

Movement of quantificational heads and its scope effects

Word count: 11515

Abstract

This paper focuses on a debate that figures in the literature of head movement (HM). The semantic effects of HM are often said to be absent, an observation that appears to distinguish HM from phrasal movement and raises non-trivial concerns on the theoretical status of HM in movement theories. The primary goal of this paper is to present a novel piece of evidence for HM with semantic effects from Cantonese. Based on an in-depth investigation into the distribution of quantificational heads such as aspectual verbs and modal verbs in Cantonese, I propose that they can undergo (overt) HM to a higher position and take wide scope in the landing site. These cases constitute instances of HM with semantic effects. Additionally, the application of the proposed HM interacts with an independently motivated condition on interpretation, namely, Scope Economy. The findings of this paper further confirms that at least some instance of HM must be syntactic by nature. It also eliminates an alleged difference between HM and phrasal movement, lending support to a unified theory of movement.

Keywords: head movement, scope shifting, Scope Economy, quantificational heads, head-phrase distinction

1 Introduction

This paper focuses on a debate that figures in the literature of **Head Movement** (HM). The semantic effects of HM are often said to be absent, an observation that appears to distinguish HM from phrasal movement and raises non-trivial concerns on the theoretical status of HM in movement theories. Together with the theoretical concerns surrounding HM (see, e.g. Roberts 2011; Dékány 2018, for recent overviews), efforts have been made to dispel HM from Narrow Syntax. One way to do so is to locate HM in a component different from phrasal movement, namely, the post-syntactic/phonological component (Chomsky 2001; Boeckx and Stjepanović 2001; Schoorlemmer and Temmerman 2012; Zwart 2017). A different line of approaches is to reanalyze HM as remnant phrasal movement, so there is no HM at all (Koopman and Szabolcsi 2000; Rackowski and Travis 2000; Mahajan 2003; Müller 2004, among others).

However, the growing body of evidence for the semantic effects (particularly scope effects) of HM suggests that at least some instances of HM should retain a syntactic status (Benedicto 1998; Takahashi 2002; Han, Lidz, and Musolino 2007; Lechner 2007; Kishimoto 2007; Szabolcsi 2010, 2011; Iatridou and Zeijlstra 2013; Keine and Bhatt 2016; Matyiku 2017; Sato and Maeda 2020; Landau 2020). The debate, however, continues, since the reported evidence for semantic effects of HM is not uncontroversial. Hall (2015) and McCloskey (2016) critically point out that the those arguments may build on unmotivated assumptions, and/or may have alternative analyses (see also Shimoyama 2006; Richter and Sailer 2008; Zeijlstra 2017; Harizanov and Gribanova 2019; Blanchette and Collins 2019, for discussions on particular analyses).

The primary goal of this paper is to present a novel piece of evidence for an instance of overt HM with semantic effects from Cantonese. Based on an in-depth investigation into the distribution of quantificational heads such as aspectual verbs and modal verbs in Cantonese, I propose that they can undergo overt HM to a higher position and take scope in the landing site. These cases constitute instances of HM with semantic/scope effects. Additionally, the proposed HM interacts with an independently motivated condition on interpretation: its application is constrained by Scope Economy (Fox 2000).

The findings in this paper further confirm the syntactic status of HM in the grammar. Additionally, that HM can impose semantic effects eliminates one of the alleged differences between HM and phrasal movement (e.g. Chomsky 2001; Schoorlemmer and Temmerman 2012; Hall 2015; McCloskey 2016), suggesting that there is no strict correspondence between semantic effects and the head-phrase distinction in movement theories. Furthermore, the observation that HM is constrained by an interface condition that is originally proposed to constrain phrasal movement (i.e. Quantifier Raising) provides new evidence for the claim that the computational system of natural languages does not discriminate HM from phrasal movement. This is in line with recent efforts in unifying head and phrasal movement (Vicente 2007; Hartman 2011; Funakoshi 2014; Harizanov 2019; Pesetsky 2020; Lee 2021).

The rest of the paper consists of seven sections, organized as follows. §2 overviews the debate of the semantic effects of HM in recent years. §3 documents the distribution of quantificational heads in Cantonese, drawing a connection between the high position of these heads and quantificational elements. §4 presents the proposal, where I argue that quantificational heads can undergo head movement and this movement is constrained by Scope Economy. §5 argues against some alternatives to a head movement account. §6 addresses the question why the proposed HM does not generally apply to all heads. §7 discusses some predictions and cross-linguistic variations on HM. §8 concludes.

2 The debate on the scope effects of HM

This section briefly traces the debate on the semantic effects of HM in recent years. While various arguments have been presented against a general non-syntactic approach to HM, existing evidence that HM can impose semantic effects remains controversial. Central to the debate are quantificational heads like determiners, modal verbs, aspectual verbs and negation. The following list summarizes some recent proposals arguing for the semantic effects of HM in particular reference to the above quantificational heads.¹

(1) Different proposed HM with semantic effects

1. I set aside two studies, namely, Benedicto (1998) and Keine and Bhatt (2016) who discuss movement of ordinary (non-quantificational) verbs that affect interpretation, but see Hall (2015) and McCloskey (2016) for discussions.

- a. *Determiner raising*: Japanese split QP (where the *wh*-expressions occur at a distance with the associating determiner) is argued to be derived via overt raising of the universal determiner *-mo* (Takahashi 2002).
- b. *Negation raising*: In Japanese and Korean, negation moves on its own or together with the verb to a higher position that allow the negation to take scope over the object (Han, Lidz, and Musolino 2007; Kishimoto 2007; Sato and Maeda 2020)
- c. *Negative auxiliary inversion*: In African American English, Appalachian English, West Texas English, the negation can be fronted over the (quantificational) subject, resulting in wide scope reading of negation (Foreman 1999; Matyiku 2017)
- d. *Modal covert movement*: In English, possibility modals (i.e. *can*) move covertly over the negative universal quantifiers to derive a split scope reading (Lechner 2007)
- e. *Modal overt movement over negation*: A subset of modals (i.e. positive polarity modals like *must* in English) moves over negation to escape negative scope (Iatridou and Zeijlstra 2013)
- f. *Fronting of aspectual verbs*: In Shupamem (and potentially Dutch), aspectual verbs like ‘begin’ can be fronted over the subject and takes scope over it (Szabolcsi 2010, 2011)

However, these proposals are not uncontroversial. For many cases above, alternative analyses to a head movement account have been suggested (Shimoyama 2006; Richter and Sailer 2008; Hall 2015; McCloskey 2016; Zeijlstra 2017; Harizanov and Gribanova 2019; Blanchette and Collins 2019). For space reasons, I cannot review all these arguments, but I briefly summarize the case concerning fronting of aspectual verbs which will be central to the following discussion in Cantonese. Szabolcsi (2010, 2011) reports that in Shupamem (Bantu, SVO), aspectual verbs like ‘begin’ can be optionally fronted over the (quantificational) subject and takes scope in the derived position. (2a) is the baseline example where *yeshe* ‘begin’ is in the low position. Crucially, it raises over the subject in (2b) and scopes over ‘only’. Both sentences convey an unambiguous surface scope reading.

(2) Aspectual verbs in Shupamem (Szabolcsi 2010, p.38)

- a. Ndùù Maria ka **yeshe** inget ndàà li?. 'only' > 'begin'
 only Maria past begin have.inf good roles
 'Only Mary is such that she began to get good roles'
- b. A ka **yeshe** ndùù Maria inget ndàà li?. 'begin' > 'only'
 it-FOCUS past begin only Maria inf.have good roles
 'It began to be the case that only Mary is getting good roles'

McCloskey (2016) suggests that if, following Szabolcsi, aspectual verbs are quantifiers over time variables, then we expect to see the same scope effects with heads that involve quantification over world variables, e.g. modals, which, as he suggests, has not been documented so far.² This concern also applies to proposals on modals which consistently exclude a comparison with aspectual verbs. Against this much background, I now turn to Cantonese, where both aspectual verbs and (a subset set of) modals, as I argue, can undergo scope-shifting HM.

3 The distribution of aspectual verbs and modals in Cantonese

This section presents the basic data concerning the distribution of aspectual verbs and modals in Cantonese. §3.1 focuses on the availability of the pre-subject (i.e. high) position of these verbs, in comparison to other embedding/clause-taking predicates. I show that the former can occupy the high position under certain environments. §3.2 discusses additional positions that are available to aspectual verbs and modals. I establish a distributional correlation between quantificational elements and these verbs.

3.1 The (pre-subject) high position

Let us start with the aspectual verb *hoici* 'begin' in Cantonese. It canonically appears after the subject (i.e. the low position), not before it (i.e. the high position), as shown in the contrast in (3).

2. In fact, Szabolcsi (2011, p.21) gives one example of the modal counterpart in Shupamem.

- (3) a. Aaming **hoici** haau-dou hou singzik
 Aaming begin get-able good result
 ‘Aaming begins to get good results.’
- b. ***hoici** Aaming haau-dou hou singzik
 begin Aaming get-able good result

However, the high position for *hoici* ‘begin’ is not strictly impossible. Observe that if the subject is marked with *dak* ‘only’, then *hoici* ‘begin’ can appear in either the high or low position.

- (4) a. dak Aaming **hoici** haau-dou hou singzik (‘only’ > ‘begin’ / *‘begin’ > ‘only’)
 only Aaming begin get-able good result
 ‘Only Aaming is such that he begins to get good results.’
- b. **hoici** dak Aaming haau-dou hou singzik (*‘only’ > ‘begin’ / ‘begin’ > ‘only’)
 begin only Aaming get-able good result
 ‘It begins to be the case that only Aaming is getting good results.’

Notably, the position of *hoici* ‘begin’ indicates different scope relations with ‘only’. In (4a), *hoici* ‘begin’ unambiguously takes scope below ‘only’, whereas in (4b) it unambiguously scope above ‘only’. Here, it is instructive to see how these scope readings are truth-conditionally independent of each other. Consider the following two scenarios in Table 1 that concerns exam results in a class of three (building on Szabolcsi (2010, 2011)).

Who is getting good results...			
Scenario 1		Scenario 2	
Test 1	Test 2	Test 1	Test 2
Aaming: 40	Aaming: 100	Aaming: 100	Aaming: 100
Bill: 40	Bill: 40	Bill: 40	Bill: 40
Chris: 100	Chris: 100	Chris: 100	Chris: 40
→ (4a) only Aaming > begin		→ (4b) begin > only Aaming	

Table 1: Two scenarios of exam results in a class of three

In Scenario 1, among all students, Aaming is the only student who obtains an improved result in Test

2, while other students are doing as good/bad as before. This scenario is true under (4a), i.e. only Aaming is such that he begins to get good results, but not under (4b). In Scenario 2, on the other hand, Aaming performs as good as before in Test 2. However, Chris, who was doing great in Test 1, performs not so well in Test 2. This renders Aaming being the only person who obtain good results in the class. This scenario is true under (4b), i.e. it begins to be the case that only Aaming is getting good results, but not (4a). The sentences in (4) are thus not only unambiguous but also truth-conditionally distinct.

Extending the discussion to other aspectual verbs and modal verbs, we observe the same pattern with *gaizuk* ‘continue’ in (5) and *hoji* ‘may’ and *wui* ‘will’ in (6). Notably, the high position is available if the subject is marked with *dak* ‘only’. Note that the examples are given in embedded contexts to show that the distribution is insensitive to root/embedded environments. Note further that these verbs unambiguously take surface scope, as indicated in the English translation.

(5) The aspectual verb *gaizuk* ‘continue’

- a. ngo tenggong [(dak) Hoenggong **gaizuk** paai tau sapwai]
 I hear only Hong.Kong continue rank initial tenth
 ‘I heard that (only) HK is such that she continues to rank among the first tenth.’
- b. ngo tenggon [**gaizuk** *(dak) Hoenggong paai tau sapwai]
 I hear continue only Hong.Kong rank initial tenth
 ‘I heard that it continues to be the case that (only) HK ranks among the first tenth.’

(6) The deontic modal *hoji* ‘may’ and the future modal *wui* ‘will’

- a. ngo deoi [(dak) Aaming { **hoji/ wui** } zou fan] mou jigin
 I to only Aaming may/ will early sleep not.have opinion
 ‘I have no opinion on (the claim that) (only) Aaming may/will sleep early.’

- b. ngo deoi [{ **hoji/ wui** } *(dak) Aaming zou fan] mou jigin
 I to may/ will only Aaming early sleep not.have opinion
 ‘I have no opinion on (the claim that) it is allowed/it will be the case that (only) Aaming sleeps early.’

When it comes to other embedding predicates, however, the pre-subject position strictly disallows, no matter the subject is associated with *dak* ‘only’ or not. Examples in (7) involve control predicates and those in (8) dynamic modals.

(7) Control predicates: *soengsi* ‘try’ and *kyutding* ‘decide’

- a. (dak) Aaming { **soengsi/ kyutding** } tai ni-bun syu
 only Aaming try/ decide read this-CL book
 ‘Only Aaming tries to/ decides to read this book.’
- b. *{ **soengsi/ kyutding** } (dak) Aaming tai ni-bun syu
 try/ decide only Aaming read this-CL book

(8) Dynamic modals: *nanggaau* ‘be.able’ and *gaam* ‘dare’

- a. (dak) Aaming { **sik/ gaam** } tai ni-bun syu
 only Aaming be.able/ dare read this-CL book
 ‘Only Aaming is able/ dare to read this book.’
- b. *{ **sik/ gaam** } (dak) Aaming tai ni-bun syu
 be.able/ dare only Aaming read this-CL book

To sum up, two issues are raised in this subsection: (i) what licenses the pre-subject positions of aspectual verbs and deontic/future modals; (ii) what distinguishes them from control verbs and dynamic modals.³ I further look into (i) in the next subsection and propose a movement analysis in §4. I return to (ii) in §6.

3. It is worth mentioning that epistemic modals show a different pattern in that the pre-subject position is *always* available, independent of the presence of *dak* ‘only’. I postpone the discussion of epistemic modals to §6.2.

3.2 Quantificational elements and the high position

This subsection reports additional properties of the distribution on aspectual verbs and deontic/future modals. The upshot is that whether these verbs can occupy a high position depends on the nature of the constituent that immediately follow this position. Precisely, the high position is licensed if the relevant constituent is *quantificational*. This basically describes the data in §3.1 where the presence/absence of the quantificational element *dak* ‘only’ is crucial to licensing the high position.

In what follows, it is further shown that (i) the relevant constituent is not confined to subjects, but may take various forms, ranging from topics to adverbials and clauses and; (ii) the licensing elements can be quantificational elements other than *dak* ‘only’. The general pattern is schematized below, where XP ranges over different constituents.

(9) The high position licensed by the (immediately) following quantificational element

a. ^{OK} **Asp./Mod.** [XP_[+quantificational]] ...

b. * **Asp./Mod.** [XP_[-quantificational]] ...

First, let us start with the subject position with different quantificational elements. The high position of *gaizuk* ‘ccontinue’ is licensed if the subject is a quantifier (10a), as opposed to a pronoun (10b). Note that if the high position is licensed, *gaizuk* ‘continue’ takes scope there. (11) makes the same point with countering quantifiers and *wh*-expressions.

(10) Group denoting quantifiers vs. pronouns in the subject position⁴

gaizuk	[_{SUBJ}	a. ^{OK} jau	jat-go	jan/	b. *keoi]	___	haau-dou	hou	singzik
continue		have	one-CL	person	he		get-able	good	result

‘It continues to be the case that one person/ he is getting good results.’

4. The underline in the examples indicates the canonical position of the high aspectual verbs or modals. The same applies to all subsequent examples.

(11) Countering quantifiers and *wh*-expressions in the subject position

- hoji** [_{SUBJ} a. zuido saam-go jan/ b. geido jan] __ lai hoiwui
 may at.most three-CL person how.many person come meeting
 a. 'It is allowed that at most three people come to the meeting.'
 b. Lit.: 'It is allowed that how many people come to the meeting?'

Second, a similar contrast is observed in the topic position. Aspectual verbs and modals are allowed to occupy the position higher than the topic if the topic is quantificational, but not if it is, for example, a definite expression.⁵

(12) Universal quantifiers vs. definite NPs in the topic position

- hoici** [_{TOP} a. ^{OK}cyunbou jan/ b. *ni-go jan] Aaming (dou) __ hou jansoeng
 begin every person this-CL person Aaming all very praise
 'It begins to be the case that Aaming praises everyone/ this person.'

Third, locative/frame-setting adverbials can occur above the subject. The high position of *hoici* 'begin' (i.e. the position above the locative/frame-setting adverbial) is allowed if the adverbial is quantificational.

(13) Quantificational vs. non-quantificational adverbs

- hoici** [_{ADV} a. ^{OK}hai mui-gaan hokhaau/ b. ??hai ngodei hokhaau] Aaming (dou) __
 begin at every-CL school at our school Aaming all
 haau-dou hou singzik
 get-able good result

'It begins to be the case that, at every/ our school(s), Aaming is getting good results.'

Additionally, the contrast is also revealed in subordinate clauses. The sentences in (14) contrast a quantificational 'whenever'-clause with a non-quantificational 'although'-clause. Only the former licenses the high position of *hoici* 'begin'. It conveys a meaning that is different from a low reading.⁶

5. Note that *dou* 'all' is strongly preferred in the presence of universal quantifiers.

6. The two sentences are not given in strict minimal pairs because *faanhai* 'whenever' favours a non-episodic sentence, whereas *seojjin* an episodic one.

(14) 'Whenever'-clauses vs. 'although'-clauses

- a. **hoici** [_{CP} faanhai daa-fung] hoimin dou ___ wui jau daailong
 begin whenever approach-typhoon sea all will have big.waves
 'It begins to be the case that whenever typhoons approach, there'll be big waves on the sea.'
 cf. the low reading: 'Whenever typhoons approach, there begin to be big waves on the sea.'
- b. ***hoici** [_{CP} seojin mou daa-fung] hoimin dou ___ jau daailong
 begin although not approach-typhoon sea all have big.waves
 Int.: 'It begins to be the case that although no typhoon is approaching, there are (still) big waves on the sea.'

If there is more than one quantificational element in the sentence, there are multiple possible landing sites for *hoici*, delivering different scope readings.

(15) Quantificational adverbs and subjects (a. 'begin' > 'every' > 'most' / b. 'every' > 'begin' > 'most')

- a. **hoici** [_{ADV} hai mui-gaan hokhaau] b. **hoici** [_{SUBJ} daaiboufan jan] dou ___
 begin at every-CL- school begin most person all
 haau-dou hou singzik
 get-able good result
- a. 'It begins to be the case that, at every school, most people are getting good results.'
 b. 'At every school, it begins to be the case that most people are getting good results.'

Based on these observations, the distribution of aspectual verbs and deontic/future modals in Cantonese can be stated as follows:

(16) Generalization on the high position of aspectual verbs and deontic/future modals

A high position of aspectual verbs and deontic/future modals is licensed if the constituent that immediately follows this position is quantificational.

4 A head movement account

In this section, I propose that the high position of aspectual verbs and deontic/future modals is derived via head movement (§4.1). Importantly, the application of this head movement is constrained by an interface condition, namely, Scope Economy (Fox 2000), which dictates that the movement must impose scope effects. These two ingredients adequately derive the generalization in (16). I discuss the landing site and trigger of the proposed HM in §4.2 and provide additional evidence for the proposed HM in §4.3.

4.1 Head Movement and Scope Economy

Before I detail the proposal, I assume that aspectual verbs and deontic/future modals are *raising* predicates (for the former, see D. Perlmutter 1968; D. M. Perlmutter 1970; Li 1990; for the latter, see Lin and Tang 1995; Bhatt 1998; Wurmbrand 1999). The surface subject of these verbs are not thematically selected; instead, it is raised from within the ν P, given the predicate-internal subject hypothesis (e.g. Koopman and Sportiche 1991).⁷ Schematically,

(17) The basic structure of sentences with aspectual verbs and deontic/future modals

[_{TP} subject_i **Asp./Mod.** [_{ν P} t_i verb object]]

As the first ingredient, I suggest that the Asp./Mod. heads can undergo movement to a position higher than the subject. The relevant examples from (4) is repeated below.


- (18) a. dak Aaming **hoici** haau-dou hou singzik ('only' > 'begin' / *'begin' > only)
only Aaming begin get-able good result
'Only Aaming is such that he begins to get good results.'
- b. **hoici** dak Aaming haau-dou hou singzik (*'only' > 'begin' / 'begin' > 'only')
begin only Aaming get-able good result
'It begins to be the case that only Aaming is getting good results.'

7. The precise position of these verbs is not crucial to the proposal. It can be a T head, Aspect head or a Modal head or any projections between TP and ν P.

Specifically, I suggest that (18b) is derived from (18a), where *hoici* ‘begin’ moves to a higher position and takes scope over ‘only’, illustrated with English glosses below. Crucially, the movement extends the scope possibility of *hoici* ‘begin’ such that it can scope above *dak* ‘only’, a reading that is otherwise unavailable.

(19) Deriving (18b) from (18a) under a HM approach

begin [_{TP} only Aaming_i ____ [_{vP} *t*_i get-good-result]] *scope enrichment*



Secondly, and importantly, I propose that this movement is constrained by Scope Economy (Fox 2000), in a similar way as other scope-shifting operations.

(20) Scope Economy (Fox 2000)

Scope-shifting operations must have a semantic effect.

This constraint is crucial in explaining why HM fails to apply in (3b), where the subject is non-quantificaitonal, i.e. a proper name. In such case, the movement of *hoici* ‘begin’ fails to shift scope relations, and thus violates Scope Economy. (21) illustrates this idea.

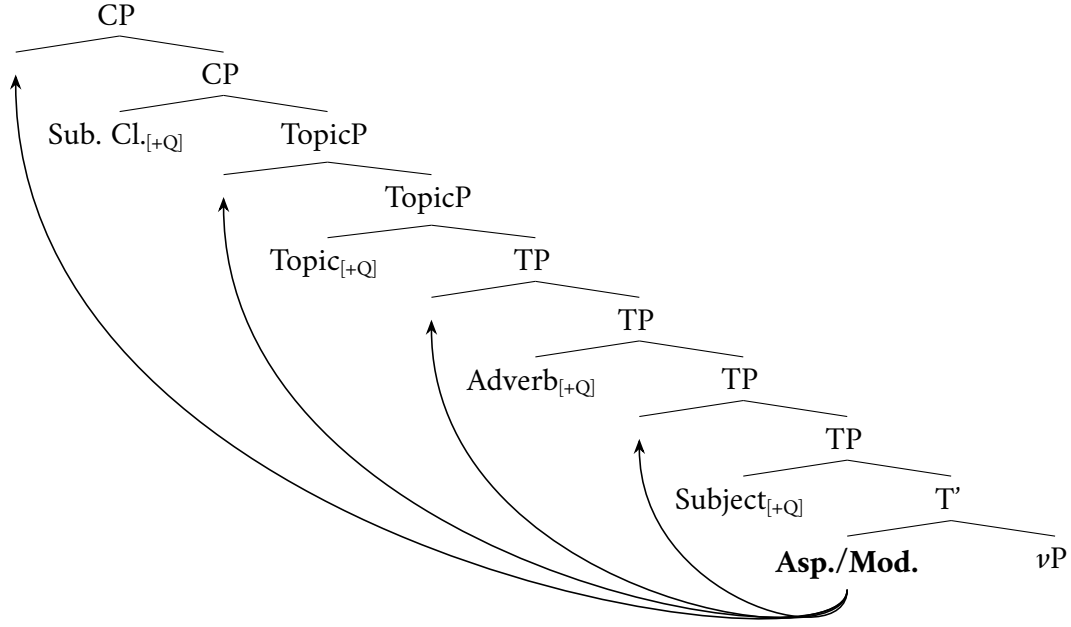
(21) Attempted derivation of (3b) from (3a) under a HM approach

begin [_{TP} Aaming_i ____ [_{vP} *t*_i get-good-result]] *vacuous movement*



Following this line of reasoning, the generalization in (16) receives a straightforward explanation: the movement of quantificational heads to a high position is only licensed by a quantificational element along its movement path, such that the movement shifts the relative scope (in adherence to Scope Economy). The relevant quantificational element along the path can be a subject, a topic, an adverbial or a subordinate clause. A graphic representation of this idea is given below:

(22) A graphic representation of the proposed HM

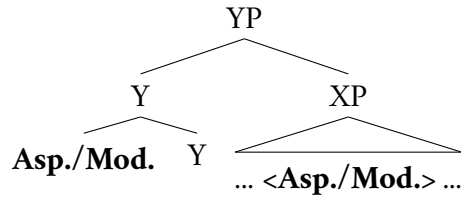


4.2 The landing site and the trigger of the proposed HM

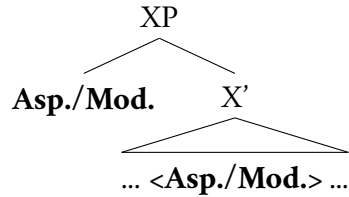
4.2.1 The landing site

Within the rich literature on HM, almost all logically possible landing sites have been proposed. (23) illustrates (with *hoici* ‘begin’) four independently motivated possibilities for the landing site, namely, (i) a head-adjoined position, (ii) a specifier position, (iii) a derived head position and, (iv) a phrase-adjoined position, illustrated with *hoici* as follows, respectively. (23a) is achieved via head-head adjunction (Baker 1988, *et seq.*) and (23b) is achieved via head-spec movement (Matushansky 2006; Vicente 2007; Harizanov 2019). (23c) is achieved via reprojection of heads (Fanselow 2003; Donati 2006; Surányi 2008; Georgi and Müller 2010). Lastly, (23d) represents a less conventional but logically possible option, where the head is adjoined to a phrase (cf. *Internal Pair-Merge*, Richards 2009).

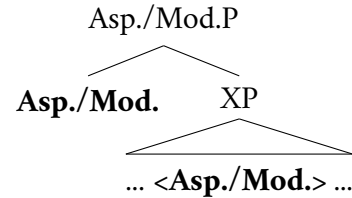
(23) a. A head-adjoined position



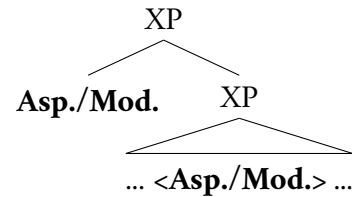
b. A specifier position



c. A derived head position



d. A phrase-adjoined position



One crucial criteria of the landing site is that it must allow the moving head to take scope over other quantificational elements. This immediately posits a challenge to the head-head adjunction approach in (23a). If the moving head is adjoined to another head, then it cannot c-command the quantificational element in the XP, unless we further assume that the scope property of the moving head “percolates” to the higher segment of Y such that it can take scope there. No such assumption is needed in the other three options.

On the other hand, the other three options allow the moving head to c-command the complement XP. To the extent that these options do not differ substantially in structural terms, I do not further distinguish them. I will, however, tentatively adopt the last option, and treat the landing site of the proposed HM in the way comparable to other scope-shifting operation such as Quantifier Raising (May 1977, 1985).

4.2.2 The trigger

As for the trigger of the proposed HM, I argue that there is no clear featural trigger of the movement. I suggest instead that movement is not feature-driven, but is driven by scope considerations.

While discourse/A'-features are often held responsible for predicate fronting, e.g. Cheng and Vicente 2013; Hein 2018; Harizanov 2019), it is unlikely the same can be said to the proposed HM.

Sentences involving a moving heads are felicitous in out-of-the-blue contexts and ‘what happened?’ contexts. To see an example:

(24) An out-of-the-blue/ ‘what happened’ context

a. faatsaang me si aa3?

happen what thing SFP

‘What happened?’

b. **hoici** dak Aaming haau-dou hou singzik

=(18b)

begin only Aaming get-able good result

‘It begins to be the case that only Aaming is getting good results.’

In light of the lack of the clear trigger of the proposed HM, together with its optionality, a natural suggestion is that the HM is in fact not driven by syntactic features, but by scope considerations, in a way similar to Quantifier Raising (May 1977; 1985; Fox 2000; Bobaljik and Wurmbrand 2012, i.a.). Supporting evidence comes from the lack of reconstruction effects of the proposed HM. Recall that sentences like (24b) above unambiguously convey a wide scope reading of the moving head, indicating the absence of reconstruction effects. This contrasts with typical (feature-driven) A’-movement which optionally reconstructs. I suggest that the absence of reconstruction effects receives a straightforward explanation if it is triggered by scope considerations. Particularly, if a movement is triggered in order to shift scope relations, reconstruction of such movement would essentially “undo”/neutralize the scope effects. Consequently, the movement becomes semantically vacuous, which unavoidably violates Scope Economy. A non-feature-driven approach to the proposed HM naturally captures the lack of reconstruction effects without further assumptions, which at the same time derives the optional nature of the proposed HM.

Furthermore, as a conceptual argument, I would like to suggest that there is a close link between operations that obey Scope Economy and the absence of a corresponding featural trigger. It is worth noting that Scope Economy appears to be a specific constraint on scope-shifting operations (Fox 2000), i.e., it does not constrain feature-driven movements. The dichotomy between scope-shifting

operations and feature-driven movements follows if we assume with Chomsky (2000, p.109) that no syntactic operation is vacuous (see also Reinhart 1995; Fox 2000; Chomsky 2001; Miyagawa 2006, 2011).

(25) Operations can apply only if they have an effect on the outcome.

Accordingly, a movement operation must either check features or alter scope relations so as to obey (25). If a movement operation obeys Scope Economy, it indicates that, unless it alters scope relations, it cannot otherwise have an effect on the outcome. It follows that movements constrained by Scope Economy necessarily lack a corresponding featureal trigger, otherwise they would not be constrained by Scope Economy.

4.3 Further evidence

In the previous section, I proposed an instance of head movement that is an overt scope-shifting operation. It is triggered by scope considerations and is subject to Scope Economy. In this subsection, I discuss further evidence for this HM.

4.3.1 Stacking of quantificational heads in the high position

The current proposal predicts that the proposed HM can apply recursively. Concretely, it predicts that the movement of one quantificational head would license the movement of another quantificational head, resulting in stacking of quantificational heads in the high position. This prediction is borne out. Observe that *hoici* ‘begin’ and *hoji* ‘may’ can co-occur in the (post-subject) low positions in (26a). Since the subject is quantificational, movement of both *hoici* ‘begin’ and *hoji* to a higher position would be in accordance to Scope Economy. As (26b) shows, both can move to the high position and both take scope above *dak* ‘only’.

(26) Stacking aspectual verbs and deontic modals

- a. dak Aaming **hoici hoji** zou fan (‘only’ > ‘begin’ > ‘may’)
 only Aaming begin may early sleep
 ‘Aaming begins to be allowed to sleep early.’
- b. **hoici hoji** dak Aaming __ __ zou fan (‘begin’ > ‘may’ > ‘only’)
 begin may only Aaming early sleep
 ‘It begins to be the case that it is allowed that only Aaming sleeps early.’

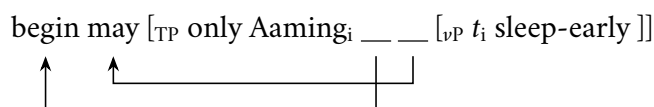
To see an additional examples with a different set of quantificational heads and in a different order (i.e. modals > aspectual verbs), consider (27).

(27) Stacking future modals and aspectual verbs

- a. ngo gokdak dak gupiu **wui gaizuk** sing (‘only’ > ‘will’ > ‘continue’)
 I think only stock will continue rise
 ‘I think that only stock (prices) will continue to rise.’
- b. ngo gokdak **wui gaizuk** dak gupiu __ __ sing (‘will’ > ‘continue’ > ‘only’)
 I think will continue only stock rise
 ‘I think that it will continue to be the case that only stock (prices) rise.’

Under the current proposal, the derivation of (26b), for instance, involves two steps, namely, the movement of *hoji* ‘may’, followed by the movement of *hoici* ‘begin’, illustrated below:

(28) A two-step derivation of (26b)



Note that the two dependencies would be a nested one instead of a crossed one, if ‘begin’ base generates at a position below ‘may’. The precise base generation position of these verbs does not bear on the proposal here.

4.3.2 Shortest Move

In addition to Scope Economy, the proposed HM is also subject to a common locality constraint on movement, namely, *Shortest Move*. Let us consider a configuration where there are a quantificational subject and a non-quantificational adverbial in a sentence with a potentially moving head.

(29) A configuration showing possible landing sites under Scope Economy

② [_{TP} Adverbial_[-Q] ① [_{TP} Subject_[+Q] **Asp./Mod.** [_{VP} ...]]]

In case of HM, it has been shown that the position right above the quantificational subject (=①) is a possible landing site in adherence to Scope Economy. Importantly, the position right above the non-quantificational adverbial (=②) should be another possible landing site, since the moving heads can take wide scope from there over the quantificational subject from there as well. This movement step should be sanctioned by Scope Economy in principle. This, however, is not the case:⁸

(30) A non-quantificational adverbial and a quantificational subject

② ***hoici** [_{ADV} hai ngodei hokhaau] ① **hoici** [_{SUBJ} daaiboufan jan] dou __ haau-dou
begin at our school begin most person all get-able
hou singzik
good result

‘At our school, it begins to be the case that, most people are getting good results.’

The unavailability of the high position suggests that the movement of *hoici* cannot be longer/higher than it needs to for scope shifting. It must land *right* above the quantificational subject, but not the non-quantificational adverbial. Such restriction does not fall out from Scope Economy. I suggest that this follows from a version of Shortest Move:⁹

(31) Shortest (scope-shifting) Move

A scope-shifting operation must move a quantifier to the closest position in which *it shifts scope*.

As such, (31) dictates that the position ① in (30) is the only possible landing site that delivers the wide

8. The high position is available if the adverbial is quantificational, as shown in (15).

9. Indeed, this version of Shortest Move ensures adherence to Scope Economy and thus Scope Economy can be said to be evaluated in a derivational way (cf. Fox 2000; Cecchetto 2004).

‘begin’-scope, as it is the *closest* position.¹⁰ I take this as further evidence for a movement approach to the high position of quantificational heads.

4.3.3 Movement out of coordinate structures

One further evidence comes from Across-the-Board (ATB) movement out of coordinate structures. In Cantonese, disjunctive scope is marked by *m-hai ... zauhai ...* ‘either ... or ...’. In (32), the two disjuncts are sentential and both contain the aspectual verb *hoici* ‘begin’.

- (32) *Scenario: It is heard that either Aaming or Aafan has done some serious study recently. The speaker guesses:*

m-hai Aaming **hoici** haau-dak hou, *zauhai* Aafan **hoici** haau-dak hou
 either Aaming begin get-RESULT good, or Aafan begin get-RESULT good
 ‘Either Aaming begins to perform well, or Aafan begins to perform well.’

Importantly, it is possible for ‘begin’ to occupy a high position above the disjunctive scope, as in (33). The relative scope of ‘begin’ is shifted and the sentence is true under a different scenario. Note that it is not true under the scenario in (32).

- (33) *Scenario: In past exams, either Aaming or Aafan or Chris got good results. Recently, Chris is distracted from study, and now either Aaming is getting good results, or Aafan is getting good results.*

hoici *m-hai* Aaming __ haau-dak hou, *zauhai* Aafan __ haau-dak hou
 begin either Aaming get-RESULT good, or Aafan get-RESULT good
 ‘It begins to be the case that either Aaming performs well, or Aafan performs well.’

Assuming that disjunction is also a quantificational element, and that ATB-movement is attested in Chinese (e.g. Pan 2011). I suggest that the proposed HM can also apply in a ATB-fashion and the high *hoici* ‘begin’ in (33) is derived as follows:

10. This also explains why the landing site of the moving quantificational heads must be *immediately* followed by a quantificational element (as stated in (16)), as it is the closest position.

(34) A simplified representation of the derivation of (33)

begin [[CP₁ *either Aaming* ___ ...] [CP₂ *or Aafan* ___ ...]]

4.4 A remark on movement out of islands

While island sensitivity is often used to diagnose movement operations, qualification is needed in the case of the proposed HM. In order to determine whether the proposed HM is sensitive to syntactic islands, the configuration of interest are given below. Note that the subjects in both matrix and embedded must be quantificational to license the proposed HM.

(35) Island intervention

Baseline: S V [_{Complex NP} S **Asp./Mod.** VP }

Target: **Asp./Mod.** S V [_{Complex NP} S VP }

The following sentences illustrate these configurations with ‘begin’.

- (36) a. dak Aaming zung soengseon [_{NP} [go-go dou **hoici** haau-dak hou] ge siusik]
only Aaming still believe CL-CL all begin get-able good GE rumor
‘Only Aaming still believes the rumor that everyone begins to perform well.’
- b. **hoici** dak Aaming zung soengseon [_{NP} [go-go dou haau-dak hou] ge siusik]
begin only Aaming still believe CL-CL all get-able good GE rumor
‘It begins that only Aaming still believes the rumor that everyone performs well.’

On the surface, (36b) appear to suggest that the proposed HM is insensitive to islands, if *hoici* ‘begin’ is base generated as indicated in the baseline sentence. Schematically:

(37) A possible parse for sentences in (36)

begin_i S V [_{Complex NP} S t_i VP }

However, it is important to note that there is an alternative parse, where ‘begin’ does not originate from the complex NP and (36) can be derived via clause-internal HM. I therefore suggest that

sentences in (36) are uninformative to the locality constraints imposed on the proposed HM.

(38) An alternative parse for sentences in (36)

begin_i S t_i V [Complex NP S VP }

In order to rule out the base generation position in the matrix clause, we can adopt a matrix verb that is (semantically) incompatible with *hoici* ‘begin’. One such verb is the hearsay verb *tengman* ‘hear’:

(39) *dak Aaming **hoici** tengman [_{NP} [go-go dou haau-dak hou] ge siusik
 only Aaming begin hear CL-CL all get-able good GE rumor
 ‘Only Aaming begins to hear (the rumor) that everyone performs well.’

When we replace the verb *soengseon* ‘believe’ in (36b) with *tengman* ‘hear’, we force the high *hoici* ‘begin’ to have a base position in the complex NP. As shown in (40), the high position is not available. This follows from a violation of the complex NP constraint.

(40) ***hoici** dak Aaming tengman [_{NP} [go-go dou haau-dak hou] ge siusik]
 begin only Aaming hear CL-CL all get-able good GE rumor
 ‘It begins that only Aaming still believes the rumor that everyone performs well.’

However, it should be noted that (40) is only *suggestive* to the island sensitivity of the proposed HM. It does not *necessarily* support this conclusion. This is because (40) can be ruled out by the fact that *tengman* ‘hear’ cannot be embedded/take scope below ‘begin’ in the same way as (39).

5 Against alternative analyses to a head movement account

In this section, I argue against three alternative analyses to the proposed HM account. These alternatives include (i) a non-movement approach, (ii) a (subject) lowering approach and (iii) a remnant VP movement approach.

5.1 Multiple base generation positions

A non-movement approach might suggest that the high and low positions of aspectual verbs and deontic/future modals are not derivationally related; instead, these elements can be merged directly in the high or low positions (i.e. they are adjunct-like elements). Recall the basic paradigm discussed in §3.1:

(41) A simplified representation of the sentences in (3) and (4)

- a. Aaming > **begin** > VP cf. (3a)
- b. ***Begin** > Aaming > VP cf. (3b)
- c. Only Aaming > **begin** > VP cf. (4a)
- d. **Begin** > Only Aaming > VP cf. (4b)

A multiple base position approach captures the admissible cases in (41a, c, d). In order to rule out cases like (41b), this approach requires additional constraint like “the high base position is only available when the following constituent is quantificational”.

At least two issues arise with this approach. First, the constraint on the high position appears to be a re-statement of the generalization in (16), or we must stipulate a base-position version of Scope Economy, which dictates “do not merge high unless you take wider scope there”. Such a constraint on base position is, as far as I know, rarely heard of and does not immediately follow from some general principle of the grammar, e.g. it is unclear why a low position would be more economical than a high one (cf. no movement is more economical than movement).


Second, this approach must *look ahead* to determine the timing of adjunction of the relevant heads. This is because if there is a quantificational element that is going to be merged, these heads must “wait” until then. In other words, the timing of adjunction of these heads must be based on the result of this look-ahead operation. On the contrary, a head movement account coupled with Scope Economy does not give rise to similar look-ahead issues. I therefore reject a multiple base generation approach.

5.2 A lowering approach

Another alternative is what I call a “lowering” approach, where aspectual verbs and modals do not move at all; instead, the surface word order and the scope effects are due to an “lowering” operation of the subject, e.g. Quantifier Lowering (May 1977, 1985). I demonstrate the idea with the sentence in (4b/18b).

(42) Deriving (4b) from (4a) under a subject lowering approach

[_{TP} __ begin [_{VP} **only Aaming** get-good-result]] *subject lowering*



Notably, Scope Economy would prevent “lowering” of non-quantificational elements, since it would not alter scope relations. Accordingly, sentences like (3b) are ruled out because the subject (i.e. a proper name) is not quantificational.

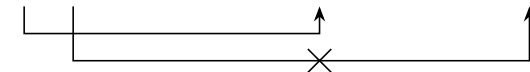
Setting aside the theoretical legitimacy of such lowering operation, this approach is empirically challenged by cases involving elements other than subjects. To see an example with a (quantificational) topic below, modified from (12a),

(43) **hoici** [_{TOP} cyunbou jan] [_{SUBJ} Aaming] dou hou jansoeng (‘begin’ > every)
begin every person Aaming all very praise
‘It begins to be the case that Aaming praises everyone.’

Under a lowering approach, to achieve the word order in (43), both the topic and the subject have to be lowered to a position below *hoici* ‘begin’. An attempted derivation is given in (44):

(44) An attempted derivation of (12a) under a subject lowering approach

__ __ begin [_{TOP} **every person**] [_{SUBJ} **Aaming**] [_{VP} appreciate ...]



Importantly, while the lowering of the quantificational topic is possible (i.e. it alters scope relations with ‘begin’), the lowering of the non-quantificational subject violates Scope Economy. If subject

lowering were allowed in (44), it would be unclear why then (3b) is disallowed.¹¹ I conclude that a lowering approach is untenable.

5.3 A remnant movement approach

One famous alternative to HM suggests that the proposed HM could indeed be remnant VP movement in disguise (den Besten and Webelhuth 1990; Koopman and Szabolcsi 2000; Mahajan 2003, among many others). The idea is that, before VP movement, all other elements except the verb are extracted from the VP. Accordingly, the remnant VP contains just a verb, and when it moves, it appears that the verb is moving on its own, but in fact it is a phrasal movement.

Implementing this idea on (4b/18b), illustrated with English glosses below, the complement of *hoici* ‘begin’ has to be extracted to a higher position first, indicated in the step in (45b). Subsequently, ν P1 containing only the verb is fronted, as in (45c).

(45) Deriving (4b from (4a) under a remnant movement approach

- a. Base structure:

[_{TP} only Aaming [_{ν P1} begin [_{ν P2} get-good-result]]]

- b. Fronting of the complement of ‘begin’, i.e. ν P2:

[_{TP} only Aaming [_{ν P2} get-good-result] [_{ν P1} begin $t_{\nu P2}$]]

- c. Remnant phrasal movement of ν P1:

[_{ν P1} begin $t_{\nu P2}$] [_{TP} only Aaming [_{ν P2} get-good-result] $t_{\nu P1}$]

There are, however, two issues with this approach. First, the legitimacy of fronting ν P2 in (45b) must be stipulated, since this intermediate step does not form an acceptable sentence, as shown in (46). In other words, its application is dependent on the subsequent ν P1 movement, which is unclear why.

11. Similar issues arise with examples involving quantificational adverbials and subordinate clauses discussed in §3.2.

- (46) *dak Aaming [_{νP2} haau-dou hou singzik] **hoici**
 only Aaming get-able good result begin
 ‘Only Aaming is such that he begins to get good results.’

Secondly, and crucially, while this approach derives the desirable word order, it does not deliver the relevant scope facts. According to the structure in (45c), ‘begin’ is “buried” in $\nu P1$, and it does not c-command ‘only’. A surface scope reading would require some non-standard scope-taking mechanism or redefinition of the notion of c-command. Even if ‘begin’ could take scope from there, it is expected that the sentence should be scopally ambiguous, since νP fronting reconstructs (cf. Huang 1993). However, ‘begin’ is unambiguously taking wide scope. As such, it is unlikely that phrasal movement is at play here; instead, a head movement account straightforwardly accounts for both the surface word order and the wide scope reading of ‘begin’.

6 The semantic types of heads

I suggested in §3.1 that only a subset of heads can occupy the high positions, namely, aspectual verbs and deontic/future modals. One remaining question is: what differentiates them from other verbs like control verbs and dynamic modals? I first discuss how the scope effects of the proposed HM is achieved compositionally in §6.1. Then in §6.2 I suggest that the proposed HM is additionally constrained by type considerations, which disallow movement of heads that are not of appropriate type.

6.1 Heads that are generalized quantifiers

I propose that aspectual verbs are generalized quantifiers over times (of type $\langle i, t \rangle, t \rangle$) (cf. Szabolcsi 2010, 2011) and deontic/future modals are generalized quantifiers over worlds (of type $\langle s, t \rangle, t \rangle$) (cf. Matushansky 2006; Iatridou and Zeijlstra 2013). I suggest that both of them head a functional projection above νP that is designated for the introduction of time and world parameters, respectively. Crucially, their movement leaves a trace of a lower type (i.e. a time/world variable) in a similar way as phrasal quantifiers (of type $\langle e, t \rangle, t \rangle$) that leaves behind an individual type trace in case of movement.

In what follows, I illustrate these ideas with the aspectual verb *hoici* ‘begin’. I assume basic compositional rules in Heim and Kratzer (1998). First of all, the (simplified) lexical semantics of *hoici* ‘begin’ can be stated as below. It basically indicates that there exist two time intervals t' and t'' and t' precedes a contextually determined time variable, presumably the speech time, which precedes t'' . A proposition P is false at (the earlier) time t' but it is true at (the later) time t'' .

(47) The lexical entry of *hoici* ‘begin’

$$\llbracket hoici \rrbracket = \lambda P_{\langle i, t \rangle}. \exists t' \exists t'' [t' < t^* \leq t'' \wedge \neg P(t') \wedge P(t'')]$$

(where t^* is a time variable whose value is contextually determined)

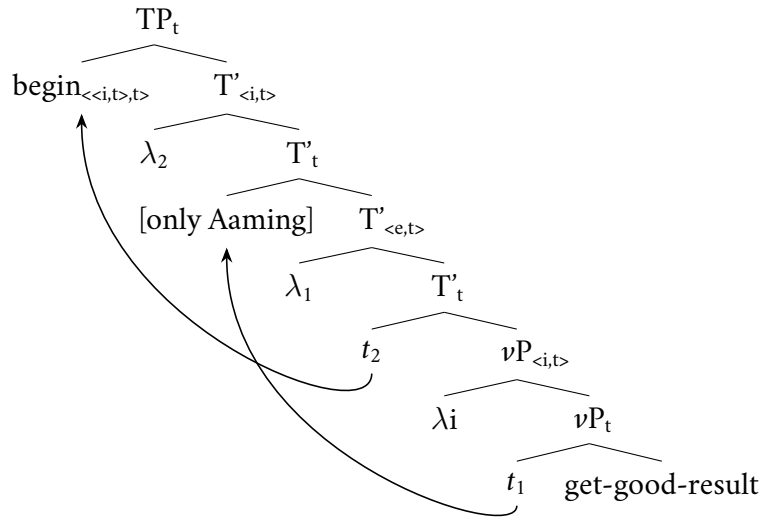
A demonstration with the sentence in (4b), repeated in (48a), is given below, where *hoici* ‘begin’ takes scope in its derived position over *dak* ‘only’ in the subject position. Note that I assume that the standard subject movement from the specifier of νP to the specifier of TP for Case reasons (cf. Li 1990, see also discussions in §4.1).

(48) a. **hoici** dak Aaming haau-dou hou singzik =(4b)

begin only Aaming get-able good result

‘It begins to be the case that only Aaming is getting good results.’

b. A compositional analysis of (4b)



c. The semantics of (48b)

$$\llbracket (48b) \rrbracket = \exists t' \exists t'' [t' < t^* \leq t'' \wedge [\neg \text{only Aaming } \lambda x. \text{get-good-result}(x)(t')]]$$

$$\wedge [\text{only Aaming } \lambda x. \text{get-good-result}(x)(t'')]]$$

When *hoici* moves, crucially, it leaves behind a trace (i.e. t_2), which is a time variable of type i .¹² *Hoici* lands at a position right above the subject and takes scope there, delivering the meaning in (48c). Similar can be said to deontic/future modals, with the only difference being the semantic types, i.e. world variables in replacement of time variables (see also Iatridou and Zeijlstra 2013).

It should be noted that Szabolcsi (2011) discusses an alternative type for aspectual verbs, where they are of modifier type $\langle\langle i, t \rangle, \langle i, t \rangle\rangle$. It is a possible option, but must come with additional assumptions on its trace. It cannot be a low type trace (a time variable), as it would lead to a potential type mismatch issue when the modifier type *hoici* ‘begin’ takes scope in the derived position: it returns a function $\langle i, t \rangle$ instead of a truth value. Different solutions have been suggested in the literature. For example, the movement may be an instance of trace-less movement or the trace is deleted at LF (Cable 2010; Stepanov 2012; Matyiku 2017). Alternatively, the aspectual verbs are type-lifted in case of movement (Matyiku 2017) or they undergo function composition with a type-lifted tense operator (Szabolcsi 2011).

To the extent that modals are more commonly identified as generalized quantifiers than modifier, I adopt a uniform analysis on both aspectual verbs and modals. But the precise choice between generalized quantifier types and modifier types does not bear on the proposal. In principle, the proposed HM can target heads that are of either type (see further discussion in §6.2).

6.2 Semantic types and head movement

In §3.1, it is observed that the pre-subject high position is not available to control verbs and dynamic modals. In other words, these verbs fail to undergo the HM proposed for aspectual verbs and deontic/future modals. Note that in addition to dynamic modals, control verbs like *try* are also said to involve quantificational meaning (over the speaker’s intention, see Grano 2017), so it is not the quantificational nature that distinguishes the two groups. I suggest that it is the *semantic types* that differentiates the former from the latter.

12. If *hoici* does not move, it takes scope at the position above νP but below the subject in Spec TP.

While aspectual verbs and deontic/future modals take only one complement (i.e. functions from sets of propositions to truth values), control verbs and dynamic modals take two, namely, a clausal complement and an external argument. As such, they are functions from sets of proposition to functions from entity to truth value, i.e. of type $\langle\langle s,t \rangle, \langle e,t \rangle\rangle$. I suggest that the reason why they cannot undergo the proposed HM is that there is no possible type of their trace that is free of problem. For example, if their corresponding trace is of an individual type (e.g. a time variable or a world variable), type mismatch is unavoidable. Other higher type traces could not avoid the type mismatch either.

In order to guarantee successful composition, the only possible type of the trace would be the same type of the moving head, i.e., $\langle\langle s,t \rangle, \langle e,t \rangle\rangle$. If this is the case, the moving head, however, would fail to take scope in its derived position; it is (semantically) reconstructed back to its base position. Their movement would then fail to shift scope and violate Scope Economy.¹³ Therefore, control verbs and dynamic verbs fail to undergo the proposed HM because they have a semantic type substantially different from aspectual verbs and deontic/future modals, and their movement would either lead to compositional conflicts or violation of Scope Economy.

Interestingly, this explanation leads us to a predication on movement of control verbs and dynamic modals. If the movement of these heads are triggered not by scope considerations, but by some syntactic feature, their movement should be allowed. This is because their trace can be of the same type, i.e. the movement can reconstruct without violating Scope Economy. This prediction is borne out. In Cantonese, it is argued that a verb can be fronted (with doubling) to deliver a topic reading (49a) or it can move on its own to the end of the sentence to escape focus interpretation (49b) (Cheng and Vicente 2013; Lee 2017, 2021).

13. Unlike modifier types, it appears to be technically impossible to ensure a wide scope reading of control verbs/dynamic modals and compositionality at the same time. For example, type-lifting the moving heads would lead to a higher type $\langle\langle\langle s,t \rangle, \langle e,t \rangle\rangle, \langle\langle s,t \rangle, \langle e,t \rangle\rangle\rangle$ in the derived position, but then it would lack the relevant arguments for further composition. Assuming trace-less movement or LF deletion of traces would not help either since the composition would crash at the base position.

- (49) a. Verb doubling in topicalization (Cheng and Vicente 2013)
soengsi, Aaming hai soeng **soengsi** tai ni-bun syu... control verbs
 try Aaming FOC want try read this-CL book
 ‘As for (whether he wants to) try, Aaming wants to try to read this book...’
- b. Right dislocation of verbs (Lee 2017)
 Aaming __ tai ni-bun syu gaa3 **sik** dynamic modals
 Aaming read this-CL book SFP be.able
 ‘Aaming is able to read this book.’

These observations suggest that it is not that control verbs and dynamic modals can never move. They can move, if reconstruction does not lead to any violation of the grammar. The fact that they cannot undergo the proposed movement is due to their reconstruction would violate Scope Economy.

Here, I return to an issue concerning epistemic modals mentioned in fn.3. Epistemic modals such as *honang* ‘be.possible’ can freely appear before or after the subject, regardless the subject being quantificational or non-quantificational.

(50) Epistemic modals and the pre-subject position

- a. (dak) Aaming **honang** haau-dou hou singzik
 only Aaming be.possible get-able good results
 ‘(Only) Aaming is possible to get good results.’
- b. **honang** (dak) Aaming haau-dou hou singzik
 be.possible only Aaming get-able good result
 ‘It is possible that (only) Aaming gets good results.’

At first glance, the distribution of epistemic modals appears to speak against the current proposal as the pre-subject position in (50b) is not regulated by Scope Economy, i.e. epistemic modals appears to be immune from Scope Economy. I suggest, following Lin and Tang (1995), that epistemic modals and deontic modals should be distinguished in terms of their syntactic distribution. One possibility suggested in Tsai (2015) is that epistemic modals are adverbs and can have multiple base generations

positions. Hence, no movement is involved at all in (50b).¹⁴ This suggestion is corroborated by the distribution of sentential negation, which also can have multiple base generation positions. Similar to epistemic modals, it is immune to Scope Economy.

(51) Sentential negation and the pre-subject position

- a. (dak) Aaming **m-hai** haau-dou hou singzik
only Aaming NOT get-able good results
‘(Only) Aaming didn’t get good results.’
- b. **m-hai** (dak) Aaming haau-dou hou singzik
NOT only Aaming get-able good result
‘It is not the case that (only) Aaming gets good results.’

Taking stock, the discussion in this subsection shows that in addition to being quantificational, the semantic types of the heads play a crucial role in determining what can undergo the proposed HM. Specifically, the proposed HM only applies to heads that are of generalized quantifier types or modifier types. This correctly rules in aspectual verbs and deontic/future modals, but rules out control verbs and dynamic modals. While epistemic modals and negation pattern with the former group, they have multiple base generation positions and hence irrelevant to the proposed HM (and Scope Economy).

7 Predictions and variations

In this final section, I explore some further issues on the proposed HM and semantic types and HM in §7.1 and compare instances of HM that have different triggers in §7.2.

14. See Lin (2011) for a different treatment of epistemic modals, which are said to be different from deontic modals in that they take a finite complement. Under this view, (50b) would be taken to be the base structure where the post-modal subject is already in a Case position (hence no need of movement). It is (50a) that is derived via an optional movement operation (e.g. topicalization), which is not subject to Scope Economy. This suggestion is also consistent with the observations here.

7.1 More on elements of modifier types

While I have focused on elements that are of generalized quantifier type, I suggested that (quantificational) elements that are of modifier types are in principle movable, as long as their movement obeys Scope Economy. It is expected to see, at least in some cases, that they undergo HM in a similar way to aspectual verbs and deontic/future modals. The relevant elements include adverbials (of type $\langle\langle\alpha,t\rangle,\langle\alpha,t\rangle\rangle$) and negation (of type $\langle t,t\rangle$). In what follows, I focus on elements of modifier types with a fixed base generation position.

Li and Thompson (1981) observe that adverbs in Mandarin can be divided into two groups, *movable* adverbs and *non-movable* adverbs. The descriptive term “movable” is used to indicate whether the adverbs can have multiple base generation positions (such that on the surface they seem to be able to move around the subject/topic). It is the non-movable ones that are relevant to the discussion here. This observation in Mandarin applies to Cantonese as well. For example, the adverb *jau* ‘again’ canonically appear after the subject.

(52) “Non-movable” post-subject adverbs

- a. Aaming **jau** haau-dou hou singzik
Aaming again straight get-able good
‘Aaming gets good results again.’
- b. ??**jau** Aaming haau-dou hou singzik
again Aaming get-able good results
‘Aaming gets good results again.’

Importantly, *jau* ‘again’ can occupy the pre-subject position if the subject is quantificational. Notably, it takes wide scope over ‘only one person’ in the derived position in (53b).

(53) “Non-movable” adverbs occupying the pre-subject position

- a. dak jat-go jan **jau** haau-dou hou singzik
 only one-CL person again straight get-able good
 ‘Only one person got good results again.’
- b. **jau** dak jat-go jan haau-dou hou singzik
 again only one-CL person get-able good results
 ‘It is again the case that only one person got good results.’

The distribution of *jau* ‘again’ follows immediately from the proposed movement account, and the high position is constrained by Scope Economy.

To see more examples, the high position of adverbs like *jatzik* ‘straight/always’ and *battyun* ‘continuously’ is constrained in a similar way. The (b) sentences below show that the presence of the quantificational elements (i.e. subjects) is crucial to the high position.

- (54) a. {zisiu saam-go jan/ Aaming} **jatzik** haau-dou hou singzik
 at.least three-CL person Aaming straight get-able good result
 ‘At least three people/ Aaming always got good results.’
- b. **jatzik** {zisiu saam-go jan/ ??Aaming} haau-dou hou singzik
 straight at.least three-CL person Aaming get-able good result
 ‘It is always that at least three people/ Aaming got good results.’
- (55) a. {zisiu saam-go jan/ Aaming} **battyun** haau-dou hou singzik
 at.least three-CL person Aaming continuously get-able good result
 ‘At least three people/ Aaming always got good results.’
- b. **battyun** {zisiu saam-go jan/ ??Aaming} haau-dou hou singzik
 continuously at.least three-CL person Aaming get-able good result
 ‘It is always that at least three people/ Aaming got good results.’

It is instructive to note that the head/phrase status of these adverbs do not affect the argument

here, as long as they are of modifier type (e.g. <<i,t>,<i,t>>). If they are phrases, then it represents the phrasal counterpart of the proposed HM, which in turn suggests that the proposed movement does not discriminate head movement from phrasal movement.

Another relevant element is negation. It has been shown in some varieties of English that the placement of negation is below the subject, and crucially, it can undergo scope-shifting movement and it is subject to Scope Economy. Matyiku (2017) reports cases of negative auxiliary inversion (NAI) in African American English, Appalachian English, West Texas English, where the movement of negation is only available if the subject is quantificational. The paradigm is given below. The unacceptability of (56) follows from Scope Economy, since the subject is a (non-quantificational) proper name.¹⁵

(56) Negative Auxiliary Inversion in West Texas English (p.16, 75)

- a. Everybody **didn't** go to the party.
- b. **Didn't** everybody see the fight. (not > everybody; *everybody > not)
'Not everybody saw the fight.'
- c. ***Didn't** Jamie see the fight.

To sum up, in addition to elements of generalized quantifier types, those of modifier types can also undergo the proposed movement, which is similarly constrained by Scope Economy.

7.2 More on the syntactic trigger

In §4.2.2, I suggested that the proposed HM is triggered by scope considerations, rather than syntactic features, and thus the scope effects brought along with this HM is obligatory (i.e. the lack of reconstruction effects), or it would violate Scope Economy. This leads us to predict that the close tie between HM and obligatory scope-shifting (or sensitivity to Scope Economy) ceases to exist if the HM has a different syntactic trigger, i.e. they are feature-driven. Particularly, we expect to see that feature-driven HM need not bring along scope effects, since they are not “vacuous” even they do not

15. In both cases of adverbials and negation, it has to be assumed that either the movement does not leave a trace or the trace is deleted at LF (Cable 2010; Stepanov 2012; Matyiku 2017); see discussions in §6.

shift scope (i.e. they check features). This subsection discusses (i) HM triggered by categorial feature and (ii) HM triggered by discourse feature and show that the prediction is borne out.

Let us first consider cases where HM is triggered by categorial features. I assume with Szabolcsi (2010, 2011) and Harizanov and Gribanova (2019), among others, that the verb second (V2) word order in German and Dutch involves syntactic verb movement triggered by categorial features (on the C head). In German, verb movement to C does not bring along scope effects. (57a) serves as the baseline, where the verb moves to C and the subject to Spec CP. The sentence unambiguously delivers the surface scope reading. In (57b), instead of the subject, the adverbial moves to Spec CP. The verb then occupies a position higher than the subject because of verb movement. Crucially, the sentence conveys the same scope reading as in (57a), suggesting that the HM of ‘begin’ does not shift scope (i.e. it must reconstruct).

(57) German V2 movement

(p.c. *****)

- a. [CP Nur die Aktienkurse [C' **begannen**_i im Mai t_i zu steigen]]
only the stock.prices began in May to rise
‘In May, only stock prices begins to rise.’ (‘only’ > ‘begin’ / *‘begin’ > ‘only’)
- b. [CP Im Mai [C' **begannen**_i nur die Aktienkurse t_i zu steigen]]
in May began only the stock.prices to rise
‘In May, only stock prices begins to rise.’ (‘only’ > ‘begin’ / *‘begin’ > ‘only’)

On the other hand, HM in Dutch shows a slightly different picture. Szabolcsi (2010, 2011) reports that verb movement to C in Dutch optionally imposes scope effects. In (58a), it is similar to the German (57a), where only the surface scope is available. Different from the German counterpart, (58b) is ambiguous between the wide and low scope reading of ‘begin’, suggesting that the verb optionally reconstructs.

(58) Dutch V2 movement

(Szabolcsi 2010, p.38, adapted)

- a. [CP Alleen Marie [C **begon_i** goede rollen t_i te krijgen]]
only Mary began.3sg good roles to get.INF
'Only Mary is such that she began to get good roles.' ('only' > 'begin' / *'begin' > 'only')
- b. [CP In mei [C **begon_i** alleen Marie goede rollen t_i te krijgen]]
in May began.3sg only Mary good roles to get.INF
i. 'Only Mary is such that she began to get good roles.'
ii. 'It began to be the case that only Mary is getting good roles.'
('only' > 'begin' / 'begin' > 'only')

The cases in German and Dutch illustrate that scope effects of HM is *not* obligatory if it is triggered not by scope considerations but by categorial features.¹⁶

Let us turn to cases of HM that are triggered by discourse features. As briefly mentioned in §6.2, a verb can be right dislocated to the end of the sentence in Cantonese. Arguably, the movement is triggered by some discourse feature (i.e. a defocus feature) and the verb lands at the CP domain (Lee 2017). The prediction on quantificational heads in Cantonese is that if they move for discourse effects, it need not alter scope relations, borne out in (59). Right dislocation of a quantificational head gives rise to scopally ambiguous sentence, i.e., reconstruction is optional.

(59) Right dislocation of quantificational heads

- dak Aaming ___ haau-dou hou sengzik aa3 **hoici** 'only' > 'begin'; 'begin' > 'only'
only Aaming get-able good result SFP begin
'Only Aaming begins to get good results.'

This is, however, not to say that feature-driven HM can never come with obligatory scope effects. Consider again the case in Shupamem (Bantu), where a verb arguably undergoes movement and obligatorily takes wide scope over the subject in (60b).

(60) Aspectual verbs in Shupamem (Szabolcsi 2010, p.38)

repeated from (2)

16. I offer no explanation to the difference between German and Dutch with regard to reconstruction facts.

- a. Ndùù Maria ka **yeshe** inget ndàà li?. 'only' > 'begin'
 only Maria past begin have.inf good roles
 'Only Mary is such that she began to get good roles'
- b. A ka **yeshe** ndùù Maria inget ndàà li?. 'begin' > 'only'
 it-FOCUS past begin only Maria inf.have good roles
 'It began to be the case that only Mary is getting good roles'

While the nature of the movement is not explicitly stated in Szabolcsi (2010, 2011), this movement is accompanied with a participle/expletive-like element *a* in before the verb, a construction said to involve subject focus (Nchare 2012). It thus seems plausible to treat this movement to be triggered by focus feature.

Summing up, the above cases in German, Dutch, Cantonese and Shupamem suggest that, while HM triggered by scope considerations entails obligatory scope effects, other instances of HM display various possibilities with regard to scope effects. The reconstruction effects of feature-driven HMs are not uniform (even for cases with similar syntactic triggers) and appears to be regulated by some independent mechanism. Investigating the details of this mechanism is beyond the scope of this paper, however.

8 Concluding remarks

In this paper, I presented a piece of novel evidence from Cantonese, and argued that there are instances of HM that can impose semantic/scope effects. Precisely, it is an (optional) scope-shifting operation constrained by Scope Economy. It speaks against previous attempts in eliminating HM from the Narrow Syntax, and further confirms the syntactic status of HM. Notably, the proposed HM alters word order but does not involve word formation, lending further support to the dichotomy of HM (i.e. syntactic HM vs. post-syntactic amalgamation) proposed in Harizanov and Gribanova (2019).

Additionally, the claim that HM can impose semantic effects eliminates one of the alleged differences between HM and phrasal movement (e.g. Chomsky 2001; Schoorlemmer and Temmerman

2012; Hall 2015; McCloskey 2016), suggesting that there is no strict correspondence between semantic effects and the head/phrase distinction in movement theories. Specifically, this proposed HM displays an array of similarities with Quantifier Raising: (i) it shifts scope relations, (ii) it is triggered by scope considerations, (iii) it obeys Scope Economy, (iv) it is optional, and (v) it can have flexible landing sites. It is therefore plausible to consider this HM to be the head counterpart of Quantifier Raising.

Furthermore, the observation that HM may be constrained by an interface condition (Scope Economy) in the same way as phrasal movement provides new evidence for the claim that the computational system of natural languages does not discriminate head movement from phrasal movement. This is in line with recent efforts in unifying head and phrasal movement (Vicente 2007; Hartman 2011; Funakoshi 2014; Harizanov 2019; Pesetsky 2020; Lee 2021), suggesting that the role of the head-phrase distinction in movement theories may be less important, if not minimal, than previously perceived.

As a final remark, while the head/phrase distinction is central in understanding linguistic structures and its endocentric property (e.g. labeling and projection-related properties), it does not seem to be as significant in theorizing the displacement property of natural languages. The postulation of two non-overlapping, non-competing operations, i.e. HM and phrasal movement, as Donati (2006, p.21) suggests, appears to be “a remnant of a ‘construction-driven’ approach to syntax,” and it arouses various theoretical concerns and empirical puzzles. To the extent that HM and phrasal movement are both results of the operation *Merge* (Chomsky 2004, 2008), the long-observed differences between HM and phrasal movement may in fact be attributed not to the mode of structure building but to other components in the grammar.

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