Movement of quantificational heads[*]

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1.   Introduction

A debate that figures in the literature of **H**ead **M**ovement (HM) concerns whether HM can impose semantic effects, particularly scope effects. Despite the growing body of evidence for the scope effects of HM suggests that at least some instances of HM should retain a syntactic status (Benedicto 1998, Takahashi 2002, Han et al. 2007, Lechner 2007, Kishimoto 2007, Szabolcsi 2010, 2011, Iatridou and Zeijlstra 2013, Keine and Bhatt 2016, Matyiku 2017, Sato and Maeda 2020, Landau 2020), Hall (2015), McCloskey (2016) critically point out that the those arguments may build on unmotivated assumptions, and/or may have alternative analyses (e.g., Shimoyama 2006, Richter and Sailer 2008, Zeijlstra 2017, Harizanov and Gribanova 2019, Blanchette and Collins 2019).

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). Furthermore, the observation that Scope Economy also applies to HM is in line with recent efforts in unifying head and phrasal movement (Vicente 2007, Hartman 2011, Funakoshi 2014, Harizanov 2019, Pesetsky 2020, Lee 2021).

2. The distribution of aspectual verbs and modals in Cantonese

2.1 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 (1).

(1)   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.

(2)   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 *dak* 'only'. In (2a), *hoici* 'begin' unambiguously takes scope below 'only', whereas in (2b) 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
➜ (2a) only Aaming > begin		➜ (2b) 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 (2a) (i.e., only Aaming is such that he begins to get good results), but not under (2b). 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 (2b) (i.e., it begins to be the case that only Aaming is getting good results), but not (2a). The sentences in (2) are thus not only unambiguous but also truth-conditionally distinct.

The same pattern is observed with *gaizuk* 'continue' in (3) and *hoji* 'may' and *wui* 'will' in (4). The high position is available if the subject is marked with *dak* 'only'.

(3)   *The aspectual verb gaizuk 'continue'*

  a. ngo tenggong [(dak) Hoenggong **gaizuk**   paai tau   sapwai]
    I   hear   only   Hong.Kong continue rank inital 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 inital tenth
    'I heard that it continues to be the case that (only) HK ranks among the first tenth.'

(4)   *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.'

2.2 Quantificational elements and the high position

This subsection reports additional properties of the distribution on aspectual verbs and modals. I show that whether these verbs can occupy a high position depends on the nature of the constituent that immediately follow this position, generalized as follows:

(5)   *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.

To begin with, the high position of *gaizuk* 'ccontinue' is licensed if the subject is a quantifier (6a), as opposed to a pronoun (6b). Note that if the high position is licensed, *gaizuk* 'continue' takes scope there .

(6) *Group denoting quantifiers vs. pronouns in the subject position*[1]
     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.'

Example (7) makes the same point with counting quantifiers and *wh*-expressions.

(7) *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.[2]

(8) *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.

(9) *Quantificational vs. non-quantificational adverbs*
     hoici [ADV a. ^{OK}hai mui-gaan hokhaau/ b. ??hai ngodei hokhaau] Aaming
     begin   at every-CL school   at   our   school   Aaming

     (dou) __ haau-dou hou singzik
     all   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 revealed in subordinate clauses. The sentences in (10) 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.

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

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

(10) *'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_ seoijin   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.'

3.   Proposal

To account for the high position and the generalization in (5), I suggest that the aspectual verbs and modals can undergo movement to a position higher than the subject. Taking (2) as an example, I suggest that (2b) is derived from (2a), where *hoici* 'begin' moves over *dak* 'only', illustrated with English glosses below. Crucially, the movement extends the scope possibility of *hoici* 'begin'.

(11) *Deriving (2b) from (2a) under a HM approach*
    begin [_TP_ only Aaming_i_ __ [_vP_ *t*_i_ get-good-result]]   *scope enrichment*
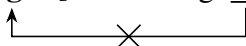
    Secondly, and importantly, I propose that this movement is constrained by Scope Economy (Fox 2000), in a similar way as other scope-shifting operations.
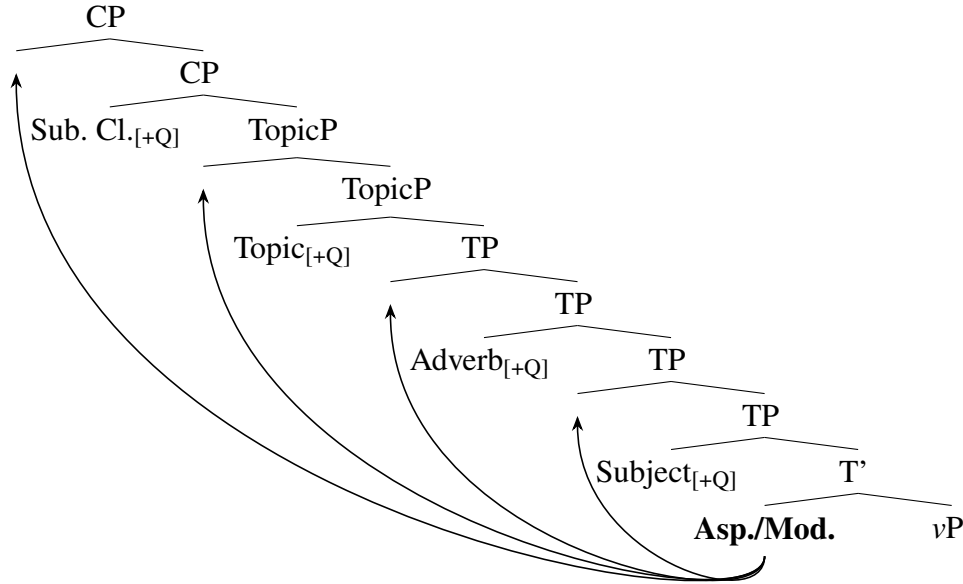
(12) *Scope Economy (Fox 2000)*
    Scope-shifting operations must have a semantic effect.

This constraint is crucial in explaining why HM fails to apply in (1b), 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. (13) illustrates this idea.

(13) *Attempted derivation of (1b) from (1a) under a HM approach*
    begin [_TP_ Aaming_i_ __ [_vP_ *t*_i_ get-good-result]]   *vacuous movement*

    Following this line of reasoning, the generalization in (5) 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:

(14) *A graphic representation of the proposed HM*[3]

As a remark on the nature of the proposed HM, it displays an array of similarities with Quantifier Raising: (i) it shifts scope relationss, (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.

4. Further evidence for the proposed HM

4.1 Stacking of quantificational heads in the high position

The current proposal predicts that the proposed HM can apply recursively, 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 (15a). Since the subject is quantificational, movement of both *hoici* 'begin' and *hoji* to a higher position would be in accordance to Scope Economy. As (15b) shows, both can move to the high position and both take scope above *dak* 'only'.

(15) *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.'

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[3]The head may land at an adjoined position (cf. Quantifier Raising, May 1977, 1985) or a specifier position (Matushansky 2006, Harizanov 2019).

Under the current proposal, the derivation of (15b) involves two steps, namely, the movement of *hoji* 'may', followed by the movement of *hoici* 'begin', illustrated below:

(16)　*A two-step derivation of (15b)*
　　　begin may [$_{TP}$ only Aaming$_i$ __ __ [$_{vP}$ t_i sleep-early]]

4.2　Shortest Move

The proposed HM is 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.

(17)　*A configuration showing possible landing sites under Scope Economy*
　　　❷ [$_{TP}$ Adverbial$_{[-Q]}$ ❶ [$_{TP}$ Subject$_{[+Q]}$ **Asp./Mod.** [$_{vP}$ ...]]]

In case of HM, it has been shown that the position right above the quantificational subject (=❶) is a possible landing site (i.e., it shifts scope). Importantly, the position right above the non-quantificational adverbial (=❷) should, in principle, be another possible landing site, since the moving head can take wide scope from there. This, however, is not the case:

(18)　*A non-quantificational adverbial and a quantificational subject*
　　　❷ ***hoici** [$_{ADV}$ hai ngodei hokhaau] ❶ **hoici** [$_{SUBJ}$ daaiboufan jan] dou __
　　　begin　　　at　our　school　begin　　　most　person　all

　　　　haau-dou hou　singzik
　　　　get-able　good result
　　　'At our school, it begins to be the case that,most people are getting good results.'

(18) suggests that the movement of *hoici* cannot be longer/higher than it needs to shift scope. 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 the proposed HM is additionally constrained by a version of Shortest Move:[4]

(19)　*Shortest (scope-shifting) Move*
　　　A scope-shifting operation must move a quantifier to the closest position in which *it shifts scope*.

As such, (19) dictates that the position ❶ in (18) is the only possible landing site that delivers the wide 'begin'-scope, as it is the *closest* position.[5] I take this locality restriction as evidence for a movement approach to the high position of quantificational heads.

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[4]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)).

[5]This also explains why the landing site of the moving quantificational heads must be *immediately* followed by a quantificational element (as stated in (5)), as it is the closest position.

4.3 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 (20), the two disjuncts are sentential and both contain the aspectual verb *hoici* 'begin'.

(20)   *Scenario: It is heard that either Aaming or Aafan has done some serious study recently. The speaker guesses:*
<u>m-hai</u> Aaming **hoici** haau-dak   hou, <u>zauhai</u> 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 (21). 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 (20).
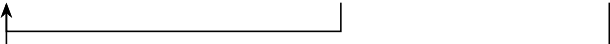
(21)   *Scenario: In past exams, either Aaming or Aafan or Chris got good results. Recently, Chris is distracted from study, and now either Aaming is getting good results, or Aafan is getting good results.*
hoici <u>m-hai</u> Aaming __ haau-dak   hou, <u>zauhai</u> Aafan __ haau-dak   hou
begin either 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 in 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 (21) is derived as follows:

(22)   *A simplified representation of the derivation of (21)*
begin [[$_{CP1}$ *either Aaming* __ ...] [$_{CP2}$ or Aafan __ ...]]

5.   Conclusions

In this paper, I presented a piece of novel evidence for the semantic effects of HM from Cantonese. It speaks against previous attempts in eliminating HM from the Narrow Syntax, and further confirms the syntactic status of HM. Additionally, the observations that HM can shift scope and is subject to Scope Economy in the same way as phrasal movement (e.g., Quantifier Raising) lend further support to a unified theory of movement.

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