

# Movement of quantificational heads

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# 1 Introduction

Head Movement (HM) usually lacks semantic effects, particularly scope effects.

- A radical-PF reply: HM is not within Narrow Syntax (Chomsky 2001; Boeckx and Stjepanovic 2001; Schoorlemmer and Temmerman 2012; Zwart 2017)
- A counter proposal: HM *can* have semantic effects (Takahashi 2002; Lechner 2007; Szabolcsi 2011; Iatridou and Zeijlstra 2013; Keine and Bhatt 2016; Matyiku 2017; Sato and Maeda 2020)
- The question now is why HM with semantic effects is so uncommon.
  - I set aside HM with discourse effects, where movement is attributed to feature encoding of the head (e.g. focus/topic) instead of the head *per se* (Harizanov and Gribanova 2019).
  - For discussions, see Vicente (2007), Cheng and Vicente (2013), Lee (2017), Hein (2018), and Harizanov (2019), among many others.

Two possible explanations:

- **Semantic types:** HM usually reconstructs (Matushansky 2006).
  - In most cases, heads are of type  $\langle e, t \rangle / \langle e, \langle e, t \rangle \rangle$  for verbs or  $\langle e \rangle / \langle e, t \rangle$  for nouns.
  - Their interpretation is the same in either the launching or the landing position.
- **The trigger:** Movement triggered by categorial feature checking (e.g. V- $\nu$ ,  $\nu$ -T movement) is purely syntactic and has no semantic effects (cf. Mahajan 2003).

These explanations make a concrete prediction on head movement:

- (1) HM may impose semantic effects if
  - a. the head is a quantificational one and;
  - b. the movement is not triggered by categorial features.
- A number of works discussing modals and aspectual verbs appear to verify (1) (Lechner 2007; Szabolcsi 2011; Iatridou and Zeijlstra 2013)
- ... but they are recently challenged (Hall 2015; McCloskey 2016).

The goals for today:

- to present a novel piece of evidence from Cantonese that (1) is borne out;

- to show that (some) HM is subject to an LF interface condition (i.e. Scope Economy), which have been proposed to constrain (some) phrasal movements, e.g. Quantifier Raising. (Fox 2000).

Take-home messages:

- HM with semantic effects does exist but is also expected to be rare, as it is restricted to quantificational heads and is further constrained by Scope Economy.
- The claim that head and phrasal movement are constrained by the same interface condition resonates with recent efforts in unifying head and phrasal movement (Vicente 2007; Hartman 2011; Funakoshi 2014; Harizanov 2019; Pesetsky 2020).

Roadmap: §2 The data; §3 Scope Economy; §4 Head movement; §5 Composition; §6 Variations

## 2 Cantonese aspectual verbs

### 2.1 The puzzle: part 1

Aspectual verbs like *hoici* 'begin' canonically appear after the subject.

- (2) 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

If the subject is quantificational, *hoici* 'begin' can appear in the initial position.

- (3) 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.'

Sentences in (3a) and (3b) are truth-conditionally distinct.

Who is getting good results...			
(3a) only Aaming > begin		(3b) begin > only Aaming	
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

## 2.2 The puzzle: part 2

The same pattern is also observed with other aspectual verbs and deontic modals.

### (4) 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  
 Int.: ‘I heard that it continues to be the case that (only) HK ranks among the first tenth.’

### (5) The deontic modal *hoji* ‘may’

- a. ngo deoi [(dak) Aaming hoji zou fan] mou jigin  
 I to only Aaming may early sleep not.have opinion  
 ‘I have no opinions on (the fact/claim that) (only) Aaming may sleep early.’
- b. ngo deoi [hoji \*(dak) Aaming \_\_ zou fan] mou jigin  
 I to may only Aaming early sleep not.have opinion  
 Int.: ‘I have no opinions on (the fact/claim that) it is allowed that (only) Aaming sleeps early.’

(Note: Epistemic modals can freely appear in pre-/post-subject positions, see Appendix A.)

However, the pattern is not observed with control verbs and dynamic modals, i.e. they cannot appear sentence-initially.

### (6) Control verbs like *soengsi* ‘try’ and dynamic modals like *nanggaau* ‘be.able’

- a. (dak) Aaming {soengsi/ nanggaau} tai ni-bun syu  
 only Aaming try/ be.able read this-CL book  
 ‘Only Aaming tries to/ is able to read this book.’
- b. \*{soengsi/ nanggaau} (dak) Aaming tai ni-bun syu  
 try/ be.able only Aaming read this-CL book

(7) Other control verbs like *hyun* ‘persuade’ and *gulai* ‘encourage’

- a. (dak) Aaming {hyun/ gulai} Aafan gaai jin  
only Aaming persuade encourage Aafan stop cigarettes  
‘Only Aaming persuade/ encourage Aafan to stop smoking’
- b. \*{hyun/ gulai} (dak) Aaming Aafan gaai jin  
persuade encourage only Aaming Aafan stop cigarettes

## 2.3 Summarizing the analytical tasks

- Q: How is the initial position of *hoici* ‘begin’ derived?
  - A: syntactic head movement - it adjoins to a phrase.
- Q: What constrains the distribution of *hoici* ‘begin’?
  - A: Scope Economy (Fox 2000) - it must move to alter scope relations.
- Q: What differentiates aspectual verbs and deontic modals from control verbs and dynamic modals?
  - A: semantic types - only quantificational heads (i.e. type:  $\langle\langle\alpha, t\rangle, t\rangle$ ) can undergo the proposed movement.

## 3 Constraining the distribution of *hoici* ‘begin’

What the bulk of the following data tries to show:

- Whether *hoici* ‘begin’ can appear initially depends on the immediately following constituent.
- This constituent must be quantificational.
- This constituent may take various syntactic forms, ranging from nominal subjects and topics to adverbials and subordinate clauses.
- Schematizing the pattern:

- (8) a. <sup>OK</sup> *hoici* [XP<sub>[+quantificational]</sub>] ...
- b. \**hoici* [XP<sub>[-quantificational]</sub>] ...

(i) Minimal pairs with (non-)quantificational **subjects**:

- (9) Existential quantifiers vs. pronouns (a. begin > most)

hoici [<sub>SUBJ</sub> a. <sup>OK</sup>daiboufan-jan/ b. \*keoidei ] \_\_ haau-dou hou singzik  
begin most-person they get-able good result

'It begins to be the case that most people/ they are getting good results.'

(ii) Minimal pairs with (non-)quantificational **topics**:

- (10) Universal quantifiers vs. definite NPs (a. begin > every)

hoici [<sub>TOP</sub> a. <sup>OK</sup>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.'

(iii) Minimal pairs with (non-)quantificational **adverbs**:

- (11) 'At every school' vs. 'at our school' (a. begin > every)

hoici [<sub>ADV</sub> a. <sup>OK</sup>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.'

(iv) Minimal pairs with (non-)quantificational **subordinate clauses**:

- (12) 'Whenever'-clause vs. 'because'-clause (a. begin > whenever)

hoici [<sub>CP</sub> a. <sup>OK</sup>faanhai daa-fung/ b. \*janwai daa-fung ] hoimin (dou)  
begin whenever approach-typhoon because approach-typhoon sea all

\_\_ wui jau daailong

will have big.waves

'It begins to be the case that whenever/ because typhoons approach, there will be big waves on the sea.'

The generalization:

- (13) *Hoici* 'begin' can appear sentence-initially if the constituent that immediately follows it is quantificational.

## A side note: disjunction and the across-the-board movement

- (v) (sentential) disjunctive scope marked by *m-hai* ... *zauhai* ... 'either ... or ...'

- (14) a. *Scenario: It is heard that either Aaming or Aafan stopped going to party everyday and began to do some serious study.*  
 m-hai Aaming hoici haau-dak hou, zauhai Aafan hoici haau-dak hou  
 either Aaming begin get-DAK good, or Aafan begin get-DAK good  
 ‘Either Aaming begins to perform well, or Aafan begins to perform well.’
- b. *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-DAK good, or Aafan get-DAK good  
 ‘It begins to be the case that either Aaming performs well, or Aafan performs well.’

## 4 A head movement account

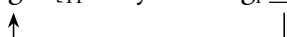
To recap:

- (15) 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.’

- The proposal: a head movement that
  - (i) is constrained by Scope Economy;
  - (ii) lands at an adjoined position to a phrase (or reprojects there) and;
  - (iii) is non-feature-driven.

### 4.1 Head movement constrained by Scope Economy

First, I propose that (15b) is derived from (15a), where *hoici* ‘begin’ moves to a position c-commanding the subject and takes scope over ‘only’.

- (16) Deriving (15b) from (15a) under a HM approach  
 begin [<sub>TP</sub> only Aaming<sub>i</sub> \_\_\_ [<sub>vP</sub> t<sub>i</sub> get-good-result ]] *scope enrichment*  


Secondly, and importantly, I propose that the movement fails to apply if it violates Scope Economy. (Fox 2000).

(17) Scope Economy (Fox 2000)

[Scope-shifting operations] that are not forced by type consideration must have a semantic effect.

Since the subject is non-quantificaitonal in (2b), i.e. a proper name, movement of *hoici* ‘begin’ fails to shift scope relations.

(18) Attempted derivation of (2b) from (2a) under a HM approach

begin [<sub>TP</sub> Aaming<sub>i</sub>        [<sub>VP</sub> t<sub>i</sub> get-good-result ]] *vacuous movement*  


An immediate consequence:

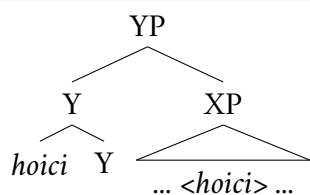
- The analysis naturally extends to the data in §3, where the movement of *hoici* ‘begin’ is only licensed by a c-commanding quantificational element.

For alternatives to a head movement account, see Appendix B.

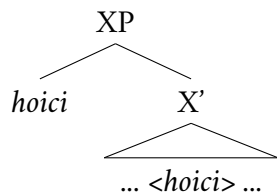
## 4.2 The landing site

There are (at least) four possibilities for the landing site of the proposed head movement.

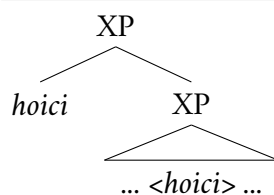
(19) a. A head-adjoined position



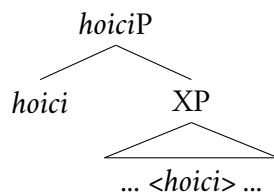
b. A specifier position



c. A phrase-adjoined position



d. A derived head position



- (19a): achieved via head-head adjunction (Baker 1985, *et seq.*)
- (19b): achieved via head-spec movement (Toyoshima 2001; Matushansky 2006; Vicente 2007; Harizanov 2019)
- (19c): achieved via head reprojection (Fanselow 2003; Donati 2006; Surányi 2008; Georgi and Müller 2010; Cecchetto and Donati 2015)



- (19d): achieved via an (unconventional) Adjoin operation applying on heads to phrases (cf. *Internal Pair-Merge* Richards 2009).

A **head-head adjunction approach** in (19a) doesn't seem to allow scope alternations.

- If *hoici* 'begin' is adjoined to another head, it does not c-command the quantificational element. The scope significance might need to rely on some non-standard definition of c-command.
- Additionally, *hoici* 'begin' must be able to be adjoined to multiple null heads along the clausal spine, which is conceptually less appealing.

In **the specifier approach** (19b), it is unclear what projection hosts the specifier.

- Since *hoici* 'begin' can cross quantificational elements of different types, it does not target a specifier position of a particular (functional) projection (e.g. FocusP or TopicP).
- If there is more than one quantificational element in the sentence, there are multiple possible landing sites.

- (20) Quantificational adverbs and subjects (a. begin > every > most / b. every > begin > most)
- |                 |                  |      |                  |   |                 |                   |                |   |     |     |          |
|-----------------|------------------|------|------------------|---|-----------------|-------------------|----------------|---|-----|-----|----------|
| a. <u>hoici</u> | [ <sub>ADV</sub> | hai  | mui-gaan-hokhaau | ] | b. <u>hoici</u> | [ <sub>SUBJ</sub> | daaiboufan-jan | ] | dou | ___ | haau-dou |
| begin           |                  | at   | every-CL-school  |   | begin           |                   | most-person    |   | all |     | get-able |
|                 |                  | hou  | singzik          |   |                 |                   |                |   |     |     |          |
|                 |                  | 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.'

Both **reprojection** in (19c) and **head-phrase adjunction** in (19d) are technically capable of

- taking care of the multiple landing sites of the moving head
- allowing the moving head to take scope there (i.e. it c-commands its sister)
- ... but it is not easy to distinguish among them empirically.

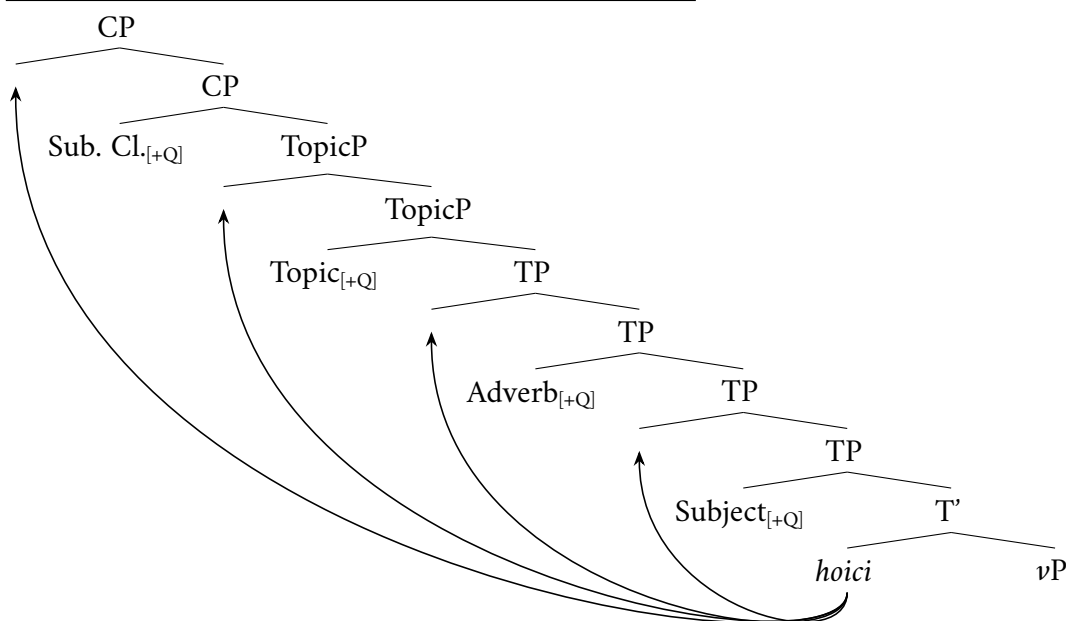
Motivations for **reprojection**:

- Conceptual motivations have been discussed in details in Fanselow (2003), Donati (2006), and Surányi (2008)
- Reprojection avoids many technical issues (e.g. Extension Condition) imposed by head-head adjunction.

But the unconventional **head-phrase adjunction** is also able to avoid these issues. As an initial thought, it seems that the absence of this option might be more surprising than its presence.

- A null hypothesis on adjunction is that it applies regardless of phrase-structural status.
  - a head can adjoin to a head (e.g. noun incorporation, Baker 1985)
  - a phrase can adjoin to a phrase (e.g. adverbs).
  - a phrase can adjoin to a head (e.g. clitics, Kayne 1975)
  - head-phrase adjunction appears to be the missing piece.
- Under a relational understanding of phrase structure (i.e. Bare Phrase Phrase), phrase-structural status is not pre-determined.
  - a head moves to be a **specifier** (Toyoshima 2001; Matushansky 2006; Vicente 2007; Harizanov 2019)
  - a head moves to become a **complement**, e.g. *Undermerge* (Pesetsky 2013) or *HM via substitution* (Funakoshi 2012, 2014).
  - a head retains its **head** status after movement, i.e. *Reprojection* (Fanselow 2003; Donati 2006; Surányi 2008; Georgi and Müller 2010; Cecchetto and Donati 2015).
  - if the notion of adjunct is primitive in phrase structure, nothing *a priori* rules out the possibility of a head becoming an **adjunct** after movement.

(21) A demonstration of a head-phrase adjunction approach



### 4.3 The trigger

As for the trigger of the movement, there are a few possibilities.

- triggered by some A'-feature in the CP periphery (cf. Beghelli and Stowell 1997)
- triggered by the edge feature on phase heads (Chomsky 2008; Richards 2009; Miyagawa 2011)
- Non-feature-driven (Chomsky 1995; Syed and Simpson 2020), but for interpretive effects (Fox 2000; Bobaljik and Wurmbrand 2012)

Concerns over a feature-driven approach:

- It is unclear what feature would be responsible for the movement, given the absence of morpho-syntactic marking.
- It is unlikely to be triggered by discourse features, since the 'begin'-initial sentences are felicitous in out-of-the-blue and 'what happened?' contexts.
- It is unlikely to be triggered by the edge feature, since the landing site can be a non-edge position, e.g. various positions in the CP domain.
- Two possibilities, though, are that (i) every phrase constitutes a phase (Müller 2010) or (ii) a phase head extends along the clausal spine (Dikken 2006; Gallego 2010; Bošković 2014).

I motivate a non-feature-driven approach.

- The obligatory absence of reconstruction of the proposed movement
  - Feature-driven movements can optionally reconstruct, or at least reconstruction is not consistently disallowed.
  - In contrast, if movements triggered purely for scope reasons reconstruct, it would neutralize the scope effects, which would unavoidably violate Scope Economy.
  - The unambiguous (3b), repeated below, is consistent with this line of reasoning, i.e. *hoici* 'begin' cannot be reconstructed to the low position.

- (22) *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.'

- As a conceptual argument, I suggest that obeying Scope Economy indeed indicates the absence of a featural trigger.

- Scope Economy appears to be specific to scope-shifting operations (Fox 2000). It does not constrain feature-driven movements.
  - The dichotomy follows if we assume with Chomsky (2000, p.109) in that no syntactic operation is vacuous (see also Reinhart 1995; Fox 2000; Chomsky 2001; Miyagawa 2006, 2011).
- (23) Operations can apply only if they have an effect on the outcome.
- Thus, a movement operation must either check features or alter scope relations.
  - If a movement operation obeys Scope Economy, it indicates that, unless it alters scope relations, it cannot otherwise have an effect on the outcome.
- Non-feature driven movement seems to be independently motivated:
    - Determiner raising in Japanese (Takahashi 2002)
    - Modal movement to derive split-scope reading (Lechner 2007)
    - PPI modals and their movement over negation (Iatridou and Zeijlstra 2013)
    - Argument scrambling within the nominal domain in Bangla (Syed and Simpson 2020)
    - Surányi (2004) discusses arguments against a feature theory of quantifier scope (Beghelli and Stowell 1997).

## 5 Compositional issues

We are left with two issues:

- How is the scope effect of the proposed HM achieved compositionally?
- What differentiates aspectual verbs and deontic modals from other verbs?

### 5.1 Aspectual verbs as generalized quantifiers

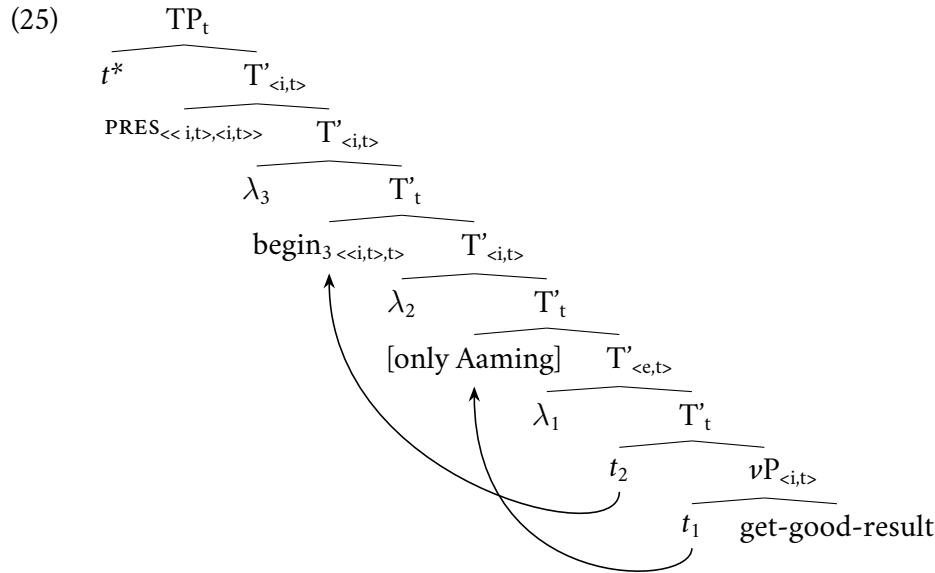
I propose that

- Aspectual verbs are generalized quantifiers over times (i.e. of type  $\langle i, t, t \rangle$ ).
- Crucially, the movement of ‘begin’ leaves a trace of a lower type (i.e. a time variable), in a similar way as phrasal quantifiers.
- The (simplified) lexical semantics of *hoici* ‘begin’:

- (24)  $\llbracket hoici_I \rrbracket = \lambda P_{\langle i,t \rangle}. \exists t' \exists t'' [t' < t_1 \leq t'' \wedge \neg P(t') \wedge P(t'')]$   
 (Read as: There exist two time intervals  $t'$  and  $t''$  such that  $t' < t_1 \leq t''$  and  $P$  is false at time  $t'$  and  $P$  is true at time  $t''$ ).<sup>1</sup>

A demonstration with the sentence in (3b) is given below, with some working assumptions:

- I assume the framework of tense by Kusumoto (2005), see Appendix C.
- Aspectual verbs head a functional projection above  $\nu P$ , e.g. a  $T$  head or an Aspect head (cf. Fukuda 2008, 2012).
- I assume that aspectual verbs are raising predicates and trigger obligatory subject movement for Case reasons (cf. Li 1990)



- (26)  $\llbracket (25) \rrbracket = \exists t''' [t''' = t^* \wedge \exists t' \exists t'' [t' < t''' \leq t'' \wedge [\neg \text{only Aaming } \lambda x. \text{get-good-result}(x)(t') \wedge \text{only Aaming } \lambda x. \text{get-good-result}(x)(t'')]]]$

Szabolcsi (2011) discusses an alternative type for aspectual verbs:

- They are of modifier type  $\langle \langle i,t \rangle, \langle i,t \rangle \rangle$ .
- Some issues arise with regard to the type of the trace:
  - An individual type, i.e. a time variable, would lead to type mismatch (cf. Lechner 2007).
  - If the trace is of the same modifier type, it would lead to semantic reconstruction (hence no scope significance).

1. The semantics of *hoici* contains a time variable, which could have been further decomposed, where *hoici* is of type  $\langle i, \langle \langle i,t \rangle, t \rangle \rangle$  and it takes a covert time variable prior to the event core (see Beck:2015).

- A possible type is  $\langle i, t \rangle$ , but traces of higher types are argued to be nonexistent. (Chierchia 1984; Landman 2006; Poole 2017)
- Solutions have been suggested to avoid the type issue, but require independent stipulations.
  - Trace-less movement or LF-deletion of trace (Stepanov:2012; Cable 2010; Matyiku 2017);
  - type-lifting of the aspectual verbs in case of movement (Matyiku 2017);
  - function composition with a type-lifted tense operator (Szabolcsi 2011)

## 5.2 Semantic types matter

What differentiates aspectual verbs and deontic modals from other verbs?

- Similar to aspectual verbs, deontic modals are raising predicates (Bhatt 1998; Wurmbrand 1999)
- They are also quantificational heads are of type  $\langle \langle \alpha, t \rangle, t \rangle$  (i.e.  $\langle s, t \rangle, t \rangle$ ) (cf. Matushansky 2006; Iatridou and Zeijlstra 2013).
- Crucially, they can leave behind a trace of a lower type i.e. a world variable.

I suggest that other verbs fail to undergo the proposed HM because of compositional conflicts.

- Control verbs and dynamic modals take two arguments, a clausal complement and an external argument (hence of type:  $\langle \langle s, t \rangle, \langle e, t \rangle \rangle$ ).
  - In case of movement, if their corresponding trace is of an individual type (e.g. an object, a time or a world), type mismatch is unavoidable.
  - Assuming that movement traces cannot be of a higher type, these heads necessarily reconstruct, violating Scope Economy.

A straightforward predication:

- These heads can move if triggered not for scope reasons, but, e.g., by discourse features.

(27) a. Right dislocation of verbs (Lee 2017)

Aaming hai soeng \_\_ tai ni-bun syu gaa3 soengsi  
 Aaming FOC want read this-CL book SFP try  
 'Aaming wants to try to read this book.'

b. Verb doubling in topicalization (Cheng and Vicente 2013)

soengsi, Aaming hai soeng soengsi tai ni-bun syu...  
 try Aaming FOC want try read this-CL book  
 'As for (whether he wants to) try, Aaming wants to try to read this book..'

Returning to the initial question: why HM with semantic effects is so uncommon?

- By making reference to semantic types, HM with semantic effects are restricted to heads that...
  - do not take an external argument;
  - but take a clausal complement (cf. unaccusative verbs are of type  $\langle e, t \rangle$ );
  - hence, are of type  $\langle \langle \alpha, t \rangle, t \rangle$ , i.e. aspectual verbs and (some) modals.
- Another movable class is adverbials (of type  $\langle \langle \alpha, t \rangle, \langle \alpha, t \rangle \rangle$ ) and negation (of type  $\langle t, t \rangle$ ).
  - We need to show that they are heads.
  - We need to show that they have a relatively fixed base generation position.
  - We also need some additional mechanism to handle their trace.
  - ... these make arguments from adverbials and negation very difficult to find.
- As a final remark, heads, especially, verbs, may fail to undergo any movement if they are hosting affixes/inflectional morphology, which appears to be the case of many OV languages.

## 6 Cross-linguistic variations on head movement

### 6.1 Variation on the component at which HM occurs

Not all movement of quantificational heads affect scope.

(28) German V2 movement

(p.c. Stefan Keine)

a.  $[_{CP}$  Nur die Aktienkurse  $[_{C'} \text{ begannen}_i$  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  $[_{C'} \text{ begannen}_i$  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')

One explanation is that languages vary w.r.t. whether HM is syntactic or post-syntactic.

- Following the proposal in Harizanov and Gribanova (2019), further evidence for this distinction comes from Head Movement Constraint (HMC Travis 1984).
- For them, HMC only applies to post-syntactic HM, but not syntactic HM.

Alternatively, V2 movement is triggered by categorial features on a higher head, where scope shifting is not required by Scope Economy, since feature checking counts as an effect on the output.

## 6.2 Variation on the syntactic trigger of HM

HM with discourse effects are not constrained by Scope Economy. It suggests a distinction between HM triggered by discourse features and HM triggered by scope effects.

(29) Bulgarian participle fronting (Embick and Izvorski 1997)


- a. Šte sām pročel knigata.  
will be.1s.prs read the.book  
'I'll have read the book.'
- b. Pročel šte sām \_\_\_ knigata.

A prediction on quantificational heads in Cantonese is that if they move for discourse effects, it does not (or need not) alter scope relations.


(30) Right dislocation of quantificational heads (Lee 2017)

- 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.'

- For the 'only' > 'begin' reading, the trace of 'begin' must be of the same quantificational type.

(31) [only Aaming  $t_{\langle i, t \rangle, t \rangle} \dots$ ] begin  


- For the 'begin' > 'only' reading, there can be two movement steps, the first one is triggered by scope considerations, the second by some discourse feature.<sup>2</sup>

(32) [ $t_{\langle i, t \rangle, t \rangle}$  only Aaming  $t_{\langle i \rangle} \dots$ ] begin  


Languages vary in terms of available triggers, where different triggers give different instructions to the type of the movement trace.

Note that feature-driven HM can also have scope effects. For example, in Shupamen (Bantu), a verb moves for focus interpretation (on the subject), and it is not subject to Scope Economy.

2. For a relevant discussion on different triggers of short scrambling in Japanese, see Miyagawa (2006, 2011).



- (33) Modal verbs in Shupamen (cited from Hsu 2016 as p.c. with A. Szabolcsi)

- a. (Nduù) Maria jètñǎǎ jìngèt nàà lì?  
only Maria can INF.have good roles  
'(Only) Maria is such that she can get good roles.'
- b. À jètñǎǎ nà (ndùù) Maria jìngèt nàà lì?  
it-FOCUS can accompl only Maria INF.have good roles  
'It is possible that (only) Maria gets good roles.'

The movement can nonetheless alter scope relations.

- (34) Aspectual verbs in Shupamen (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'

### 6.3 Variation on the treatment on movement trace

Movement of negation (presumably of type  $\langle t, t \rangle$ ) has been shown to be able to affect scope relations and it is subject to Scope Economy.

- (35) Negative Auxiliary Inversion in West Texas English (Matyiku 2017, 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.

Either the movement does not leave a trace or the trace is deleted at LF (**Stepanov:2012**; Cable 2010; Matyiku 2017). Languages vary w.r.t. the availability of such mechanism.

## 7 Concluding remarks

In addition to the two take-home messages, repeated below:

- HM with semantic effects does exist but is also expected to be rare, as it is restricted to quantificational heads and is further constrained by Scope Economy.
- The claim that head and phrasal movement are constrained by the same interface condition resonates with recent efforts in unifying head and phrasal movement (Vicente 2007; Hartman 2011; Funakoshi 2014; Harizanov 2019; Pesetsky 2020).

I also suggested that

- A head can adjoin to a phrase (or reproject).
- Non-feature-driven movements exist in the syntax (Fox 2000; Bobaljik and Wurmbrand 2012; Syed and Simpson 2020).
- Scope Economy follows from a general principle that ensures every operation must have an effect on the outcome: if an operation does not check any feature, it must have scope effects.

## Appendix A: the distribution of epistemic modals

Epistemic modals such as *honang* ‘be.possible’ can freely appear before or after the subject (unlike aspectual verbs and deontic modals).

- (36) 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.’

A potential concern is that epistemic modals appear to be immune from Scope Economy in that its movement does not require a c-commanding quantificational element (36b).

Two possibilities:

- Epistemic modals are adverbs (Tsai 2015, contra Li 1990).
- Epistemic modals take a finite complement (Lin 2011). The post-modal subject is thus in a Case position. The subject may optionally undergo topicalization.

## Appendix B: alternative analyses to a head movement account

Alternatives come in two families:

- Heads do not move: **(a)** Subject lowering; **(b)** Remnant VP movement
- Nothing moves at all: **(c)** Multiple base generation positions of aspectual verbs

Instead of verb movement, **(a)** amounts to a suggestion that


- the subject is reconstructed at LF and its lower copy is pronounced at PF, a case where both LF and PF ‘privilege’ the lower copy (Bobaljik 2002), or
- the subject undergoes Quantifier Lowering.

A demonstration of the idea:

(37) Deriving (3b) from (3a) in a subject lowering approach

[<sub>TP</sub> \_\_ begin [<sub>VP</sub> only Aaming get-good-result ]]

*subject lowering*

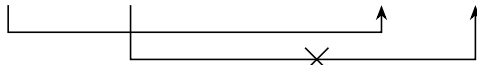


- **(2b)** is ruled out because the subject (i.e. a proper name) is not quantificational, assuming, for the sake of discussion, reconstruction also obeys Scope Economy.

However, this approach does not extend to elements other than subjects. Consider an attempted derivation for (10a), i.e. surface order ‘begin > everyone > Aaming ...’:

(38) (Halfway) derivation of (10a) under a subject lowering approach

\_\_ [<sub>SUBJ</sub> Aaming ] begin [<sub>TOP</sub> everyone ] \_\_ [<sub>VP</sub> ... appreciate ... ]



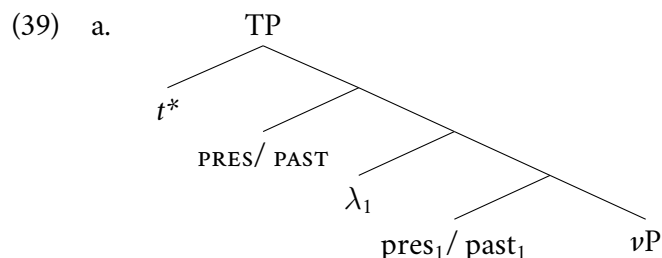
- Importantly, if subject lowering were allowed in (38), **(2b)** would have been allowed as well.

Other approaches:

- **(b)** presumes a productive scrambling mechanism in Cantonese, whose existence is questionable (Soh 1998; Cheng and Vicente 2013).
- **(c)** requires establishment of an unconventional link between the availability of base generation positions and Scope Economy.

## Appendix C: the framework on tense

The basic components of the framework on tense by Kusumoto (2005), assuming *vP* to be the event core of type <i,t>:



b.  $t^*$ : The speech time provided by the context

c. PRES/ PAST: Null operator on time variables (of type  $\langle\langle i, t \rangle, \langle i, t \rangle\rangle$ )

e.g.  $\llbracket \text{PAST} \rrbracket = \lambda P_{\langle i, t \rangle}. \lambda t. \exists t' [t' < t \wedge P(t')]$

e.g.  $\llbracket \text{PRES} \rrbracket = \lambda P_{\langle i, t \rangle}. \lambda t. \exists t' [t' = t \wedge P(t')]$

d.  $\text{pres}_1 / \text{past}_1$ : Time variables, realized as tense morphemes

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