

# ATB Movement and Parasitic Gaps: from the Perspective of Head Movement

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## 1 Introduction

A recent line of research casts doubt on the claim that head movement and phrasal movement are distinctive syntactic operations. It has been suggested that head movement can be assimilated to phrasal movement in terms of interpretative effects, locality constraints, and so on (Lechner, 2007; Vicente, 2007; Hartman, 2011; Funakoshi, 2012; Harizanov, 2019; Pesetsky, 2020; Lee, 2021, 2022). To contribute to this discussion, this paper explores an uncharted corner of head movement by examining two constructions, namely, Across-the-board (ATB) movement and Parasitic Gaps. Specifically, the two empirical questions relating to head movement is (i) whether heads can undergo ATB movement (Ross, 1967; Williams, 1978), and (ii) whether head movement can license Parasitic Gap constructions (henceforth PGs, Engdahl (1983)). ATB movement and PG constructions are most commonly discussed with phrasal elements. Nothing *a priori*, however, should rule out the head counterpart of these cases. In other words, the null hypothesis on head movement is (1).

(1) The null hypothesis

Both ATB movement and PG configurations of heads are allowed by the mechanism that licenses their phrasal counterparts.

I evaluate this null hypothesis by examining a verb movement construction in Cantonese, namely, verb topicalization. Empirically, I will reveal an asymmetry between the two configurations: ATB head movement of verbs is attested in Cantonese; however, Parasitic Gaps for verbal heads are not. Instead of taking the asymmetry as a piece of evidence that distinguishes head movement from phrasal movement, I propose that the unavailability of PGs for verbal heads is not due to the phrase structural status of the moving elements: they are ruled out because the possible types for operators are independently restricted (assuming an operator theory of PGs (Nissenbaum, 2000)). The findings suggest (i) that there is no substantial counter evidence for the unity of movement from PG constructions, and (ii) that ATB movement and PG constructions should receive non-uniform treatment.

The rest of this paper consists of five sections. In section 2, I first show that ATB movement and PGs are possible for phrasal elements in Cantonese. In section 3, I give an overview of the verb topicalization in Cantonese, showing that it involves head movement in its derivation and thus can be adopted as a diagnostic test for ATB movement and PGs. In section 4, I show that while verb topicalization can involve ATB movement, it does not license PGs of a verbal element. In section 5, I develop an analysis that accounts for the asymmetry. I conclude in section 6.

## 2 Phrasal ATB Movement and PG Constructions in Cantonese

### 2.1 Phrasal ATB Movement

A relevant case showing that Cantonese allows ATB movement comes from *wh*-fronting. While Cantonese is a *wh-in-situ* language, *wh*-expressions can optionally be fronted (Cheung, 2008, 2015). More importantly, a fronted *wh*-expression can correspond to the two gaps in coordination (Pan, 2011).

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(2) ATB movement of a *wh*-expression

**bin-wai** **zokgaa** [ [IP1 Aaming zungji t<sub>wh</sub>] ] ji [IP2 Aafan m zungji t<sub>wh</sub>] ]  
 which-CL writer Aaming like and Aafan not like  
 ‘Which writer does Aaming like but Aafan dislike?’

On the contrary, a fronted *wh*-expression cannot correspond to only one gap in one of the conjunct, as shown in (3), which violates the Coordinate Structure Constraints (Ross, 1967).

(3) Movement of a *wh*-expression out of a conjunct

\***bin-wai** **zokgaa** [ [IP1 Aaming zungji ni-wai zokgaa] ] ji [IP2 Aafan m zungji t<sub>wh</sub>] ]  
 which-CL writer Aaming like this-CL writer and Aafan not like  
 Int.: ‘Which writer does Aaming like this author but Aafan dislike?’

Schematically, the paradigm motivating the availability of the ATB movement is given in (4).

(4) Across-the-Board (ATB) movement

- a. **WH** ... [CP1 Subj V WH] and [CP2 Subj V WH] → (2)  
 b. \***WH** ... [CP1 Subj V XP] and [CP2 Subj V WH] → (3)

## 2.2 Phrasal PG Constructions

*Wh*-fronting in Cantonese also reveals that PG constructions are possible in the language (see also discussions in Mandarin, Lin (2005); Ting and Huang (2008); Huang and Kaiser (2008)). Consider the contrast in the sentences in (5). Note that the symbol  $\Delta$  represents the position of a PG.

(5) *Wh*-movement licensing a PG (cf. Lin, 2005)

- a. **bin-go jan** Aaming [hai gin  $\Delta$  zicin] zau caau-zo t<sub>wh</sub>?  
 which person Aaming at meet  $\Delta$  before already fire-PERF  
 ‘Which person is it who Aaming fired before meeting?’  
 b. ??Aaming [hai gin  $\Delta$  zicin] zau caau-zo **bin-go**?  
 Aaming at meet  $\Delta$  before already fire-PERF who  
 ‘Who did Aaming fire before meeting?’

In (5a), a gap resides in the temporal adjunct “before meeting  $\Delta$ ”. *Wh*-fronting of “which person” can license this gap. In contrast, in (5b), when the *wh*-expression stays *in-situ*, the gap is no longer licensed. In other words, the gap in the adjunct is parasitic on *wh*-fronting. Schematically, the paradigm motivating the availability of PGs can be represented in (6).


(6) PGs reside in a (temporal) adjunct of a matrix clause (Lin, 2005)

- a. **WH** ... Subj [adjunct ...  $\Delta$  ... ] V WH → (5a)  
 b. \*Subj [adjunct ...  $\Delta$  ... ] V WH → (5b)

As such, both ATB movement and PG constructions are attested in Cantonese. Before I proceed to see the same configurations are possible with head movement, I first introduce a case of verb movement in Cantonese in the next section.

### 3 Verb Topicalization as Head Movement

Cheng and Vicente (2013) discusses two verb movement constructions in Mandarin, one of them being **verb topicalization** (or verbal cleft constructions). In this construction, a copy of the verb in the base position appears in the left periphery, arguably derived by head movement in a way depicted in (7).

- (7) Verb topicalization  
 $V_1$ , Subj COP ( $V_2$ )  $V_1$  (Obj)  


As discussed at length in Lee (2021, 2022), the same construction is observed in Cantonese, exemplified in (8). The verb “buy” is copied and receives a contrastive interpretation.

- (8) Verb topicalization in Cantonese  
**maai**, Aaming hai soeng **maai** ge2  
 buy, Aaming COP want buy SFP  
 ‘As for (whether he) buys, Aaming wants to buy (it) earlier (but...)’

The evidence for verb movement comes from (i) the Lexical Identity Effects, (ii) island sensitivity, and (iii) Focus Intervention Effects. The following arguments are repeated from Cheng and Vicente (2013); Lee (2021, 2022). In (9), the verbs in the periphery and in the base positions have to be lexically identical - the semantically equivalent *cek* ‘check’ is illicit, indicating that the verb in the periphery is not base generated there.

- (9) Lexical Identity Effects  
**caa/\*cek**, ngo hai **caa**-gwo ni-go jan  
 check/check I COP check-EXP this-CL person  
 ‘As for checking, I have checked this person.’

(10) shows the adjunct island effects: the two verbs cannot span across island boundaries.

- (10) (Adjunct) island sensitivity  
 \***tai**, [<sub>adjunct</sub> hai Aaming hai **tai**-jyun bun syu zihau] , ngo sin faan-dou  
 read at Aaming COP read-finish CL book after I first return-arrive  
 ukkei  
 home  
 Int.: ‘As for reading, I was back after Aaming has already finished reading the book.’

In (11), the dependency between the two verbs is interrupted by focused elements (marked by *dak* ‘only’ in this case). The interruption follows if the verb moves for focus interpretation and violates the minimality/locality condition on Agree/Move (cf. Rizzi, 2004).

- (11) Focus Intervention Effects  
**heoi**, (\*dak) Aaming hai soeng **heoi** Meigwok  
 go only Aaming COP soeng heoi Meigwok  
 Int.: ‘As for going, only Aaming wants to go to the US.’

Based on these arguments, I follow previous works and conclude that head movement is involved in verb topicalization, and adopt it as a diagnostic test for ATB movement and PG constructions.<sup>1</sup>

<sup>1</sup>The doubling effects of verb movement in Cantonese have been argued to follow from independent requirements relating to linearization (Lee, 2021). Similar proposals include Landau (2006) on Hebrew. I set aside this issue in this paper.

## 4 Diagnosing the Head Counterparts of ATB Movement and PG constructions

### 4.1 ATB Head Movement

Since verb topicalization independently requires doubling, in case of ATB movement, the “gap” in each conjunct is expected to be occupied by a copy of the moving head. More concretely, the relevant configurations (and the predicted judgment if ATB head movement exists) are given in (12).

(12) The configuration of ATB head movement

- a.  $V_1 \dots [CP_1 \text{ Subj } V_2 V_1]$  and  $[CP_2 \text{ Subj } V_3 V_1]$   
 b.  $*V_1 \dots [CP_1 \text{ Subj } V_2 V_3]$  and  $[CP_2 \text{ Subj } V_4 V_1]$

The relevant examples are constructed and given in (13). In (13a), the verb *maai* ‘buy’ is topicalized, and it is corresponded to the two copies in the conjuncts. Its acceptability shows that ATB movement is possible with heads in Cantonese. In contrast, in (13b), changing the verb in the first conjunct to another verb *fong* ‘sell’ renders the sentence unacceptable. This follows from the Coordinate Structure Constraint (i.e., the two occurrences of *maai* ‘buy’ span across a coordination island).

(13) Verb topicalization

- a. *Scenario: Aaming and Aafan are discussing wheether to invest in cryptocurrencies. Aaming thinks that it is time-consuming to learn about them and Aafan thinks that it is too risky to buy them. I then summarize their opinions by saying:*  
**maai**, ngo gokdak [Aaming hai m-seong **maai**] ji [Aafan hai m-gaam **maai**]  
 buy I think Aaming COP not-want buy and Aafan COP not-dare buy  
 ‘As for buying, I think Aaming doesn’t want to buy (cryptocurrencies) and Aaming dare not to buy (cryptocurrencies)’
- b. *Scenario: Aaming and Aafan have invested in cryptocurrencies. They can earn some money if they sell them now. Aaming thinks that they should invest in stock market instead but Aafan thinks that they should invest more. I then summarize their opinions by saying:*  
 \***maai**, ngo gokdak [Aaming hai seong fong] ji [Aafan hai soeng zoi **maai**]  
 buy I think Aaming COP want sell and Aafan COP want more buy  
 ‘As for buying, I think Aaming wants to sell (their cryptocurrencies) and Aafan wants to buy more (cryptocurrencies)’

It should be remarked that this is consistent with the analysis in Tang (2001) for gapping-like constructions in Mandarin, where the verb arguably verb movement in an ATB fashion. The Cantonese counterpart is given in (14).<sup>2</sup>

(14) Short verb movement in an ATB fashion

- keoi **fong**-zo [~~fong~~ jat-bun syu hai toi-min], [~~fong~~ saam-zi bat hai dang  
 s/he put-PERF one-CL book on table-surface three-CL pen on chair  
 soeng-min]  
 up-surface  
 ‘S/he put one book on the table, three pens on the chair.’ (cf. Tang, 2001, p.209)

<sup>2</sup>Short verb movement typically moves from V to v, and thus cannot move across an adjunct clause that hosts parasitic gaps (i.e., such a clause presumably beyond the vP domain). As such, it cannot be used to diagnose PG constructions. For this reason, verb topicalization is chosen to evaluate both ATB movement and PG constructions.

#### 4.2 Parasitic Gaps Licensed by Heads?

Turning to the PG constructions, the relevant configurations (and the predicted judgment if PGs exist for heads) are given in (15).

- (15) a.  $V_1 \dots \text{Subj} [\text{adjunct} \dots \Delta \dots] V_2 V_1$   
 b.  $*\text{Subj} [\text{adjunct} \dots \Delta \dots] V_1 X$

The relevant Cantonese examples are constructed in (16). However, different from the ATB movement case, verb topicalization does not license a potential site of PG. Concretely, in (16a), the verb *maai* ‘buy’ is topicalized, but it does not license the gap in the temporal adjunct. Note that (16b) is also ruled out because the gap does not have a licenser.

(16) Verb topicalization

*Scenario: A new game is going to be released next month. Aaming wants to buy/rent the game.*

- a. ??*maai*, Aaming hai soeng [hai Aafan waa keoi m-gaam  $\Delta$  zicin] *maai* ge2  
 buy Aaming COP want at Aafan say him not-dare  $\Delta$  before buy SFP  
 ‘As for buying, Aaming wants to buy before Aafan says that he would not dare to (buy) (but...)’
- b. ??Aaming soeng [hai Aafan tai keoi hoji  $\Delta$  zicin] *maai* ge2  
 Aaming want at Aafan remind him may  $\Delta$  before buy SFP  
 ‘Aaming wants to buy before Aafan reminds him that he may (buy) (but...)’

I therefore conclude that verb movement does not license a PG in a way similar to phrasal movement (e.g., *wh*-fronting).

### 5 Analysis

The previous section reveals an asymmetry listed in (17).

(17) An asymmetry relating to head movement

While verb movement can move in an ATB fashion, it fails to license a PG.

For the ATB movement case, the derivation can be implemented in the same way as their phrasal counterparts, such as Coordination Reduction (Wilder, 1994), Parallel Merge (Citko, 2005), or Sideward Movement (Nunes, 2001), etc. I do not further distinguish these approaches in the paper.

In what follows, I focus on the unavailability of head counterparts of PG constructions. There are a few possibilities. The first one is to suggest that PGs are specific to NPs. However, it has been reported that there cases where PGs correspond to non-nominal elements. To see some examples,

(18) Adverbial and clausal PGs (Levine et al., 2001)

- a. **How harshly** do you think we can treat them \_ without in turn being treated  $\Delta$  ourselves?
- b. **That Robin is a spy** would naturally be difficult to refute \_ without (someone) having first conjectured  $\Delta$ .

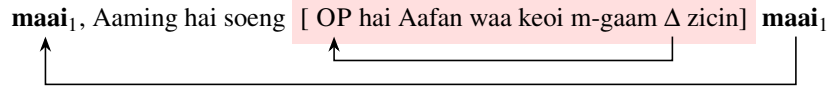
A second possibility is to attribute the difference to head and phrasal movement. One might suggest that head movement is distinct from phrasal movement, and they have different application domains. This in turn begs the question of what is special about head movement such that it differs from phrasal movement in PG constructions.

I suggest that the failure of verb movement to license PGs does not necessitate a distinction on

heads and phrases in movement theories. Instead, I pursue a third possibility: independent requirements on operators (not on head movement) preclude their ability to license PGs.

In more concrete terms, I assume with Nissenbaum (2000) the null operator theory of PGs. It is suggested that PGs are in fact traces of a null operator that moves within the containing adjunct. Under such an approach, a hypothetical derivation of (16a) is depicted in (19). Within the temporal adjunct, a null operator moves to the edge of the clause.

- (19) A hypothetical structure for (16a), under the null operator theory of PGs



Crucially, I suggest that heads are systematically prevented from licensing PGs due to an independent constraint on semantic types of null operators.

- (20) The proposed type constraint on operators

Syntactic operators cannot be of types of predicates, i.e.,  $\langle e, t \rangle$ .

In effect, the failure of a head to license PGs in (16a) is reduced to the unavailability of appropriate operators that are independently required in PG constructions. In other words, (16a) is unacceptable due to the attempted operator movement.

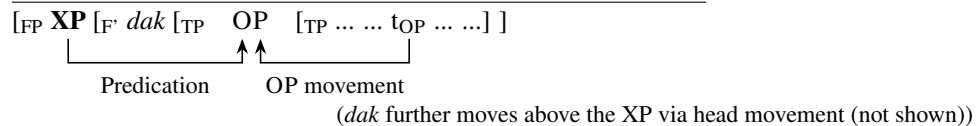
This suggestion predicts that other instances of operator movements cannot involve operators of types of predicates. Two constructions have been suggested to involve operator movement, namely, (i) long passives (Ting, 1998; Feng, 1997), and (ii) preverbal *dak* ‘only’ focus constructions (Tang, 2002). It is well known that passivization cannot target verbs (i.e., it targets arguments). So this is consistent with the prediction. Let us consider the preverbal *dak* constructions in greater details. An example is given in (21). The nominal subject is focused by the preceding *dak* ‘only; lit. obtain’.

- (21) NPs are compatible in *dak* constructions

dak **ngo** zyu-gwo Hoenggong  
 only I live-EXP Hong.Kong  
 Int.: ‘Only me have lived in Hong Kong.’

Tang (2002) argues that the derivation of (21) involve operator movement in the lower clause, and the focused element XP is merged into the structure serving as (secondary) predication.

- (22) The proposed analysis for preverbal *dak* proposed in Tang (2002)



Assuming this analysis is on the right track, (23) shows that the *dak*-focus constructions cannot target a verb like *zyu* ‘live’.

- (23) Verbs are incompatible in *dak* constructions

\*dak **zyu**, ngo **zyu**-gwo Hoenggong  
 only live I live-EXP Hong.Kong  
 Int.: ‘I have only lived in Hong Kong.’

Admittedly, the discussion here is confounded by the possibility that both passives and *dak*-focus constructions fail to target verbal elements in general. It is therefore instructive to consider nominal predicates, as they are nominal but of type  $\langle e, t \rangle$ . However, the sentences in (24) show that

these constructions cannot target nominal predicates either.<sup>3</sup>

(24) Nominal predicates in *dak* constructions and long passives

- a. ??*dak jisaang* Aaming soeng zou *dak*-focus  
 only doctor Aaming want become  
 Int.: ‘Aaming only wants to become a doctor.’
- b. ??*jisaang* bei Aaming zou-zo long passives  
 doctor give Aaming become-PERF  
 Int.: ‘Aaming became a doctor.’

To sum up, the proposal in (20) receives support from constructions involving operator movement, and the reason why verb movement cannot license a PG is the same as why the sentences in (23) and (24) are unacceptable: they involve the movement of an (illicit) operator of type <e,t>.

## 6 Conclusions

The current paper set out to reveal an asymmetry relating to head movement: while verb movement is able to undergo ATB movement, it fails to license a PG. Instead of attributing the failure to license PGs to head movement, I attempted an explanation based on independent requirements on operators: syntactic operators cannot be of types of predicates, i.e., < e,t>. This in effect precludes head movement to license PGs. The findings implicates that (i) there is no substantial counter evidence for the unity of movement, from PG constructions, and (ii) ATB movement and PG constructions should receive a non-uniform treatment.

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<sup>3</sup>It should be acknowledged that some speakers do not find the sentences in (24) entirely unacceptable, especially on a reading where *jisaang* ‘doctor’ is interpreted as ‘the role of a doctor’ (in a drama context, for example). But if this is the case, *jisaang* becomes an entity argument (i.e., the doctor-role), instead of a nominal predicate.

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