

**Abstract.** This paper observes that the modals *di* and *dei* can occur postverbally in Zhongyuan Mandarin. A head-final analysis for the postverbal *di* and the sentence-final *dei* will be provided to explain why they can occur postverbally. I will expand on an analysis of sentence-final particles (SFPs) by Erlewine (2017) that breaks the structure into regions such that the Final-over-Final constraint (FOFC) holds within a region. I argue that only *di* yields an FOFC violation, which can be repaired by object movement. The observations in Zhongyuan Mandarin shed light on the nature of FOFC: it is not only a structural constraint but also an output constraint.

**Keywords.** postverbal; modality; head-final; Zhongyuan Mandarin; Final-over-Final Constraint

**1. Introduction.** In Zhongyuan Mandarin (also known as Central Plain Mandarin),<sup>1</sup> a head-initial language, modals usually precede a verb phrase, presumed to project as a functional head. A special postverbal modal *di* can be used to express a deontic meaning, ‘should/ought to’, when occurring with the sentence-final particle (SFP) *le*, as shown in (1a).<sup>2</sup> The preverbal modal *dei* can also occur with *le* to express a similar meaning to *di*, as in (1b). Besides its deontic use, *dei* in (1b) can function as an epistemic modal. The meaning for these two examples comes from both *le* and the deontic nature of *di* or *dei*, not just from the modals alone. The SFP *le* contributes an inchoative meaning, indicating a change of state or the onset of actions (Chao 1968; Soh 2009). The sentences mean that the obligation of eating has just begun, paraphrased as follows:

- (1) a. Zhangsan chi-di-fan le.  
Zhangsan eat-DI-meal SFP  
‘It is time for Zhangsan to eat a meal.’  
b. Zhangsan dei chi-fan le.  
Zhangsan DEI eat-meal SFP  
Interpretation 1: ‘It is time for Zhangsan to eat a meal.’  
Interpretation 2: ‘Zhangsan must be eating a meal now.’

In addition to occurring preverbally, the common modal *dei* can occur sentence-finally to express deontic necessity, as shown in (2). Unlike the preverbal modal, which conveys both deontic and epistemic meanings, the sentence-final *dei* functions exclusively as a deontic modal.

- (2) Zhangsan chi-fan dei. (Deontic)  
Zhangsan eat-meal DEI  
‘Zhangsan should eat a meal.’

If *di* projects as a head, the occurrence of the postverbal modal potentially violates the Final-over-Final-Condition (FOFC) (Holmberg 2000; Myler 2009; Biberauer et al. 2014; Biberauer

<sup>\*</sup> I would like to thank Neil Myler, Paul Hagstrom, Elizabeth Coppock, and the audience at LSA 2026 for their helpful insights on various aspects of the data and analysis presented in this article. All remaining errors are entirely my own. Author: Yuanyuan Zhang, Boston University ([zhyy@bu.edu](mailto:zhyy@bu.edu)).

<sup>1</sup> Zhongyuan Mandarin is a variety of Mandarin Chinese. It is widely spoken in the Central Plain, including Henan, northern Jiangsu (Chappell 2002).

<sup>2</sup> The judgments of the examples in this paper come from four native speakers of Zhongyuan Mandarin, including the author.

2017; Erlewine 2017, 2018; Hu & Liu 2021).

(3) **The Final-over-Final Condition (FOFC) (Holmberg 2000: 124):**

If a phrase  $\alpha$  is head-initial, then the phrase  $\beta$  immediately dominating  $\alpha$  is head-initial. If  $\alpha$  is head-final,  $\beta$  can be head-final or head-initial.

According to FOFC, a head-initial phrase cannot be dominated by a head-final projection. *Di*, as a modal, therefore, seems to present a case that violates this condition, considering that modals are often taken as heads that select head-initial complements like *vP* or *VP*. In (4a), *di* follows the *V* head of the *VP chi* ‘eat’. If *di* projects as a head-final modal, then a head-final phrase *ModP* dominates the *VP*, violating FOFC:



Similarly, the example in (2) of the sentence-final *dei* also seems to present an FOFC violation case based on their linear order, as shown in (4b).

	<b>Preverbal <i>dei</i></b>	<b>Sentence-final <i>dei</i></b>	<b>Postverbal <i>di</i></b>
<i>deontic</i>	✓	✓	✓
<i>epistemic</i>	✓	×	×
FOFC-like violation	No	Yes	Yes

Table 1. Descriptive generalizations

The general pattern of *dei* and *di* is summarized in Table 1. The preverbal modal *dei* can express both deontic and epistemic meanings. In contrast, postverbal modality behaves differently: both the sentence-final *dei* and the postverbal *di* can express deontic meaning, but they cannot express epistemic meaning. Notably, postverbal modals (the sentence-final *dei* and *di*) exhibit an FOFC-like violation.

The first goal of this paper is to examine whether the occurrence of the postverbal modals *di* and *dei* violates FOFC. The second goal is to explain why these modals can be postverbal, specifically focusing on how to derive *di* and the sentence-final *dei*.

Erlewine (2017) summarizes several possible reactions to an apparent exception to FOFC. One possible analysis is that the head in the seemingly FOFC-violating structure is not subject to FOFC due to its category or lexical entry. Another possibility is that the head only appears to be an exception to FOFC but is not. I will expand on Erlewine’s (2017) analysis of sentence-final particles, which breaks the structure into regions such that FOFC holds within but not across regions (Spell-Out domains). According to Erlewine’s proposal, head-final projections are allowed at the bottom of a region (Spell-Out domain). In my analysis, the sentence-final *dei* is allowed to project at the bottom of a region. However, *di* yields an FOFC violation according to the definition in (3). Based on observations of object movement, I propose a revised version of FOFC, as stated in (5). In this new output constraint version of FOFC, the violation of FOFC caused by

the occurrence of *di* will be repaired by object movement. Object movement leads to a superficial head-final structure of the VP, thus preventing an FOFC violation.

(5) **The Final-over-Final Condition** (the output-constraint version):

If XP and YP are within the same Spell-Out domain, with YP as the complement of XP and XP being head-final, then YP must be head-final. If Y is pronounced last in YP, then as a head-final phrase on the surface, it can be dominated by the XP.

In Chinese linguistics, previous analyses have regarded postverbal modality as a head-initial phrase involved in syntactic derivations such as head movement (Cheng & Sybesma 2004; Wu 2004; Chung 2013). However, when the data from Zhongyuan Mandarin is examined, it becomes evident that the head-initial explanation falls short in deriving negated modality. Hence, given the limitations of the head-initial analysis, it is imperative to reevaluate the postverbal modality from an alternative perspective: a head-final analysis.

This paper is structured as follows. I will examine whether the occurrence of the postverbal *di* and the sentence-final *dei* violate FOFC by applying the phase boundary hypothesis in section 2. In section 3, I will summarize the analysis of postverbal modal *di* and will outline future directions for the study of *dei* and *di*.

**2. Head-final modality and FOFC.** In this section, I will provide a concise overview of head-final phrases in Mandarin Chinese and Zhongyuan Mandarin. Following that, I will delve into a review of the phase boundary hypothesis (Erlewine 2017), which is applied to explain the seeming FOFC violations implied by the lower SFPs like *le*. By adapting the phase boundary hypothesis, I will offer a head-final analysis for *di* and the sentence-final *dei* and present evidence favoring this hypothesis. Specifically, the sentence-final *dei* occurs at a phase boundary, where its complement is in a separate Spell-Out domain, thereby avoiding an FOFC violation. In contrast, *di* occurs within the same phase with VP, and object movement is employed as a strategy to rectify an FOFC violation. The observations in Zhongyuan Mandarin shed light on FOFC as an output constraint related to headedness in pronunciation. Additionally, I will explain how postverbal modality is derived in Zhongyuan Mandarin.

2.1. HEAD-FINAL PHENOMENA . Head-final phrases are not rare in Chinese. SFPs like *le* and *eryi* ‘only’ in (7) are also analyzed as head-final heads in previous studies (Erlewine 2017, 2018).

(7) Mandarin Chinese

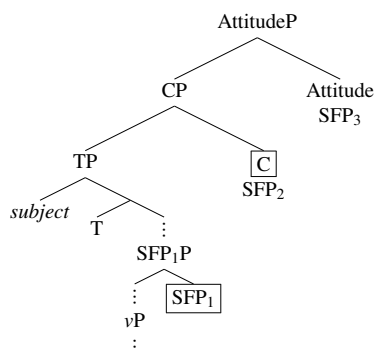
- a. Lisi qu Beijing le.  
Lisi go.to Beijing SFP  
‘Lisi went to Beijing.’
- b. Lisi kanshu eryi.  
Lisi read.book SFP  
‘Lisi only reads books.’

2.2. THE PHASE BOUNDARY HYPOTHESIS. Erlewine (2017) proposes that the lower SFPs like *le* function as a head in the extended projection of VP. The sentence-final particle *le* is analyzed as a lower SFP (SFP<sub>1</sub>) between TP and vP, compared to CP (SFP<sub>2</sub> such as clause-type markers), as shown in (8).<sup>3</sup>

---

<sup>3</sup> Erlewine (2017) analyzes SFP<sub>2</sub> as a realization of C and follows Paul (2015) by analyzing the SFP<sub>3</sub> as a realization

(8) Erlewine’s proposal: low SFPs at the lower phase edge



Erlewine summarizes three classes of Mandarin Chinese SFPs, which are also used in Zhongyuan Mandarin:

- (9) a. SFP<sub>1</sub> (low SFP): *le*, *laizhe*, *ne* (durative aspect), *eryi* (exclusive ‘only’)  
 b. SFP<sub>2</sub> (clause-type): *ma* (polar question marker), *ba* (imperative), *ne* (contrastive topic or follow-up and constituent questions)  
 c. SFP<sub>3</sub> (speaker/addressee attitude): *ou* (impatience), *a* (softening), *ei* (gentle reminder)

Previous research has assumed that all SFPs are located high in the CP periphery. However, Erlewine (2017) demonstrates that a subset of SFPs appears in a lower, clause-medial position. Erlewine (2017) motivates his claim by showing that the lower SFPs such as *le* at a clause-medial position take scope under the negation marker *bu* ‘not’, epistemic modals, quantificational subjects, and alternative question disjunction. Erlewine schematizes the Spell-Out domains in Mandarin Chinese based on Chomsky (2000, 2001):

- (10) Spell-Out domains of the Mandarin Chinese clausal spine (hierarchical):  

$$[{}_{CP} C(=SFP_2) \underbrace{[{}_{TP} T \dots [{}_{SFP_1P} SFP_1 \dots [{}_{vP} v [{}_{VP} V \dots$$

*Spell-Out domain*    *Spell-Out domain*

His proposal also aligns with the characterization of FOFC domains from Richards (2016):

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

In this interpretation of FOFC domains, SFPs can be head-final without violating FOFC as they constitute the lowest head within their Spell-Out domain.

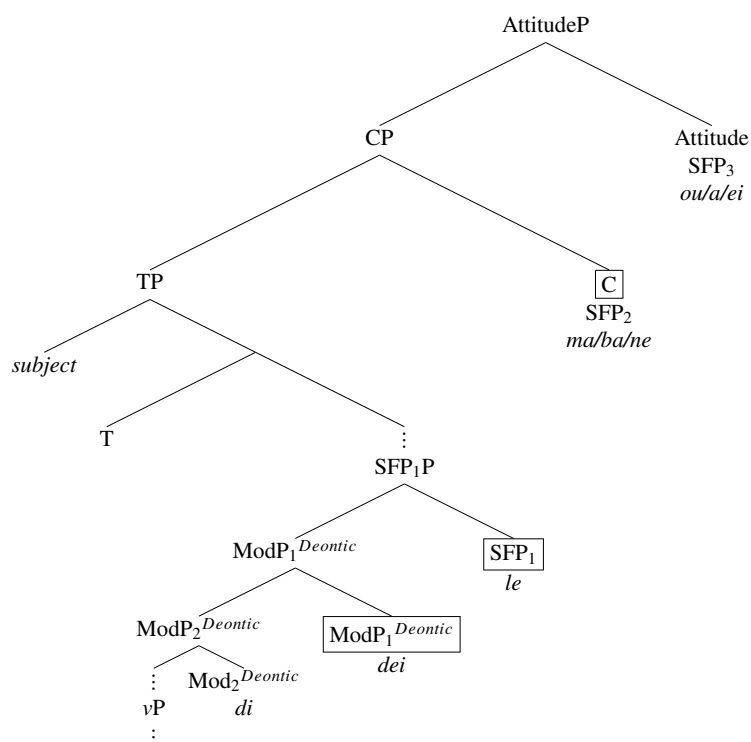
2.3. PROPOSAL AND EVIDENCE. After reviewing prior research, we are ready to dive into our investigation of Zhongyuan Mandarin. Building on the key insights of Erlewine (2017), I propose that the postverbal modal *di* does not mark a phase boundary, whereas the sentence-final *dei* does. The occurrence of *di* results in an FOFC violation, which can be repaired through object movement. In contrast, I will present evidence showing that the head-final projection of *dei* occurs at a phase boundary without violating FOFC and does not require object movement.

2.3.1. PROPOSAL. I propose that *di* projects as a head-final head positioned below the phase edge of the lower SFP *le*, as shown in (12). The lower SFP *le*, as a phase head, occupies a medial position in the structure, and projects head-finally without violating FOFC (Erlewine 2017).

---

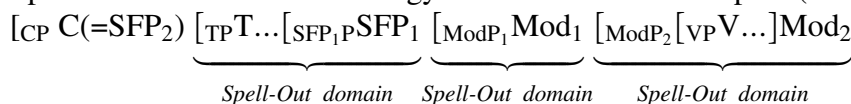
an Attitude head. The boxes in (8) indicate “phase head”.

(12) Proposed structure (adapted from Erlewine (2017))



The sentence-final *dei* (Mod<sub>1</sub>), as shown in (13), is situated at a higher position compared to *di* (Mod<sub>2</sub>). Like *le*, *dei* (Mod<sub>1</sub>) occurs at the phase boundary, but its occurrence does not cause an FOFC violation because its complement is in a separate Spell-Out domain. In contrast, *di*'s projection as a head-final head violates FOFC. *Di* (Mod<sub>2</sub>) is situated at the same Spell-Out domain as the VP, causing an FOFC violation because the head-final ModP<sub>2</sub> dominates the head-initial VP.

(13) Spell-Out domains of the Zhongyuan Mandarin clausal spine (hierarchical):



In the following section, I will present arguments for the proposal. These arguments are based on the interaction with SFPs. The semantic scope of the lower SFP *le* is higher than *di* while the sentence-final *dei* competes with *le* for the same position. The interaction with other higher SFPs indicates that the postverbal modals are situated at a lower position. Regarding the postverbal *di*, I propose that object movement can repair its violation, as evidenced by the restrictions on the object.

2.3.2. EVIDENCE FROM *DI* AND OBJECT MOVEMENT. In this section, I will present evidence regarding the SFP *le*, which is situated at a higher position compared to *di*. Following this, I will provide arguments based on observations of objects, which undergo movement and face restrictions such as definiteness.

The lower SFP *le* takes scope above the deontic modal *di* as well as the sentence-final *dei*, consistent with the pattern observed for the deontic modal *xuyao* ‘need’ by Santana-Labarge (2016), where the sentence-final particle systematically scopes over the modal *xuyao*. This par-

allel suggests that the SFP *le* occupies a position higher than deontic modals. Regarding the semantic contribution of *le*, I follow Soh (2009), as shown in (14b).

- (14) The speaker using a sentence with sentential *-le*:
- a. asserts a proposition *p* at speech time  $t_s$ ,
  - b. presupposes [ $\neg p$  before speech time  $t_s$ ],

Taking (15) as an example, the sentence with *-le* asserts that Zhangsan now needs to eat a meal. It also presupposes that Zhangsan did not need to eat a meal immediately prior.

- (15) Zhangsan chi-di-fan le.  
 Zhangsan eat-DI-meal LE  
 Asserts: ‘It is now the case that Zhangsan needs to eat a meal.’  
 Presupposes: ‘Zhangsan did not need to eat a meal in the immediate past.’

As shown in (16) and (17), based on the semantic interpretation, both *di* and the preverbal deontic *dei* exhibit a similar pattern, indicating that the phrase hosting *le* (SFP<sub>1</sub>) is higher than the phrase hosting *dei/di* (ModP).

- (16) Zhangsan chi-di fan le. LE>MUST, \*MUST>LE  
 Zhangsan eat-DI meal LE.  
 ‘It is now the case that Zhangsan needs to eat a meal.’  
 \*‘It must be the case that Zhangsan starts eating a meal.’
- (17) Zhangsan dei chi-fan le. LE>MUST, \*MUST>LE  
 Zhangsan DEI eat-meal LE.  
 ‘It is now the case that Zhangsan needs to eat a meal.’  
 \*‘It must be the case that Zhangsan starts eating a meal.’

Based on the above, the SFP *le* scopes over the deontic modals *di* and *dei*.

Object movement (O-V-DI) is an effect of head-final projection. To avoid violating FOFC, objects with the postverbal *di* must move. Preposing is a way to move objects, especially for definite objects. In (18a), the sentence with a fronted definite object can express two meanings. When the postverbal *di* expresses ‘capable’, then definite DPs must be fronted. However, with the other meaning, ‘ought to/should’, definite DPs are not necessarily fronted. In (18b), the only available reading is the deontic one.<sup>4</sup>

- (18) Zhongyuan Mandarin
- a. Lisi, Zhangsan-jia de fangzi, chai-di le.  
 Lisi Zhangsan-household POSS house demolish-DI SFP  
 Interpretation 1: ‘It is time for Lisi to demolish Zhangsan’s house.’  
 Interpretation 2: ‘Lisi has become capable of demolishing Zhangsan’s house now.’
  - b. ?Lisi chai-di Zhangsan-jia de fangzi le.  
 Lisi demolish-DI Zhangsan-household POSS house SFP  
 Interpretation 1: ‘It is time for Lisi to demolish Zhangsan’s house.’  
 Interpretation 2: \*‘Lisi can demolish Zhangsan’s house now.’

<sup>4</sup> One of the participants does not accept (18b). Other participants reported that they prefer (18a) as a way to convey deontics, even though they can get a deontic interpretation in (18b). Hence, a question marker is added in front of this sentence. For those who accept this sentence, the sentence can only be interpreted with a deontic meaning.

Unlike definite DPs, indefinite DPs cannot move to avoid FOFC violations, resulting in ungrammaticality. As shown in (19a) and (19b), indefinite DPs are incompatible with *di*, even with leftward or rightward movement. In contrast, definite DPs remain compatible with *di*, as in (19c) and (19d).

- (19) a. \*Zhangsan chi-di wu-wan-fan le.  
 Zhangsan eat-DI five-CL-rice SFP  
 Intended interpretation: ‘It is time for Zhangsan to eat five bowls of rice.’
- b. \*Zhangsan, wu-wan-fan, chi-di le.  
 Zhangsan five-CL-rice eat-DI SFP  
 Intended interpretation: ‘It is time for Zhangsan to eat five bowls of rice.’
- c. Zhangsan, na-wu-wan-fan, chi-di le.  
 Zhangsan that-five-bowl-rice eat-DI SFP  
 ‘It is time for Zhangsan to eat those five bowls of rice.’
- d. ?Zhangsan, chi-di na-wu-wan-fan le.  
 Zhangsan eat-DI that-five-bowl-rice SFP  
 ‘It is time for Zhangsan to eat those five bowls of rice.’

In Zhongyuan Mandarin, indefinite objects are compatible with transitive verbs, as shown in (20a). Indefinite objects can also occur with *dei*, as in (20b), indicating semantic compatibility. In contrast, as shown in (19a), the indefinite object is incompatible with the postverbal *di* construction. This incompatibility arises because the object must move to avoid an FOFC violation, but it cannot do so, leading to ungrammaticality as seen in (19a). This suggests that FOFC can be repaired if there is an independent mechanism to move a complement, making the head relevantly final. However, repairing an FOFC violation alone does not justify the movement. Therefore, for (19a), it is ungrammatical because, although FOFC necessitates a movement, there is no available motivation for such movement.

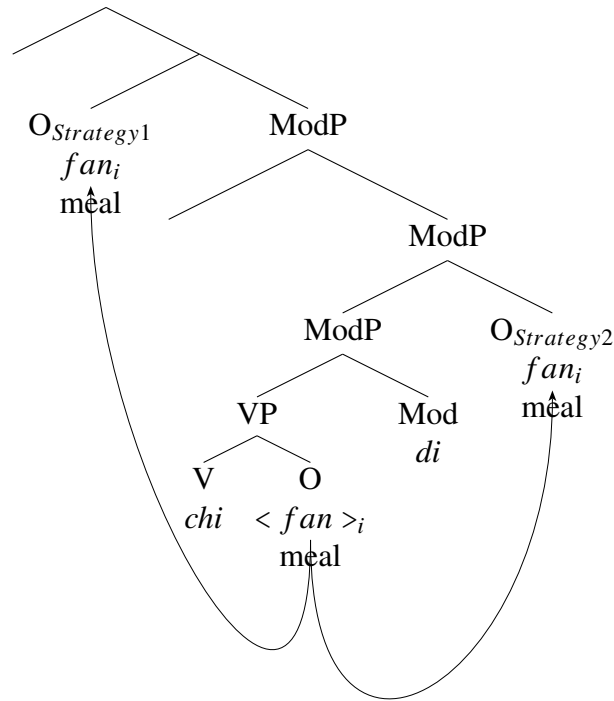
- (20) a. Zhangsan chi wu-wan-fan le.  
 Zhangsan eat five-CL-rice SFP  
 ‘Zhangsan ate five bowls of rice.’
- b. Zhangsan dei chi wu-wan-fan le.  
 Zhangsan dei eat five-CL-rice SFP  
 ‘It is time for Zhangsan to eat five bowls of rice.’



FOFC can force an independently available movement that is normally optional. Generally,

both options are possible, either through being preposed or extraposed, but if FOFC eliminates one, the other becomes obligatory. In other words, object movement is a way to repair the FOFC violation, as shown in (21). According to FOFC, a phrase that is not head-final cannot be dominated by a head-final phrase. When the object is preposed, the linear order becomes S-O-V-DI-LE, effectively circumventing the FOFC violation.

(22)



A second strategy, shown in (22) as strategy 2, involves extraposing the object to the right. This strategy is generally used for objects composed of monosyllabic words or bare nouns.<sup>5</sup> Once either strategy is adopted, the surface order will not be V-O-DI, and thus FOFC is satisfied.

While FOFC violations can be repaired through movement, such movement is generally motivated by factors other than fixing FOFC violations. For example, *wu-wan-fan* ‘five bowls of rice’ cannot be preposed nor extraposed, as in (23a) and (23b). In contrast, *zhe-wan-fan* can be preposed, as shown in (23c).

- (23) a. \*Wu-wan-fan, Zhangsan chi-di le.  
 five-CL-rice Zhangsan eat-DI SFP  
 Intended interpretation: ‘It is time for Zhangsan to eat five bowls of rice.’
- b. \*Zhangsan chi-di wu-wan-fan le.  
 Zhangsan eat-DI five-CL-rice SFP  
 Intended interpretation: ‘It is time for Zhangsan to eat five bowls of rice.’
- c. Zhe-wan-fan, Zhangsan, chi-di le.  
 This-bowl-rice Zhangsan eat-DI SFP  
 ‘It is time for Zhangsan to eat this bowl of rice.’

Object movement is restricted by the Mapping Hypothesis. According to Diesing (1992), VP forms a domain for default existential closure, and the material above VP is linked to a quantifier.

<sup>5</sup> The detailed factors determining the use of strategy 2 are left for future research.

(24) **The Mapping Hypothesis** (Diesing 1992):

Material from VP is mapped into nuclear scope. Material from IP is mapped into a restrictive clause.

In German, a definite object needs to precede an adverb, while an indefinite object can either precede or follow an adverb. According to Diesing & Jelinek (1995), if the object stays within VP, it is within the scope of existential closure; if the object scrambles out of VP, it is outside of existential closure. In either case, a well-formed interpretation is achieved. A definite DP cannot stay within the scope of existential closure. Therefore, they must be scrambled out of existential closure. Kung (1993) argues that the mapping principle also holds in Mandarin Chinese: indefinites can be treated as variables but not quantifiers. This explains why indefinite objects like ‘five bowls of meal’ cannot occur with *di*. German allows for the interpretation of indefinite objects even if they have been moved out of the VP, whereas Chinese does not.

Given the evidence presented above, object movement is required due to the head-final projection but is restricted by definiteness. Object movement provides important evidence that FOFC can be satisfied through repair, suggesting that whether a phrase is head-final or head-initial is not determined at the beginning of the derivation. Instead, it can be dynamically modified throughout the derivation, reflecting the properties of Spell-Out. In the subsequent section, I will present evidence from the sentence-final *dei* to support the hypothesis that postverbal modals in Zhongyuan Mandarin project head-finally.

	<b>Preposing</b>	<b>Extraposition</b>
Bare noun	✓ *	✓
Definite DP	✓	✓ *
Indefinites	×	×

\*Note: For monosyllabic words, extraposition is preferred. For definite DPs, preposing is favored.

Table 2. Object movement

2.3.3. EVIDENCE FROM *DEI*. This section will present evidence from the sentence-final *dei*. I propose that the sentence-final *dei*, like *di*, projects head-finally. But, it is situated at a phase edge similar to lower SFPs such as *le*.

An inconsistency in the interaction with preposed objects between the preverbal *dei* and the postverbal *dei* indicates that the sentence-final *dei* and *di* project similarly, with object movement potentially required by head-final projection. Consider the examples in (25). When *dei* occurs sentence-finally, preposing the object is optional, as in (25a) and (25b). However, preposing the object is prohibited for the preverbal *dei*, as shown in (25c) and (25d). The preverbal *dei* does not allow the object to immediately precede the verb. The sentence becomes grammatical when the object moves even further, as shown in (25e).

- (25) a. Zhangsan zhe-jian-shi shangliang dei.  
Zhangsan this-CL-matter discuss DEI  
‘Zhangsan should discuss this matter.’

- b. Zhangsan shangliang zhe-jian-shi dei.  
Zhangsan discuss this-CL-matter DEI  
'Zhangsan should discuss this matter.'
- c. Zhangsan dei shangliang zhe-jian-shi.  
Zhangsan DEI discuss this-CL-matter  
'Zhangsan should discuss this matter.'
- d. \*Zhangsan dei zhe-jian-shi shangliang.  
Zhangsan DEI this-CL-matter discuss  
'Zhangsan should discuss this matter.'
- e. Zhangsan zhe-jian-shi dei shangliang.  
Zhangsan this-CL-matter DEI discuss  
'Zhangsan should discuss this matter.'

Object movement is necessary for the occurrence of *di* while it is optional for the sentence-final *dei*. When *dei* occurs sentence-finally, the object can be preposed or remain in place, as shown in (25a) and (25b). In contrast, for the postverbal *di*, object movement is obligatory, as shown in (26).<sup>6</sup>

- (26) a. Zhangsan zhe-jian-shi shangliang-di le.  
Zhangsan this-CL-matter discuss-DI SFP  
'It is time for Zhangsan to discuss this matter.'
- b. \*/?Zhangsan shangliang-di zhe-jian-shi le.  
Zhangsan discuss-DI this-CL-matter SFP  
'It is time for Zhangsan to discuss this matter.'

The disparity in the necessity of object movement can be attributed to *dei*'s occurrence at a phase boundary. Its sentence-final projection does not cause an FOFC violation, whereas *di*'s projection does. The key difference between *dei* and *di* is that *dei* is situated at the bottom of the FOFC domain, making it exempt from the constraints that FOFC imposes. Therefore, having a VO structure underneath postverbal *dei* is not problematic, as FOFC does not require any movement in this case.

The compatibility with the SFPs like *le* differs between the sentence-final *dei* and *di*, as well as the preverbal *dei*. The sentence-final *dei* is incompatible with *le*, as shown in (27a) and (27b). In contrast, both the preverbal *dei* and *di* are compatible with *le*, as in (27c) and (27d).

- (27) a. \*/?Zhangsan bianpang le dei.  
Zhangsan getting.fat SFP DEI  
'It is possible for Zhangsan to get fat.'<sup>7</sup>
- b. \*Zhangsan bianpang dei le.  
Zhangsan getting.fat DEI SFP  
'It is possible for Zhangsan to get fat.'
- c. Zhangsan dei bianpang le.  
Zhangsan DEI getting.fat SFP  
'It is possible for Zhangsan to get fat.'

<sup>6</sup> For those who accept (26b), the sentence is marginal. My analysis for this is that the object moves but an additional movement restores the original word order, making it superficially appear as if the object does not move, even though it does. I will discuss this further in the following section.

<sup>7</sup> One of the informants accepted this sentence.

- d. Zhangsan bian-pang-di le.  
Zhangsan getting-fat-DI SFP  
'It is time for Zhangsan to get fat.'

Similarly, the sentence-final *dei* is incompatible with another SFP *eryi* 'only', as shown in (28).

- (28) a. Zhangsan bianpang dei.  
Zhangsan getting.fat DEI  
'Zhangsan should get fat.'
- b. \*Zhangsan bianpang dei eryi.  
Zhangsan getting.fat DEI only  
'It is the only case that Zhangsan should get fat.'
- c. Zhangsan bianpang eryi.  
Zhangsan getting.fat only  
'Zhangsan only gets fat.'

In contrast, the deontic modals, *di* and the preverbal *dei* are compatible with *eryi*, as shown in (29).

- (29) a. Zhangsan chi-di fan le eryi.  
Zhangsan eat-DI meal LE only.  
'It is only the case that it is time for Zhangsan to eat a meal.'
- b. Zhangsan dei chi-fan eryi.  
Zhangsan DEI eat-meal only.  
'It is only the case that Zhangsan needs to eat a meal.'

Unlike the difference in compatibility with SFP<sub>1</sub>s, sentence-final *dei*, as well as *di* and the preverbal *dei*, can occur with other higher SFPs, SFP<sub>2</sub> and SFP<sub>3</sub>. As shown in (30), sentence-final *dei* is compatible with SFP<sub>2</sub>s, such as *ba* and *ma*. *Di* and the preverbal *dei* also show a similar pattern, as shown in (31) and (32). The three modals are all compatible with SFP<sub>3</sub>, as shown in (33).

- (30) a. Zhangsan bianpang dei ba!  
Zhangsan getting.fat DEI BA  
'Zhangsan should get fat!'
- b. Zhangsan bianpang dei ma?  
Zhangsan getting.fat DEI MA  
'Should Zhangsan get fat?'
- (31) a. Zhangsan dei bianpang ba!  
Zhangsan DEI getting.fat BA  
'Zhangsan should get fat!'
- b. Zhangsan dei bianpang ma?  
Zhangsan DEI getting.fat MA  
'Should Zhangsan get fat?'
- (32) a. Zhangsan bianpang-di le ba!  
Zhangsan getting.fat-DI LE BA  
'It is time for Zhangsan to get fat!'

- b. Zhangsan bianpang-DI le ma?  
Zhangsan getting.fat-di LE MA  
'Is it time for Zhangsan to get fat?'
- (33) a. Zhangsan bianpang dei ou/a/ei.  
Zhangsan getting.fat DEI OU/A/EI  
'Zhangsan should get fat.'
- b. Zhangsan dei bianpang ou/a/ei.  
Zhangsan getting.fat DEI OU/A/EI  
'Zhangsan should get fat.'
- c. Zhangsan bianpang-di le ou/a/ei.  
Zhangsan getting.fat-DI LE OU/A/EI  
'It is time for Zhangsan to get fat.'

The sentence-final *dei* shares a property with the lower SFP *le*, both taking scope over the negator *bu*. As shown in (34a), *le* scopes over the negation marker, presupposing that Zhangsan ate meals before (Soh 2009; Erlewine 2017). Similarly, the sentence-final *dei* also takes scope above *bu*, as in (34b).

- (34) a. Zhangsan bu chi-fan le. LE>NEG, \*NEG>LE  
Zhangsan NEG eat-meal LE.  
'Zhangsan stopped eating.'  
\* 'Zhangsan did not just start eating.'
- b. Zhangsan bu chi-fan dei. DEI>NEG, \*NEG>DEI  
Zhangsan NEG eat-meal DEI.  
'Zhangsan should not eat a meal.'  
\* 'It is not the case that Zhangsan should eat a meal.'

In summary, I propose that the sentence-final *dei* behaves similarly to *le* or *eryi*, projecting as a phase head situated at the bottom of its Spell-Out domain. This explains why *dei* cannot occur with the SFP<sub>1</sub>s while *di* can. Furthermore, its compatibility with other higher SFPs, as shown in (30) and (33), indicates that the sentence-final *dei* can occur with the higher SFPs but it cannot occur with the lower SFPs situated within its phase. Essentially, *dei* and the lower SFPs compete for the same structural position and thus they cannot co-occur in the same sentence. In the following section, I will show how to derive the two postverbal modals from a syntactic perspective.

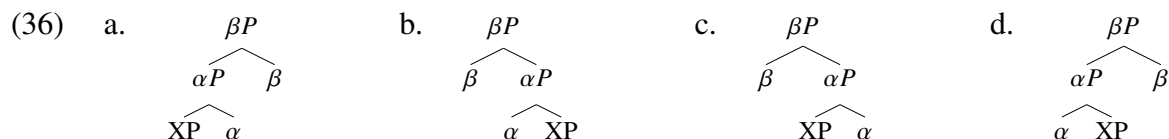
2.4. IMPLICATIONS FOR FOFC: A BROAD VIEW OF FOFC. Based on the above, I propose that FOFC is a constraint on output. The new analysis for Zhongyuan Mandarin relies on the assumption that FOFC is a constraint on the final structure, which can be resolved through derivation. In other words, object movement can remove the effect of an FOFC violation.

2.4.1. BACKGROUND. Holmberg (2000) originally proposes that there is a universal constraint on structure-building and word order, namely FOFC:

(35) **The Final-over-Final Constraint :**

If a phrase  $\alpha$  is head-initial, then the phrase  $\beta$  immediately dominating  $\alpha$  is head-initial. If  $\alpha$  is head-final,  $\beta$  can be head-final or head-initial.

FOFC predicts that head-final phrases cannot dominate head-initial phrases. Only (36d) is impossible.



The original version of FOFC was unrestricted, and later Biberauer et al. (2014) offers a revised version of FOFC. The revised version of FOFC only holds within a single extended projection:

(37) **The Final-over-Final Condition:**

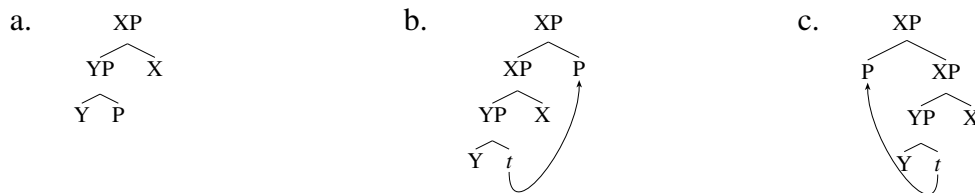
A head-final phrase  $\alpha P$  cannot dominate a head-initial phrase  $\beta P$  where  $\alpha$  and  $\beta$  are heads in the same extended projection.

The effect of FOFC has been observed in many languages. Finnish is an ideal language for demonstrating the power of FOFC. Both VO and OV orders are allowed. The auxiliary can either precede or follow the VP. But, it is not allowed to follow a head-initial VP.

The revised version of FOFC is still too strong. The previously unattested word order V-O-Aux is attested in Zhongyuan Mandarin, and the postverbal *dei* violates the revised FOFC. Furthermore, by accepting that FOFC holds only in individual Spell-Out domains as proposed by Erlewine (2017), the occurrence of postverbal modality will no longer cause an FOFC violation. These findings reveal something fundamental about the nature of FOFC.

2.4.2. POSTVERBAL MODALITY AND THE LIMITS OF FOFC. My proposal, particularly regarding the observation of object movement, presents a more dynamic view of FOFC that captures aspects not included in Biberauer et al. (2014) (BHR)'s formulation. According to BHR, FOFC is posited as a structural constraint rather than a constraint on surface word order. In BHR's model, FOFC is part of the initial construction of the structure and can't be repaired by movement. However, in Zhongyuan Mandarin, FOFC is not just about initial representation but is rather related to pronunciation, as movement can avoid an FOFC violation that would have otherwise arisen. "Head-final" means that the head is positioned at the right edge of the projection, with X being pronounced last in the XP. The headedness is concerned with pronunciation or Spell-Out rather than projection:

(38) **Movement leads to a conversion in headedness:**



(39) **The Final-over-Final Condition** (the output-constraint version):

If XP and YP are within the same Spell-Out domain, with YP as the complement of XP and XP being head-final, then YP must be head-final. If Y is pronounced last in YP, then as a head-final phrase on the surface, it can be dominated by the XP.

In the case where YP is VP, when the object is moved out of VP, the headedness is converted. In other words, once the object is moved, the head-initial VP (V) appears head-final on the surface. Regarding the occurrence of *di*, the VP with the object moved out is a head-final phrase

on the surface and thus does not cause an FOFC violation anymore. For the construction with sentence-final *dei*, the VP as a complement is in a separate domain, so its occurrence with a head-final modal will not cause an FOFC violation.

In conclusion, the dynamic version of FOFC offers us a more dynamic view of the headedness, enabling us to understand deeply the nature of FOFC. FOFC is not just about the structure derivation but about Spell-Out.

2.5. SUMMARY. Up to now, a head-final analysis has been proposed for *di* and *dei*. Building on Erlewine (2017)'s phase boundary analysis concerning the lower SFP in Mandarin Chinese, I propose that the sentence-final *dei* occurs at a phase boundary, enabling it to project head-finally without violating FOFC. As for *di*, it projects as a head-final head but is not situated at the bottom of its Spell-Out domain. Therefore, the phrase below *di* must be head-final, meaning that the head must be the last element pronounced in that phrase. Object movement can avoid an FOFC violation. Object movement provides important evidence for the constituency of the postverbal modality, whereas the preverbal *dei* does not share this property, as shown in Table 4.

	Preposing	Extraposition
Preverbal <i>dei</i>	×	×
Postverbal <i>di</i>	✓	✓
Sentence-final <i>dei</i>	✓	×

Table 3. Object movement

**3. Conclusion.** In this paper, I observed that the postverbal modal *di* conveys a deontic meaning. I offered a head-final analysis for *di* and the sentence-final *dei*. By expanding Erlewine (2017)'s analysis on SFP like *le*, I proposed that only *di* results in an FOFC violation, which can be repaired by object movement. In contrast, the sentence-final *dei* occurs at a phase edge, similar to *le*. Given that FOFC only applies within individual domains (Richards 2016), the complement of *dei* undergoes Spell-Out, allowing it to project head-finally without violating FOFC. These observations provided deeper insights into the nature of FOFC, showing that FOFC is not just a structural constraint but also a constraint on pronunciation. In the future, I will try to explain why the sentence-final *dei* tends to occur with non-monosyllabic words and whether the head-final analysis applies to other postverbal phenomena in Chinese.

## References

- Biberauer, Theresa. 2017. *The final-over-final condition: A syntactic universal* 187–296. MIT Press Cambridge, MA. <https://doi.org/10.7551/mitpress/8687.001.0001>.
- Biberauer, Theresa, Anders Holmberg & Ian Roberts. 2014. A syntactic universal and its consequences. *Linguistic Inquiry* 45(2). 169–225. [https://doi.org/10.1162/LING\\_a0153](https://doi.org/10.1162/LING_a0153).
- Chao, Yuen Ren. 1968. *A grammar of spoken chinese*. University of California Press.
- Chappell, Hilary. 2002. *The universal syntax of semantic primes in Mandarin Chinese*. John Benjamins Publishing Company. <https://doi.org/10.1075/slcs.60.12cha>.
- Cheng, Lisa L.-S. & Rint Sybesma. 2004. Postverbal ‘can’ and in Cantonese (and Hakka) and Agree. *Lingua* 114. 419–445. [https://doi.org/10.1016/S0024-3841\(03\)00067-6](https://doi.org/10.1016/S0024-3841(03)00067-6).

- Chomsky, Noam. 2000. Minimalist inquiries: The framework. In Roger Martin, David Michaels & Juan Uriagereka (eds.), *Step by step: Essays on minimalist syntax in honor of Howard Lasnik*, 89–155. Cambridge, MA: MIT Press.
- Chomsky, Noam. 2001. Derivation by phase. In Michael Kenstowicz (ed.), *Ken Hale: A life in language*, 1–52. Cambridge, MA: MIT Press.
- Chung, Jui-Yi Zoey. 2013. *Topography of the vP Periphery in Hakka*. Hsinchu, Taiwan: National Tsinghua University dissertation.
- Diesing, Molly. 1992. *Indefinites*. Cambridge: MIT Press.
- Diesing, Molly & Eloise Jelinek. 1995. Distributing arguments. *Natural Language Semantics* 3(2). 123–176. <https://doi.org/10.1007/BF01249836>.
- Erlewine, Michael Yoshitaka. 2017. Low sentence-final particiles in Mandarin Chinese and the Final-over-Final Constraint. *Journal of East Asian Linguistics* 26. 37–75. <https://doi.org/10.1007/s10831-016-9150-9>.
- Erlewine, Michael Yoshitaka. 2018. A syntactic universal in a contact language: The story of singlish already. In *Discourse particles in asian languages volume ii*, vol. 2, 91–128. Routledge.
- Holmberg, Anders. 2000. Deriving OV order in Finnish. In Peter Svenonius (ed.), *The derivation of VO and OV* (Linguistik Aktuell/Linguistics Today 31), 123–152. John Benjamins. <https://doi.org/10.1075/la.31.06hol>.
- Hu, Xuhui & Yuchen Liu. 2021. Plural events and the progressive particle in Dalad Chinese, and the final-over-over condition. *Journal of East Asian Linguistics* 30. 1–37. <https://doi.org/10.1007/s10831-020-09218-4>.
- Kung, Hui-i. 1993. *The mapping hypothesis and postverbal structures in Mandarin Chinese: The University of Wisconsin-Madison dissertation*.
- Myler, Neil. 2009. *Form, function and explanation at the syntax-morphology interface: Agreement, agglutination and post-syntactic operations*: University of Cambridge. M.Phil.dissertation.
- Paul, Waltraud. 2015. *New perspectives on Chinese syntax*. Berlin/Boston: De Gruyter. <https://doi.org/10.1515/9783110338775>.
- Richards, Norvin. 2016. *Contiguity theory*. Cambridge, Massachusetts: MIT Press. <https://doi.org/10.7551/mitpress/10542.001.0001>.
- Santana-Labarge, Robert. 2016. The grammaticalization of yao and the future cycle from Archaic Chinese to Modern Mandarin. In Elly van Gelderen (ed.), *Cyclical change continued*, vol. 395, 395–418. John Benjamins. <https://doi.org/10.1075/la.227.13lab>.
- Soh, Hooi Ling. 2009. Speakers presupposition and Mandarin Chinese sentence-final-le: A unified analysis of "change of state" and the "contrary to expectation" reading. *Natural Language & Linguistic Theory* 27. 623–657. <https://doi.org/10.1007/s11049-009-9074-4>.
- Wu, Ching-Huei Teresa. 2004. On *de/bu* and the syntactic nature of resultative verbal compounding. *Language and Linguistics* 5(1). 271–329.