFP_1] $\Rightarrow$ $^{\checkmark}SFP_1$ > Op, *Op > SFP_1

b. A higher operator (Op) above *v*P:
[$_{TP}$ ... Op ... [*v*P SFP_1]] $\Rightarrow$ *SFP_1 > Op, $^{\checkmark}$Op > SFP_1

In contrast, if the low SFPs are in the extended CP, as has been assumed in previous work (§2), we predict that they will necessarily scope over all scope-bearing operators in the clause's TP (17).

(17) **If low SFPs are in CP, we predict scope over all TP-internal operators:**
[$_{CP}$ [$_{TP}$ ... Op ...] SFP_1] $\Rightarrow$ $^{\checkmark}SFP_1$ > Op, *Op > SFP_1

In the following subsections I will show that two low SFPs, sentence-final *le* and the ONLY *éryǐ*, participate in scope alternations of the form predicted by (16). This requires the low SFPs (SFP_1) to be in a clause-medial position, supporting the current proposal. I will begin with *le* in section 3.2 and then present the evidence from *éryǐ* in section 3.3. I will summarize the evidence at the end of this section, in 3.4.

[7] Paul (2014, 2015) argues that the *de* in the *shì...de* construction is also a member of SFP_1. (See footnote 4 above.) The position of SFP_1 proposed here then also accords with Paul and Whitman's (2008) analysis of this *de* as an Asp head "in a position directly above the base position of the subject (Spec,*v*P)" (p. 435).

3.2 Evidence from sentence-final *le*

I begin with a discussion of sentence-final *le*, which is often referred to as a Currently Relevant State marker following Li and Thompson (1981) and is by far the best-studied low SFP. It's important to note at this point that this sentence-final *le* is distinct from the perfective verbal suffix *-le*. In all examples here, *le* is placed after a postverbal object to avoid this confound.

After the background on the semantics of *le*, I will present arguments from the interaction of sentence-final *le* with negation, modals, *wh*-words, and alternative question formation.

3.2.1 Background: the semantics of sentence-final *le*

The function of sentence-final *le* is often described as expressing a change of state or that the assertion is somehow unexpected (Li and Thompson, 1981, e.g.). Both of these readings are observed through the translations in (18b) below, as compared to the baseline (18a).

(18) **The semantic contribution of sentence-final *le* (ex Soh, 2009, p. 625):**

a. Tāmen dàodá-le shān-dǐng.
they reach-PERF mountain-top
'They reached the top of the mountain.'

b. Tāmen dàodá-le shān-dǐng **le**.
they reach-PERF mountain-top LE
'They reached the top of the mountain, {which they hadn't done before, contrary to what one may expect}.'

There are a variety of proposals for characterizing the semantic contribution of sentence-final *le*. Here for concreteness I will follow the proposal of Soh and Gao (2006), which is also elaborated on in Soh (2009):

(19) **Semantics for sentence-final *le* (Soh and Gao 2006; extended in Soh 2009):**
Given a proposition p:
Asserts: p is true; and
Presupposes: there is "an immediate past event or state" where p is false.

Interpreting the presupposition in (19) as a requirement on the common ground shared by both speaker and addressee leads to the "change of state" interpretation. Consider a basic example with *le* in (20), below. The sentence asserts that the speaker now likes papaya. In addition, the sentence-final *le* contributes the presupposition that the speaker did not like papaya at an immediately prior point. Together, this yields the "change of state" inference.

(20) **Example from Soh and Gao (2006):**

Wǒ xǐhūan mùguā le.
I like papaya LE

Asserts: 'I (now) like papaya.'
Presupposes: 'I did not like papaya in the immediate past.'

Soh (2009) proposes that the presupposition in (19) could also be a presupposition which held of the common ground at a previous time: this is the source of the "contrary to expectation" reading. See Soh (2009) for detailed discussion of this unification of the "change of state" and "contrary to expectation" readings. Here I will discuss only "change of state" readings of sentence-final *le*.

3.2.2 Negation

In this section I turn to the interaction of sentence-final *le* and two forms of negation. The two forms of negation in question are *bù*, the basic negation form, and *búshì*, which is often used in cases of denial and metalinguistic negation (Li and Thompson, 1981; Yeh, 1995; Wible and Chen, 2000).[8] It is important for our purposes that *búshì* is structurally higher than *bù* (Huang, 1988a; Yeh, 1992; Hsieh, 1996). This structural difference manifests itself in a number of ways. For one, when the two cooccur, they are required to be in the order *búshì bù*, rather than **bù búshì*. Li and Thompson (1981) shows that *búshì* can precede certain sentential adverbs which *bù* cannot:

(21) ***búshì* can precede *hái* 'still' but *bù* cannot:**

a. Tā {***bu hái**, ✓**hái bù**} xǐhuān Zhōngguó cài.
s/he NEG still still NEG like China dish
'S/he still does not like Chinese dishes.' (Li and Thompson, 1981, p. 345)

b. Tā **búshì hái** zài hǎi-biān, tā shì hái zài xuéxiào.
s/he NEG still at sea-side s/he SHI still at school
'It's not the case that s/he's still at the beach, it is that s/he's still at school.' (*Ibid* p. 348)

In addition, *bù* cannot be used to negate a perfective verb or the existential verb *yǒu*, whereas *búshì* is not subject to such restrictions. Huang (1988a) takes these facts to also show that *búshì* is higher in the clause and not in a structurally local relationship with the verb as *bù* is.

With this background in place, we now turn to the interaction of sentence-final *le* and these two negations. Specifically, Soh and Gao (2006) observes the contrast below in (22). Examples (22a) and (22b) below differ only in the choice of negation used, leading to a subtle difference in interpretation: the two express identical assertions but carry different presuppositions. Specifically, example (22a) does seem to express a change of state—the speaker did miss home before and doesn't anymore—whereas example (22b) expresses a *continuation* of their not missing home.

[8] The form *búshì* may be the combination of the simple negation *bù* with the so-called focus marker usage of *shì* (Teng, 1979; Huang, 1988a,b). The negation *bù* is generally subject to a tone sandhi rule, realizing *bú* when preceding a falling tone syllable, explaining its realization in *búshì*. There is, however, evidence that *búshì* may be a single lexical item in the synchronic grammar of Mandarin. For example, Wiedenhof (1994)—following discussion in Chao (1968)—notes that in certain spoken varieties of Mandarin, *búshì* is realized as *búr* or even simply *bú* with rising tone.

For our purposes here, it will only be important that *búshì* is structurally higher and takes scope higher than *bù*. Whether it can be decomposed synchronically or not does not affect the discussion here. I thank Paul Kroeger (p.c.) for discussion of the relation between *bù* and *búshì* and for sharing his notes on the subject with me.

Note that in terms of linear order, the sentences are identical in terms of the relative position of negation and sentence-final *le*.

(22) **SFP *le* takes scope above *bù* but below *búshì* (Soh and Gao, 2006):**

a. *bù...le*: ✓LE > NEG, *NEG > LE

Wǒ **bù** xiǎng jiā **le**.
I NEG miss home LE

Asserts: 'I do not miss home now.'
Presupposes: 'I did miss home before.'

b. *búshì...le*: *LE > NEG, ✓NEG > LE

Wǒ **búshì** xiǎng jiā **le**.
I NEG miss home LE

Asserts: 'I do not miss home now.'
Presupposes: 'I did not miss home before.'

Soh and Gao (2006) argue that the difference between (22a) and (22b) should be thought of as a difference in scope between negation and *le*. In example (22a), *le* takes scope over negation, and therefore we yield the presupposition that "I does not miss home" was false in the immediate past, i.e. that the speaker did miss home in the immediate past. In contrast, in example (22b), negation takes scope over *le*. The presupposition introduced by *le* therefore is that "I did miss home" was false in the immediate past, i.e. that the speaker did not miss home in the immediate past. This presupposition will then project through the higher negation. These assertions and presuppositions can be computed compositionally as follows:

(23) **Semantic interpretations of (22), based on (19):**

a. $[\![(22a)]\!]$ = LE(p), where p = NEG('I miss home')
Asserts: p is true now $\iff$ I do not miss home now
Presupposes: in the immediate past, p was false $\iff$
I *did* miss home immediately before

b. $[\![(22b)]\!]$ = NEG(LE(p)), where p = 'I miss home'
Asserts: NEG(p is true now) $\iff$ I do not miss home now
Presupposes: in the immediate past, p was false $\iff$
I *did not* miss home immediately before

The contrast between the presuppositions in (22) shows us that sentence-final *le* must take scope above the lower negation *bù* but below the higher negation *búshì*. These scope relations are predicted by the proposal put forward here, where SFP_1, including *le*, occupies a position in the extended *v*P periphery. This allows it to be above the lower negation *bù* but below the higher negation *búshì*. In contrast, if *le* were in the CP periphery, we predict it to take scope over both forms of negation.

(24) **Explaining the contrast in (22):**

[$_{TP}$ ... (*búshì* = NEG) ... [[$_{vP}$ ... (*bù* = NEG) ...] *le*]]

a. "... *bù* ... *le*" (22a) ⇒ LE > NEG

b. "... *búshì* ... *le*" (22b) ⇒ NEG > LE

3.2.3 Modals

Lin (2011) observes a similar contrast regarding the scope of *le* with respect to different modals. Consider the following pair of sentences in (25), varying only in the choice of existential modal: the ability modal *néng* 'able to' and the epistemic modal *kěnéng* 'may.'[9]

(25) **SFP *le* takes scope above *néng* but below epistemic *kěnéng* (Lin, 2011):**[10]

a. ABLE *néng*...*le*: ✓LE > ABLE, *ABLE > LE

Zhāngsān **néng** qù Táiběi **le**.
Zhangsan ABLE go Taipei LE

✓ 'It has become the case that Zhangsan is able to go to Taipei.'
Asserts: 'Zhangsan is able to go to Taipei.'
Presupposes: 'Zhangsan was not able to go to Taipei in the immediate past.'
* 'Zhangsan is able to have gone to Taipei.'

b. MAY *kěnéng*...*le*: *LE > MAY, ✓MAY > LE

Zhāngsān **kěnéng** qù Táiběi **le**.
Zhangsan MAY go Taipei LE

* 'It has become possible that Zhangsan goes to Taipei.'
✓ 'Zhangsan may have gone to Taipei.'
Asserts: 'Zhangsan may have gone to Taipei.'
Presupposes: 'Zhangsan had not gone to Taipei in the immediate past.'

While *le* takes scope over the circumstantial ability modal *néng* 'able to'—reflected by the presupposition introduced by *le* commenting on the previous inability of Zhangsan to go to Taipei—it takes scope under the epistemic modal *kěnéng* 'may.' Grano (2012, section 5.4.4) argues that both (25a) and (25b) are monoclausal and that this contrast is best explained by these modals occupying different positions in the clause, with *le* in a structural position above *néng* and below *kěnéng*. This accords with the structural hierarchy of modals observed crosslinguistically: epistemic modals (here, *kěnéng*) are structurally higher in the clause, whereas circumstantial ability modals (here, *néng*) are structurally lower in the clause (Cinque, 1999; Hacquard, 2010, a.o.).

[9] Lin (2011) presents the contrast in (25) as an argument for a finite/non-finite distinction in Mandarin Chinese, and his characterization of the contrast is more complex. See Lin (2011) for the details of this view and Grano (2012) for arguments against this approach.

[10] Translations here are from Lin (2011). The phrasing 'It has become the case that' in the faithful English translation for (25a) reflects *le* taking scope over the modal.

Based on my discussion of the contrast in (25) above, Santana-LaBarge (to appear) notes that a parallel contrast is observed between universal modals as well. Specifically, Santana-LaBarge (to appear) discusses *yào* which is primarily a future-oriented epistemic modal and *xūyào* which is unambiguously a deontic modal, and shows that these two modals differ in their scope with respect to sentence-final *le*. Santana-LaBarge's (to appear) examples are reproduced here, with his translations and supporting contexts:

(26) **SFP *le* takes scope above deontic *xūyào* but below epistemic *yào* (Santana-LaBarge, to appear):**

a. Deontic MUST *xūyào...le:* ✓LE > MUST, *MUST > LE

Wǒ míngtiān **xūyào** qù Chéngdū **le**.
I tomorrow MUST go Chengdu LE

✓ 'It's now the case [change of state] that tomorrow, I must go to Chengdu.'
Example context: An employee comes home to tell her husband that her boss is unexpectedly sending her on assignment to Chengdu the next day.

* 'It will be the case that tomorrow, I must go to Chengdu.'
Example context: An employee predicts that her employer will send her to Chengdu, even though she is currently not assigned to go.

b. WILL *yào...le:* *LE > WILL, ✓WILL > LE

Wǒ míngtiān **yào** qù Chéngdū **le**.
I tomorrow WILL go Chengdu LE

* 'It's now the case [change of state] that tomorrow, I will go to Chengdu.'
✓ 'Tomorrow, I will be going to Chengdu [as a new state].'

Just as in the contrast in (25) above, the sentences in (26) form a clear minimal pair which differs only in the choice of modal: deontic *xūyào* vs epistemic *yào*. The translations here show that deontic *xūyào* necessarily scopes under the low SFP *le*, whereas the epistemic *yào* must scope over *le*.

These contrasts require that low SFPs such as sentence-final *le* occupy a position above some modals such as *néng* and *xūyào* but below others such as *kěnéng* and *yào*. If *le* were in the CP domain, we would expect it to take scope over all modals and we would not predict the contrasts in (25) and (26). Instead, the correct scope relations for (25–26) are predicted by the proposal put forward here, if we analyze the modals *néng* and *xūyào* within the lower (*v*P) phase and *kěnéng* and *yào* above it. This is independently motivated by Tsai's (2012) work on the cartography of modals in Mandarin Chinese, which identifies deontic and ability modals (*xūyào*, *néng*) within the TP and epistemic modals (*yào*, *kěnéng*) in a higher position in the clause.

(27) **Explaining the contrast in (25) and (26):**

[$_{TP}$ ... (Modal$_{epistemic}$) ... [[$_{vP}$ ... (Modal$_{deontic,ability}$) ...] *le*]]

a. "... Modal$_{epistemic}$ ... *le*" (25a, 26a) ⇒ LE > Modal$_{epistemic}$

b. "... Modal$_{deon,circ}$ ... *le*" (25b, 26b) ⇒ Modal$_{deon,abil}$ > LE

3.2.4 Subjects

The *v*P edge position proposed here for low SPFs entails that sentence-final *le* will take internal arguments in its scope, but not the subject. In this section I will present evidence for this based on the distribution of *wh*-indefinites in Mandarin.

In addition to functioning as question words in constituent questions, the simplex *wh*-words *shénme* 'what' and *shéi* 'who' in Mandarin Chinese can be used as indefinites under certain conditions. As detailed in work such as Huang (1982); Li (1992); Cheng (1994); Lin (1998b, 2004), *wh*-words can only receive an indefinite interpretation within the scope of certain licensors. The pair of examples in (28) below illustrates the indefinite use made possible by a licensing negation.

(28) **Interrogative and indefinite *wh*:**

a. Tā xiǎng chī *shénme*
s/he want eat what
   i. 'What did s/he want to eat?'
   ii. * 'S/he wanted to eat something/anything.'

b. Tā **bù** xiǎng chī *shénme*
s/he NEG want eat what
   i. 'What didn't s/he want to eat?'
   ii. 'S/he didn't want to eat anything.'

Example (28b) is ambiguous between a *wh*-question reading (28bi), which requires question intonation, and an assertion with *shénme* interpreted as an inanimate indefinite within the scope of negation (28bii). Without the negation (28a), the utterance is unambiguously a *wh*-question. It is not simply the case that the indefinite use is made available in negative sentences—the *wh*-word must be in the scope of negation:

(29) ***Wh*-word outside of the scope of negation:**

Shéi **bù** xiǎng chī fàn
who not want eat rice

a. 'Who doesn't want to eat?'
b. * 'Anyone/someone doesn't want to eat.'

Early work such as Huang (1982) therefore proposed that these *wh*-indefinites are negative polarity items (NPI), akin to English *anyone/anything*. Work by Lin (1998b) and others shows that the set of licensing contexts is a superset of what are considered NPI-licensors cross-linguistically. The precise characterization of the set of licensors is not relevant here; see Lin (1998b) for a survey.

What is important here is that (a) *wh*-indefinites must be in the scope of a licensing operator and (b) sentence-final *le* is one such licensor of *wh*-indefinites. This is illustrated in (30) below:

(30) ***Wh*-indefinite licensed by sentence-final *le* (Li, 1992, p. 133):**

a. Tā kàndào *shénme*
s/he see what
i. 'What did s/he see?'
ii. * 'S/he saw something.'

b. Tā kàndào *shénme* **le**.
s/he see what LE
'S/he saw something.'[11]

The contrast between (30a) and (30b) shows us that the sentence-final *le* can license an indefinite use of *wh*-words. Now consider the following contrast between *wh*-words in object and subject position:

(31) ***le* licenses *wh*-indefinites as object but not subject:**

a. Tā shūo *shénme* **le**
s/he say what LE
i. 'What did s/he say?'
ii. 'S/he said something.'

b. {*Shéi*, *shénme* ren} shūo huà **le**
who what person say speech LE
i. 'Who spoke?'
ii. * 'Someone spoke.'

Note that it is not simply the case that there is a general ban against *wh*-indefinites in subject position. Polar question formation with sentence-final *ma* can license *wh*-indefinites in subject position, as discussed in Li (1992):[12]

(32) **Polar question *ma* licenses subject *wh*-indefinites (Li, 1992, p. 128):**

{*Shéi*, *shénme* ren} xǐhuān tā **ma**?
who what person like him MA

'Does anyone like him?'

We see then that two sentence-final particles, *le* and *ma*, differ in their ability to license *wh*-indefinites in subject position. This is surprising if we follow Paul (2014, 2015) in assuming that all sentence-final particles are in the CP domain and therefore should take the subject in their scope. This type of contrast is in fact noted in Li (1992), leading to a suggestion that sentence-final *le* is in

[11] The translation in (30b) from Li (1992) does not reflect the semantic contribution of sentence-final *le*, but the prose in Li (1992, p. 133) describes an appropriate situation for (30b) which supports a change of state or contrary to expectation reading, making the use of *le* felicitous. The semantic contribution of sentence-final *le* will similarly not be translated in (31) below.

[12] There is some variation in judgments in the literature on this point. Examples with the same configuration as (32) are judged as ungrammatical in Huang (1982); Cheng (1991, 1994). But footnote 14 in Cheng (1994) recognizes that there are indeed some cases of subject *wh*-indefinites.

Infl, and it is also explained under the proposal made here. As a member of SFP_1, sentence-final *le* occupies a clause-medial position, taking scope over internal arguments but not over the subject. In contrast, *ma* is a member of SFP_2 and therefore realizes a C head, taking the subject in its scope.

(33) **Explaining the contrast in (31–32):**

a. [$_{TP}$ (subject *wh*) ... [[$_{vP}$ ... (object *wh*) ...] *le*]]
⇒ *subject *wh*-indefinite, ✓object *wh*-indefinite

b. [$_{CP}$ [$_{TP}$ (subject *wh*) ... [... (object *wh*) ...]] *ma*]
⇒ ✓subject *wh*-indefinite, ✓object *wh*-indefinite

3.2.5 Alternative question disjunction

Finally I present one additional argument from alternative question formation. Alternative questions in Mandarin Chinese are formed using the special disjunction *háishì*. Erlewine (2014a) argues that the disjunctions in (34) below are all local disjunctions of categories of different sizes, as indicated by the bracketing in (34).

(34) **Examples of *háishì* alternative questions from Erlewine (2014a):**

a. DP disjunction:

Nǐ (shì) xiǎng hē [[$_{DP}$ kāfēi] **háishi** [$_{DP}$ hóngchá]] (ne)?
you SHI want drink coffee HAISHI tea NE

'Do you want to drink coffee or tea?'

b. *v*P disjunction:

Nǐ (shì) [[$_{vP}$ xiǎng hē kāfēi] **háishi** [$_{vP}$ xiǎng hē hóngchá]] (ne)?
you SHI want drink coffee HAISHI want drink tea NE

'Do you want to drink coffee or want to drink tea?'

c. *v*P disjunction under 'want':

Nǐ (shì) xiǎng [[$_{vP}$ sǎo dì] **háishi** [$_{vP}$ xǐ wǎn]] (ne)?
you SHI want sweep ground HAISHI wash dishes NE

'Do you want to sweep the floor or wash the dishes?'

d. TP disjunction:

(Shì) [[$_{TP}$ nǐ nòng cuò le] **háishi** [$_{TP}$ diànnǎo zìjǐ dāngjī le]] (ne)?
SHI you make wrong PERF HAISHI computer self crash PERF NE

'Did you make a mistake or did the computer crash by itself?'

The examples in (34) above also illustrate that alternative questions can optionally include the focus marker *shì* and the sentence-final contrastive topic marker *ne* (SFP_2; Constant 2014). The distribution of the focus marker *shì* in alternative questions follows the general distribution of *shì*

in clauses with narrow focus. For current purposes, it suffices to note that *shì* always *precedes* the left edge of the *háishì* disjunction. See Erlewine (2014a) for additional discussion.

Erlewine (2014a) specifically argues against analyses which derive these disjunctions through conjunction reduction, such as Huang (2009, 2010). For example, Huang (2010) proposes that *háishì* disjunctions are always underlyingly disjunctions of the minimal clauses which contain the surface-disjoined material, schematized in (35) below.

(35) **Conjunction reduction derivation for (34a) following Huang (2010):**

[[$_{\text{clause}}$ Nǐ xiǎng hē kāfēi] **háishi** [$_{\text{clause}}$ ~~nǐ~~ ~~xiǎng~~ ~~hē~~ hóngchá]] (ne)?
you want drink coffee HAISHI you want drink tea NE

'Do you want to drink coffee or tea?'

Erlewine (2014a) shows that such a conjunction reduction analysis faces both conceptual and empirical problems. First is the problem that the proposed deletion targets a non-constituent. This deletion also cannot be accomplished through the combination of multiple independent deletions: for example, in (35), the deletion of the verbs is problematic as Mandarin Chinese lacks gapping (Tai, 1969; Tsai, 1994, a.o.).[13] Alternative questions are, in the general case, also not amenable to an analysis where the surface disjunct (here, 'tea') is moved and the remainder of the full clausal disjunct is deleted, as *háishì*-disjunctions can be embedded within syntactic islands (Huang, 1991). In addition, Erlewine (2014a) shows that such analyses make incorrect predictions regarding *wh*-island sensitivity, intervention effects, and the placement of the focus marker *shì* in *háishì* alternative questions. In the interest of space, these arguments of Erlewine's will not be reproduced here.

Assuming then that *háishì* alternative questions do not involve deletion, we can use sub-TP disjunctions to see whether low SFPs are included within a sub-TP constituent. I argue that example (36) below shows that, indeed, the sentence-final particle *le* is included within a constituent below CP, which does not include the subject. Note that the *le* in the first disjunct is preceded by an object, and therefore it cannot be the perfective *le* which is a verbal suffix.

(36) **Sub-TP disjunction can include sentence-final *le*:**
Context: The addressee is crying.

Nǐ (shì) [[xiǎng jiā **le**] **háishì** [gēn nánpéngyǒu fēnshǒu le] (ne)?
you SHI miss home LE HAISHI with boyfriend break.up PERF NE

'Did you start to miss home or break up with your boyfriend?'

One might wonder whether the apparent disjunction of sub-TP constituents in (36) is actually a disjunction of full CPs with pro-drop in the second disjunction. This possibility is illustrated below in (37). If such a derivation is available, the data in (36) would be compatible with sentence-final *le* being in the CP domain.

[13] The idea that Mandarin Chinese lacks gapping completely has been questioned in work such as Paul (1999). But see Tang (2001); Wu (2003) for discussion showing that their apparent counterexamples are not true instances of gapping.

(37) **Hypothetical CP disjunction derivation for (36):**

[[$_{CP}$ Nǐ$_i$ xiǎng jiā **le**] **háishì** [$_{CP}$ *pro*$_i$ gēn nánpéngyǒu fēnshǒu le] (ne)?
you miss home LE HAISHI with boyfriend break.up PERF NE

However, under that derivation we would predict the focus marker *shì* to precede the subject *nǐ* 'you' in the first disjunct, contrary to fact:

(38) **Incorrect placement of *shì* predicted by (37):**

* Shì [[$_{CP}$ nǐ$_i$ xiǎng jiā **le**] **háishì** [*pro*$_i$ gēn nánpéngyǒu fēnshǒu le] (ne)?
SHI you miss home LE HAISHI with boyfriend break.up PERF NE

Intended: 'Did you start to miss home or break up with your boyfriend?' (=36)

The unavailability of a CP disjunction derivation (37) for (36), then, shows that sentence-final *le* is part of a sub-TP projection. This supports the analysis proposed here, where low SFPs are at the *v*P edge. It is incompatible with the hypothesis that all SFPs are in the CP domain.

3.3 Evidence from sentence-final *éryǐ*

As with sentence-final *le*, in this section I will show that the low sentence-final ONLY *éryǐ* takes scope above operators in the *v*P domain, but below scope-bearing operators higher in the clause. This is unexpected under the view that all SFPs are in the CP periphery (see §2) but is predicted by the proposal that low SFPs are in the extended *v*P periphery.

The organization of this section will parallel that of the preceding section on sentence-final *le* (§3.2). Specifically, I begin with some background on the semantic contribution of *éryǐ* and then present evidence for my proposal from the interaction of *éryǐ* with negation, modals, quantificational subjects, and finally alternative question disjunction.

3.3.1 Background: the semantics of *éryǐ* ONLY

Mandarin Chinese has two *only* words which can introduce a semantics of exclusivity: a preverbal *zhǐ* and sentence-final *éryǐ* (SFP$_1$). Consider the two examples in (39), which are equivalent in meaning. (There is another use of *éryǐ*, which will be discussed below.)

(39) **Two ONLYs in Mandarin:**
Context: "What does he do on Saturdays?"

a. Tā **zhǐ** [kàn diànshì]$_F$.
He ONLY watch TV
'He only watches TV.' ⇒ He doesn't do anything else.

b. Tā [kàn diànshì]$_F$ **éryǐ**.
He watch TV ONLY
'He only watches TV.' ⇒ He doesn't do anything else.

The VPs in each example in (39) are focused, which is indicated by F-marking (Jackendoff, 1972). The F-marked constituent or a subpart thereof will be prosodically prominent. The choice of F-marked constituent affects the interpretation of the focus-sensitive *only*, as observed in the following contrast:

(40) **The focus-sensitivity of English *only* (based on Beaver and Clark, 2008):**

a. David will only wear bow tie when [teaching]$_F$.

b. David will only wear a [bow tie]$_F$ when teaching.

Tsai (2004) and Erlewine (2010) respectively argue that *zhǐ* and *éryǐ* have the same semantics as English *only* as described by Horn (1969), and I therefore gloss both as ONLY here. For details of the semantic interpretation of *only*, see Horn (1969); Rooth (1985, 1992). The focus-sensitivity of *éryǐ*, similar to (40), is observed in (41) below. Parallel examples with *zhǐ* also show the same effect.

(41) **The focus-sensitivity of sentence-final ONLY *éryǐ*:**

a. Wǒ hùi [nìan]$_F$ Yīngwén **éryǐ**.
I can read English ONLY
'I can only [read]$_F$ English.' ⇒ I cannot speak it, write it, etc.

b. Wǒ hùi niàn [Yīngwén]$_F$ **éryǐ**.
I can read English ONLY
'I can only read [English]$_F$.' ⇒ I cannot read Chinese, etc.

In the remainder of this section I will argue that this focus-sensitive *éryǐ* is at the *v*P edge, in a clause-medial position, rather than in the CP domain. The semantics of ONLY is scope-bearing and affects the truth conditions of the utterance (Horn, 1969, a.o.), making it useful for diagnosing the structural scope of low SFPs.

Before presenting these arguments, though, it is important to note that there is another, different use of *éryǐ* where it associates with the entire utterance. The contribution of *éryǐ* in this use can be translated as "It's just that..." or "It's just because..." I will refer to this as *utterance éryǐ*, and the item described above as *focus-sensitive éryǐ*. Note that there is inter-speaker variation: some speakers that I have consulted do not have the focus-sensitive *éryǐ*. The judgements in the remainder of this section therefore only reflect those speakers who robustly have the focus-sensitive *éryǐ*; for example those who readily accept and produce the contrast in (41).

3.3.2 Negation

I begin in this section by investigating the interaction of *éryǐ* ONLY with negation in Mandarin. Because the semantics of ONLY is truth-conditional, its scope with respect to negation is clear. Consider for example the contrast in the English pair in (42).

(42) **The scope of negation and *only* in English:**

a. ONLY > NEG:
I **only don't** drink [tea]$_F$. ⇒ I drink everything else.

b. NEG > ONLY:
I **don't only** drink [tea]$_F$ ⇒ I also drink other things (not necessarily everything else).

Here I will again consider two negations in Mandarin: *bù* and *búshì*. Recall from section 3.2.2 that *bù* is structurally lower in the clause, while *búshì* is necessarily higher. In each case the scope of *éryǐ* with respect to negation is clear: *éryǐ* takes obligatorily wide scope with respect to the negation *bù* (43a), but takes obligatorily narrow scope with respect to the higher negation *búshì* (43b).

(43) **SFP éryǐ ONLY takes scope above *bù* but below *búshì* (Erlewine, 2010):**

a. *bù...éryǐ*: ✓ONLY > NEG, *NEG > ONLY

Wǒ **bù** hē [chǎ]$_F$ **éryǐ**.
I NEG drink tea ONLY

✓'I only don't drink [tea]$_F$.' ⇒ I drink everything else.
* 'I don't only drink [tea]$_F$.' ⇒ I also drink other things.

b. *búshì...éryǐ*: *ONLY > NEG, ✓NEG > ONLY

Wǒ **búshì** hē [chǎ]$_F$ **éryǐ**.
I NEG drink tea ONLY

* 'I only don't drink [tea]$_F$.' ⇒ I drink everything else.
✓'I don't only drink [tea]$_F$.' ⇒ I also drink other things.

The only difference between (43a) and (43b) is the form of the negation chosen: *bù* and *búshì*, respectively. Because *éryǐ* is in a sentence-final position, its linear position with respect to the two negations is uniform. Note also that this pattern in (43) was precisely what we observed in section 3.2.2 above between sentence-final *le*, another low SFP, and these two forms of negation.

The proposal put forward here predicts the contrast observed in (43). Low SFPs including *éryǐ* are in a clause-medial position at the *v*P edge. The contrast in (43) is explained straightforwardly by the different structural heights of *bù* and *búshì*. The proposed structures for (43a) and (43b) are schematized below in (44).

(44) **Explaining the contrast in (43):**
[$_{TP}$ ... (*búshì* = NEG) ... [[$_{vP}$ ... (*bù* = NEG) ...] *éryǐ*]]

a. "... *bù* ... *éryǐ*" (43a) ⇒ ONLY > NEG

b. "... *búshì* ... *éryǐ*" (43b) ⇒ NEG > ONLY

In contrast, under the view that all SFPs are in the extended CP (§2), *éryǐ* taking scope below negation in (43b) is unexplained.

3.3.3 Modals

In section 3.2.3 above, we saw that epistemic modals such as *kěnéng* 'may' take scope over the sentence-final *le*, while the ability modal *néng* takes scope under *le*. The following example shows that the same relationships hold with sentence-final *éryǐ*:

(45) **SFP *éryǐ* takes scope above *néng* but below *kěnéng*:**

a. ABLE *néng...éryǐ*: ✓ONLY > ABLE, *ABLE > ONLY

Zhāngsān **néng** shūo [Fǎwén]$_F$ **éryǐ**.
Zhangsan ABLE speak French ONLY

✓ 'Zhangsan is only able to speak [French]$_F$.'
⇒ He cannot speak other languages.

* 'Zhangsan is able to only speak [French]$_F$.'
(Possible continuation: ...but be could also speak other languages if he wanted to.)

b. MAY *kěnéng...éryǐ*: *ONLY > MAY, ✓MAY > ONLY

Zhāngsān **kěnéng** shūo [Fǎwén]$_F$ **éryǐ**.
Zhangsan MAY speak French ONLY

* 'It's only possible that Zhangsan speaks [French]$_F$.'
⇒ it's not possible that Zhangsan speaks other languages.

✓ 'It's possible that Zhangsan only speaks [French]$_F$.'[14]
(Possible continuation: ...but it's also possible that he speaks other languages.)

This contrast is explained by the proposal here, in the same way that the parallel contrast with *le* in section 3.2.3 is. Cross-linguistically, epistemic modals are structurally higher in the clause whereas ability modals are lower (Cinque, 1999; Hacquard, 2010). In Mandarin Chinese, both *néng* and *kěnéng* modal sentences are monoclausal (Grano, 2012; Tsai, 2012). The proposal here, that low SFPs such as *le* and *éryǐ* are in a clause-medial position, allows them to take scope between these two modals. These structures are illustrated schematically here:

(46) **Explaining the contrast in (45):**
[$_{TP}$ ... (*kěnéng* = 'may') ... [[$_{vP}$ ... (*néng* = 'able') ...] *éryǐ*]]

a. "... *néng* ... *éryǐ*" (45a) ⇒ ONLY > ABLE

b. "... *kěnéng* ... *éryǐ*" (45b) ⇒ MAY > ONLY

3.3.4 Subjects

The proposal here predicts that internal arguments inside the *v*P will be inside the scope of low SFPs at the *v*P edge, while subjects will be outside of this scope. In section 3.2.4 above, I showed that

[14] A monoclausal translation using English epistemic *may* would be "Zhangsan may only speak [French]$_F$." Here the biclausal "It's possible that..." is used to make the scope of the epistemic modal explicit.

this is correct for one low SFP, sentence-final *le*, as diagnosed by its ability to license *wh*-indefinites. In this section, I will show that similar asymmetries can be observed with the focus-sensitive sentence-final *éryǐ*.

I will show that sentence-final *éryǐ* does not take scope over its clausemate subject in two ways. The first argument comes from *éryǐ*'s focus-sensitivity. The semantics of focus requires that *éryǐ* associate with a focused constituent in its scope (Jackendoff, 1972; Tancredi, 1990; Aoun and Li, 1993; Erlewine, 2014b). For example, consider the contrast in the English examples in (47) below.

(47) ***Only* must associate with a focused constituent in its scope (based on Beaver and Clark, 2008):**

a. David will only wear bow tie when [teaching]$_F$.

b. David will only wear a [bow tie]$_F$ when teaching.

c. * [David]$_F$ will only wear a bow tie when teaching.
Intended: 'Only [David]$_F$ will wear a bow tie when teaching.'

In examples (47a–b), *only* associates with a different constituent in its scope, leading to different truth-conditions. When the focused constituent is outside the scope of *only*—for instance the subject in (47c)—*only* is unable to associate with it as intended.

In the case of Mandarin sentence-final *éryǐ*, we can use this as a diagnostic of its structural height. In section 3.3.1 above I showed that *éryǐ* can associate with different focused constituents within the *v*P, including the verb and object; see example (41) above. In contrast, *éryǐ* is unable to associate with a subject:[15]

(48) **Sentence-final *éryǐ* is unable to associate with the subject (cf 41):**

* [Wǒ (yī ge rén)]$_F$ hùi niàn Yīngwén **éryǐ**.
I one CL person can read English ONLY

Intended: 'Only [I (one person)]$_F$ can read English.' ⇒ No one else can.

The observation here that focus-sensitive *éryǐ* is unable to associate with the subject in Mandarin Chinese is new, but I note that a parallel observation has been made before by Tang (1998) for the

[15] Jo-Wang Lin (p.c.) notes that there are sentences with sentence-final *éryǐ* such as (i) below, where an ONLY seems to associate with the subject, as reflected in the translation. I note, however, in that all such examples, there is an independent ONLY operator in a position to associate with the subject: here, the pre-subject *zhǐyǒu*. (See Erlewine (2015) for more on the ONLY operator *zhǐyǒu* which can be used in cases of subject focus.)

(i) ✓ **Zhǐyǒu** [wǒ (yī ge rén)]$_F$ hùi niàn Yīngwén **éryǐ**.
ONLY I one CL person can read English ONLY
'(It's just that) only [I (one person)]$_F$ can read English.' (cf 48)

I propose that the proper analysis of such examples is with the presubject *zhǐyǒu* ONLY associating with the subject and the sentence-final *éryǐ* being an instance of *utterance éryǐ*, discussed briefly at the end of section 3.3.1, rather than a focus-sensitive ONLY operator exceptionally associating with the subject. Such examples therefore do not counterexemplify the generalization presented here that *focus-sensitive éryǐ* cannot associate with the subject of the local clause.

Cantonese counterpart *zaa*. Like *éryǐ*, Cantonese *zaa* has been identified as a low SFP—an "inner particle" in Tang's terms. Tang (1998, p. 45–47) shows that sentence-final *zaa* can associate with different subparts of the *v*P, but not with the subject or higher adjuncts. Two examples from Tang (1998) are reproduced here:

(49) **Cantonese sentence-final ONLY *zaa* cannot associate with the subject (Tang, 1998):**

a. Ngo tai-zo ni bun syu **zaa**.
I read-PERF this CL book ONLY
✓ 'I only read [this book]$_F$.'
✓ 'I only [read]$_F$ this book.'
* 'Only [I]$_F$ read this book.' (ex. 37)

b. Camjat ngo tai-syu **zaa**.
yesterday I read-book ONLY
'Yesterday I only [read]$_F$.'
* 'Yesterday Only [I]$_F$ read.'
* 'Only [yesterday]$_F$ I read.' (ex. 43)

The second argument that the subject takes scope over *éryǐ* comes from quantificational subjects. Consider example (50) below with a plural subject *wǒmen* 'we' and the distributive operator *dōu* (see Lee, 1986; Cheng, 1995; Huang, 1996; Lin, 1998a, a.o.). Because both the quantification of *dōu* and the semantics of ONLY *éryǐ* are truth-conditional, their relative scope is easily identified: the subject obligatorily takes scope over ONLY.

(50) **Distributive subject with *dōu* takes scope over *éryǐ*:**

Wǒmen dōu hē [hēi]$_F$ kāfēi **éryǐ**.
we DOU drink black coffee ONLY

✓ 'Each of us only drinks [black]$_F$ coffee.' ✓subject DOU > ONLY
* 'Only [black]$_F$ coffee is such that we all drink it.' *ONLY > subject DOU

3.3.5 Alternative question disjunction

The final argument for my proposal comes from the distribution of sentence-final *éryǐ* in alternative questions. In section 3.2.5, I presented the view, following Erlewine (2014a), that alternative questions in Mandarin Chinese are formed through *local* disjunction of constituents of various size using *háishì*, and do not involve any deletion operations. Consider the two examples in (51), which will serve as baselines for the argument here. The same alternative question can be posed using a local disjunction of two *v*Ps or two DPs.

(51) ***Háishì* disjunctions of different sizes:**

a. <u>*v*P disjunction:</u>

Nǐ (shì) [[$_{vP}$ yào yī wǎn fàn] **háishì** [$_{vP}$ yào liǎng wǎn fàn]] (ne)?
you SHI want one CL rice HAISHI want two CL rice NE

'Do you want one bowl of rice or two bowls of rice?'

b. DP disjunction:

Nǐ (shì) yào [[$_{DP}$ yī wǎn fàn] **háishì** [$_{DP}$ liǎng wǎn fàn]] (ne)?
you SHI want one CL rice HAISHI two CL rice NE

'Do you want one bowl of rice or two bowls of rice?' (=a)

Note that, because the optional focus marker *shì* must precede the left edge of the disjunction, (51a) cannot underlyingly be a TP or CP disjunction with a pro-dropped subject. Furthermore, because Mandarin Chinese does not have gapping (Tai, 1969; Tsai, 1994, a.o.), the second disjunct in (51b) cannot underlying be a *v*P with deletion of the verb. The disjunctions in (51) therefore must be of *v*P and DP size as illustrated by the bracketing above.

The *háishì* disjunction in alternative questions lets us clearly isolate a constituent of *v*P size and distinguish it from larger (TP or CP) and smaller (DP) constituents. Now consider the distribution of sentence-final *éryǐ* in these alternative questions. Specifically, *éryǐ* associates with the numeral 'one' in 'one bowl of rice':

(52) **Sub-TP disjunction can include sentence-final *éryǐ*, but DP disjunction cannot:**

a. Sub-TP disjunction:

Nǐ (shì) [[yào [yī]$_F$ wǎn fàn **éryǐ**] **háishì** [yào liǎng wǎn fàn]] (ne)?
you SHI want one CL rice ONLY HAISHI want two CL rice NE

'Do you want only [one]$_F$ bowl of rice or two bowls of rice?'[16]

b. DP disjunction:

* Nǐ (shì) yào [[$_{DP}$ [yī]$_F$ wǎn fàn **éryǐ**] **háishì** [$_{DP}$ liǎng wǎn fàn]] (ne)?
you SHI want one CL rice ONLY HAISHI two CL rice NE

Intended: 'Do you want only [one]$_F$ bowl of rice or two bowls of rice?' (=a)

The first thing we notice is that, unlike in the baseline (51) above, only the larger disjunction option in (52a) is available. This indicates that the left disjunct in (52b), a DP, is not large enough to host the SFP *éryǐ*. In (52a), the disjuncts are roughly *v*P in size, and this is now large enough to include *éryǐ* within a disjunct. Note that the disjuncts in (52a) are necessarily smaller than TP, as the argument from the position of *shì*—mentioned above for (51a)—still holds and therefore the disjuncts cannot include the subject. The availability of *éryǐ* in (52a), as well as its ungrammaticality in (52b), is explained by the analysis proposed here, where low SFPs including *éryǐ* head a projection right above *v*P, properly contained within the TP.

[16] For the English translation here, I use a DP-adjoining constituent-marking *only*, which Mandarin Chinese does not have, allowing it to be in an apparent local DP disjunction in the alternative question.

3.4 Summary

In this section I proposed that low SFPs in Mandarin Chinese (*le*, *éryǐ*, etc.) occupy a head in the extended *v*P periphery, which for convenience I label SFP_1. This contrasts from previous proposals which propose that all Mandarin SFPs are in the CP domain (Paul, 2014, 2015). These two proposals are indistinguishable from word order alone, as the linear position of SFPs does not clearly reflect their structural height. Nonetheless, two types of evidence were presented here which argue for the *v*P edge analysis over the CP domain analysis.

The first set of evidence comes from the semantic scope of low SFP, as diagnosed by interactions with other scope-bearing operators whose heights are more clearly identifiable. Here I focused on two low SFPs whose semantics have been well established: sentence-final *le* and the focus-sensitive sentence-final *éryǐ* ONLY. Data from high and low negations, high and low modals, and subjects support the view that low SFPs are in a clause-medial position, in the extended *v*P periphery. These semantic scope contrasts are illustrated schematically in (16), repeated here as (53):

(53) **With low SFPs at *v*P edge, we predict scope over some operators and under others:**

a. A lower operator (Op) inside *v*P:
[[$_{vP}$ ... Op ...] SFP_1] $\Rightarrow$ ✓SFP_1 > Op, *Op > SFP_1

b. A higher operator (Op) above *v*P:
[$_{TP}$ ... Op ... [*v*P SFP_1]] $\Rightarrow$ *SFP_1 > Op, ✓Op > SFP_1

A second, additional set of evidence comes from the distribution of low SFP in alternative questions. The availability of low SFP within disjunctions of sub-TP constituents but not DP-size constituents supports the view that low SFP are at the *v*P edge, in a constituent lower than the TP but above the *v*P. This too was demonstrated with sentence-final *le* and *éryǐ*.

Having motivated that the low SFPs occupy a position in the extended *v*P periphery, important questions remain regarding the syntax of SFPs. Given the overwhelmingly head-initial nature of Mandarin Chinese clause structure (Huang, 1982, a.o.), why are apparently head-final heads allowed at these positions—low SFP (SFP_1) at the *v*P edge and high SFPs (SFP_2 and SFP_3) in the CP domain—and not at other positions in the clause? I will explore this question in the next section.

4 The Final-over-Final Constraint and the derivation of head-finality

Given the overwhelmingly head-initial nature of the Chinese clause, the head-final nature of the closed set of Sentence-Final Particles has been a long-standing puzzle. How does a strongly head-initial language generate a limited set of head-final projections, and what constrains their distribution? The phenomenon of Chinese SFPs has also gained broader cross-linguistic import due to the growing influence of the *Final-over-Final Constraint* (FOFC; Holmberg 2000; Biberauer, Holmberg, and Roberts 2008, 2014; Biberauer, Newton, and Sheehan 2009; a.o.), a proposed universal on structure-building, which such SFPs apparently violate. What can the new evidence here regarding the position of low SFPs teach us about FOFC and its exceptions?

In this section, I will address such questions as I discuss both the technical implementation and broader implications of the proposal here. I will begin in section 4.1 by introducing the Final-over-Final Constraint, reviewing some of the arguments presented in the literature to motivate it, and some previously observed apparent exceptions and limitations. In section 4.2 I will discuss the challenge presented for FOFC by the presence of low SFPs in a clause-medial position and what this teaches us about FOFC. Finally, in section 4.3 I will turn to a more concrete discussion of how these head-final projections may be derived in Mandarin.

4.1 Background: The Final-over-Final Constraint and its exceptions

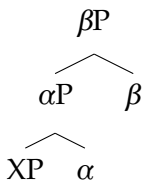
The theoretical backdrop for this discussion is the *Final-over-Final Constraint*, a universal constraint on structure-building and word order proposed by Holmberg (2000) and supported by work such as Biberauer, Holmberg, and Roberts (2008, 2014) and Biberauer, Newton, and Sheehan (2009):

(54) **The Final-over-Final Constraint (FOFC) (Holmberg, 2000, p. 124):**
If a phrase α is head-initial, then the phrase β immediately dominating α is head-initial. If α is head-final, β can be head-final or head-initial.

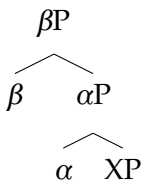
Informally, FOFC allows for the existence of three types of linguistic structure: strictly head-initial (HI), strictly head-final (HF), and mixed structures with head-initial projections above head-final projections. Mixed structures with head-final projections above head-initial projections are predicted to be ungrammatical. This is schematized as follows:

(55) **Predictions of the Final-over-Final Constraint:**

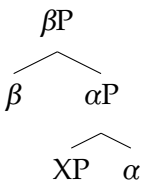
a. ✓HF over HF:



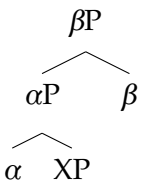
b. ✓HI over HI:



c. ✓HI over HF:



d. *HF over HI:



The effects of FOFC can be observed both across languages and within individual languages with relatively free word orders. For example, Holmberg (2000) originally proposed FOFC based on a range of Finnish word order facts. Consider for example the Finnish *wh*-question in (56) below. This *wh*-question allows for various word orders between the auxiliary, V, and O, which correspond to a head-initial or head-final auxiliary and a head-initial or head-final verb. The data in (56) shows that just one of the four possible orders is unavailable: the V-O-Aux order.

(56) **Word orders in Finnish *wh*-questions (Holmberg, 2000, p. 128):**

a. Aux-V-O:

✓ Milloin Jussi olisi kirjoittanut romaanin?
when Jussi would.have written a novel
'When would Jussi have written a novel?'

b. Aux-O-V:

✓ Milloin Jussi olisi romaanin kirjoittanut?
when Jussi would.have a novel written

c. O-V-Aux:

✓ Milloin Jussi romaanin kirjoittanut olisi?
when Jussi a novel written would.have

d. V-O-Aux:

* Milloin Jussi kirjoittanut romaanin olisi?
when Jussi written a novel would.have

For the purposes of the current discussion, consider the possibility that the auxiliary occupies v, projecting a vP which immediately dominates VP, as discussed by Biberauer, Holmberg, and Roberts (2008, p. 101; 2014, p. 209). The unattested V-O-Aux order corresponds to a head-final vP dominating a head-initial VP, which is exactly the configuration banned by FOFC ((55d) with α = V, $\beta = v$ (Aux)). We could also imagine other structures where the auxiliary occupies a higher position in a clause, in a different phase than the verb—we will return later to questions raised by this possibility.

The effect of FOFC can also be observed across languages and in patterns of diachronic change. For example, Biberauer, Holmberg, and Roberts (2008, 2014) survey the word order of verb, object, and auxiliary across a range of modern and historical Germanic languages. Of the six locally possible orders—including two where the verb and object are discontinuous—five are attested. The one order which is unattested is again V-O-Aux, predicted to be ungrammatical by FOFC. Here for reasons of space I will not reproduce their evidence; see Biberauer, Holmberg, and Roberts (2008) for an overview and Biberauer, Holmberg, and Roberts (2014) for more detailed discussion and examples.

The effects of FOFC can be observed beyond the different permutations of verb, auxiliary, and object. For example, Holmberg (2000) shows that a parallel effect can be observed in Finnish PP structures. Locative adpositions in Finnish can be prepositional or postpositional (57) and complements of 'picture' nouns can also be prenominal or postnominal (58).

(57) **Adpositional object placement (Holmberg, 2000, p. 136):**

a. ilman kuvaa
without picture

b. kuvaa ilman
picture without

(58) **Nominal complement placement (Holmberg, 2000, p. 135–136):**

a. kuva Marjasta
picture of.Marja

b. Marjan kuva
Marja's picture

This predicts maximally four different word orders for adpositions which take such a noun phrase: head-initial or head-final P and head-initial or head-final N. Again, only three out of four orders are possible, and the one ungrammatical order is the FOFC-violating configuration with a head-initial N selected by a head-final P. (Gen is the label given in Holmberg (2000) for the complement of the 'picture' noun.)

(59) **Word orders in Finnish PPs:**

a. P-O-Gen:
✓ ilman [kuvaa Marjasta]
without picture of.Marja

b. P-Gen-O:
✓ ilman [Marjan kuvaa]
without Marja's picture

c. Gen-O-P:
✓ [Marjan kuvaa] ilman
Marja's picture without

d. O-Gen-P:
* [kuvaa Marjasta] ilman
picture of.Marja without

There is a variety of evidence that indicates that FOFC as stated above in (54) is, by itself, too strong. The first such example—mentioned in passing as a potential problem for FOFC in Holmberg (2000, p. 146)—is the issue of German DP complements of V, exemplified in (60) below. If this entire structure is subject to evaluation by FOFC all together, we would predict the structure in (60) to be ungrammatical, given the head-final VP that dominates a head-initial DP.

(60) **A potential exception to FOFC, in German (Biberauer, Holmberg, and Roberts, 2008):**

Johann hat [$_{VP}$ [$_{DP}$ den Mann] gesehen].
John has the man seen

'John has seen the man.'

A common intuition for accounting for such data is that *FOFC holds only over certain domains*. I will call such domains that FOFC holds over *FOFC domains*. For example, Biberauer, Newton, and Sheehan (2009); Biberauer and Sheehan (2012); Biberauer, Holmberg, and Roberts (2014) propose that FOFC should hold only between heads of the same extended projection (Grimshaw, 2000, a.o.). The grammaticality of the German structure in (60) is due to the object DP's FOFC domain being its nominal extended projection, distinct from the verbal projection above it which is part of a different FOFC domain.

One important challenge for this characterization of FOFC domains comes from Biberauer and Sheehan (2012).[17] Under the extended projection characterization of FOFC domains, we do not expect FOFC to hold across clause boundaries. However, Biberauer and Sheehan (2012) argue that in examples with CP complements of verbs, the CP complement and its dominating VP are subject to FOFC: that is, the structure "[$_{VP}$ [$_{CP}$ C TP] V]" is cross-linguistically unattested.[18] For instance, one place where we might look for such structures would be head-final OV languages

[17] Biberauer, Holmberg, and Roberts (2014) attributes this argument to a 2008 talk by Michelle Sheehan.
[18] See Biberauer and Sheehan (2012) and Biberauer et al. (2014, §2.3) for different possible approaches to these facts.

with initial complementizers, but such languages systematically extrapose CP complements to the right, apparently as a strategy to avoid a FOFC violation. The determination of the relevant notion of FOFC domain, then, remains an open, empirical question and active area of research.

With this brief overview of FOFC in place, in the following section I will return to the question of Mandarin SFPs. I will propose that the *v*P edge position of low SFPs, proposed here, bears on this question of the proper characterization of FOFC domains.

4.2 Low SFPs and the limits of FOFC

We now return to the problem of SFPs: why does Chinese clause structure allow for a small number of head-final projections, and what constrains their distribution? Chinese SFPs are anomalous creatures within the otherwise robustly head-initial clausal syntax of Chinese. Moreover when we consider the behavior of SFPs against the backdrop of the Final-over-Final Constraint (FOFC) and its cross-linguistic empirical motivation, reviewed in the previous section, the problem of SFPs becomes even more puzzling and also gains a broader theoretical significance.

That Chinese SFPs may counterexemplify FOFC has been extensively discussed (Biberauer, Holmberg, and Roberts, 2008; Biberauer, Newton, and Sheehan, 2009; Bailey, 2010; Chan, 2013; Paul, 2014, a.o.), with most of this discussion being based on the clause-typing heads in SFP_2. Given the strong cross-linguistic support for FOFC, how should we react when we identify an apparent violation of this proposed universal? There are, I believe, broadly three possible reactions:

(61) **Possible reactions to an apparent exception to FOFC:**
Given a FOFC-violating structure $[_{\beta P}\ [_{\alpha P}\ \alpha\ XP\ ]\ \beta\ ]$,

a. FOFC is not a constraint on structure-building (in my language);

b. The head β is exempt from FOFC evaluation; or

c. β and α are in different FOFC domains and therefore FOFC does not apply over them (but FOFC is observed upwards for β and downwards for α).

Much previous discussion on Chinese SFPs and FOFC has taken the second approach, that Chinese SFPs are somehow exempt from FOFC evaluation.[19] Central to this discussion has been the idea that SFPs are "particles" in a broader sense: lexical categories which are somehow defective and inherently exceptional. For example, Biberauer, Newton, and Sheehan (2009) and Biberauer, Holmberg, and Roberts (2014) link particle-hood to *acategoriality*. Consider a conception of FOFC that holds only across heads of the same major category, verbal or nominal. The acategorial nature of SFPs will make them exempt from FOFC, as they are neither verbal nor nominal, unlike neighboring heads. In their discussion of clause-final particles, which includes a reference to Mandarin Chinese SFPs, Biberauer, Newton, and Sheehan (2009, p. 712) states:

> "Particles can often appear in both nominal and clausal environments..., and as such might be considered to be categorially deficient, i.e. associated with neither [+V] nor [+N] specification. If particles have no categorial specification they will necessarily

always be categorially distinct from the phase head, and so will never be subject to FOFC."

Importantly, in the case of Mandarin SFPs, the idea that they are "associated with neither [+V] nor [+N] specification" is clearly false, as SFPs must take a clausal complement to their left—in my analysis here, high SFPs take a TP complement and low SFPs take a *v*P complement.[20] While this idea of being "categorially deficient" may possibly apply to other FOFC violators that these authors have in mind, the Mandarin SFPs discussed here clearly must be heads in a *verbal* (+V) extended projection.

This literature arguing that we can dismiss SFPs as exceptional particles is based solely on discussion of clause-typing SFP_2. As noted by Paul (2014), much of this discussion does not apply to other SFPs, which Paul (2014) views as also being in the CP periphery. Furthermore, following the arguments presented in this paper which show that low SFPs are in a clause-medial position, the behavior of SFPs cannot be described simply as exceptional behavior at the periphery of the clause, either.

It has also been noted that there is a certain class of languages and language families that apparently violate FOFC, and that their violations are limited to a semi-predictable class of clause-final particles; as stated in Biberauer, Holmberg, and Roberts (2008, p. 100), "FOFC violations may cluster." The suggestion, it seems, is that there is a certain known set of poorly-behaved lexical items cross-linguistically (or at least in certain language families), and that this supports the idea of exempting these items from FOFC. In response to this idea, Paul (2014, fn. 23) notes:

> "As pointed out by an anonymous reviewer, particles are explicitly noted as a 'recurring,' i.e. 'predictable' type of exception to the FOFC by Biberauer, Newton, and Sheehan (2009) and are accordingly assumed to differ in crucial ways from FOFC-respecting complementisers. I fail to see, though, why an exception would count as less of an exception and potential counterevidence when of a recurring type."

[20] There are a few SFPs which may also appear to be compatible with nominal categories: a number of SFP_3 attitude particles and the SFP_2 *ne*, analyzed by Constant (2014) as a contrastive topic marker, can also appear following clause-initial constituents, such as topics. Whether these are the same lexical items which exhibit no categorial specification, or are simply cases of homophony, is a question of analysis. However, this is not the case for any of the low SFPs in SFP_1, which is the focus of my study here. See also discussion in Paul (2014).

[20] No one, to my knowledge, explicitly argues that SFPs show that FOFC does not hold in Mandarin Chinese or in general (61a). The closest that anyone comes to this is Paul (2014), who criticizes Biberauer, Newton, and Sheehan's reliance on data (and interpretation of that data) from *The World Atlas of Linguistic Structures Online* (WALS; current citation: Dryer and Haspelmath 2013) in claiming that "VO languages with final complementizers, appears not to be attested" (Biberauer, Newton, and Sheehan, 2009, p. 183). Her point is that, in the same way that a close look at Mandarin SFPs indicates that head-final heads do exist in Mandarin Chinese, more careful work on additional languages surveyed by WALS may result in similar violations of FOFC, "thus weakening the at first sight statistically solid empirical basis for FOFC" (Paul, 2014, p. 110), thus casting doubt on the universality of FOFC itself.

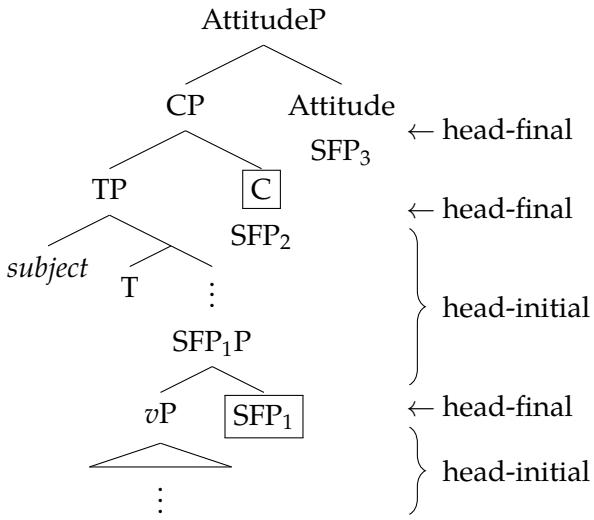
Given the rich evidence for FOFC from a variety of languages and empirical domains, reviewed above, I will not pursue a wholesale rejection of FOFC, nor advocate for making FOFC-compliance a language-specific parameter. I will briefly address this parameterization approach at the end of this section, and argue against it, at least as far as the Mandarin Chinese evidence is concerned.

I wholeheartedly agree with Paul (2014) on this point. The issue of SFPs violating FOFC must be taken seriously. How, then, should we reconcile the syntax of Mandarin SFPs with FOFC?

The most constructive response to the problem of SFPs is option (61c): the presence of apparently FOFC-violating head-final heads in certain positions of the clause helps us identify the boundaries of FOFC domains (the domains over which FOFC holds). I will advocate for and pursue this approach here.

Recall that I have proposed here that the the low class of Mandarin SFPs (SFP_1) occupies a position in the *v*P periphery and presented evidence from the semantic scope of SFP_1 to support this view. The schematic illustration of my proposal for the position of Mandarin SFPs (15) is repeated below in (62). Because of their relevance to the discussion of FOFC, I will concentrate here on head-final heads which take head-initial projections as complements. Under my proposal, there are maximally two such heads, boxed in (62): head-final C taking a head-initial TP and head-final SFP_1 taking a head-initial *v*P complement.

(62) **Proposed structure:** (=15)



What these heads have in common is that their positions align neatly with known *phase edges*: specifically, the CP phase and the *v*P phase. Recall that it has been independently argued that FOFC does not hold of full utterances, but instead only over certain substructures, which I am referring to as *FOFC domains*. I argue that this behavior of Mandarin SFPs supports the following characterization of FOFC, within a theory of phase-based cyclic Spell-Out (Chomsky, 2000, 2001):

(63) **FOFC domains = Spell-Out domains:**
FOFC holds only within individual Spell-Out domains.

Consider a dynamic view of phase boundaries as in Bošković (2014), where the highest head in an extended projection behaves as the phase head. The proposed SFP_1 head will be the highest head in the extended verbal projection, and will therefore act as the phase head of the lower phase

of the clause. Similarly, the phase head of the higher phase will be C, the locus of SFP_2.[21] Taking the complements of phase heads to be Spell-Out domains, the Spell-Out domains in a simple Mandarin Chinese clause will be as illustrated schematically in (64).

(64) **Spell-Out domains of the Mandarin clausal spine (hierarchical):**

phase head *phase head*

$[_{CP}\ C(=SFP_2)\ \underbrace{[_{TP}\ T\ ...\ [_{SFP1P}\ SFP_1}_{\textit{Spell-Out domain}}\ \underbrace{[_{vP}\ v\ [_{VP}\ V\ ...}_{\textit{Spell-Out domain}}$

Under the view that FOFC holds only within individual Spell-Out domains (63), SFP_1 can be head-final without violating FOFC because it is the lowest head in its Spell-Out domain. The fact that its complement (vP) is head-initial is irrelevant, as the vP is in a separate FOFC domain. Once a head-initial projection is built above SFP_1, FOFC ensures that the rest of the Spell-Out domain above it will stay head-initial. This same logic also explains why C is allowed to be head-final, even though its complement is head-initial, without violating FOFC.

Motivation for the hypothesis that FOFC holds only within Spell-Out domains (63) comes from the mechanism of Spell-Out itself. Once a phase is built, Phase Impenetrability dictates that only its edge is accessible for outside operations. Under a cyclic Spell-Out model (Chomsky, 2000, 2001, a.o.), this is because the complement of the phase head will undergo Spell-Out (65), after which it behaves like a compound and its internal structure becomes invisible to the outside.[22] In the resulting structure (65b), there is no information on the headedness of the complement of β, allowing β to be head-final while trivially satisfying FOFC. A similar intuition is presented in Sheehan (2013a), who proposes that FOFC-violating particles take "atomized" complements.

(65) **Spell-Out leads to a natural break in FOFC enforcement:**

a. Merge αP with phase head β: → b. αP undergoes Spell-Out:

In this way, the linearization of Chinese SFPs can be reconciled with FOFC. What's more, this Spell-Out-based characterization of FOFC domains offers an explanation for why head-final heads can only occur at these two positions in the Mandarin Chinese clause: the vP edge and CP edge. These are the two phasal boundaries in the Mandarin clause, each of which triggers Spell-Out.

[21] Recall that Attitude, the locus of SFP_3, does not count here as part of the same extended projection as CP, contra Rizzi's (1997) split CP hypothesis, adopted in Paul (2014, 2015). This choice was made in order to adopt Bošković's (2014) characterization of phase heads as the highest head in a phasal extended projection here; nothing else here independently motivates this decision.

[22] This particular view is articulated in Uriagereka (1999) as the "conservative proposal."

Taking the overwhelmingly head-initial nature of Chinese together with FOFC, we predict that these positions of Spell-Out are the only positions within the clause which allow head-final heads, i.e. SFPs. Note that by accepting the universality of FOFC and taking apparent exceptions to identify boundaries of FOFC domains, we yield a more restrictive, explanatory theory of the structural distribution of SFPs in Mandarin Chinese than if we had simply taken SFPs to be evidence that FOFC does not hold in the language.

Note that under this characterization of FOFC domains, a complement clause's C head will be in the same FOFC domain as the verb selecting it. This predicts that a structure with a head-initial CP selected by a head-final VP "[$_{VP}$ [$_{CP}$ C TP] V]" will be ungrammatical. Biberauer and Sheehan (2012) and Biberauer, Holmberg, and Roberts (2014) note that this structure is indeed unattested. This makes the current characterization of FOFC domains superior to the view that FOFC domains are extended projections (Biberauer, Holmberg, and Roberts, 2014).[23] To account for this restriction under the extended projection approach, Biberauer, Holmberg, and Roberts (2014) have to modify the notion of extended projection to diverge from the standard conception (Grimshaw, 2000, a.o.).

Before concluding this section, let us discuss one potential concern for my characterization of FOFC domains. Much of the original motivation for FOFC stemmed from a gap in the possible word orders of auxiliary, verb, and object, in the world's languages. If the auxiliary is outside of the lower, *v*P phase and assuming that the verb remains inside VP, these facts seem to indicate that FOFC must hold across heads in both the *v*P and CP phases. If FOFC holds within the *v*P Spell-Out domain and separately within the CP Spell-Out domain, FOFC no longer explains this pattern. Given the proposal and discussion here, it would seem that FOFC holds across the higher and lower Spell-Out domains of clauses in some languages, but not others.

I will tentatively suggest that this difference is determined by the morphological properties of the heads involved. Specifically, if the lower phase's phase head head-moves, this results in expansion of the phase and therefore a shift in the Spell-Out boundary or the suspension that Spell-Out event (see e.g. Den Dikken, 2007; Gallego and Uriagereka, 2006; Gallego, 2010).[24] In a language with a head-initial VP, by suspending or shifting the lower Spell-Out domain, we lose or postpone the opportunity to introduce a head-final head without violating FOFC. The prediction is that such phase expansion/sliding occurs in those languages (e.g. Finnish) and language families (e.g. Germanic) where verb, auxiliary, object word orders have been shown to robustly follow FOFC.

[23] However, more must be said under this view for why DP complements, unlike CPs, are not subject to FOFC enforcement together with the selecting verb. See Biberauer and Sheehan (2012) for discussion.

[24] An alternative approach which does not rely on the notion of phase expansion/sliding is to adopt the explanations for FOFC in Trinh (2011, chapter 4) and Richards (2014). Trinh (2011) and Richards (2014) independently offer derivations of FOFC effects which explicitly rule out FOFC-violating configurations between projections which are related by head movement.

Trinh (2011, chapter 4) proposes an independent explanation for certain FOFC effects, based on an independently motivated constraint governing the pronunciation of copies of movement (see also Trinh, 2009). This proposal explicitly derives FOFC for cases where head movement is involved: given projections YP dominating XP where the heads X and Y are related by head movement, Trinh's condition predicts that YP cannot be head-final if XP is head-initial. See also Zeijlstra (2015) for a similar proposal.

Richards (2014) proposes a derivation for FOFC based on a theory that heads are by default head-initial and become head-final only if the head is an affix which can then be adjacent to a host. If *v* is an affix which is linearly adjacent to

Because one trigger for head movement is the formation of well-formed morphophonological words, this characterization predicts that apparent FOFC violations are more likely to occur in isolating/analytic languages and less so in agglutinating/synthetic languages. Such a typological tendency has already been noted in the literature: for example, Philip (2013, p. 206) cites Matthew Dryer (p.c.) in stating that "for many of the VO languages exhibiting final uninflected tense or aspect particles, there is simply no verbal inflection in the language at all." The Chinese languages are indeed highly analytic languages with little to no verbal inflection. This approach also offers a natural explanation for the observation that "FOFC violations may cluster" (Biberauer et al., 2008, p. 100) in certain language families or in certain parts of the clause.

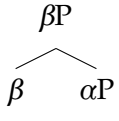
4.3 Deriving head-finality and implementing FOFC

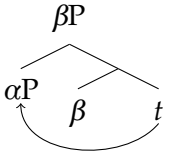
In the previous section I motivated a characterization of FOFC domains which makes Mandarin SFPs compatible with FOFC and which furthermore correctly predicts these head-final heads to be limited to phase edges. However, one question remains: what exactly is the derivation of these head-final projections? In the following section I will discuss two concrete approaches to the derivation of Mandarin SFPs as head-final heads. I will begin in section 4.3.1 by discussing a movement approach based on Hsieh and Sybesma (2011) and then in section 4.3.2 I will discuss a non-movement approach based on Sheehan (2013b). Ultimately in this paper I will stay agnostic as to which of these two approaches to head-finality is involved in Mandarin.

4.3.1 Movement approaches

Much previous literature on head-final structures has been concerned with the derivation of head-finality while adopting Kayne's (1994) Antisymmetry approach to linearization. Kayne's Linear Correspondence Axiom (LCA) translates c-command relations into linearization statements, resulting in head-initial structures. Head-final order can be derived by moving the head's complement to its own specifier position. This is schematized in (66) below.

(66) **Deriving head-finality through movement:**

a. 

→ b. 

This approach to head-finality is taken in work on FOFC such as Biberauer, Holmberg, and Roberts (2008, 2014) and is also adopted by much previous work on Chinese SFPs, including Tang (1998); Simpson and Wu (2002); Lin (2006); Takita (2009); Hsieh and Sybesma (2011). Specifically, here I will discuss the movement approach presented in Hsieh and Sybesma (2011), which is very similar

a possible host V, v will necessarily stay head-initial, and therefore the effect of FOFC will apply across the higher and lower Spell-Out domains of the clause. If v is not an affix, FOFC will only hold within each logical Spell-Out domain, as proposed here.

I refer the reader to Trinh (2011) and Richards (2014) for details.

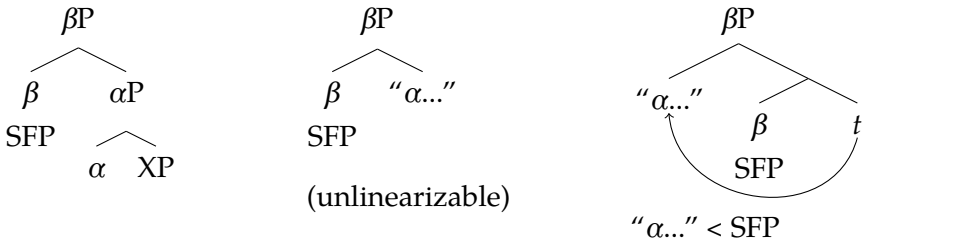
to the general approach that I presented in section 4.2, that Mandarin SFPs are phase heads whose complements undergo Spell-Out.

Hsieh and Sybesma (2011) propose that the theory of cyclic Spell-Out, taken together with Kayne's LCA, results in a natural motivation for the existence of certain head-final projections in Mandarin Chinese. Under their theory SFPs are necessarily at Spell-Out boundaries, just as I proposed above, although their discussion was limited to high SFPs in the CP periphery. Specifically, they propose that SFPs are heads whose complements undergo Spell-Out.[25]

Recall that in the theory of cyclic Spell-Out, the Spell-Out domain becomes a syntactic atom with no internal structure (67b) (see e.g. Uriagereka, 1999). The resulting structure is unlinearizable by Kayne's LCA, as neither the SFP nor the atomized complement "α..." (αP) asymmetrically c-commands the other. Hsieh and Sybesma (2011) proposes that these heads then front their complements as a symmetry-breaking operation (cf Moro, 2000), resulting in a derived head-final order (67c).

(67) **SFP complements are Spell-Out domains, move to break symmetry:**

a. Merge SFP: → b. Spell-Out αP: → c. Move to break symmetry:



Although not explicitly designed to address FOFC, note that this characterization derives the desired distribution of headedness in Mandarin Chinese. The clausal spine will be generally head-initial, as linearized by Kayne's LCA, with head-final projections predicted to occur precisely at the edges of Spell-Out domains.

One complication for this approach is that it predicts one derived head-final projection of this form at every Spell-Out boundary, but Mandarin Chinese allows for clauses without SFPs. A technical but somewhat unsatisfying solution would be to propose that the heads hosting SFPs—SFP_1, C, and Attitude (the latter for root clauses)—are always present in the syntactic structure, even if they are instantiated by variants of the heads which are both semantically and phonologically vacuous. These heads would nonetheless trigger the symmetry-breaking movement (67), resulting in a (superficially) fully head-initial clause.[26]

[25]The details of Spell-Out and phasehood in Hsieh and Sybesma (2011) differ slightly from what I have presented here. In contrast to the standard view that Spell-Out targets complements of phase heads, Hsieh and Sybesma propose that Spell-Out targets the entire phase, including the phase head and its specifier. Therefore under their conception, the highest head in the complement of the SFP is a phase head, rather than the SFP itself as described here. Hsieh and Sybesma's proposal can be recast without difficulty in the terms I present here. The key is to allow the highest head within an extended projection to be the phase head, as proposed by Bošković (2014). This allows us to keep the common conception of Spell-Out domains as the complement of phase heads.

[26]This solution is interestingly incompatible with the evidence presented by Lin (2006) and discussed by Takita (2009). Lin (2006) presents a contrast between clauses with SFPs and those without SFPs which he takes to indicate that complement-to-specifier movement occurred in the latter but not the former.

Hsieh and Sybesma (2011) only discuss high SFPs, which are at the CP edge. Without additional restrictions, Hsieh and Sybesma's Spell-Out-based analysis predicts the existence of SFPs at the *v*P edge as well as the CP edge, assuming a lower phase boundary triggering Spell-Out. Hsieh and Sybesma (2011, §7) discuss this prediction as a potential problem for their analysis:

> "A question reviewers have raised has to do with *v*P, also a phase. On the basis of our treatment of CP, we expect that with *v*P, we will also run into symmetry problems, as soon as a higher functional head (e.g., Asp, T) is merged after it has been spelled out, with subsequent movement to the spec of this head. The reviewers raising this important point imply that this never happens."

Far from being a problem, this prediction made by the theory of Hsieh and Sybesma (2011) is borne out by the low class of SFPs, such as *le*, *éryǐ*, *láizhe*, etc., which I argue are in precisely this position: the extended *v*P periphery.

The movement-based proposal of Hsieh and Sybesma (2011) is thus an overall attractive proposal for the derivation of head-finality in Mandarin Chinese. Their proposal derives the general head-initiality of the Mandarin Chinese clause, using Kayne's (1994) Linear Correspondence Axiom, while also motivating the existence of derived head-final heads exactly where they are observed, at the *v*P and CP edges. The chief criticism of this and other movement-based approaches is the movement step itself. In an influential proposal, Abels (2003) argues that complement-to-specifier movement, of the type employed here in (66) and (67), is banned under a variety of anti-locality. I will therefore also discuss non-movement approaches to Chinese head-finality in the following section.

4.3.2 Non-movement approaches

The alternative to the movement approach is to allow individual lexical items or particular projections to be marked as head-final. The problem with such an approach is how patterns of headedness can be constrained so that violations of the Final-over-Final Constraint (FOFC) are not produced, while allowing for apparent violations near Spell-Out domains, as observed here. Here I will briefly present the non-movement approach of Sheehan (2013b), which derives the desired FOFC effects observed in Mandarin.[27]

The proposal in Sheehan (2013b) is unique in combining both local, phrase-level direction parameters and the intuition from Kayne (1994) that c-command relations are involved in linearization. Specifically, she proposes the following, "two-step" revision to Kayne's Linear Correspondence Axiom:

(68) **Sheehan's (2013b) Revised Linear Correspondence Axiom (LCA):**

[27] This approach is also sketched as the "PF interface account" in Sheehan (2013a).

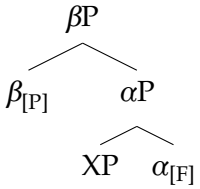
Another non-movement approach to head-finality compatible with the core proposal here is Richards (2014), as mentioned in footnote 24 above. Richards (2014) presents an approach to head-finality involving an operation called "rotation," which also has the effect of deriving FOFC effects within Spell-Out domains but not across them. See Richards (2014) for details.

i. If a category A c-commands and c-selects a category B, then A precedes or follows B at PF [MYE: depending on the direction parameter setting on A].

ii. If no order is specified between A and B even transitively by (i), then A precedes B at PF if A asymmetrically c-commands B.

This two-step LCA in Sheehan (2013b) has the result that it is unable to derive FOFC-violating structures, unless Spell-Out is involved as will be discussed below. Consider first the structure in (69), where head β bears a "precede" (P; head-initial) direction parameter and head α bears a "follow" (F; head-final) direction parameter. These direction parameters, using statement (i) of the Revised LCA, yield the linearization statements in (69a–b). Note, however, that the statements in (69a–b) together do not yield a unique total ordering for the three terminal nodes. In order to determine a total order, we must determine the order of β with respect to XP. Because β does not c-select XP (α's complement), statement (68i) does not apply, and so the consideration of asymmetric c-command (68ii) kicks in. This results in the linearization statement in (69c), which now determines a total order.

(69) **The linearization of a mixed, FOFC-obeying structure:**



a. $\beta < \alpha$ by (68i), as β bears a "precede" (P) instruction

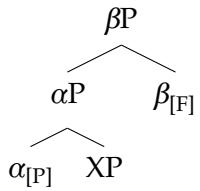
b. XP $< \alpha$ by (68i), as α bears a "follow" (F) instruction

c. $\beta <$ XP by (68ii), as (68i) does not apply and β asymmetrically c-commands XP

$\Rightarrow$ $\beta <$ XP $< \alpha$

Now consider what happens if we attempt to build a FOFC-violating structure as in (70). Using statement (i) of the Revised LCA, the direction parameters on the heads β and α yield the linearization instructions in (70a–b). Again, these two statements alone do not yield a total ordering of terminals, so we must determine the ordering of β with respect to XP. Statement (68ii), based on asymmetric c-command, gives us the statement $\beta <$ XP in (70c).

(70) **The linearization of a mixed, FOFC-violating structure:**



a. $\alpha < \beta$ by (68i), as β bears a "follow" (F) instruction

b. $\alpha <$ XP by (68i), as α bears a "precede" (P) instruction

c. β < XP by (68ii), as (68i) does not apply and β asymmetrically c-commands XP

$\Rightarrow$ $\alpha < \beta <$ XP ☠

The three linearization statements in (70) taken together yield a total order which linearizes the phrase αP as a discontinuous constituent. Sheehan (2013b) takes this to violate a ban on discontinuous linearization of subtrees. FOFC-violating structures such as (70) are thus ungrammatical due to their inability to be properly linearized by the Revised LCA. See Sheehan (2013b) for additional discussion of the Revised LCA and its derivation of FOFC effects.

This approach to linearization does however allow apparent violations of FOFC across Spell-Out domains, which accords with my proposal for the syntax of Mandarin SFPs. Suppose that heads in the Chinese clausal spine have a default "precede" [P] setting. SFPs have a marked, lexically-specified "follow" [F] setting and their complements undergo Spell-Out. The process involved in linearizing a SFP and its complement is illustrated below in (71):

(71) **The linearization of SFPs:**

a. Merge SFP β: → b. Spell-Out αP: → b. Revised LCA for βP:

"α..." < β (SFP) by (68i), as β bears a "follow" (F) instruction

Sheehan (2013b) follows Uriagereka (1999) in taking the result of Spell-Out to be an atomized syntactic object with no internal structure. Following Spell-Out of αP, then, a single linearization statement, "α..." < SFP, yields a total order for the two terminal nodes in βP. The problem observed with the FOFC violation in (70) above does not occur because internal subparts of αP no longer participate in linearization instructions with the SFP.

5 Conclusion

Sentence-final particles (SFPs) have long been a puzzle for Chinese syntax. Many previous approaches have analyzed all SFPs as heads high in the clausal periphery. In contrast, in this paper I propose that the low class of Mandarin SFP—SFP_1: sentence-final *le*, *éryǐ*, *láizhe*, etc.—occupy a clause-medial position in the extended vP periphery. Evidence for this view comes from the semantic scope of SFP_1 with respect to negation, modals, quantificational subjects, and alternative question disjunction. This new evidence from semantic scope sheds light on the position of these items in the structure of the Mandarin clause, particularly as the linear position of these SFPs does little to communicate their structural position.

The fixed sentence-final linear position of Chinese SFPs, in contrast to the otherwise strictly head-initial clausal spine, has made them a notorious possible counterexample to the Final-over-Final Constraint (FOFC), a proposed universal on structure-building and linearization. The data from

low SFPs that I present here adds a new twist to this debate: if SFPs are exceptions to FOFC, exceptions to FOFC do not just occur at the clausal periphery, but also clause-medially, at the *v*P edge.

I propose that the behavior of Mandarin SFPs motivates the view that FOFC holds only within individual Spell-Out domains. In a phase-based cyclic Spell-Out architecture, the fact that SFPs occur in just two particular positions in the clause—at the *v*P edge and CP edge—is explained, as these positions coincide with phase edges. The complements of SFPs undergo Spell-Out, allowing SFPs to be linearized on the right (be head-final) while taking a head-initial projection as their complement. Alternative approaches which simply consider SFPs (or the entire language) to be exempt from FOFC would overgenerate the structural positions of SFPs. The result of my proposal is a more restricted and explanatory theory of the structural distribution of these items. The analysis here also affords Mandarin SFPs an understanding that brings them in line with other apparent exceptions to FOFC.

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