Improper Verb Doubling in Mandarin Chinese and the Williams Cycle

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1. Introduction

Cross-linguistically, complement clauses can be transparent to some kinds of movement but not others. For instance, finite clausal complements in English are transparent to VP-topicalisation (1-a) but not raising-to-subject (1-b).

(1) a. **Read that novel**, Wassily said [$_{CP}$ Piet did *t*] VP-fronting out of CP ✓
b. ***Piet** seems [$_{CP}$ *t* read that novel]. Raising-to-subject out of CP ✗

A historically prominent approach to the clause-boundedness of movements like (1-b) uses the *Ban on Improper Movement* (henceforth BOIM) in (2) (e.g., Chomsky 1973, 1981, May 1979). This locality principle suffers from empirical and theoretical problems related to relying on A/Ā-positions (see relevant discussion in Keine 2016, 2019, 2020, Meadows 2024, a.o.).

(2) *Ban on Improper Movement (BOIM)*
Movement cannot proceed from an Ā-position to an A-position.

Constraints in a similar spirit have been developed without reference to A/Ā-positions. Informally these are known as the *Williams Cycle* (e.g., Williams 2003, 2011). One formulation, the *Generalised Ban on Improper Movement* (henceforth GBOIM), is given in (3), adopted from Poole (2022).

(3) *Generalised Ban on Improper Movement (GBOIM)*
Movement to [Spec,XP] cannot proceed from [Spec,YP] or across YP, where Y is higher than X in the clausal functional sequence (*fseq*).

In this paper, we present novel data from *verb doubling* (VD) constructions in Mandarin Chinese (Cheng 2017, Li & Thompson 1981, Tai 1999, a.o.), schematised in (4), which provides further support for the GBOIM. We show that cross-clausal VP-fronting to the pre-Subject position is relatively unconstrained compared to the highly restricted VP-fronting to the post-Subject position. We propose that VP-fronting targets two landing sites, and that the choice of landing sites for long-distance VP-fronting depends on the size of clausal complements. We argue that the GBOIM can account for the varying locality profile of VP-fronting, as well as give correct predictions about VD with multiple levels of clause embedding.

(4) *Schematic long-distance VP-fronting in Mandarin Chinese* Landing sites
a. (**VP**) Subj (***VP**) Pred.$_{G1}$ [$_{CP}$ . . . ~~VP~~ . . .] ✓ Subj ✗
b. (**VP**) Subj (***VP**) Pred.$_{G2}$ [$_{TP}$ . . . ~~VP~~ . . .] ✓ Subj ✗
c. (**VP**) Subj (**VP**) Pred.$_{G3}$ [$_{FP}$ . . . ~~VP~~ . . .] ✓ Subj ✓

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2. Verb doubling, predicate group, and clause size

2.1. Verb doubling as VP-fronting

There are two types of verb doubling constructions in Mandarin Chinese, exemplified in (5). (5-a) is the baseline structure without VD, where the VP *kàn nà-běn xiǎoshuō* 'read the novel' is followed by a manner adverbial *hěn kuài* 'very quickly'. In its VD counterparts, the whole VP occurs either in a post-subject/clause-medial position (5-b) or a pre-subject/clause-initial one (5-c). Interestingly, what precedes the adverbial now becomes the single lexical verb plus an obligatory verbal particle *de*, which is simply assumed as a functional head forming a constituent with adverbials (Meadows & Yan 2023, to appear).[1] Since the lexical verb occurs twice in the clause, these constructions are termed 'verb doubling'.

(5) a. Piet **kàn nà-běn xiǎoshuō** hěn kuài.
Piet read that-CL novel very quickly
'Piet reads the novel quickly.' No VD

b. Piet ***kàn*** **nà-běn xiǎoshuō** *kàn de* hěn kuài.
Piet read that-CL novel read DE very quickly
'Piet reads the novel quickly.' Post-Subj VD

c. ***Kàn*** **nà-běn xiǎoshuō** Piet *kàn de* hěn kuài.
read that-CL novel Piet read DE very quickly
'As for reading the novel, Piet reads it quickly.' Pre-Subj VD

We treat VD as movement of the lower thematic domain, minimally containing the object (Lai 2021, Meadows & Yan 2023, to appear), which we refer to as VP for simplicity.[2] Evidence in favour of phrasal movement includes (i) lexical identity effects, (ii) island effects, and (iii) reconstruction effects (Lai 2021, Meadows & Yan 2023, to appear). As given below, (6) and (7) show respectively that pre-Subj VD not only is sensitive to islandhood, but also displays Principle A and C reconstruction effects. By contrast, most traditional movement diagnostics are less informative for post-Subj VD in mono-clauses, as post-Subj VD neither is formed out of the islands, nor moves across the antecedent in binding. Nonetheless, we argue that post-Subj VD is still a consequence of VP-movement since it is subject to the lexical identity effects and other well-formedness conditions as with pre-Subj VD (see Lai (2021) for more relevant discussion).

(6) *Island effects of pre-Subj VD*

a. ***Kàn xiǎoshuō** Wassily xiǎng zhīdào [*wèishéme* Piet kàn de hěn kuài].
read novel Wassily want know why Piet read DE very quickly
Int.:'Wassily wonders why Piet reads novels quickly.' *Wh*-island + pre-Subj VD

b. ***Kàn xiǎoshuō** Wassily jùjué [Piet kàn de hěn kuài de *shuōfǎ*].
read novel Wassily reject Piet read DE very quickly DE claim.
Int.:'Wassily rejects the claim that Piet reads novels quickly.' CNP island + pre-Subj VD

(7) *Reconstruction effects of pre-Subj VD*

a. **Huà *tāzìjǐ*$_i$ de xiàoxiàng** *méi rén*$_i$ huà de hěn kuài.
draw himself DE portrait NEG people draw DE very quickly
'No one$_i$ draws the portrait of himself$_i$ quickly.' Principle A reconstruction effect

b. ***Huà *Piet*$_i$ de xiàoxiàng** *tā*$_i$ huà de hěn kuài.
draw Piet DE portrait he draw DE very quickly
*'He$_i$ draws the portrait of Piet$_i$ quickly.' Principle C reconstruction effect

[1] Several types of particles are possible in VD constructions (Cheng 2017, Li & Thompson 1981, Tai 1999), and they all appear to be involved with VoiceP-modification. We illustrate the patterns for simplicity with 'manner *de*'.

[2] Larger chunks of thematic structure including applied arguments can be moved as well. See Meadows & Yan (2023) for relevant examples.

Following the idea that external arguments in Mandarin Chinese typically occupy Spec,TP (Lin 2011),[3] we propose that there are two possible landing sites for VP, namely, a relatively lower position in the clausal spine Spec,FP, and a higher one Spec,CP. Given that the post-Subj VD seems to be information-structurally neutral compared to the pre-Subj VD, we postulate that the former is triggered by some feature [$u\mathrm{F_M}$] located in the medial clausal spine,[4]and that the latter is triggered by some left-peripheral feature [$u\mathrm{F_{LP}}$] for the sake of information structure. Moreover, we argue elsewhere (Meadows & Yan 2023, to appear) that doubling of the lexical verb reflects partial realisation of the lower VP-copy (that is, only the object contained within the VP is 'deleted' at PF), driven by linearisation requirements of local particles, i.e., *de* in (5) (cf. Cheng 2007, Lai 2021). A simple derivation of VD is schematised as follows.

(8) *Landing sites for VP-fronting & Doubling as partial copy deletion*
[$_{\mathrm{CP}}$ [**VP**$_{\text{pre-Subj}}$] [$_{\mathrm{TP}}$ [DP$_{\mathrm{Subj}}$] . . . [$_{\mathrm{FP}}$ [**VP**$_{\text{post-Subj}}$] [$_{\mathrm{VoiceP}}$ [V ~~DP~~$_{\mathrm{Obj}}$ *de*]]]]]

2.2. Improper verb doubling

In this section we show that different groups of embedding predicates give rise to different patterns of long-distance VP-fronting. Building on C.-T. J. Huang (2022)'s classification of embedding predicate types in Mandarin Chinese, we identify three kinds of embedding contexts, demonstrated by three groups of predicates.[5]The overall pattern that we will go through below is generalised in (10).

(9) *Group 1*: *fāxiàn* 'find out', *fǒurèn* 'deny', *juéde* 'feel', *rènwéi* 'think', *zhīdào* 'know'. . .
Group 2: *bī(pò)* 'force', *qiǎngpò* 'force', *quàn* 'urge, persuade', *yǐnyòu* 'lure', *zhǐdǎo* 'instruct'. . .
Group 3: *chángshì* 'try', *dǎsuan* 'intend', *jìhuà* 'plan', *juédìng* 'decide', *kāishǐ* 'begin'. . .

(10)

	Pre-Subj VD	Post-Subj VD	Embedded VD
Group 1: 'think' + [. . .]	✓	✗	✓
Group 2: 'force' + [. . .]	✓	✗	✓
Group 3: 'try' + [. . .]	✓	✓	✓

We start the discussion with Group 3 embedding predicates, represented by *chángshì* 'try' in (11). The baseline configuration (11-a) illustrates that it is possible to construct verb doubling within the embedded clause taken by a Group 3 predicate. (11-b) and (11-c) further demonstrate that cross-clausal VP-fronting can land either before or after the matrix subject (i.e., *Wassily*) in a Group 3 embedding context.

(11) a. Wassily chángshì [**kàn nà-běn xiǎoshuō** kàn de hěn kuài].
Wassily try read that-CL novel read DE very quickly
'Wassily tries to read the novel quickly.' 'try' + embedded VD ✓

b. Wassily **kàn nà-běn xiǎoshuō** chángshì [kàn de hěn kuài].
Wassily read that-CL novel try read DE very quickly
'Wassily tries to read the novel quickly.' 'try' + post-Subj VD ✓

c. **Kàn nà-běn xiǎoshuō** Wassily chángshì [kàn de hěn kuài].
read that-CL novel Wassily try read DE very quickly
'As for reading the novel, Wassily tries to read it quickly.' 'try' + pre-Subj VD ✓

[3] TP is understood as a (series of) position(s) in the middle of clausal spine where external arguments are licensed. We remain agnostic towards whether it is related to tense in Mandarin Chinese. See Lin (2011, 2015) for more discussion.
[4] A similar idea is proposed in van Urk (2024) accounting for predicate fronting in Imere. We leave open the discussion about the nature of such kind of features that trigger word order effects.
[5] C.-T. J. Huang (2022) relates the different types of predicates to finiteness. There is some overlap between his proposed types and ours groups of predicates. To be precise, C.-T. J. Huang's Type I is our Group 1, and his Type III falls into our Group 3. The actual difference lies in his Type II versus our Group 2: only those Type II predicates which are able to take a surface object plus a clausal complement (i.e., control or ECM verbs) are defined as our Group 2 predicates, and the remaining Type II ones all belong to Group 3. We leave for future study why the surface object renders the clause size different between Group 2 and 3 predicates.

The contrast with respect to long-distance VP-fronting arises once we have a closer look at the Group 2 embedding predicates, e.g., *qiǎngpò* 'force' in (12). Unlike their Group 3 counterparts seen above, Group 2 predicates take a (surface) object and a clausal complement simultaneously. As with (11-a), the baseline configuration (12-a) shows that verb doubling can be constructed within the complement clause taken by a Group 2 predicate. Though VP-fronting to the matrix-initial position is still possible (12-c) (cf. (11-c)), VP-fronting to the matrix post-Subj position (12-b) is prohibited (cf. (11-b)). Such a configuration exemplifies what we term *improper verb doubling*.

(12) a. Wassily qiǎngpò Piet [**kàn nà-běn xiǎoshuō** kàn de hěn kuài].
Wassily force Piet read that-CL novel read DE very quickly
'Wassily forces Piet to read the novel quickly.' 'force' + embedded VD ✓

b. *Wassily **kàn nà-běn xiǎoshuō** qiǎngpò Piet [kàn de hěn kuài].
Wassily read that-CL novel force Piet read DE very quickly
Int.: 'Wassily forces Piet to read the novel quickly.' 'force' + post-Subj VD ✗

c. **Kàn nà-běn xiǎoshuō** Wassily qiǎngpò Piet [kàn de hěn kuài].
read that-CL novel Wassily force Piet read DE very quickly
'As for reading the novel, Wassily forces Piet to read it quickly.' 'force' + pre-Subj VD ✓

The proper/improper VD distinction is also found in the Group 1 embedding contexts, such as *rènwéi* 'think' in (13). The baseline configuration (13-a) reveals that *rènwéi* 'think', similar to its Group 2 and 3 counterparts, can take a complement clause containing verb doubling. The position-contrast regarding the long-distance VP-fronting appears again between (13-b) and (13-c). That is, the long-distance VP-fronting is only able to target the clause-initial position (13-c) rather than the clause-medial one (13-b).

(13) a. Wassily rènwéi [Piet **kàn nà-běn xiǎoshuō** kàn de hěn kuài].
Wassily think Piet read that-CL novel read DE very quickly
'Wassily thinks that Piet reads the novel quickly.' 'think' + embedded VD ✓

b. *Wassily **kàn nà-běn xiǎoshuō** rènwéi [Piet kàn de hěn kuài].
Wassily read that-CL novel think Piet read DE very quickly
Int.: 'Wassily thinks that Piet reads the novel quickly.' 'think' + post-Subj VD ✗

c. **Kàn nà-běn xiǎoshuō** Wassily rènwéi [Piet kàn de hěn kuài].
read that-CL novel Wassily think Piet read DE very quickly
'As for reading the novel, Wassily thinks Piet reads it quickly.' 'think' + pre-Subj VD ✓

To summarise, we have shown that long-distance VP-fronting differs in targeting the two landing sites in various embedding contexts. Though it is always possible for the VP to move across the complement clause and target the matrix pre-Subj position, it becomes more restricted when the VP targets the relatively lower, post-Subj position in the matrix clausal spine, giving rise to the proper/improper VD contrast.

2.3. Three sizes of clausal complement

To capture the locality differences presented above, we rely on clausal complements varying in size. In the literature of Mandarin syntax, clause-size variation has been proposed and discussed in, for instance, Xue & McFetridge (1996, 1998), Grano (2012, 2015, 2017), and C.-T. J. Huang (2022), among many others. Along the same lines, we propose that Group 1 predicates take CP-sized complements, Group 2 TP-sized ones, and Group 3 FP-sized ones.[6]We offer two suggestive empirical arguments in this direction.

The first argument comes from the fact that Group 2&3 complements are more transparent to morphosyntactic processes, and display less temporal independence than Group 1 complements, which

[6] Throughout the discussion we use CP and TP as general terms for a bunch of functional projections in the clause-initial and clause-medial positions (in line with the spirit of Ramchand & Svenonius 2014). Clarifying the ultimate identity of these functional projections is left to future work.

arguably reflects reduced clause structure. The key patterns are concerned with the distributions of a specific aspectual marker *guò* and of a group of *before*-adverbs. As seen in (14-a) and (15-a), the aspectual marker *guò* can be attached to either the Group 2&3 embedding predicates or the lower copy of the embedded ones without altering the sentences' interpretations. However, the meanings of both examples suggest that it is the matrix predicates (i.e, *qiǎngpò* 'force' and *chángshì* 'try') that receive the perfective aspect. Thus, *guò* attached to the embedded predicates seems to be lowered from the matrix clause.

(14) *Group 2 complements: Guò-lowering possible; Embedded before-adverb impossible*

a. Wassily qiǎngpò(-*guò*) Piet [**kàn nà-běn xiǎoshuō** kàn(-*guò*) sān biàn].
Wassily force-ASP Piet read that-CL novel read-ASP three time
'Wassily has forced Piet to read the novel three times.'

b. Wassily (*zhīqián*) qiǎngpò Piet [(**zhīqián*) **kàn nà-běn xiǎoshuō** kàn-*guò* sān biàn].
Wassily before force Piet before read that-CL novel read-ASP three time
'Wassily has forced Piet to read the novel three times before.'

(15) *Group 3 complements: Guò-lowering possible; Embedded before-adverb impossible*

a. Wassily chángshì(-*guò*) [**kàn nà-běn xiǎoshuō** kàn(-*guò*) sān biàn].
Wassily try-ASP read that-CL novel read-ASP three time
'Wassily has tried to read the novel three times.'

b. Wassily (*zhīqián*) chángshì [(**zhīqián*) **kàn nà-běn xiǎoshuō** kàn-*guò* sān biàn].
Wassily before try before read that-CL novel read-ASP three time
'Wassily has tried to read the novel three times before.'

Li (1990) and C.-T. J. Huang (2022) point out that *before*-adverbs *zhīqián/cóngqián/yǐqián* can co-occur with *guò*. Assuming that *before*-adverbs mark *guò*'s base position, that they cannot co-occur within clausal complements in (14-b) and (15-b) confirms the idea that *guò* undergoes some lowering-process. We posit that *guò* in Group 2&3 complements results from postsyntactic lowering from the higher clause (cf. N. Huang 2018), and that the truncated complement is transparent to this morphosyntactic process.

(14) and (15) lead to an expectation that, if the complement clause was big enough, the lowering phenomenon would be impossible. This is borne out in (16). In (16-a), *guò* in the embedded clause cannot be interpreted as modifying the matrix predicate. In (16-b), *guò* and *before*-adverbs can co-occur within complements to Group 1 predicates. We argue that, unlike their Group 2&3 counterparts, Group 1 complements are structurally rich enough for temporal modification and aspectual marking, and that the lack of a matrix reading for *guò* from the embedded clause reflects opacity to the aspect-lowering process.

(16) *Group 1 complements: Guò-lowering impossible; Embedded before-adverb possible*

a. Wassily rènwéi [Piet **kàn nà-běn xiǎoshuō** kàn-*guò* sān biàn].
Wassily think Piet read that-CL novel read-ASP three time
'Wassily thinks that Piet has read the novel three times.'

b. Wassily rènwéi [Piet *zhīqián* **kàn nà-běn xiǎoshuō** kàn-*guò* sān biàn].
Wassily think Piet before read that-CL novel read-ASP three time
'Wassily thinks that Piet has read the novel three times before.'

The distributional patterns regarding *guò*-lowering and *before*-adverbs are summarised in (17). We make an interim proposal here that Group 1 predicates take CP-complements, whereas Group 2&3 predicates both take complements with smaller sizes (categorially denoted by '< CP').

(17)

Complement type	Cross-clausal aspect-lowering	Embedded *before*-adverb
Group 1: 'think' + [$_{CP}$ . . .]	✗	✓
Group 2: 'force' + [$_{<CP}$ . . .]	✓	✗
Group 3: 'try' + [$_{<CP}$ . . .]	✓	✗

The second argument is that Group 2&3 complements display a reduced range of, or a complete absence of, modal verbs, by comparison to their Group 1 counterparts, which also reflects reduced clause structure. Modal verbs in Mandarin Chinese display some hierarchy while co-occurring (Lai & Li 2023, Lin 2011, 2012, a.o.). The modal hierarchy that concern us in the following discussion can be roughly stated as: *epistemic* ≫ *future* ≫ *deontic*.

As illustrated in (18), all parts of the modal hierarchy can show up in the Group 1 complements. In the relevant literature, Lin (2011, 2012) and Zhang (2019) argue that epistemic modals and/or future modals may occur in finite complements. The empirical picture and previous analyses are all aligned with our proposal made in the previous section that complement clauses taken by Group 1 predicates are CP-sized.

(18) *Modal verbs in Group 1 complements*

a. Wassily rènwéi [Piet *kěnéng*^{epis} **kàn nà-běn xiǎoshuō** kàn de hěn kuài]. M_{epis}✓
Wassily think Piet may read that-CL novel read DE very quickly
'Wassily thinks that Piet may read the novel quickly.'

b. Wassily rènwéi [Piet *huì*^{fut} **kàn nà-běn xiǎoshuō** kàn de hěn kuài]. M_{fut}✓
Wassily think Piet will read that-CL novel read DE very quickly
'Wassily thinks that Piet will read the novel quickly.'

c. Wassily rènwéi [Piet *bìxū*^{deon} **kàn nà-běn xiǎoshuō** kàn de hěn kuài]. M_{deon}✓
Wassily think Piet must read that-CL novel read DE very quickly
'Wassily thinks that Piet must read the novel quickly.'

Group 2 complements in (19) show that only the lower part of the modal hierarchy is possible (19-c). We tentatively postulate that Group 2 complements are TP-sized, and that each modal realises a separate MP below TP in the *fseq* (as with Lin 2011, 2012 and Lai & Li 2023; cf. Cinque 1999 and Tsai 2015). Since there is no CP layer between the matrix predicate and its clausal complement, we argue that the selection of modals in the embedded clause might be constrained by the matrix predicate (cf. (18)).

(19) *Modal verbs in Group 2 complements*

a. *Wassily qiǎngpò Piet [*kěnéng*^{epis} **kàn nà-běn xiǎoshuō** kàn de hěn kuài]. M_{epis}✗
Wassily force Piet may read that-CL novel read DE very quickly

b. *Wassily qiǎngpò Piet [*huì*^{fut} **kàn nà-běn xiǎoshuō** kàn de hěn kuài]. M_{fut}✗
Wassily force Piet will read that-CL novel read DE very quickly

c. Wassily qiǎngpò Piet [*bìxū*^{deon} **kàn nà-běn xiǎoshuō** kàn de hěn kuài]. M_{deon}✓
Wassily force Piet must read that-CL novel read DE very quickly
'Wassily forced Piet to have to read the novel quickly.'

The examples in (20) demonstrate that Group 3 complements are incompatible with all modal verbs. This suggests that, Group 3 complements are not only non-finite clauses (which is why the selection of modals is totally conditioned by matrix verbs), but are even smaller than their Group 2 counterparts. Therefore, we postulate that Group 3 complements are FP-sized, and that FP is lower than MP in the *fseq*.

(20) *Modal verbs in Group 3 complements*

a. *Wassily chángshì [*kěnéng*^{epis} **kàn nà-běn xiǎoshuō** kàn de hěn kuài]. M_{epis}✗
Wassily try may read that-CL novel read DE very quickly

b. *Wassily chángshì [*huì*^{fut} **kàn nà-běn xiǎoshuō** kàn de hěn kuài]. M_{fut}✗
Wassily try will read that-CL novel read DE very quickly

c. *Wassily chángshì [*bìxū*^{deon} **kàn nà-běn xiǎoshuō** kàn de hěn kuài]. M_{deon}✗
Wassily try must read that-CL novel read DE very quickly

The patterns regarding the compatibility of modals and clausal complements are summarised in (21). Combined with our previous proposal that Group 1 predicates take CP-complements, we further propose that Group 2 predicates take TP-complements, and Group 3 predicates take FP-complements.

(21)

Complement type	Epistemic modal	Future modal	Deontic modal
Group 1: 'think' + [$_{CP}$ . . .]	✓	✓	✓
Group 2: 'force' + [$_{TP}$ . . .]	✗	✗	✓
Group 3: 'try' + [$_{FP}$ . . .]	✗	✗	✗

3. The Williams Cycle

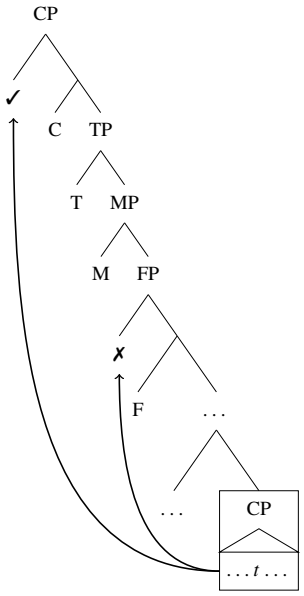
3.1. The GBOIM and its effects

A range of work (e.g. Keine 2016, 2020, Poole 2022, Williams 2003, 2011) has identified a connection between the structural height of movement and locality, namely, the *Williams Cycle*. We propose that improper verb doubling reflects a variant of the Williams Cycle, repeated below in (22).

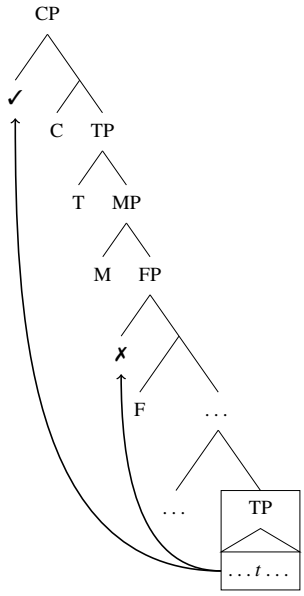
(22) *Generalised Ban on Improper Movement (GBOIM)*
Movement to [Spec,XP] cannot proceed from [Spec,YP] or across YP, where Y is higher than X in the clausal functional sequence *fseq*.

The general effect of the GBOIM is illustrated in schematic trees below. Complement clauses have to be FP-sized or smaller to permit movement out of themselves to land in Spec,FP.

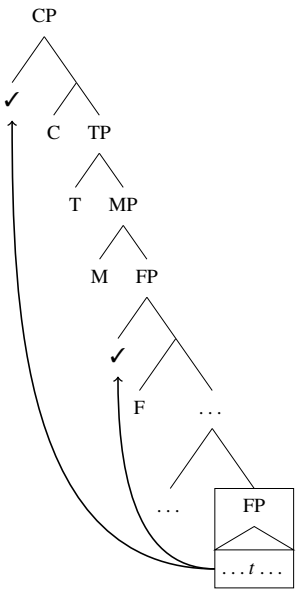
(23) *Big complement*



(24) *Medium complement*



(25) *Small complement*



Note that GBOIM does not rely on intermediate steps of movement to derive its effect, unlike the earlier BOIM. Intermediate movement through Spec,CP, is compatible with the GBOIM but we abstract way from it throughout.

3.2. Sketching a Level Embedding derivation of the GBOIM

The GBOIM is merely an output constraint on movement derivations. It is a useful stipulation that ultimately needs to be derived from appreciably fundamental aspects of how grammars operate. We offer a version of the *Level Embedding* approach pioneered by Williams (2003, 2011), and recently explored by Poole (2022) and Meadows (2024). All versions of the Level Embedding approach involves interactions

between the timing of clausal embedding and the timing of other syntactic operations. We offer a simplified exposition here (see (Meadows 2024: Ch.5) for a more worked-out version).

The first constraint (26) regulates how the clausal functional sequence is built in different workspaces. One functional sequence cannot be completed before another: they must be built in parallel. *Parallel Derivation* has a knock-on effect for clausal embedding, summarised in (27). We cannot complete CP-sized complement before we complete a CP-sized matrix clause. In order to embed a CP-sized complement, we need to wait around until a late stage of the derivation. Smaller complements will, by the same token, be embedded earlier in the derivation. The amount of 'waiting time' associated with embedding proves crucial with addition of a further constraint.[7]

(26) *Parallel Derivation*
The Merge of a component of clausal functional sequence applies in parallel across all workspaces.

(27) *Consequences of Parallel Derivation*

a. Bigger clauses are embedded later in the derivation than smaller ones.
b. *$[_{VP}$ $[_{V}$ said] $[_{CP}$ that $[_{TP}$ Piet $[_{VP}$ read that novel]]]] Illicit derivational stage!

This further constraint (28) regulates what parts of the clause featurally-driven operations can affect at a given cycle. This is essentially a version of the *Strict Cycle/Extension Condition* (Chomsky 1973, 1995).[8] FER provides a kind of one-cycle time-limit within which features can be representationally-altered or checked. Movement to Spec,FP, if it is driven by some kind of feature-checking, must happen in the cycle in which F is merged. One cannot delay doing this movement until CP/TP is present.

(28) *Featural Extension Requirement (FER)*
Movement triggers/probes (e.g. $[uF_M]$) can only be satisfied at the cycle at which they are added. Each clausal FP is introduced in its own cycle.

(29) *Consequences of the Featural Extension Requirement*

a. Movement at F-cycle: $[_{FP}$ $\mathbf{VP}_{[F_M]}$ $F_{[uF_M]}$ $[_{VoiceP}$ t]] Satisfies $[uF_M]$!
b. *Movement at later cycles: $[_{TP}$ $[_{FP}$ $\mathbf{VP}_{[F_M]}$ $F_{[uF_M]}$ $[_{VoiceP}$ t]]] Cannot satisfy $[uF_M]$!

The GBOIM arises from the interaction between the waiting-around-induced late clausal embedding, and the short time limit on checking features. Movement out of big complements lower in the functional sequence is not possible because, in waiting around for the clause to be embedded, the derivational window for feature-checking movement is possible has passed. The core logic of restrictions in VP-fronting is summarised in (30).

(30) *The source of restrictions on movement to Spec,FP in a nutshell*

a. *The effect of Parallel Derivation*:
CP/TP complements are embedded in a later cycle than when $F_{[uF_M]}$ is merged.
b. *The effect of the Featural Extension Requirement*:
By the time CP/TP complements are embedded, $[uF_M]$ on F can no longer be satisfied.

[7] A challenge for this approach is how to allow late clausal embedding without violating the Extension Requirement. Meadows (2024) assumes that it involves adjunction, i.e., first Merge not checking any features, whereas Poole (2022) employs a novel operation of Substitution alongside regular Merge.

[8] We are using the version of *Extension Requirement* (Williams 2003) explored in Meadows (2024). The advantage of this version is that non-featurally-driven movement will be exempt from the Williams Cycle effects. This may be crucial ruling in types of movement problematic for the Williams Cycle. See Poole (2022) for a version of Level Embedding which uses the Strict Cycle Condition.

4. Testing predictions: VP-fronting out of multiple layers of embedding

It follows from the GBOIM that landing in Spec,FP out of an FP-complement will not always be grammatical. Restricted cases involve movement out of bigger complement embedded in a smaller one. We correctly predict post-Subj VD to be restricted if a Group 2 Predicate is embedded under a Group 3. The relevant contrast is illustrated schematically in (31), and concretely in (32).

(31) *Group 2 embedded under Group 3: No post-Subj VD*

a. [$_{CP}$ **VP** [$_{TP}$ [$_{FP}$ [$_{VoiceP}$ try [$_{FP}$ force [$_{TP}$ . . . ~~VP~~ . . .]]]]]] Pre-Subj VD in (32-a) ✓
b. *[$_{CP}$ [$_{TP}$ [$_{FP}$ **VP** [$_{VoiceP}$ try [$_{FP}$ force [$_{TP}$ . . . ~~VP~~ . . .]]]]]] Post-Subj VD in (32-b) ✗

(32) a. **Kàn nà-běn xiǎoshuō** Wassily chángshì [$_{FP}$ qiǎngpò Piet [$_{TP}$ kàn de hěn kuài]].
read that-CL novel Wassily try force Piet read DE very quickly
'As for reading the novel, Wassily tries to force Piet to read it quickly.'

b. *Wassily **kàn nà-běn xiǎoshuō** chángshì [$_{FP}$ qiǎngpò Piet [$_{TP}$ kàn de hěn kuài]].
Wassily read that-CL novel try force Piet read DE very quickly
Int.: 'Wassily tries to force Piet to read the novel quickly.'

We make a similarly correct prediction about post-Subj VD when a Group 1 predicate is embedded under a Group 3 predicate. The contrast is illustrated schematically in (33), and concretely in (34).

(33) *Group 1 embedded under Group 3: No post-Subj VD*

a. [$_{CP}$ **VP** [$_{TP}$ [$_{FP}$ [$_{VoiceP}$ decide [$_{FP}$ believe [$_{CP}$ . . . ~~VP~~ . . .]]]]]] Pre-Subj VD in (34-a) ✓
b. *[$_{CP}$ [$_{TP}$ [$_{FP}$ **VP** [$_{VoiceP}$ decide [$_{FP}$ believe [$_{CP}$ . . . ~~VP~~ . . .]]]]]] Post-Subj VD in (34-b) ✗

(34) a. **Kàn nà-běn xiǎoshuō** Wassily juéding [$_{FP}$ xiāngxìn [$_{CP}$ Piet kàn de hěn kuài]].
read that-CL novel Wassily decide believe Piet read DE very quickly
'As for reading the novel, Wassily decides to believe that Piet reads it quickly.'

b. *Wassily **kàn nà-běn xiǎoshuō** juéding [$_{FP}$ xiāngxìn [$_{CP}$ Piet kàn de hěn kuài]].
Wassily read that-CL novel decide believe Piet read DE very quickly
Int.: 'Wassily decides to believe that Piet reads the novel quickly.'

If a Group 3 predicate is embedded under another Group 3, we do not expect restrictions since clauses are the same size. The relevant non-contrast is illustrated schematically in (35), and concretely in (36).

(35) *Group 3 embedded under Group 3: No restrictions*

a. [$_{CP}$ **VP** [$_{TP}$ [$_{FP}$ [$_{VoiceP}$ decide [$_{FP}$ try [$_{FP}$ . . . ~~VP~~ . . .]]]]]] Pre-Subj VD in (36-a) ✓
b. [$_{CP}$ [$_{TP}$ [$_{FP}$ **VP** [$_{VoiceP}$ decide [$_{FP}$ try [$_{FP}$ . . . ~~VP~~ . . .]]]]]] Post-Subj VD in (36-b) ✓

(36) a. **Kàn nà-běn xiǎoshuō** Wassily juéding [$_{FP}$ chángshì [$_{FP}$ kàn de hěn kuài]].
read that-CL novel Wassily decide try read DE very quickly
'As for reading the novel, Wassily decides to try to reads it quickly.'

b. Wassily **kàn nà-běn xiǎoshuō** juéding [$_{FP}$ chángshì [$_{FP}$ kàn de hěn kuài]].
Wassily read that-CL novel decide try read DE very quickly
'Wassily decides to try to read the novel quickly.'

These data highlight that improper verb doubling cannot be simply modelled as sensitivity of cross-clausal movement to the matrix predicate. A suitable model needs, in fact, to keep track of the path that cross-clausal movement takes. Of crucial relevance are any clause-boundaries crossed along the way. Even if movement leaves an FP-sized clause, it cannot land in Spec,FP if a clause-boundary higher in the *fseq* is crossed. The Level Embedding approach to the GBOIM is one way to keep track of this information.

5. Conclusion

The strongest arguments for some version of the Williams Cycle involve comparing instances of the same kind of movement targeting different landing sites. Although less obvious in languages like English, it looks like VP-fronting in Mandarin Chinese can land in a clause-initial or a clause-medial position. The choice of landing site clearly correlates with locality differences. Landing in the medial position is possible out of a very limited range of complement clauses, whereas landing in the initial position is essentially unrestricted. On a Williams Cycle view, the restrictions reflect the fact that movement cannot land lower than any clause boundaries crossed along the way. The complements transparent to the clause-medial VP-fronting are particularly small.

Beyond substantiating the Williams Cycle itself, the restrictions we have observed on VP-fronting raise interesting questions about the clause structure of Mandarin Chinese. Previous literature (e.g., C.-T. J. Huang 2022) has largely focused on the distinction between predicates (Group 1) taking finite complements vs. those predicates (Group 2&3) taking non-finite complements. Cross-clausal VP-fronting reveals that non-finite complements do not behave uniformly: Group 3, but not Group 2, complements are transparent to VP-fronting to the clause-medial position. We have therefore assumed that Group 2 complements are built to higher in the *fseq* than their Group 2 counterparts. This reinforces the value of movement as a diagnostic of clause structure, especially in languages lacking familiar morphosyntactic cues like agreement and complementisers.

A number of issues remain open. It is probable that movement of DPs in Mandarin has multiple landing sites, with the lower one being constrained in similar but not identical ways to clause-internal VP-fronting (see Yan (2024) for some discussion). In principle the generality of the restrictions is encouraging for the Williams Cycle. Yet puzzles remain concerning the structure of complement clauses. It is potentially surprising correlation that Group 2 predicates seem to take a matrix object and a bigger complement clause, than Group 3 predicates. Why should object control (or ECM) complements be structurally richer than subject control (or raising) complements? We leave these and other issues to future work.

References

Cheng, Lisa L.-S. 2007. Verb copying in Mandarin Chinese. In Norbert Corver & Jairo Nunes (eds.), *The copy theory of movement*, 151–174. Amsterdam: John Benjamins.

Cheng, Lisa L.-S. 2017. Verb copying. In Rint Sybesma, Wolfgang Behr, Yueguo Gu, Zev Handel, C.-T. James Huang & James Myers (eds.), *Encyclopedia of Chinese language and linguistics, Vol. 4*, 488–490. Leiden: Brill.

Chomsky, Noam. 1973. Conditions on transformation. In Stephen Anderson & Paul Kiparsky (eds.), *A festschrift for Morris Halle*, 232–286. New York: Harper & Row.

Chomsky, Noam. 1981. *Lectures on government and binding*. Dordrecht: Foris.

Chomsky, Noam. 1995. *The Minimalist Program*. Cambridge, MA: MIT Press.

Cinque, Guglielmo. 1999. *Adverbs and functional heads: A cross-linguistic perspective*. Oxford: Oxford University Press.

Grano, Thomas. 2012. *Control and restructuring at the syntax-semantics interface*. The University of Chicago dissertation.

Grano, Thomas. 2015. *Control and restructuring*. Oxford: Oxford University Press.

Grano, Thomas. 2017. Finiteness contrasts without Tense? A view from Mandarin Chinese. *Journal of East Asian Linguistics* 26. 259–299.

Huang, C.-T. James. 2022. Finiteness, opacity, and Chinese clausal architecture. In Andrew Simpson (ed.), *New explorations in Chinese theoretical syntax: Studies in honor of Yen-Hui Audrey Li*, 17–76. Amsterdam: John Benjamins.

Huang, Nick. 2018. Control complements in Mandarin Chinese: Implications for restructuring and the Chinese finitenss debate. *Journal of East Asian Linguistics* 27. 347–376.

Keine, Stefan. 2016. *Probes and their horizons*. University of Massachusetts Amherst dissertation.

Keine, Stefan. 2019. Selective opacity. *Linguistic Inquiry* 50. 13–61.

Keine, Stefan. 2020. *Probes and their horizons*. Cambridge, MA: MIT Press.

Lai, Jackie Yan-Ki. 2021. *The nature of the postverbal field in Mandarin Chinese*. The University of Chicago dissertation.

Lai, Jackie Yan-Ki & Haoming Li. 2023. Moving heads to specifiers: Evidence from Mandarin multiple pre-subject modals. *Natural Language & Linguistic Theory* 42. 247–272.

Li, Charles N. & Sandra A. Thompson. 1981. *Mandarin Chinese: A functional reference grammar*. Berkeley, CA: University of California Press.
Li, Y.-H. Audrey. 1990. *Order and constituency in Mandarin Chinese*. Dordrecht: Kluwer.
Lin, Tzong-Hong Jonah. 2011. Finiteness of clauses and raising of arguments in Mandarin Chinese. *Syntax* 14. 48–73.
Lin, Tzong-Hong Jonah. 2012. Multiple-modal constructions in Mandarin Chinese and their finiteness properties. *Journal of Linguistics* 48. 151–186.
Lin, Tzong-Hong Jonah. 2015. Tense in Mandarin Chinese sentences. *Syntax* 18. 320–342.
May, Robert. 1979. Must COMP-to-COMP movement be stipulated? *Linguistic Inquiry* 10. 719–725.
Meadows, Tom. 2024. *Size matters: Clause structure and locality constraints in Swahili relatives*. Queen Mary University of London dissertation.
Meadows, Tom & Qiuhao Charles Yan. 2023. Verb doubling in Mandarin Chinese as PF-driven lower copy pronunciation. In Tae Sik Kim & Jungu Kang (eds.), *Proceedings of the 24th Seoul International Conference on Generative Grammar*, 109–120. Seoul: Hankook Munhwasa.
Meadows, Tom & Qiuhao Charles Yan. to appear. The syntax and post-syntax of verb doubling in Mandarin Chinese. Proceedings of WCCFL41.
Poole, Ethan. 2022. Improper case. *Natural Language & Linguistic Theory* 41. 347–397.
Ramchand, Gillian & Peter Svenonius. 2014. Deriving the functional hierarchy. *Language Sciences* 46. 152–174.
Tai, James H.-Y. 1999. Verb-copying in Chinese revisited. In Yuen-mei Yin, I-li Yang & Hui-chen Chan (eds.), *Chinese language and linguistics V: Interactions in language*, 97–119. Taipei: Academia Sinica.
Tsai, Wei-Tien Dylan. 2015. On the typography of Chinese modals. In Ur Shlonsky (ed.), *Beyond functional sequence*, 275–294. Oxford: Oxford University Press.
van Urk, Coppe. 2024. Constraining predicate fronting. *Linguistic Inquiry* 55(2). 327–373.
Williams, Edwin. 2003. *Representation theory*. Cambridge, MA: MIT Press.
Williams, Edwin. 2011. *Regimes of derivation in syntax and morphology*. New York: Routledge.
Xue, Ping & Paul McFetridge. 1996. Complement structure in Chinese. In Lise M. Dobrin, Kora Singer & Lisa McNair (eds.), *CLS 32: Papers from the main session*, 409–421. Chicago, IL: Chicago Linguistic Society.
Xue, Ping & Paul McFetridge. 1998. Verb complementation, null pronominals and binding. In Emily Curtis, James Lyle & Gabriel Webster (eds.), *Proceedings of the Sixteenth West Coast Conference on Formal Linguistics*, 479–493. Stanford, CA: CSLI.
Yan, Qiuhao Charles. 2024. *On the locality profile of verb doubling in Mandarin Chinese*. Handout presented at MIT Syntax Square.
Zhang, Niina Ning. 2019. Sentence-final aspect particles as finite markers in Mandarin Chinese. *Linguistics* 57(5). 967–1023.