

# Do We Really Need to Stipulate the CED: One More Reason for Adopting the Phase Impenetrability Condition and the Copy Theory of Movement, and Thus Excluding the Constraint on Extraction Domains from the Grammar\*

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## **Abstract:**

In this article, we would like to point out that the grammar does not need the Condition on Extraction Domains (CED) proposed in Huang (1982) as a constraint. Specifically, we will point out that the CED is only phenomenal and derivable from the Phase Impenetrability Condition (PIC) proposed in Chomsky (2000, 2001a, 2001b) under the assumption of the Copy Theory of Movement (CTM) rigidly observed. Such an analysis will not only contribute to our deeper understanding of the CED as epiphenomena but also enable the grammar to make far more articulate predictions about the extractability in extraction phenomena.

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## 1 . Introduction: Basic CED-Effects

The deviance of (1) and (2) exemplifies Huang's (1982) Condition on Extraction Domains (CED) and shows that a subject or an adjunct is an island for extraction:

- (1) a. \*Who<sub>i</sub> was [ <sub>$\alpha$</sub>  a picture of  $t_i$  ] taken by Bill?  
b. \* [ Which politician ] did [ <sub>$\alpha$</sub>  pictures of  $t_i$  ] upset the voters?
- (2) a. \* [ Which book ] did you review this paper [ <sub>$\alpha$</sub>  without reading  $t_i$  ]  
b. \* Who<sub>i</sub> did John arrive [ <sub>$\alpha$</sub>  after Bill kissed  $t_i$  ]

Nunes and Uriagereka (2000) propose an interesting analysis of the CED-effects within the general framework of the Minimalist Program. Let us first consider how they analyze the subject island case of the CED-effects in (1)

Assuming that cyclicity is inviolable and passive precedes *wh*-movement, (1a) shows that extraction out of a subject yields unacceptable results. (3a) is a derivational stage of (1a) prior to the movement of DP  $\alpha$  to the specifier of T, and (3b) is the result of that movement.

- (3) a. [<sub>TP</sub> was taken [ <sub>$\alpha$</sub>  a picture of who ] by Bill ]  
b. C [<sub>TP</sub> [ <sub>$\alpha$</sub>  a picture of who ] was taken [ <sub>$\alpha$</sub>  a picture of who ] by Bill ]

Assuming Uriagereka's (1999) Multiple Spell-Out system, N and U (2000) claim that DP  $\alpha$  containing the *wh*-phrase is already spelled out independently at the stage of (3a) before its movement to the specifier of T. This is forced by their simplified version of Kayne's (1994) Linear Correspondence Axiom (LCA) as follows:

### (4) *Linear Correspondence Axiom*

A lexical item  $\alpha$  precedes a lexical item  $\beta$  iff  $\alpha$  asymmetrically c-commands  $\beta$ .

(N and U's (7))

According to N and U (2000), the number of applications of the rule of Spell-

out is determined by linearization considerations and the Spell-out operation must apply in accordance with the LCA.

Under this view, if DP  $\alpha$  were not independently spelled out before it moves to the specifier of T in (3a), the resulting structure in (3b) would not be linearizable in terms of the LCA (4) because the constituents of the upper occurrence of  $\alpha$  in (3b) would not enter into a c-command relation with lexical items in the rest of the structure. With the constituents of  $\alpha$  shipped to the PF and the LF components,  $\alpha$  is left only with its label in (3a). Accordingly, in (3b) resulting from movement of  $\alpha$  to the specifier of T, extraction out of  $\alpha$  is impossible with the constituents of  $\alpha$  gone once  $\alpha$  is spelled out, which is as if extraction out of a *lexical item* is impossible. The same analysis holds of (1b).

Similarly, the adjunct  $\alpha$  in (2a) and (2b) must be spelled out independently in accordance with the LCA before they are adjoined to the verb phrases headed by the matrix verbs because verbs do not c-command adjuncts adjoined to the verb phrases they head. Accordingly, what is adjoined in the derivations of (2a) and (2b) is only the label of the adjunct  $\alpha$ , from which allegedly follows the fact that extraction out of the adjunct is impossible.

N and Uš (2000) analysis of the CED-effects is quite attractive in their attempt to attribute the phenomena to a well-established principle, i.e. the LCA, under which to give a unified account of the two subparts of the CED-effects, i.e. the subject island case and the adjunct island case.

However, there are two problems to be found with N and Uš (2000) analysis, one conceptual and the other empirical. Conceptually, it suffers from an obvious *look-ahead* property (Collins (1997)). For example, the derivation with independent Spell-out of DP  $\alpha$  illustrated in (3) for the subject island cases in (1) is chosen based on the fact that another derivation *without* independent Spell-out of  $\alpha$  would violate the LCA at the next step of the derivation, i.e. as a result of movement of  $\alpha$  to the specifier of T. Similarly for the adjunct island cases in (2a) and (2b), the independent Spell-out of the adjunct  $\alpha$  is chosen based on the fact that another derivation *without* independent Spell-out of  $\alpha$  would violate the LCA at the next step of

the derivation, i.e. as a result of adjunction  $\alpha$  to the verb phrase because the verb does not c-command an adjunct adjoined to the verb phrase it head.

The empirical problem is that an analysis based on the LCA is too strong and predicts inadequately that extraction is generally impossible unless it is out of a complement. However, as has often been reported, the fact is more complicated and extraction out of a phrase, which is neither a subject nor a complement, often shows a better result than in the standard cases of extraction out of a subject in (1). For example, Lasnik and Saito (1992 : 101-102) point out examples in (5) claiming that extraction out of a fronted *wh*-phrase or a topic-phrase produces only a mild island effect, in contrast with extraction out of a subject.

- (5) a. ?? Who<sub>2</sub> do you wonder [ which picture of  $t_2$  ] Mary bought  $t_1$ ?  
b. ?? Who<sub>2</sub> do you wonder [ which picture of  $t_2$  ]<sub>i</sub>  $t_1$  is on sale?  
c. ?? Who<sub>2</sub> do you think that [ pictures of  $t_2$  ]<sub>i</sub>, Mary believes  $t_1$  are on sale?

With the position of the fronted *wh*-phrases in (5a) and (5b) being the specifiers of C and that of a topic phrase in (5c) arguably so, (5) shows that extraction out of the specifier of C has a better result than extraction out of the specifier of T in (1)<sup>1</sup>

Note, however, that N and U's (2000) analysis will predict unacceptability for (5): the bracketed phrases in the specifier of C must be spelled out before they move there in accordance with the LCA. Accordingly, extraction out of them should be no more acceptable than extraction out of lexical items is.<sup>2</sup>

The fact is more complicated, however, because extraction out of the subject of small clauses and that of the ECM-construction is judged unacceptable in Lasnik (2001) and Sabel (2002) as in the following:<sup>3</sup>

- (6) a. \* Who<sub>i</sub> does May consider [ friends of  $t_i$  ] idiotic?  
b. \* Of whom<sub>i</sub> does Mary consider [ friends  $t_i$  ] idiotic?  
c. \* Who<sub>i</sub> does Mary believe [ friends of  $t_i$  ] to be stupid?

d. \* Of whom<sub>i</sub> does Mary believe [ friends  $t_i$  ] to be stupid?

( Sabel § ( 40 ) )

In this case, N and U § ( 2000 ) analysis makes the right prediction and excludes ( 6 ) based on the LCA. In sum, the appropriate analysis of extraction phenomena must eliminate ( 1 ), ( 2 ) and ( 6 ), while allowing ( 5 ), and in this respect N and U § analysis based on the LCA is too strong in excluding ( 5 ). With the above two problems of N and U § analysis in mind, let us propose our analysis in the next section.

## 2 . Deriving CED-Effects

We adopt the Copy Theory of Movement ( CTM ) ( Chomsky ( 1993, 2000 ) ) in our analysis, and assume that a trace is a copy of the moved element and that a chain is conceived of as a set of occurrences of an object  $\alpha$ , where an occurrence of  $\alpha$  is a sister of  $\alpha$ , and a higher occurrence of  $\alpha$  properly contains lower ones. Crucially, we adopt Nunes ' ( 2004 ) proposal in the CTM that the heads and traces of chains are nondistinct from each other and are thus subject to the same principles of grammar.

Let us first observe a case where A-movement occurs and the chain CH is formed, as shown in ( 7 )

( 7 ) a. [ John [ was [ kissed John ] ] ]

b. CH= ( John, John )

At this point, there are two possibilities in regard to how the Case feature of the lower link is eliminated so that it does not cause LF-crash. In Chomsky § ( 1995 ) “ chain-checking ” approach, once the Case feature of the head of the chain is checked in the A-chain in ( 7b ) the Case feature of the lower link is deleted and erased, thus causing no problem on the LF side. On the other hand, in the “ link-checking ” approach proposed in Nunes ( 2004 ), movement is taken to create non-uniform chains, in that only the uninterpretable formal feature of the head of a chain is deleted. Accordingly, Nunes proposes an operation *Chain Uniformization*, which deletes the Case-feature of the

lower link of the A-chain in (7b) and renders it uniform on the LF side. Whichever way we may take for eliminating the Case feature of the lower link in (7b) under the CTM, it is true that the Case feature of the lower link of an A-chain is eliminated as a consequence of the Case-checking of the higher link.

Interestingly, however, if we pay attention to pied-piped elements in a chain, the above assumption does not hold. Let us observe (8) as an example:

(8) [[ That Mary kissed John<sub>i</sub> ] was revealed [ that Mary kissed John<sub>i</sub> ]]

While the *that*-clause in (8) forms a two-membered A-chain as the result of its movement to the specifier of T, constituents pied-piped by that movement do not form a chain. For example, two copies of *John* in (8) within the *that*-clause do not form a chain because neither c-commands the other.<sup>4</sup> In fact, their occurrences, i.e. their sisters, are exactly the same. Given that the two copies of *John* in (8) are not links of an A-chain, the analysis of the two copies of *John* in (7a) as an A-chain does not hold in this case, and the Case feature of *John<sub>i</sub>* cannot be deleted as a consequence of Case checking of *John<sub>i</sub>* in (8). The Case feature of *John<sub>i</sub>* in (8) was already checked inside the *that*-clause before the latter was merged with *revealed* so that both copies of *John* in (8) are without Case features though they do not form an A-chain. On the other hand, it is also true that the two copies of *John* seem like chain links in that they are nondistinct in terms of the initial numeration. This ambivalent property of copies of pied-piped parts of a chain, i.e. *pied-piped copies*, has not been taken as a problem because tacitly we seem to assume (9).

(9) *Assumption on Pied-Piped Copies*

Copies of a constituent  $\alpha$  sharing the same occurrence (= sister) represent a single lexical item in the initial numeration.

By definition, “copies of a constituent  $\alpha$  sharing the same occurrence (=

sister )” in (9) are pied-piped copies. It is because we generally assume that *John<sub>i</sub>* and *John<sub>i</sub>* in (8) are interpreted as if they formed a chain, i.e. as a single lexical item, though they do not satisfy the c-command condition of a chain. Crucially, (9) also implies that no matter how many times copies of a constituent  $\alpha$  may appear in a syntactic representation, as far as their occurrences (= sisters) are the same, they count as a single lexical item.

Application of pied-piping in the derivation of (8) causes no problem, due to (9). However, if a *wh*-phrase is part of the pied-piped elements, a serious problem emerges because of (9). The relevant case is the case of subject island in (1) repeated as follows:

- (1) a. \*Who<sub>i</sub> was [ $\alpha$  a picture of *t<sub>i</sub>*] taken by Bill?  
 b. \*[[Which politician]<sub>i</sub>] did [ $\alpha$  pictures of *t<sub>i</sub>*] upset the voters?

At the stage where the matrix [ $+wh$ ] C is to agree with the *wh*-phrase within the subject, (1a) and (1b) have structures in (10a) (= (3b)) and (10b), respectively. (10) differs from (8) in that *wh*-phrases with their unchecked uninterpretable features (Chomsky (2001a)) are pied-piped, and that both *who<sub>1</sub>* and *who<sub>2</sub>* in (10a) and both *which politician<sub>1</sub>* and *which politician<sub>2</sub>* in (10b) retain their uninterpretable [ $+wh$ ] features.

- (10) a. C[<sub>TP</sub> [ $\alpha$  a picture of *who<sub>1</sub>*] was taken [ $\alpha$  a picture of *who<sub>2</sub>*] by Bill ]  
 (= (3b))  
 b. C[<sub>TP</sub> [ $\alpha$  pictures of *which politician<sub>1</sub>*] ][<sub>VP</sub> [ $\alpha$  pictures of *which politician<sub>2</sub>*] ][<sub>VP</sub> upset the voters ]]

Accordingly, the matrix [ $+wh$ ] C, must agree with two *wh*-phrases to eliminate their uninterpretable features. However, we assume that C cannot multiply agree with plural number of *wh*-phrases at the same time in English so that it can agree with only one of the two *wh*-phrases in (10). Since it is generally assumed that closeness is defined under c-command, neither copy of *who*  $\bar{s}$  in (10a) or *which politician*  $\bar{s}$  in (10b) is closer to C than the other because neither copy of *who*  $\bar{s}$  in (10a) or *which politician*  $\bar{s}$  in (10b)

c-commands the other.<sup>5</sup> Therefore, C agrees either with *who*<sub>1</sub> or *who*<sub>2</sub> in (10a) and with *which politician*<sub>1</sub> or *which politician*<sub>2</sub> in (10b). As the result of Agree, the matrix C overtly attracts a *wh*-phrase to check its EPP feature. Let us take (10a) for example, and examine what would happen as the result of extracting a *wh*-phrase. One might think that if C agrees with *who*<sub>1</sub>, (11a) is derived, and if C agrees with *who*<sub>2</sub>, (11b) is derived.

- (11) a. Who<sub>1</sub> C [ TP [ α a picture of who<sub>1</sub> ] was taken [ α a picture of who<sub>2</sub> ] by Bill ]  
 b. Who<sub>2</sub> C [ TP [ α a picture of who<sub>1</sub> ] was taken [ α a picture of who<sub>2</sub> ] by Bill ]

However, we assume that neither structure in (11) is derivable as a result of *wh*-extraction in this case. Since chain-links are defined in terms of their occurrences (= sisters) in the formation of a chain (Chomsky (2000)), and *who*<sub>1</sub> and *who*<sub>2</sub> share the same occurrence, C in (10a) cannot distinguish between the two copies of *who* when it attracts the *wh*-phrase. Therefore, if the *who*<sub>1</sub> is specified as a constituent to be attracted, *who*<sub>2</sub> must be so specified as well, and vice versa. With two copies of a *wh*-phrase being attracted, structures derived from (10a) would be either (12a) or (12b) depending on which of the two is attracted first. Incidentally, the same result will be obtained for (10b)<sup>6</sup>

- (12) a. who<sub>1</sub> [ who<sub>2</sub> C [ TP [ α a picture of who<sub>1</sub> ] was taken [ α a picture of who<sub>2</sub> ] by Bill ] ]  
 b. who<sub>2</sub> [ who<sub>1</sub> C [ TP [ α a picture of who<sub>1</sub> ] was taken [ a picture of who<sub>2</sub> ] by Bill ] ]

The operation of Attract to derive (12) however, is obviously a violation of a principle of derivational economy because two copies of a *wh*-phrase need not be attracted to check the EPP feature of the matrix C, thus accounting for the deviance of (1a). The same analysis holds in (10b) and accounts for the deviance of (1b)<sup>7</sup>



Note that our analysis of the subject island cases is free of the look-ahead property of Nunes and Uriagereka's (2000) analysis that we pointed out in Section 1. The derivations of (1) are cancelled at the stage of (10) instantaneously when the [ $\alpha$   $wh$ ] C tries to attract one of the two  $wh$ -phrases. We will return to N and U's (2000) empirical problem in Section 3.2.

### 3. Consequences

#### 3.1. A Uniform Analysis of CED-effects

As in N and U (2000), our analysis also attempts a uniform account of the two subcases of CED-effects, i.e. the subject island case (1) and the adjunct island case (2), repeated as follows:

- (1) a. \*Who<sub>i</sub> was [ $\alpha$  a picture of  $t_i$ ] taken by Bill?  
 b. \*[ Which politician ] did [ $\alpha$  pictures of  $t_i$ ] upset the voters?
- (2) a. \*[ Which book ] did you review this paper [ $\alpha$  without reading  $t_i$ ]?  
 b. \*Who<sub>i</sub> did John arrive [ $\alpha$  after Bill kissed  $t_i$ ]?

We would like to propose that the two subcases are related more indirectly than proposed in N and U (2000) under the LCA. Before proposing our analysis, let us review Chomsky's (2001b) analysis of adjuncts and his (2005) account of the adjunct-island subcase, which we follow in this paper.

Chomsky (2001b) argues that adjunction of  $\alpha$  to  $\beta$  applies cyclically and attaches  $\alpha$  on a *separate plane* from where  $\beta$  lies, i.e. *the simple structure*, and that it is at Spell-Out (*Transfer*, for that matter) when the adjunct is placed on the simple structure. Notably, Chomsky proposes that the relation of c-command is defined on simple structures. Based on this assumption, Chomsky (2005) further claims that since the search domain of a probe is defined on its c-command domain, an adjunct is not in the search domain of the probe. Accordingly, the [ $\alpha$   $wh$ ] C in the derivations of (2a) and (2b) cannot agree with a  $wh$ -phrase inside the adjunct  $\alpha$ , wherever the adjunct is positioned and the inapplicability of Agree accounts for the deviance of (2a) and (2b)<sup>8</sup>



### 3.2 . Extraction out of the Specifier of C

Our account of the Subject Island Condition in Section 1 depends on our claim that redundant goal is accessible to the matrix C for Attract in the derivations of (1). In this subsection, we would like to point out the cases in which a redundant goal becomes inaccessible because it is out of the search space of the probe, i.e. the matrix C, due to the Phase Impenetrability Condition (PIC). Chomsky (2001a) states that as a consequence of the PIC, for strong phase HP with head H:

(14) The domain of H is not accessible to operations outside HP, but only H and its edge.

(Chomsky § (7))

The strong phases are CP and  $v^*P$ , where  $v^*P$  is a verbal phase with full argument structure, and the edge is either specifiers or elements adjoined to HP.

We regard Lasnik and Saito § (1992 : 101–102) examples in (5) (repeated as follows) which we quoted in Section 1 as counterexamples to Nunes and Uriagereka § (2000) analysis of the CED-effects, as examples illustrating the case in point. Remember that Lasnik and Saito (1992 : 101–102) point out that extraction out of a fronted *wh*-phrase or a topic-phrase in (5) produces only a mild island effect, in contrast with extraction out of a subject (Cf. (1a) and (1b)).

- (5) a. ??Who<sub>2</sub> do you wonder [ which picture of  $t_2$  ], Mary bought  $t_1$ ?  
b. ??Who<sub>2</sub> do you wonder [ which picture of  $t_2$  ],  $t_1$  is on sale?  
c. ??Who<sub>2</sub> do you think that [ picture of  $t_2$  ], Mary believes  $t_1$  are on sale?

In our analysis, extraction out of a moved phrase XP is banned only when a redundant pied-piped copy of a *wh*-phrase is accessible to [ +*wh* ] C as the result of the movement of the XP. However, this situation does not occur in the derivations of examples in (5) due to the PIC. For example, (5a) has

the derivational stage (15) when the [ $+wh$ ] C is to attract a *wh*-phrase.

(15) C you wonder [<sub>CP</sub> [ which picture of *who*<sub>1</sub> ]<sub>i</sub> [<sub>TP</sub> Mary [<sub>VP</sub> [ which picture of *who*<sub>2</sub> ]<sub>j</sub> ] bought [ which picture of *who*<sub>3</sub> ]<sub>k</sub> ]]]

When the matrix C attracts *who*<sub>1</sub> inside the moved *wh*-phrase<sub>1</sub>, *who*<sub>2</sub> and *who*<sub>3</sub> inside the traces of *wh*-phrase<sub>1</sub> are not accessible to the matrix C due to the PIC (14) because *wh*-phrase<sub>2</sub> and *wh*-phrase<sub>3</sub> are inside the domain of the embedded C, which is already spelled out. Accordingly, the undesirable situation observed with the derivations of (1a) shown in (12) in Section 2, i.e. formation of two distinct A-bar chains for a single *wh*-phrase, is avoided in (15). The same analysis holds for (5b) and (5c).

Our account, however, does not fully explain the acceptability of (5). Since we assume, as in Chomsky (2001a: fn.51), that *wh*-phrases have uninterpretable feature *wh*-, for the derivation continuing from (5a) to converge, uninterpretable features of *who*<sub>2</sub> and *who*<sub>3</sub> in (15) (or the uninterpretable *wh*-features of the corresponding *wh*-phrases in the derivations of (5b) and (5c) for that matter) must be eliminated one way or another. As we mentioned above, the matrix C does not agree with *who*<sub>2</sub> and *who*<sub>3</sub> in (15), and the same situation should occur for the derivations of (5b) and (5c).

As a clue to this problem, let us observe the parasitic gap constructions in the following:

(16) a. [ which politician ] did critics of *pg*<sub>i</sub> upset *t*<sub>i</sub>?  
b. [ Which paper ] did you file *t*<sub>i</sub> without reading *pg*<sub>i</sub>?

While examples in (1) and (2) showed that regular extraction out of a subject or an adjunct yields unacceptable results, (16) shows that parasitic gaps can occur within a subject or an adjunct (cf. Taraldsen (1979), Engdahl (1981), Chomsky (1982)). Since it is impossible to extract a *wh*-phrase from the CED-islands, *wh*-movement applies to the position of *t*<sub>i</sub> in (16). Assuming the CTM, let us follow Nunes and Uriagereka (2000) and Nunes

(2004) in regarding (16) as having structures in (17) as the result of *wh*-movement, where the *wh*-phrases are moved from the position of the object of *upset* in (16a) and that of *file* in (16b). The copies are numbered for ease of reference.

- (17) a. [ which politician ]<sub>2</sub> did critics of [ which politician ]<sub>3</sub> upset [ which politician ]<sub>1</sub>  
 b. [ which paper ]<sub>1</sub> did you file [ which paper ]<sub>2</sub> without reading [ which paper ]<sub>3</sub>

Reflecting the semantic interpretations, parasitic gaps in (17), i.e. [ which politician ]<sub>2</sub> in (17a) and [ which paper ]<sub>2</sub> in (17b) are coindexed with other two copies of the *wh*-phrase in each example, and several analyses have been proposed for the mechanism of coindexation. For example, Frampton (1990) claims that indexing is free at D-structure and proposes that [ which politician ]<sub>2</sub> and [ which politician ]<sub>3</sub> in (17a) bear the same index when they are base-generated at their position. Since *wh*-movement is allowed only from the position of [ which politician ]<sub>3</sub> due to the CED, [ which politician ]<sub>1</sub> and [ which paper ]<sub>3</sub> form an A-bar chain which is the *history of movement*. As for [ which politician ]<sub>2</sub> in (17a), though it is not a tail of a chain headed by [ which politician ]<sub>1</sub> arising as a history of movement, [ which politician ]<sub>1</sub>, after moved to its position by *wh*-movement, binds [ which politician ]<sub>2</sub> in (17a) and they fulfill the condition of a chain. In this condition, Frampton claims that [ which politician ]<sub>1</sub> and [ which politician ]<sub>2</sub> in (17a) form a parasitic chain. Similar analysis applies to (17b) and after moving to its position in (17b), [ which paper ]<sub>1</sub> binds [ which paper ]<sub>3</sub> and they form a parasitic chain without history of movement.

On the other hand, in N and Uš (2000) and Nunes (2004) analysis, [ which politician ]<sub>2</sub> and [ which politician ]<sub>3</sub> share the same index in (17a) because *which politician* moves from the position of [ which politician ]<sub>2</sub> to that of [ which politician ]<sub>3</sub> through *sideward movement* before moving to the position of [ which politician ]<sub>1</sub> through *wh*-movement. As in Frampton's (1990) analysis, after the application of *wh*-movement, [ which politician ]<sub>1</sub>

binds [ which politician ]<sub>2</sub> in (17a) and they form a parasitic chain without history of movement. The same analysis applies to (17b), where *which paper* moves from the position of [ which paper ]<sub>1</sub>, through sideward movement, to the position of [ which paper ]<sub>2</sub> before it moves from the position of [ which paper ]<sub>2</sub> to the position of [ which paper ]<sub>1</sub> through *wh*-movement. Also in this case, [ which paper ]<sub>1</sub> binds [ which paper ]<sub>2</sub> as the result of *wh*-movement, and they form a parasitic chain without history of movement.

At the moment, it is not clear which of the above two analysis is the more plausible answer for the question of why the parasitic gap can have the same index as the trace of *wh*-movement. However, it is obvious that whichever position may be taken, it has to be the case that grammar must have a mechanism to acknowledge a chain without history of movement, i.e. a parasitic chain (Richards (1998)). While the overt A-bar chain in (17a), i.e. CH = ([ which politician ]<sub>1</sub>, [ which politician ]<sub>2</sub>) is formed as a result of Agree (Chomsky (2001a), (2001b)), the parasitic chain CH = ([ which politician ]<sub>1</sub>, [ which politician ]<sub>2</sub>) does not result from Agree. We follow Nunes (2004 : 91) in assuming that parasitic chains are licensed by the independent operation *Form Chain*. They are formed without neither Agree nor Copying between two *wh*-phrases A and B on condition that neither A and B satisfy the relevant conditions of a chain for acting as links of a chain, specifically, c-command condition and co-indexation among links. Note that these conditions hold for [ which politician ]<sub>1</sub> and [ which politician ]<sub>2</sub> in (17a). The same situation is observed with [ which paper ]<sub>1</sub> and [ which paper ]<sub>2</sub> in (17b). The uninterpretable features of parasitic gaps are eliminated due to the fact that the gaps become part of a parasitic chain. Crucially, since the chains licensed by *Form Chain*, i.e. CH = ([ which politician ]<sub>1</sub>, [ which politician ]<sub>2</sub>) in (17a) and CH = ([ which paper ]<sub>1</sub>, [ which paper ]<sub>2</sub>) in (17b), have not undergone overt movement, it is not constrained by the CED, explaining the dependency between [ which politician ]<sub>1</sub> and [ which politician ]<sub>2</sub> in (17a) and that between [ which paper ]<sub>1</sub> and [ which paper ]<sub>2</sub> in (17b).

Nunes (2004) claims that “ *Form Chain* is an operation that applies in the course of the mapping from the numeration to LF (p.101) ” and this

character of Form Chain as an operation is clearly observed in his analysis of the parasitic construction (16a) (Nunes (2004 : 104-105)). Note that the representation (17a) for (16a) is oversimplified; assuming that the subject of a transitive verb moves from Spec of *v* to Spec of T, the structure of (16a) after the application of *wh*-movement should be (18) more precisely under the CTM, and not (17a)

(18) [<sub>CP</sub> [ which politician ]<sub>i</sub> did [<sub>TP</sub> [ critics of [ which politician ]<sub>j</sub> ]<sub>i</sub> [<sub>VP</sub> [ critics of [ which politician ]<sub>j</sub> ] upset [ which politician ]<sub>k</sub> ]]]

If we follow Nunes (2004) and insist that parasitic gaps are licensed under Form Chain, there must be *two parasitic chains* licensed at the stage of (18). That is, beside the overt A-bar chain CH1 = ([ which politician ]<sub>i</sub>, [ which politician ]<sub>k</sub>), Form Chain must license two parasitic chains, i.e. CH2 = ([ which politician ]<sub>i</sub>, [ which politician ]<sub>j</sub>) and CH3 = ([ which politician ]<sub>i</sub>, [ which politician ]<sub>k</sub>) and thereby eliminate the uninterpretable features of [ which politician ]<sub>j</sub> and [ which politician ]<sub>k</sub>. Note that [ which politician ]<sub>j</sub> and [ which politician ]<sub>k</sub> are not links of the same chain because neither c-commands the other. Since the occurrences (= sisters) of [ which politician ]<sub>j</sub> and [ which politician ]<sub>k</sub> are the same, CH2 and CH3 are non-distinguishable at LF-interface, and we assume that if both of them remained at LF-interface, they would be interpreted as a single chain.<sup>11</sup> However, the fact remains that at the stage of (18) Form Chain has licensed two parasitic chains and thereby eliminated the uninterpretable [ +*wh* ] features of [ which politician ]<sub>j</sub> and [ which politician ]<sub>k</sub>. It may seem counterintuitive that two parasitic chains are formed in the derivation of (16a) but as far as we assume that Form Chain is another type of operation (like *Agree*) for eliminating uninterpretable features, it seems natural for Form Chain to apply twice at the stage of (18) because there are two copies of *wh*-phrases with uninterpretable [ +*wh* ] features under the CTM.

Following Nunes (2004) claim that “ Form Chain is an operation that applies in the course of the mapping from the numeration to LF (p.101) ” we can assume that it applies at the stage of the root CP-phase in the narrow

syntax in (18) because the parasitic gaps [ which politician ]<sub>2</sub> and [ which politician ]<sub>3</sub> are not spelled out yet and still visible from the root C in (18). On the other hand, Form Chain must apply to the structure of (17b) in LF-component because if the whole chains can be inspected across strong phases (Nunes and Uriagereka (2000 : 42) it is not until the derivations reach LF-component. As we mentioned in Section 3.1, following Chomsky (2001b) as an adjunct *without reading* [ which paper ]<sub>3</sub> in (17b) is attached on a *separate plane* in the narrow syntax, and is placed on *the simple structure* at Spell-Out (*Transfer*, for that matter). Therefore, it is not until after Spell-out, i.e. LF-component, that [ which paper ]<sub>3</sub> inside the adjunct gets in the search domain of the root C, and licensed as a link of a parasitic chain formed by Form Chain.

Now, having the above-mentioned Nunes(2004) analysis of (16a) let us return to our problem of (5), repeated in the following:

- (5) a. ??Who<sub>2</sub> do you wonder [ which picture of t<sub>2</sub> ]<sub>1</sub> Mary bought t<sub>1</sub>?  
 b. ??Who<sub>2</sub> do you wonder [ which picture of t<sub>2</sub> ]<sub>1</sub> t<sub>1</sub> is on sale?  
 c. ??Who<sub>2</sub> do you think that [ picture of t<sub>2</sub> ], Mary believes t<sub>1</sub> are on sale?

After the application of *wh*-movement, under the CTM, (5a) for example, has the representation (19)

- (19) Who<sub>1</sub> C you wonder [ <sub>CP</sub> [ which picture of who<sub>2</sub> ]<sub>1</sub> [ <sub>TP</sub> Mary [ <sub>VP</sub> [ which picture of who<sub>3</sub> ]<sub>2</sub> ] bought [ which picture of who<sub>4</sub> ]<sub>3</sub> ] ] ]

For the representation (19) to converge, uninterpretable *wh*-features of the copies of *who* which are not links of the overt A-bar chain CH1 = (who<sub>1</sub>, who<sub>2</sub>) i.e. *who*<sub>3</sub> and *who*<sub>4</sub>, must be eliminated by Form Chain. Since *who*<sub>3</sub> does not c-command *who*<sub>4</sub>, Form Chain must form two parasitic chains, i.e. CH2 = (who<sub>1</sub>, who<sub>3</sub>) CH3 = (who<sub>1</sub>, who<sub>4</sub>) for eliminating the uninterpretable *wh*-features of *who*<sub>3</sub> and *who*<sub>4</sub>. Crucially, this is exactly the same structural environment as (18), i.e. the derivational stage for the parasitic gap construction (16a) at which Form Chain applies. The only difference is the



derivational stages where Form Chain applies in each case. When the derivational stage of (18) is reached in the narrow syntax after the movement of the overt movement of *which politician*, Form Chain can apply and license parasitic chains CH2 = ([ *which politician* ]<sub>1</sub>, [ *which politician* ]<sub>2</sub>) and CH3 = ([ *which politician* ]<sub>1</sub>, [ *which politician* ]<sub>3</sub>) with no violation of the PIC because [ *which politician* ]<sub>2</sub> and [ *which politician* ]<sub>3</sub> are not part of spelled out portions at that stage.<sup>12</sup> On the other hand, (19) must be a representation at LF because in the narrow syntax, *who*<sub>1</sub> cannot form parasitic chains with *who*<sub>3</sub> and *who*<sub>4</sub> due to the PIC and it is only at LF level that chain identification can proceed across spelled-out portions ( Nunes and Uriagereka(2000 : 42 )) We don't regard this as a problem because we follow Nunes (2004) in assuming that " Form Chain is an operation that applies in the course of the mapping from the Numeration to LF (p.101) " With Form Chain being an operation to eliminate uninterpretable features, it can apply no matter how many times to eliminate uninterpretable features, as needed. Therefore, we assume that if Form Chain contributes to convergence of the parasitic gap constructions, it should operate in (19) as well. After the uninterpretable features of *who*<sub>3</sub> and *who*<sub>4</sub> in (19) are eliminated under Form Chain at LF, the two parasitic chains CH2 = ( *who*<sub>1</sub>, *who*<sub>3</sub> ) and CH3 = ( *who*<sub>1</sub>, *who*<sub>4</sub> ) being non-distinct, are reinterpreted as a single chain CH2/3 = ( *who*<sub>1</sub>, *who*<sub>3/4</sub> ) at LF-interface. Note, further, that this reinterpreted chain is not distinguishable in terms of its occurrence ( =sister ) from the overt *wh*-chain CH1 = ( *who*<sub>1</sub>, *who*<sub>2</sub> ) formed in the narrow syntax. Accordingly, (5a) is interpreted at LF-interface as containing a single A-bar chain CH1/2/3 = ( *who*<sub>1</sub>, *who*<sub>2/3/4</sub> ). Basically the same analysis applies to (5b) and (5c) and interprets them at LF-interface as having a single A-bar chain, as in (5a)

In sum, we proposed that examples like those in (5) which seem to pose a serious problem for the previous analyses of the CED, are licensed through formation of parasitic chains, as in the case of the standard parasitic gap constructions. The only difference between examples like (5) and the parasitic gap constructions is that while all the A-bar chains formed in the derivations of (5) are reinterpreted at LF-interface as a single A-bar chain, two *wh*-chains remain in the case of the latter.

### 3.3 . Extraction out of Specifier of $\nu$ P

As observed in Section 3.2, it is allowed to extract a *wh*-phrase out of a head of an *A-bar chain* (See (5)). In contrast, Lasnik (2001 : 112) and Sabel (2002) point out the unacceptability of examples like the following, where a *wh*-phrase is extracted out of a head of an *A-chain*:<sup>13</sup>

- (20) a. \*Who does Mary consider [ friends of *t* ] to be stupid?  
b. \*Of whom does Mary consider [ friends *t* ] to be stupid?  
( Sabel (2002 : 293) )

For the analysis of the ECM-constructions in (20), let us follow Koizumi (1995), and assume that ECM subjects overtly move to the matrix object position, i.e. the specifier of  $\nu$ . Therefore, the question that arises is why *wh*-movement is prohibited from extracting a *wh*-phrase out of a head of an *A-chain* in (20) while it can extract a *wh*-phrase out of a *wh*-phrase in the specifier of C in (5) in Section 3.3.

We also adopt Lasnik's (1999) proposal that while *A-bar* movement, which typically creates an operator-variable relation, needs to leave a trace, *A*-movement does not leave a trace, i.e. a copy. If this claim is on the right track, there is no such object as a nontrivial *A-chain*; an argument is invariably a single-membered chain.<sup>14</sup> However, it is not clear how this claim is executed technically if we understand Move as the description of the interaction of the independent operations Agree/Pied-Pipe/Merge (Chomsky (2001a)) and a copy is inevitably left as a result of any type of Move. In this respect, let us propose that the absence of a "trace," i.e. a copy, of *A*-movement is a natural result of the fact that it does not contain any unchecked uninterpretable features or any features that are relevant to the interpretation at LF-interface when the structure containing it is handed to the semantic component by TRANSFER (Chomsky (2001b))<sup>15</sup>

With these assumptions, let us return to (20). In those examples, since the ECM subjects are raised to the matrix  $\nu$ P-Spec, i.e. to the edge of  $\nu$ P-phase, before *wh*-movement applies, a copy of *A*-movement, i.e. *friends* of *whom* occupying the specifier of the complement TP is already spelled out

when *wh*-movement applies. However, this copy contains a *wh*-phrase with an unchecked uninterpretable feature, i.e. *wh*-feature (cf. Chomsky (2001a : fn.51)). If this uninterpretable feature remains at LF-interface, the derivations of (20) will crash at LF. In our analysis, the only way for it to be eliminated is for the *wh*-phrase containing it to form a secondary chain at LF with the *wh*-phrase in the specifier of the matrix C, as in the derivations of the examples in (5) in Section 3.3. (21) is the LF-representation of (20a):

(21) Who<sub>i</sub> does Mary consider [<sub>VP</sub> [<sub>NP</sub> friends of who<sub>i</sub>] [<sub>TP</sub> [<sub>NP</sub> friends of who<sub>k</sub>] to be stupid ]]

However, for *who<sub>i</sub>* and *who<sub>k</sub>* to form a secondary chain at this stage, i.e. at LF-interface (in addition to the primary *wh*-chain *who<sub>i</sub>*, *who<sub>i</sub>* already formed in the narrow syntax), they must remain at LF-interface. On the contrary, the existence of the *wh*-phrase *who<sub>k</sub>* in (21) seems to contradict with the assumption in Lasnik (1999) mentioned above that there is no non-trivial A-chain; with *who<sub>k</sub>* being a subpart of a copy left by A-movement, if it remains at LF-interface, the copy of A-movement containing it must also remain at LF-interface. In sum, the derivation of (20a) crashes at the stage of LF-interface (21) because the presence of the copy of A-movement containing *who<sub>k</sub>* violates Full Interpretation, with there being no such object like trace of A-movement. The same analysis holds of (20b)<sup>16</sup>

Our analysis of (20) in this section is also applicable to the following well-known Basque example pointed out by Uriagereka (1988):

(22) \*Nori buruzko sortu zituzten aurreko asteko istiluek  
 who about-of create scandals last week scandals  
 zurrumurruak.  
 rumors.  
 ' Who have last week's scandals caused [ rumors about ] '  
 (Uriagereka (1988 : 395))

Uriagereka (1988) claims that objects also raises overtly in Basque, and

points out that extraction out of *objects* is not allowed in Basque, as illustrated in (22). Assuming that Basque objects are raised to the edge of  $v^*$ , exactly the same analysis that applied to (20) applies to (22) and accounts for its unacceptability. That is, for the derivation of (22) to converge, at LF-component, Form Chain must form a parasitic A-bar chain consisting of the *wh*-phrase in the matrix Spec of C and the *wh*-phrase within the trace of the object. However, this application of Form Chain is impossible because the trace of the overtly moved object should not be present at LF-interface.

### 3.4 . An Exception to the Subject Condition

Chomsky (2005) doubts Huang's (1982) assumption that the surface subject is an island and points out that extraction from the subject of a passive construction in the following example is acceptable, where the *wh*-phrase is moved with pied-piping.<sup>17</sup>

- (23) a. it was the CAR ( not the TRUCK ) of which [ the ( driver, picture )  
was found ]  
b. of which car was [ the ( driver, picture ) awarded a prize ]  
( Chomsky's (2005) (7) )

On the other hand, he further points out that extraction from the transitive examples like those in (24) is deviant.

- (24) a. \*it was the CAR ( not the TRUCK ) of which [ the ( driver, picture )]  
caused a scandal  
b. \*of which car did [ the ( driver, picture ) ] cause a scandal  
( Chomsky's (2005) (6) )

In this paper, we can ill afford to introduce Chomsky's (2005) analysis, where (23) is generated and (24) excluded. However, it is noteworthy that Chomsky (2005 : fn.35) notes that extraction from the transitive examples is not necessarily deviant by pointing out the following example:

(25) of which books did the authors receive the prize

We suppose that if extraction out of the subject of transitive examples is allowed depending on the theta role of the subject, as Chomsky himself suggests, we should not over-generalize from the observation of (24) that extraction from transitive examples are deviant. Therefore, we conclude from (23) and (25) that, if accompanied by pied-piping, extraction from subject is allowed in English.<sup>18</sup>

Acceptability of examples in (23) (and (25) for that matter) may discourage one from treating subject as an island. Our analysis, however, does not stipulate that subject is an island. We claimed that the islandhood of subject is due to the fact that [ +wh ] C probe attracts two possible goals out of a surface subject and of its trace, i.e. its copy. Remember that we proposed that (1a) and (1b) have structures (10a) and (10b), respectively, at the stage where wh-movement is to apply, with (1) and (10) repeated as follows:

- (1) a. \*Who<sub>i</sub> was [  $\alpha$  a picture of  $t_i$  ] taken by Bill?  
b. \***[ Which politician ]** did [  $\alpha$  pictures of  $t_i$  ] upset the voters?
- (10) a. **Q**<sub>TP</sub> [  $\alpha$  a picture of who<sub>1</sub> ] was taken [  $\alpha$  a picture of who<sub>2</sub> ] by Bill ]  
( = (3b) )  
b. **Q**<sub>TP</sub> [  $\alpha$  a picture of which politician<sub>1</sub> ] **I**<sub>VP</sub> [  $\alpha$  a picture of which politician<sub>2</sub> ] upset the voters ]]

Since it is obvious that pied-piping contributes to the acceptability of (23) and (25) we are now faced with the question why the application of pied-piping cancels the islandhood of subject in (1)

As we proposed in Section 2, at the stage of (10) the [ +wh ] C was forced to attract two wh-phrases inside a subject and its copy because they are equally close to C and non-distinguishable in terms of their occurrences ( =sisters ) On the other hand, as Chomsky (2001b) claims, elements to be moved under Agree are determined not by the features of a probe but by *the uninterpretable feature of the goal*. Considering in this light the derivations of (23) (and (25) for that matter), since each of the two wh-phrases in

those examples has the option of triggering pied-piping, there should be four possible representations for each example at the stage when [ + *wh* ] C is to attract its goal. For example, (23b) can have four possible representations in (26) where [ + *wh* ] C has already agreed with either of the two copies of *which car*. The italicized phrases labeled  $\alpha$  in (26) are PPs pied-piped by the *wh*-phrase.

- (26) a. C was [ TP [ DP a picture of [  $\alpha$  *which car* ] ] awarded [ DP a picture of [  $\alpha$  *which car* ] ] a prize ] ?
- b. C was [ TP [ DP a picture [  $\alpha$  *of which car* ] ] awarded [ DP a picture [  $\alpha$  *of which car* ] ] a prize ] ?
- c. C was [ TP [ DP a picture [  $\alpha$  *of which car* ] ] awarded [ DP a picture of [  $\alpha$  *which car* ] ] a prize ] ?
- d. C was [ TP [ DP a picture of [  $\alpha$  *which car* ] ] awarded [ DP a picture [  $\alpha$  *of which car* ] ] a prize ] ?

As in the derivation of (1) proposed in Section 2, *wh*-extraction in (26a) and (26b) violates the principle of derivational economy: In order to check its EPP-feature, the [ + *wh* ] C in (26a) and (26b) is forced to extract two copies of a *wh*-phrase redundantly because the two *wh*-phrases have the same occurrence (= sister) with the two *wh*-phrases not having triggered pied-piping in (26a) and having triggered it and picked up the containing PP in (26b)

On the other hand, the pied-piped PP in (26c) and (26d) is licitly extractable because in those examples, only one of the two copies of the *wh*-phrase has triggered pied-piping and picked up the PP so that the extraction of a *wh*-phrase is not accompanied by that of the other, with the two copies of a *wh*-phrase having distinct occurrences (= sisters). The occurrence of *which car* is *of* and that of *of which car* is *picture* in (26). That is, in (26c) and (26d), though the two copies of the *wh*-phrase are in the search domain of and in the same distance from the [ + *wh* ] C, C can, in fact, *must* extract a single copy of a *wh*-phrase. The extraction of the pied-piped *wh*-phrase in (26c) results in (27a) and that of the same phrase in (26d) results in

(27b)<sup>19</sup>

- (27) a. [<sub>α</sub> of which car ] C was [ TP [ DP a picture [<sub>α</sub> of which car ] ] awarded  
[ DP a picture of [<sub>α</sub> which car ] ] a prize ] ?  
b. [<sub>α</sub> of which car ] C was [ TP [ DP a picture of [<sub>α</sub> which car ] ] awarded  
[ DP a picture [<sub>α</sub> of which car ] ] a prize ] ?

Both (27a) and (27b) are pre-spelled out structures, in which a trace of a moved DP, i.e. *a picture of which car*, is still retained, and they both contain a copy of the *wh*-phrase *which car* whose uninterpretable *wh*-features are not eliminated. For the derivations continuing from (27) to converge at LF-component, where traces of A-movement cannot exist, the uninterpretable *wh*-feature of the *wh*-phrase which have not undergone *wh*-movement must be eliminated. We assumed in Section 3.2. that Form Chain is an operation that applies in the course of the mapping from the numeration to LF. Note, in this light, that in (27a) [<sub>α</sub> of which car ] in the specifier of C binds the PP *of* [<sub>α</sub> which car ] within the *trace* of the moved DP, and in (27b) it binds the same PP within the *head* of the moved DP, and that Form Chain can come into play in each case to eliminate the uninterpretable[ + *wh* ] features of the *wh*-phrases which have not undergone *wh*-movement. After Form Chain applies to (27) traces of the moved DP is eliminated at LF-component, and the derivations will converge, accounting for the acceptability of (23b). Essentially the same analysis applies to (23a) (whose derivation also undergoes extraction out of subject) and (25) (for that matter)<sup>20</sup>

### 3.5 . Extraction and the Double Object Construction

Runner (2001) points out that while extraction of a *wh*-phrase out of the first object in the so-called double object construction is not allowed, extraction out of the second object is permitted as shown in the following:.

- (28) a. \*Who did you say John sent [ a friend of *t* ] a book?  
b. Who did you say John sent me [ a picture of *t* ] ?





*economy*.<sup>21</sup>

In sum, the deviance of (28a) which represents islandhood of the first object of the double object construction, is explained on a par with the subject island case in (1)<sup>22</sup>

### 3.6 . TH/EX

Observing the following constructions (Chomsky § (2001a) (22ii) and (22iii)), Chomsky claims that where the construction is unaccusative or passive, surface structure of the form [ V-DO ] is not allowed in English:

- (33) a. \*There arrived a strange package in the mail.  
b. \*There was placed a large book on the table.

He further points out that this gap, which is quite idiosyncratic to English and not observed in other languages like Italian or Dutch, is filled by constructions such as (25) (Chomsky § (2001a) (24)), where the object of the passive participle is moved leftward (34a) or rightward (34b)

- (34) a. There were several packages placed on the table.  
b. There were placed on the table several (large) packages.

According to Chomsky, these idiosyncratic constructions are derived by a phonological rule “Thematization/Extraction” (TH/EX), which applies at the level of a weak phase vP (v a light verb marking unaccusative/passive). In the derivation of (34a), TH/EX applies to DP *several packages* and substitutes it in the specifier of v, and in (34b), it adjoins *several (large) packages* to vP, in both cases leaving a copy without phonological features. Since TH/EX allegedly applies in the phonological component, the object moved by TH/EX is inaccessible to syntactic rules. This claim explains unacceptability of the following examples:

- (35) a. \*How many packages did there arrive in the mail?  
(Chomsky § (28i))

- b. \*How many packages were there placed on the table?

( Chomsky § ( 28ii ) )

- (36) a. \*What did there arrive in the mail some books about *t*?

( Chomsky § ( 33iv ) )

- b. \*What topics were there some books about *t* ( being ) sold in Boston stores?

( Chomsky § ( 33vi ) )

With only the traces of the moved objects being visible to a probe C, C can agree with the trace of the moved object in (35) and with the *wh*-phrase inside the trace in (36). Chomsky argues, however, that by a principle of UG, pied-piping requires phonological content, making the trace in (35) and the *wh*-phrase inside the trace in (36) inaccessible to Move, explaining the deviance of (35) and (36).

In his account of (35) and (36), Chomsky (2001a) attributes their unacceptability to the property of *trace* left by TH/EX, specifically to his assumption that empty category disallows pied-piping. He does not consider the property of the moved object as a factor for the unacceptability of (35) and (36) because the object is moved by an operation in the phonological component, i.e. TH/EX, so that the moved object is not accessible to the narrow syntax.

However, if the above analysis is on the right track, unacceptability of (35) and (36) trivially follows in our analysis, irrespective of the property of the traces.<sup>23</sup> Note that in our analysis, if extraction of a *wh*-phrase out of an already moved phrase XP results in deviance unless the uninterpretable [ *wh*- ] feature of other copies of the *wh*-phrase within the “ trace ” (or “ traces ”) of XP is somehow eliminated in the derivation. In other words, if *wh*-extraction applies to a *wh*-phrase within an already moved phrase, uninterpretable features of all the copies of the *wh*-phrase within all the chain-links of the moved phrase must be eliminated in the derivation. If, as Chomsky claims, TH/EX is a phonological rule, it cannot move a phrase containing a *wh*-phrase because the uninterpretable [ *wh*- ] feature of the *wh*-phrase within

the *head* of the chain becomes inaccessible to a probe in the narrow syntax and cannot be eliminated. Since it is not accessible at LF-component, Form Chain cannot eliminate it, either.

#### 4 . Remaining Problems

We would like to leave the unacceptability of the following examples for future research.

- (37) a. \*Which book<sub>i</sub> did you borrow <sub>it</sub> [ PP after leaving the bookstore [ PP without finding *pg?* ] ]  
b. \*Which politician<sub>i</sub> did you criticize <sub>it</sub> [ PP before [ pictures of *pg* ] upset the voters ] ?

( Nunes ( 2004 : 117 ) )

Although ( 16 ) in Section 3.2 shows that parasitic gaps can occur within a CED island, ( 37 ) shows that they cannot be embedded further within a CED island ( see Kayne ( 1984 ) Contreras ( 1984 ) and Chomsky ( 1986 ) ) Nunes and Uriagereka ( 2000 ) and Nunes ( 2004 ) propose an account of the parasitic gap construction with recourse to what they term *sideward movement*, which allegedly allows ( 16 ) and rules out ( 37 )

#### 5 . Concluding Remarks

To summarize, we have argued that under the general assumptions of the copy theory of movement and the economy principle banning superfluous steps in derivation, the CED-effects are derivable from the PIC. We further argued that the PIC-based CED account is superior to the CED as a constraint in being capable of making a more accurate prediction about the extractability of *wh*-phrases, and explains apparent counter-examples to the CED. Specifically, we claimed that the extractability of a *wh*-phrase XP out of a previously moved phrase YP differs mainly depending on two factors, i.e., whether the trace ( = copy ) of YP is visible in the narrow syntax when XP is extracted or whether the movement of YP is A-movement or A-bar movement. The former factor crucially interacts with the PIC and the latter with the assumption that A-movement does not leave a trace.

## Footnotes

\*I am grateful to Hideki Maki and Željko Bošković for the discussions on this topic.

- 1 . We follow Authier (1992) and assume that the complement clause in (5c) has iterated-CP structure and that the embedded topic in (5c) i.e. *pictures of t*, is located in the specifier of the lower C.
- 2 . In addition to (5), the claim that *wh*-extraction out the specifier of C is allowed seems to be supported by the following empirical evidence. The first evidence concerns McCloskey's (2000) claim concerning quantifier-float as stranding under A-bar movement. McCloskey points out that a variety of Irish English in West Ulster allows quantifier-float with A-bar movement. Following Sportiche (1988), he takes quantifier-float as the result of stranding and analyzes (ia) as the result of stranding of the quantifier *all* as in (ib):

- ( i ) a. What did you get all for Christmas?  
b. What did you get [ all t ] for Christmas?

He further points out that stranding under A-bar movement can occur in more than one position as in ( ii ):

- ( ii ) What did John say ( all ) that Peter ate ( all ) for breakfast?

It is noteworthy that in ( ii ), the leftmost position of the stranded quantifier is most probably the specifier of C. In McCloskey's analysis, this shows that the *wh*-phrase can move out of the specifier of C, more specifically, out of a QP positioned in the specifier of CP, and supports the claim above. The second evidence concerns Spanish examples in ( iii ), which Chomsky (1986) attributes to Torrego's (1985) observation:

- ( iii ) a. \*esta es la autora [ de la que ] [ <sub>IP</sub> [ varias traducciones *t<sub>i</sub>* ] han ganado premios internacionales ]
- a.' this is the author by whom several translations have won international awards
- b. [ de que autora ] no sabes [ <sub>CP</sub> [ que traducciones *t<sub>i</sub>* ] han ganado premios internacionales ]
- b.' by which author don ' t you know what translations have won international awards

( Chomsky ( 1986, p.26 ) )

While the deviance of ( iiia ) shows that the subject is an island for *wh*-extraction in Spanish ( a CED effect ), the acceptability of ( iiib ) shows that the specifier of C is not an island for extraction. Therefore, as Torrego ( 1985 ) and Chomsky ( 1986 ) observe, the islandhood of a subject is cancelled if the latter moves to the specifier of C. From these facts, we conclude that an element inside an edge of a strong phase is accessible for extraction, which will be crucial for our account of the Subject Condition, i.e. a subpart of the CED, especially for our account of ( 1b ) in Section 2.

- 3 . While we regard ( 6 ) as unacceptable adopting Lasnik ' s ( 2001 ) and Sabel ' s ( 2002 ) judgment, let us note that Doherty ( 1997 : 211, fn.18 ) judges relevant examples differently, and regards not only the extraction out of a phrase in the specifier of C, i.e. ( ia ) but also the extraction out of a subject of the ECM and small clause complement, i.e. ( ib ) and ( ic ) as having relative acceptability:

- ( i ) a. This is the author by whom<sub>i</sub> we don ' t know [ <sub>CP</sub> what books *t<sub>i</sub>* [ <sub>IP</sub> to read ] ]
- b. Who do you believe [ <sub>IP</sub> [ friends of *t<sub>i</sub>* ] to be stupid ] ] ?
- c. Who do you consider [ <sub>SC</sub> [ friends of *t<sub>i</sub>* ] stupid ] ] ?

( Doherty ( 1997 : 211. fn. 18 ) )

- 4 . For ease of reference, we use different indices for two copies of *John* in

(8) though they are a single lexical item in the initial numeration.

- 5 . One might wonder if C can agree with *which politician*<sub>2</sub> in (10b) because the latter is within the edge of  $v^*P$ . We assume, however, that from the observation of (5) in Section 1 and the examples in fn.2, elements within the edge of a strong phase, i.e.  $v^*P$  or CP, is accessible to the probe above.
- 6 . Considering Chomsky's (2001a) claim that Pied-Piping requires phonological content, one might argue that *who*<sub>2</sub> in (10a) and *which politician*<sub>2</sub> in (10b) cannot be extracted because they are within traces. However, Chomsky (2001a) also claims that features deleted under Agree remain until the strong phase level, where the deleted features are stripped away at Spell-Out. Accordingly, *who*<sub>2</sub> in (10a) and *which politician*<sub>2</sub> in (10b) (or traces of DP  $\alpha$  containing them, for that matter) do retain phonological features when C agrees with them and it is not the case that they are prevented from moving due to the lack of phonological content.
- 7 . One might argue that, as is different from the derivation for (1a), two copies of a *wh*-phrase are not extracted at the stage of (10b) because *which politician*<sub>2</sub> is within the edge of  $v^*P$ , and that extraction is impossible out of the edge of  $v^*$ . However, as we observed in (5) in Section 1 and fn. 2, we have evidence that edge of C, i.e. another strong phase head, is not an island. Therefore, we assume that the edge of strong phases CP and  $v^*P$  are not islands, and that two copies of a *wh*-phrase are extracted in the derivation of (1b) as well as in (1a).
- 8 . As for the question of why adverbial *wh*-phrases like *where*, *why*, *how*, or *when*, can undergo *wh*-movement, I presume that a possible answer is that being cyclically adjoined to an object on the simple structure, an adjunct itself, though on a separate plane, is still in contact with the simple structure and is accessible to Agree.

- 9 . This account also applies to the ban on extraction out of relative clauses ( i ) nominal complements ( ii ) or complements of verbs of manner of saying ( iii ) because these structures are arguably adjuncts ( hence, on a separate plane )
- ( i ) \*Who did John meet [ the woman [ that kissed  $t$  ] ] ?
- ( ii ) \*Who did John listen to [ rumors [ that Peter kissed  $t$  ] ] ?
- ( iii ) \*Who did John grunt [ that Mary likes  $t$  ] ?
- 10 . Subordinate clauses headed by complementizers like *if* or *when* are known to function like complements, in so-called *irrealis* usage. We assume that in such cases the apparent subordinate clauses, i.e. the apparent adjuncts, occur within VP, thus showing the properties typical of complements. Cf. Pesetsky (1995) for the references concerning irrealis *if* or *when*. We also regard the so-called *restructurable* PPs as only apparent adjuncts within VP. If such an approach is on the right track, there seems to be no need to adopt restructuring for explaining the extractability out of PPs.
- 11 . In the next section we will adopt Lasnik's (1999) claim that A-movement does not leave traces. If this assumption is on the right track, the parasitic chain CH3 = ( [ which politician ]<sub>i</sub>, [ which politician ]<sub>j</sub> ) formed in (18) cannot remain at LF-interface because the tail of that chain, i.e. [ which politician ]<sub>j</sub>, is within the trace of an A-chain in (18)
- 12 . We assume, as in fn.2, that an element in the specifier of a strong phase is accessible to the next higher strong phase head so that [ which politician ]<sub>j</sub> in (18) is accessible to the operation of Form Chain at the root CP-phase level. Cf. fn.2.
- 13 . Let us mention, for the fairness of description, that Doherty (1997 : fn.18) judges his equivalents of the examples in (20) as *relatively acceptable*.

- 14 . While Chomsky ( 1995 ) argues that at least the initial trace of A-movement is needed for theta-theoretic reasons, Lasnik ( 1999 ) claims that theta-roles are checked in the course of a derivation.
- 15 . Similar idea was pursued in Sato ( 2006 ) for executing Lasnik § ( 1999 ) claim that A-movement does not leave a “ trace. ”
- 16 . It might seem that our analysis of the Subject Condition in Section 2 contradicts with the assumption that A-movement does not leave a trace. We claimed that the examples in ( 1 ) do not converge because in their derivations, *wh*-movement inappropriately extracts two *wh*-phrases, i.e. one from the head and the other from the trace of the A-chain of the DP containing the *wh*-phrase (cf. the analysis of ( 1a ) in ( 12 )) However, if, as we claimed in the text, a trace of an A-chain remains until it is spelled out, our analysis of ( 1 ) in Section 2 is not affected by the assumption above.
- 17 . Attributing the observation to Kuno ( 1972 ), Chomsky ( 1986 ) already pointed out the fact that *wh*-movement out of a subject is more acceptable with pied-piping, particularly in relatives. Chomsky suggests that PP-extraposition precedes *wh*-movement in the derivation of ( i ) thus avoiding a violation of Subjacency.
- ( i ) he is the person of whom [ IP pictures are on the table ]  
( Chomsky § ( 1986 ) ( 64 ) )
- 18 . We suppose that if ( 25 ) is acceptable, the unacceptability of ( 24 ) should be explained in the realm of semantics, and leave ( 24 ) unexplained. Cf. Broekhuis ( 2005 ) as for criticisms against Chomsky § ( 2005 ) claim that examples like ( 23 ) undergo extraction.
- 19 . Of course, the derivation involving the operation of pied-piping applied twice in ( 26b ) should violate a principle of derivational economy since the derivation will converge through applying pied-piping only once as in



(26c) and (26d). We also assume that extraction of DP, not PP, in (26c) and (26d) with pied-piping having no effect is prohibited by the derivational economy.

20. One might point out that while (23) and (25) show that the operation of pied-piping in *wh*-movement can void the islandhood of a subject out of which a *wh*-phrase is extracted, unacceptability of (20b) relative to (20a) in Section 3.3 shows that pied-piping cannot void the islandhood of an element moved to the edge of *v*. Since both subjects in (23) and (25) and the ECM subject in (20b) have undergone A-movement, it seems difficult to distinguish between these two cases. With the application of pied-piping improving the acceptability of extraction out of subject in (23) and (25) relative to (1) one might wonder why (20b) is not judged as more acceptable than (20a) in Section 3.3. (20) is repeated as follows for ease of reference:

- (i) a. \*Who does Mary consider [ friends of *t* ] to be stupid?  
 b. \*Of whom does Mary consider [ friends *t* ] to be stupid?  
 (Sabel (2002 : 293)) (= 20)

However, our analysis precisely predicts these differences of acceptability. That is, (23) and (25) are better than (1) because in the derivations of the former, Form Chain can apply and eliminate the uninterpretable feature of the *wh*-phrase which has not undergone *wh*-movement before it is spelled out. On the contrary, in the case of (20b) as well as (20a) Form Chain cannot apply until the derivation reaches LF-interface due to the PIC. However, if Form Chain must wait until LF-component to eliminate uninterpretable features of the *wh*-phrase which has not undergone *wh*-movement, A-movement must retain its trace at LF-interface in contradiction to our assumption. Therefore, (20a) and (20b) equally violate our assumption that A-movement does not leave a trace, explaining why (20b) is no more acceptable than (20a) is. Another possible problem for our analysis of (23) and (25) (or for

Chomsky's (2005) analysis of those examples) is that the saving effect of pied-piping observed with (23) and (25) in English does not seem to exist in Spanish. Observe the following example which Chomsky (1986:26) quotes from Torrego 1985):

(ii) \*Esta es la autora [ de la que ]<sub>IP</sub> [ varias traducciones  $t_i$  ] han ganado premios internacionales ]

' This is the author by whom several translations have won international awards. '

( = (iii a) in fn.2 )

Our analysis seems to predict inappropriately acceptability for this example. However, for explaining the unacceptability of (ii) we have to understand the role which pied-piping plays in Spanish. If it is the *unmarked* or a *sole* option for movement in Spanish, a principle of economy of derivational steps does not come into play for the derivation of (ii) as it does in the case of examples in (23) and (25). Let us leave this problem for the future research.

- 21 . We assumed in Section 3.3 that A-chains do not have traces at LF-interface. Note, however, at the stage of (32) the trace, i.e. the copy, of NP1 is still present because it is not part of spelled-out portions yet, causing the undesirable extraction of two *wh*-phrases as in the derivations of (1) proposed in Section 2.
- 22 . We leave the fact for the future research that the first object of the double object construction cannot itself be moved by further operations
- 23 . While Chomsky (2001a) claims that trace cannot be moved, we follow Nunes (2004) in assuming that " once the copy theory of movement is adopted, there is no principled reason to expect lower links to be inherently different from the head of the chain in terms of accessibility to the computational system (p.78) ," and assume that there is nothing

to prevent a *wh*-phrase within the trace of the object moved by TH/EX from moving.

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