

How Does Head Movement Affect Ellipsis and Extraction?

Semoon Hoe, Dongwoo Park, and Han-Byul Chung

1. Introduction

Head movement (HM) has received much attention, since it is crucially different from phrase movement. In English, for instance, it is generally assumed that V-to-*v* HM is simply attributable to the morphological status of *v*, while T-to-interrogative C (C_0) largely has to do with the interpretation of questions (Chomsky 1995 *et seq.* among many others). Thus, it is easy to draw a conclusion that they may amount to different sorts of HM. The goal of this paper is to provide a unified analysis of these two types of HM based on Chomsky (2015) (POP+, hereafter). Especially, by showing that both T-to- C_0 HM and R-to-*v* HM induce *de-phasing*, we propose that they are triggered by the “affixal status” of phase heads.

2. Core Data

To explore the questions raised above, we first focus on the difference in the possibility of extraction from an embedded clause and a matrix clause. We will argue that the difference in the extraction facts can be accounted for if i) if affixal C_0 triggers *de-phasing*, and ii) matrix C_0 s are affixal, while embedded C_0 s are non-affixal.

As illustrated in (1a) and (2a), the object *wh*-phrase base-generated inside the ellipsis site can be extracted out of the ellipsis site. On the other hand, extraction of the object *wh*-phrase is not permitted when copula phrase ellipsis occurs in the embedded clause as in (1b) and (2b) (see Park 2017).¹

- (1) a. What should Bill be proud of, and what₁ should John ~~be proud of~~ t₁?
b. ?*I don't know what Bill should be proud of, but I know what₂ John should ~~be proud of~~ t₂.
- (2) a. What shouldn't Bill be fond of, and what₃ should he ~~be proud of~~ t₃?
b. ?*I don't know what Bill shouldn't be proud of, but I know what₄ he should ~~be proud of~~ t₄.

3. Background and Assumptions

3.1. Two Different Verbal Domain Structures

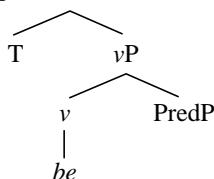
Among many proposals on the structure of copular constructions, in this paper, we assume the one suggested by Mikkelsen (2005), illustrated in (3a). In that structure, the subject is base-generated in the specifier position of the PredP, as proposed in Bowers (1993). The PredP merges with the functional head *v*, where the copula is generated. v_b is a subtype of unaccusative *v*: the difference between normal *v* and v_b is that the former and the latter takes VP and PredP as complement, respectively. On the other hand, in case of regular verbal domain, we assume that the VoiceP layer is interspersed between T and vP , as shown in (3b). (see also Merchant 2013; Aelbrecht 2010, among others).

Given that the copula is elided in copular phrase ellipsis, we can say that the ellipsis site is v_bP . Merchant (2013) argues that the ellipsis site of regular VPE is the complement of Voice, namely vP . This means that both copular phrase ellipsis and regular VPE have the same ellipsis site. Next, we assume that both copular phrase ellipsis and regular VPE is licensed by T (see Park 2017; cf. Lobeck 1995).

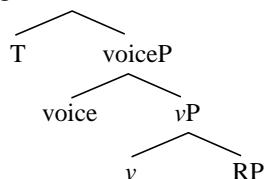
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¹ There are speaker variations. Ten out of thirteen native speakers of American English report that (1a) and (2a) are fully acceptable, while (1b) and (2b) are unacceptable. On the other hand, two informants report that they are all acceptable, even though (b) sentences are degraded.

(3) a. Copular verbal domain (Mikkelsen 2005)



b. Regular verbal domain



3.2. *De-phasing* in POP+

Chomsky (2013) proposes that labeling is marked by a labeling algorithm (LA) at the point of *Transfer* in the following manner. When two phrases merge, the resulting set is either i) labeled by the prominent feature shared by the phrases, or ii) one of the phrases undergoes internal merge (move) leaving the remaining phrase to serve as the label (the assumption here is that a trace/copy is invisible at the NS and LA).² Based on this, Chomsky (2013) explains that the EPP can be reduced to LA: For α to get a proper label in (4), SUB should move to the position where the feature sharing can be applied (the EPP). In POP+, he further argues that β may also be responsible for the EPP. To capture the well-known correlation between the *pro*-drop phenomena and the EPP, he assumes that unlike T in languages like Italian, T in English is too *weak* to serve as a label independently, therefore for β to be labeled as T, φ -sharing in γ is required: φ -sharing enhances T to be able to serve as a label.

(4) $\{\beta \text{ T}, \{\alpha \text{ SUB}, \text{vP}\}\}$ (α and β cannot be labeled) $\rightarrow \{\gamma \text{ SUB}, \{\beta \text{ T}, \{\alpha \text{ SUB}, \text{vP}\}\}\}$ ($\alpha=\text{vP}, \beta=\text{T}, \gamma=\langle\varphi, \varphi\rangle$)

Chomsky also argues that “that-trace” effect can be explained by the labeling system as well. In (5a), the subject *who* moves to Spec,T (for expository purpose, classical terminologies are used) in order for β and α to be labeled. However, for *who* to arrive at the specifier of the matrix C_0 , it must first move to the edge of the embedded CP phase (PIC).

(5) a. who do you think $\{C, \{\gamma \text{ who}, \{\beta \text{ T}, \{\alpha \text{ who}, \text{vP}\}\}\}\}^{\text{phase}}$ *‘who do you think that read the book’
 b. who do you think $\{C, \{\gamma \text{ who}, \{\beta \text{ T}, \{\alpha \text{ who}, \text{vP}\}\}\}\}^{\text{phase}}$ ‘who do you think read the book’

However, once *who* moves, γ cannot be labeled as the shared feature, since a trace/copy of *who* is invisible for LA; hence, β cannot be labeled since weak T alone cannot serve as a label. To avoid this problem, POP+ introduces *de-phasing*. He argues that “feature transmission” may also inherit the phasehood of a phase-head to its complement, and when the phase-head becomes *invisible* in the NS (via some independent operation), the inherited phasehood of the complement is *activated*. By adopting *de-phasing*, (5b) can be explained as follows: ‘that’-deletion in (5b) is a phase-head C deletion which occurs in the NS. As a result, T becomes a phase-head. By adopting the idea that a label determined at the previous phase is preserved in the higher phase-levels, POP+ concludes that there is no labeling failure in (5b): since *who* in γ is in a phase edge, the φ -sharing is preserved unlike (5a).

However, POP+ also points out that this kind of analysis raises a non-trivial problem for the ECM-sentence like (6a).

(6) a. who do you $\{T, \{\text{you}, \{V, \{\gamma \text{ who}, \{\beta \text{ R}, \{\alpha \text{ who}, \text{TP}\}\}\}\}\}\}^{\text{phase}}$
 b. who do you $\{T, \{\text{you}, \{[R, v], \{\gamma \text{ who}, \{\beta \text{ R}, \{\alpha \text{ who}, \text{TP}\}\}\}\}\}\}^{\text{phase}}\}^3$

To explain the subject-to-object raising in ECM-constructions, POP+ argues that since R is universally *weak*, the φ -sharing in γ is required for β to be labeled just like the case with T in (4). However, once *who* moves to Spec,v, β should face the labeling failure same as (5a). To explain this, POP+ assumes that *de-phasing* can also be triggered by HM. When a non-phase-head undergoes HM to a phase-head

² When a head and a phrase merge, the head provides the label for the resulting set.

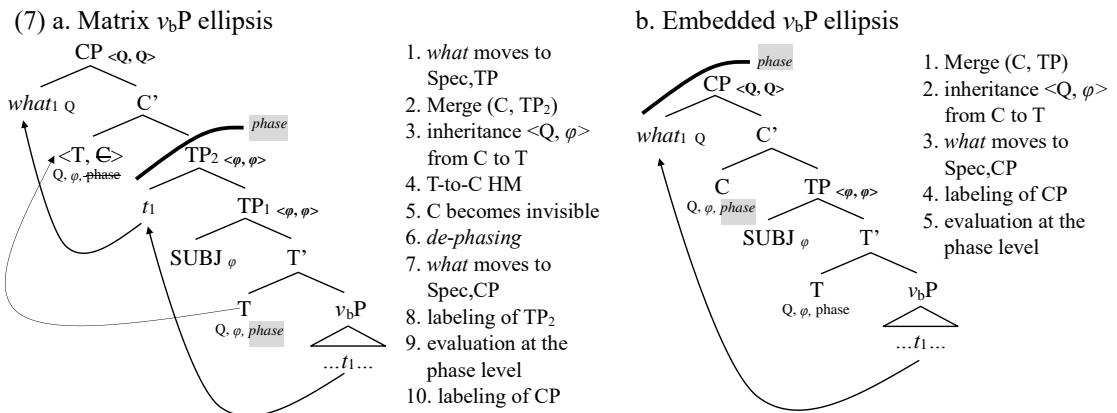
³ As for the reason of why a copy/trace of HM in this case does not become invisible to the NS and LA, we refer to Epstein et al. (2016) (cf. Bošković 2016).

triggered by an affixal nature of the phase-head, they form a *pair-merged* “amalgam”. POP+ further argues that while amalgamation is triggered by a morphological property of the affixal head, it should occur in the NS since it makes the affix in the amalgam become invisible in the NS. Then, ν in the amalgam [R, ν] in (6b) should become invisible. As a result, the phase shrinks to RP. In short, the HM, like phase-head deletion in (5b), triggers *de-phasing*.

4. Analysis

We assume that XP ellipsis occurs as soon as the licensor of XP ellipsis is introduced into the derivation (Baltin 2012; Aelbrecht 2010; cf. Park 2017). According to Lobeck (1995) and Aelbrecht (2010), the licensor of VPE is T. Park (2017) argues, based on the observation that T plays a similar role in both VPE and copular phrase ellipsis, that the licensor of a copular phrase ellipsis is T. Following Park (2017), we assume here that the licensor of copular phrase ellipsis is T. Given this, the elision of ν_b P in (1) and (2) (i.e., copular phrase ellipsis) occurs when T merges with ν_b P.

We also assume that internal merge to Spec,TP and the elision of ν_b P triggered by T are unordered, since they are the operations associated with the same head T. Therefore, at first glance, Spec,TP would seem to allow extraction from the ellipsis site in both (1) and (2). However, we propose that the reason for the asymmetry between the sentences (1) and (2) with regard to object *wh*-phrase extraction is attributable to whether the object *wh*-phrase can be located in Spec,TP (i.e., outside the ellipsis site), or not. We propose the following two distinct derivations for copular phrase ellipsis.



In (7a), the object *wh*-phrase can escape from the ellipsis site only if internal merge of the object *wh*-phrase in Spec,TP is possible as soon as T merges with ν_b P. How is such movement possible?⁴ First, we assume that C_Q in (7a) is an affix, which creates an amalgam via HM. Then, when C merges with TP, T inherits all the features and phasehood from C_Q . Due to the affixal status of C, T undergoes HM to C_Q , an amalgam [T, C] is created. Then since C_Q is not visible in the NS, T becomes the phase-head (*de-phasing*). Once *de-phasing* occurs, Spec,TP becomes a viable landing site for the object *wh*-phrase, furthermore, such movement is *necessary* as to not violate the PIC. Consequently, all the labels and movement of the object *wh*-phrase to Spec,TP in (7a) are regarded licit, since the evaluation of all the grammatical processes is applied when the phase completes (POP+.). In sum, the object *wh*-phrase can escape from the elided ν_b P when *de-phasing* occurs.

The impossibility of extraction from an embedded copular ellipsis site, as in (2b) and (3b), can be explained if embedded C_Q s are non-affixal. If so, T-to-C HM does not occur, and TP does not turn into a phase, as in (7b). If we assume that internal merge is allowed only if interface conditions along with 3rd factor principles are satisfied at the phase-level evaluation (i.e., \bar{A} -movement precedes only through phase edges), the object *wh*-phrase must move directly to Spec,CP. (and not via Spec,TP). In (7b),

⁴ POP+ assumes that any kind of acyclic merger is not allowed since it creates a “two-peaked set (Epstein et al. 2012)”(cf. Chomsky 2013).

Spec,TP, which is a non-phase edge cannot be an intermediate landing site. Then, movement of the object *wh*-phrase to Spec,TP will be judged illicit upon evaluation at the phase-level. Given that copular phrase ellipsis occurs as soon as T merges with v_bP , the object *wh*-phrase which does not move through Spec,TP must remain inside the ellipsis site when v_bP is elided.^{5, 6} In other words, extraction out of the ellipsis site will be blocked.

Our analysis fulfills SMT in explaining an apparent variability in the timing of ellipsis. Although they differ in detail, Baltin (2012) and Aelbrecht (2010) have already proposed that XP ellipsis occurs as soon as the licenser of XP is introduced into the derivation. However, their analyses alone without *de-phasing* cannot account for the asymmetry in (1) and (2). Regardless of the existence of T-to-C movement, ellipsis must occur when T merges with the ellipsis site. Then, they erroneously predicts that object *wh*-phrase extraction should be impossible, since Spec,TP cannot be an intermediate landing site of *wh*-movement. Most of all, our analysis does not require any suspicious options such as (i) the EPP, (ii) any other undesirable options utilizing Agree and arguably (iii) Agree itself.

5. Related Issues

5.1. The parametrization of C_Q : comparison with the previous analyses

Previous literature has argued that “null embedded C” is an affix (Pesekty 1991; Bošković 2011, among others). They assume that embedded null affix C itself undergoes HM to the higher head, namely lexical V, while matrix null Cs is not an affix. However, since our analysis based on POP+ assumes that the affixal head is an *attractor* of HM, there is no reason not to believe that the matrix C can be an affixal head.

Then, a question that arises here is how matrix subject questions are well-formed without T-to-C movement or its affixation to a higher head. Here is our answer: Unlike object *wh*-phrase, subject *wh*-phrase contains both Q and φ features. With a proviso that a feature bundle should undergo feature sharing simultaneously, we can say that when subject *wh*-phrase moves to Spec,TP, both features undergo feature sharing simultaneously as shown in (8a). Then, it is natural to assume that subject *wh*-phrase cannot move to Spec,CP due to “*riterial freezing effect*” as illustrated in (8b). However, T should still move to C_Q due to the affixal status of C_Q as in (8c).

(8) Who bought this book?

- a. $\{C_{(iQ, \varphi, \text{phase})}, \{ \langle Q, Q \rangle, \langle \varphi, \varphi \rangle \text{ who}_{(Q, i\varphi)}, \{T_{(iQ, \varphi, \text{phase})}, \{ \text{who}, vP \} \} \} \}$
- b. $* \{ \text{who}, \{ C_{(Q, \varphi, \text{phase})}, \{ \langle Q, Q \rangle, \langle \varphi, \varphi \rangle \text{ who}_{(Q, i\varphi)}, \{T_{(iQ, \varphi, \text{phase})}, \{ \text{who}, vP \} \} \} \} \}$
- c. $\# \{ \{ T_{(iQ, \varphi, \text{phase})}, \{ C_{(iQ, \varphi, \text{phase})} \}, \{ \langle Q, Q \rangle, \langle \varphi, \varphi \rangle \text{ who}_{(Q, i\varphi)}, \{T_{(iQ, \varphi, \text{phase})}, \{ \text{who}, vP \} \} \} \} \text{phase}$
- d. $\{ C_{(iQ, \varphi, \text{phase})}, \{ \langle Q, Q \rangle, \langle \varphi, \varphi \rangle \text{ who}_{(Q, i\varphi)}, \{T_{(iQ, \varphi, \text{phase})}, \{ \text{who}, vP \} \} \} \} \text{phase}$

But, according to POP+, movement such as in (8c) should yield a “gibberish” polar question: POP+ assumes that if a head with interpretable Q feature (iQ) is not a sister of *wh*-operator, the sentence is interpreted as a polar question in English. Then, since the moved T in the amalgam contains an inherited iQ , and since the amalgam is not a sister of any *wh*-operator, (8c) cannot be interpreted as an information

⁵ We assume that v_bP is a phase, adopting the idea that accusative vPs are also phases (Legate 2003, among others). If this is so, the object *wh*-phrase is located in Spec, v_bP . Since the target of the elision in copular phrase ellipsis is v_bP , the object *wh*-phrase must be elided along with v_bP .

⁶ In case of regular VPE, extraction out of ellipsis site is allowed both in embedded and matrix questions, as illustrated in (i).

- (i) a. What did John criticize and what did Mary?
b. I know what John criticize, but I have no idea about what Mary did.

This is because the phase VoiceP provides an escape hatch for *wh*-phrase extraction. When the verbal domains contain Voice, VoiceP but not vP , is a phase (Legate 2014, among others). The ellipsis site of regular VPE is vP , and the licenser is T. This means the elision of vP does not occur until T merges with VoiceP. When T is introduced into the derivation, the object *wh*-phases have already been located in Spec, VoiceP (i.e., outside the ellipsis site). Thus, the ellipsis site in regular VPE does not contain the object *wh*-phrases.

wh-question.⁷ The problem can be avoided if the matrix C_Q is deleted by a phase-head deletion as shown in (8d): The deletion of the affixal head can prevent the HM. Therefore (8d) will not become a “gibberish” while preserving the CP with the TP phase just as object wh-sentences like (7a) (cf. truncated IP analyses; e.g., Bošković 1997).

5.2. Farsi/Korean Data and the De-phasing Analysis

The *de-phasing* approach may also be extended to account for the Farsi extraction facts in (9) and (10). Farsi complex predicates may consist of a light verb taking a non-verbal element (e.g. NP, PP, AP) as its complement. According to Folli, Harley, and Karimi (2005), and Toosarvandani (2009), light verbs are base-generated in v , and the ellipsis site of Farsi complex predicate ellipsis is the non-verbal element of the complex predicate, as illustrated in (10) (i.e., NP in (10b)). (10) shows that this type of ellipsis allows A-bar extraction out of the ellipsis site.

- (9) rostam PIRAN-O otu na-zade(LV) vali SHARVĀR-O₁
 Rostam shirt-OBJ iron NEG-HIT.PART.3sg but pants-OBJ
 midunam ke [~~NP-t_i-otu~~] zade(LV).
 know.PRES.1sg that iron HIT.PART.3sg
 ‘Rostam did not iron the shirt, but the pants, I know he did.’ (Toosarvandani 2009)
- (10) a. rāmin [_{vP} [NP farsh-o jāru] kard(LV)]
 Ramin carpet-OBJ broom DO ‘Ramin swept the carpet.’
 b. sohrāb piranā-ro otu na-ZAD vali rostam [_{NP} piranā-ro otu]
 Sohrab shirts-OBJ iron NEG-hit.PAST.3sg but Rostam shirts-OBJ iron
 ZAD.
 hit.PAST.3sg ‘Sorab did not iron the shirts, but Rostam did.’ (Toosarvandani 2009)

This extraction fact can be accounted for as follows: Suppose first, that the verbal domain of the complex predicate contains a Voice layer and that VoiceP, not vP , is a phase (Legate 2014, among others). Suppose also, that Farsi (light) verbs moves to Voice, which is expected by the Head Movement Constraint (Travis 1984), if Farsi (light) verbs move to C (Shafiei 2016). Suppose further that, an element base-generated inside the non-verbal element moves by A-bar movement. Then, if v to Voice movement triggers *de-phasing*, Spec, vP becomes a viable intermediate landing site for movement from the elided site, similar to [Spec, TP] after T-to-C movement in English discussed above. In sum, moved element can be located outside the ellipsis site, namely Spec, vP , at the point of ellipsis:

- (11) {[zade₂, voice], [_{vP} SHARVĀR-O₁, {_v zade₂, [_{NP} SHARVĀR-O₁, otu]}]}^{phase}}

The analysis above predicts that extraction out of the complement of v would be blocked if v does not undergo HM to Voice. We will argue that the prediction is indeed borne out in Korean. Park (2017) argues that Korean has VP ellipsis, whereby the complement VP of the light verb *ha*, which functions as an ellipsis licenser and is base-generated in v , is elided. He calls this construction light verb (LV) stranding ellipsis, which is exemplified in (12).

- (12) A: John-un [_{VP} [_{CP} Mary-ka ttokttokha-ta-ko] sayngkak] ha-ess-e.
 John-TOP Mary-NOM clever-D-C think LV-PAST-D
 ‘John thought that Mary was clever.’
 B: Tom-un [_{VP} e] an-ha-ess-e.
 Tom-TOP NEG-LV-PAST-D
 ‘(Intended) Tom did not think that Mary was clever.’ (Park 2017)

⁷ Here, we assume that a so-called “double labeling” is possible. We also follow POP+ in that the substantive feature like Q should be interpretable. As for the role of (un)interpretable feature(s) in the moved head in an amalgam, see POP+ (footnote 12, page 11).

Similar to Farsi complex predicate ellipsis, the complement of the light verb (generated in v) serving as the ellipsis licenser is elided in Korean LV stranding ellipsis. However, the only difference is that v does not undergo head movement in Korean (Ahn 1991; Park 2017, among others). Then, it is predicted that extraction of an element out of the ellipsis site would not be permitted. This prediction is borne out, as illustrated in (13).

- (13) A: Bill-ul₁ Mary-nun [_{VP} [_{CP} Kim-i t₁ cohahanta-ko] sayngkak] an-ha-n-ta.
 Bill-ACC Mary-TOP Kim-NOM like-C think NEG-DO-PRES-D
 ‘Mary does not think that Kim likes Bill.’
 B: *Tom-ul₁ John-nun [_{VP} [_{CP} ~~Kim-i t₁ cohahanta-ko~~] ~~sayngkak~~] an-ha-n-ta.
 Tom-ACC John-TOP Kim-NOM like-C think NEG-DO-PRES-D
 ‘John does not think that Kim likes Tom.’ (Park 2017)

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