On Parasitic Gap Structures in English[1]

Seok-Hwa Yoon
(Wonkwang University)

Yoon, Seok-Hwa. 1996. On Parasitic Gap Structures in English. *Linguistics* 4, 145-168. The purpose of this paper is to survey on parasitic gap structures with special reference to English, and to provide adequate accounts for the phenomena closely related to them, within the principles and parameters approach to the grammar of natural language. We assume that null operator structures involve predicational null operator structures and parasitic gap structures, but examine only parasitic gap structures. The assumption that a governed null operator is a variable seems to be specific to adjunct-internal PG structures. But if we do not put any restriction on the Bijection Principle, typical adjunct PG structures will violate it. Furthermore, there are some exceptional adjunct PG structures for which the Modified Strong Binding Condition is not applicable. **(Wonkwang University)**

1. Introduction

The purpose of this paper is to survey theories on Parasitic Gap (=PG) structures, one of Null Operator (=NO) Structures with special reference to English, and to provide adequate accounts for the properties and distribution of Parasitic Gap Structures and phenomena closely related to them, within the principles and parameters approach to the grammar of natural languages.

We assume that PG structures should follow more or less directly from independently needed, general principles of Universal Grammar (=UG). The syntax of PG structures presumably provides a reflex of the interaction of certain abstract principles in UG. There are no specific rules in the grammar dealing with PG structures but their distribution and interaction may result from the interaction of principles of UG and language-particular rules, which interact to yield the distribution and interpretation of PG structures in English. The study is

conducted within the framework of Government-Binding theory pre sented originally in Chomsky(1981) and elaborated further in Chomsky(1986a,b)

PG structures have been extensively investigated in generative grammar since Taraldson (1981), Engdahl (1981,1983), and Chomsky (1982). Many fashionable approaches to PG structures (e.g. Chomsky 1986b, Contreras 1984, Stowell 1985, and others) involve the existence of a NO binding the PG.

In this chapter we argue for the existence of NOs in PG structures.

Within the framework of the NO analysis, there are two approaches to dealing with the locality holding between the NO and the licensing chain in licensing PG structures. One is the Composed A'-Chain, which is proposed in Chomsky(1986b) and further developed in Browning(1987). The other approach is proposed and defended by Aoun and Clark(1984) and Contreras (1988), and takes the NO as an anaphor in the sense of Aoun's (1985) Generalized binding. In this approach Generalized Binding Theory governs the relation between the NO and the licensing operator.

Contreras (1989) argues that the NO in subject-internal PG Structures is ungoverned, and is therefore PRO. He also argues that the licensing of the NO in adjunct-internal PG structures, derives from his Modified Strong Binding Condition.

We survey Chain Composition Analysis(Chomsky 1986b) in the second section, Complex Chain Analysis(Browning 1987) in the third section. In the discussion we consider how appropriate each mechanism is for the licensing of PGs.

2. Theoretical Background

2.1. Properties of Parasitic Gap Structures

The fundamental property of PG structures is that there appear two gaps, one of which is parasitic on the other in its value. Thus the PG cannot survive on its own, but rather must be licensed in the appropriate way by a licensing gap. One characteristic property of PG constructions is that the position occupied by the PG is inaccessible to

the matrix clause.   Adjuncts and Subjects in English are islands which resist extractions from within, as illustrated in (1).

(1) a. ??which $book_i$ did you leave the library without having read e_i
    b.   Which $book_i$ did you file t_i without having read e_i
    c.   *Who_i did friends of e_i surprise John so much
    d. ??Who_i did friends of e_i surprise t_i so much

This has led Chomsky (1982) to propose that PGs are base-generated as empty pronominals. One of their basic properties is described as following:

(2) A. PG e is licensed by a real gap t if
       a. t is a variable at S-structure;
       b. t does not c-command e

In Chomsky (1982), property (2a) was accounted for under the functional determination of empty categories and well-formedness conditions in the distribution of empty categories(e.g., Binding Theory and the θ-Criterion and the Projection Principle, and the Principle of identification which requires that a pronominal non-anaphoric[1]. Given the existing grammatical principles, this empty category could not be characterized as an NP-trace, because it would not be bound in its governing category.   The PG could not be PRO because the gap occurs in a governed position, thus violating the PRO theorem which requires that PRO be ungoverned.   The PG, furthermore, could not be pro because it would not be locally identified. The only possibility, than, is for the PG to be characterized as a variable.

The property (2b) is described as the anti-c-command condition and is one of the core properties in PG structures.   The anti-c-command condition prevents variables from being A-bound. If the PG is c-commanded by the real gap, it violates Strong Crossover[2] or Binding Theory (C). Under the anti-c-command condition, the PG can be licensed as a variable which is bound by the real gap operator.   The anti-c-command condition usually accounts for the fact that subject traces are not able to license PGs.

(3) a. Which woman$_i$ did you[$_{VP}$ recognize t$_i$ [$_{PP}$ before you spoke to e$_i$]]

   b. *Which woman$_i$ [t$_i$ [$_{VP}$ spoke to you [$_{PP}$ before you recognized e$_i$]]]

A further property of PG Structures is that a PG cannot be licensed by a <u>wh</u>-phrase in an A-position. It demands that the binder of the real gap be in a position to c-command the PG, as shown in (4).

(4) a. * Who filed [which books]$_i$ without reading e$_i$

   b. * John filed [those books]$_i$ without reading e$_i$

This constraint is motivated by contrasts such as those given in (5), which differ only with respect to the position of the adjunct clause.

(5) a.   You$_k$ knew[which articles$_i$ Bill$_j$ read t$_i$ [even without PRO$_j$ analyzing e$_i$]]

   b. * You$_j$ knew[which articles$_i$ Bill read t$_i$] even [without PRO$_j$ analyzing e$_i$]

   c. * You$_j$ knew, even [without PRO$_j$ analyzing e$_i$][which articles$_i$ Bill read t$_i$]

There are two main approaches which have been pursued in resolving the locality constraints above. One is that taken by Kayne (1983) (adopted and developed in different ways by Longobardi (1985), Cinque (1984) and Pesetsky (1982), among others), who argues that the PG Phenomenon indicates that island constraints apply both to movement-derived and non-movement derived structures and, therefore, must be formulated as conditions in representation. That is, PG Structures are regarded as structures in which one and same operator binds two or more variables. The alternative position is the NO Movement Analysis, which is assumed in Contreras (1984), Aoun and Clark(1984), Aoun (1985), Stowell (1985), Chomsky (1986b), Contreras (1987, 1988). Here it is held that PGs are traces of movement of a NO to the Spec of CP of the adjunct clause.

2.2 Motivations for Null Operators in Parasitic Gap Structures

Chomsky (1986b) assumes that NO movement is involved in PG Structures as in predicational NO constructions like adjective complements or purpose clauses. That is, although the PG is not the trace of the real operator, it is nonetheless a trace in its own chain, headed by a NO. Extraction out of adjunct clauses is precluded; thus the landing site of the NO is taken to be within the adjunct clause, i.e. the Spec of CP position. We will consider the PG Structures in the following.

(6) a. Which book$_i$ did you file t$_i$[$_{PP}$ without [$_{CP}$ O$_i$ [$_{IP}$ having reviewed e$_i$]]]

    b. an artist who$_i$ [[O$_i$ close friends of e$_i$] admire t$_i$

    c. ? the person$_i$ that John described t$_i$ [$_{PP}$ without [$_{CP}$ O$_i$

       [$_{IP}$ examining any pictures of e$_i$]]]

    d. * the person$_i$ that John described t$_i$ [$_{PP}$ without [$_{CP}$ O$_i$ [$_{IP}$

       [$_{NP}$ any pictures of e$_i$] being on file

If each PG in (6) is regarded as a trace left by wh-movement, there is a violation of CED since extraction occurs from non-properly governed domains: from the adjunct PP in (6a, c, d) and from the subject NP in (6b). However, if we assume that a NO is assumed to exist in the adjunct or subject island domain, we have two separate chains. That is, the overt wh-movement yields a real chain (wh, t) and the NO movement yields a parasitic chain(O,e). Under this hypothesis, the extraction is allowed from within the adjunct PP or subject NP in (6a, b, c) since no barrier intervenes between the NO and its gap. But extraction is disallowed from within the adjunct PP in (6d) since two barriers (NP and IP) block movement from within the NP to the Spec of CP position of the adjunct clause and hence the Subjacency Condition is violated.

The NO analysis is supported by the fact that PG structures, internal to the domain defined by the adjunct clause containing them, show all the island effects typical of movement.

(7) a ? This is the man [$_{CP}$ O$_i$ John interviewed t$_i$[$_{PP}$ O$_j$ before [$_{CP}$ O$_j$

    PRO expecting us [$_{CP}$ to give the job to e$_j$]]]]]

    b. ?* This is the man [$_{CP}$ O$_i$ John interviewed t$_i$ [$_{PP}$ before [$_{CP}$ O$_j$

PRO reading [$_{NP_k}$ the book [$_{CP}$ you gave t$_k$ to t$_j$]]]]]

c. ?? This is the man [$_{CP}$ O$_i$ John interviewed t$_i$ [$_{PP}$ before [$_{CP}$ O$_j$ PRO announcing [$_{NP}$ the [$_N$ plan [$_{CP}$ PRO to speak to t$_j$]]]]]]

The examples in (7) also indicate locality constraints that operate within the adjunct clause including the PG. The PGs involved within adjunct cluses are subject to the island constraints on movement: thus they cannot be contained inside a relative or noun-complement clause, both of which are subject to the CNPC within adjunct clauses. In (7a), the NO of th PG moves to the Spec of CP and PP in the adjunct clause successively without any barrier. The adjunct clauses in (7b, c) constitute Subjacency violations. The relative clause CP in (7b) is a BC and a barrier, since the head noun does not L-mark the CP. and the NP inherits barrierhood from CP because it is L-marked by reading. Thus two barriers are crossed, and hence Subjacency is violated. In (7c), the appositive complement CP is L-marked by N (plan), so it is not a BC and does not transfer barrierhood to the dominating NP, which is not a BC, either, since it is L-marked by announcing. Thus the noun-complements case of CNPC is predicted to be somewhat grammatical although it is not fully grammatical.

Consider the structure in (8).

(8) * the head of cattle [$_{CP}$ O$_i$ that we have eliminated t$_i$ [$_{PP}$ without [$_{CP}$ PRO trying to [$_{VP}$ call a vet [$_{PP}$ instead of [$_{CP}$ O$_j$ PRO killing e$_j$]]]]]]

The structure in (8) is ungrammatical though there are no Subjacency violations within the adjunct clause containing the PG, since there is nothing in the analysis to force movement of the NO to the Spec of CP in the preceding adjunct clause and hence the PG Chain (O$_j$, e$_j$) is not local to the matrix real gap chain(O$_i$, t$_i$).

Contreras (1988) presents some poeces of evidence for the presence of a NO in typocal PG constructions like (9).

(9) Which articles$_i$ did you file t$_i$ without [$_{CP}$ O$_i$ PRO reading e$_i$]

First, the Bijection Principle[2] provides an argument in favor of the

NO in PG constructions since the PG can be licensed by its own A′-Chain involving a NO, as the following examples show:

(10) a. * Which articles$_i$ did you file t$_i$ without [$_{VP}$ a look at e$_i$]
   b. * Which articles$_i$ did you throw away t$_i$ [$_{AP}$ disgusted with e$_i$]
   c. Which articles$_i$ did you file t$_i$ without reading e$_i$

If neither NP nor AP can contain a wh-operator, the ungrammaticality of (10a, b) is accounted for. Unless a NO is posited in (9), (10a,b) look like (9) in the relevant respects, and there is no explanation for the difference in grammaticality. In the NO analysis (10a) violates the Bijection Principle, since there is no place for a NO, on the basis of the accepted view that operators occur only in the Spec of CP. The same is true of (10b), since APs in English are never of category CP.

The configuration in (10c) also violates the Bijection Principle since an overt A′-operator binds both the real gap and the PG. However, the violation of the Bijection Principle in this case is different from that in the other two cases, since a NO is allowed to occur in the Spec of CP. Thus, in the NO analysis, (10c) does not violate Bijection Principle, as illustrated in (9).

The second argument for the NO analysis is based in the observation that the real gap weakly c-commands the PG, as the contrast of (11) shows.

(11) a. * We admitted them$_i$ without interviewing those students$_i$
   b.   Which articles$_i$ did you file t$_i$ without PRO reading e$_i$

The ungrammaticality of (11a) can be attributed to a violation of Binding Theory (C) only under the assumption that them weakly c-commands those students.

In (11b) where a NO is not involved, since t$_i$ weakly c-commands e$_i$,

---

[2]Bijection Principle (Koopman and Sportiche 1982): There is a bijective correspondence between operators and variables. Each operator must A′-bind exactly one variable and each variable must be A′-bound by exactly one operator.

t_i A-binds e_i, and since there is no intermediate binder, t_i locally A-binds e_i. Thus it violates Binding Theory (C). This means that we have an A'-chain (which articles, t_i, e_i), but this chain violates the θ-Criterion, since two θ-roles are assigned to the chain from file and reading.

The structure of the NO in the parasitic adjunct clause, on the other hand, does not violate the θ-Criterion, since e_i is no longer locally A-bound by t_i, and the structure, consequently, does not form just one chain.

The third piece of supporting evidence for the existence of a NO comes from the fact that the PG obeys Subjacency[3]. To put it concretely, the existence of the NO in PG structures is empirically supported by the Subjacency Condition in Nonpronminal Variables and the Antisubjacency Condition on Pronominal Variables Proposed in Contreras (1988)[4]. Contreras discusses one class of structures where pronomimal and non pronominal variables appear to alternate freely. However, the alternation is predicted to be impossible for English, where both the Subjacency and the Antisubjacency Conditions apply.

The contrast between the following examples, noted by Chomsky (1986b: 62) supports the NO analysis of PG constructions.

(12) a. Who$_i$ did you tell t_i [$_{CP}$ O$_i$ that you would visit e_i]
    b. * Who$_i$ did you ask t_i [$_{CP}$ why you should visit e_i]
    c. * Who$_i$ did you ask t_i [$_{CP}$ how you should address e_i]

Chomsky argues that examples (12b, c) seem considerably worse under the intended interpretation. If so, the contrast can be accounted for under the assumption that only in (12a) can there be a NO to bind e_i. In (12b, c), on the other hand, this is impossible because Spec (C) is filled with the overt operator and hence operator movement is barred.

---

[3]The Subjacency Condition (Chomsky 1986b) as revised in Contreras (1988) is as follows: X is subjacent to Y iff there is no more than one barrier for X which dominates x and does not dominate Y.

[4]Subjacency Condition On Nonpronominal Variables (Contreras 1988): A[-pronominal] variable must be subjacent to its A'-binder.

Antisubjacency Condition in Pronominal Variables (Contreras 1988): A[+pronominal] variable must be nonsubjacent to its A'binder.

2.3 Chain Composition Analysis

Chomsky (1986b) proposes that the chains involved in PG structures, i.e. the real chain and the NO-headed parasitic chain, must undergo a process of chain compositon at S-structure.

(13) If $\vartheta = (a_1 \ldots\ldots a_n)$ is the chain of the real gap and $\vartheta' = (\beta_1 \ldots\ldots \beta_n)$ is the chain of the PG, than the "Composed Chain", $(\vartheta, \vartheta') = (\alpha_1 \ldots \alpha_n, \beta_1 \ldots \beta_m)$ is the chain associated with the PG structures and which yields its interpretation.

The anti-c-command condition and the o-Subjacency condition are proposed as comditions on the chain composition.

(14) Chain composition is possible only if the anti-c-command requirement is satisfied: that is, the real gap may not c-command the PG.

(15) In chain composition as in (13), forming (ϑ, ϑ'), the head of ϑ' must be O-subjacency to the final element of ϑ.

Condition (14) indicates that the NO of the PG must not be c-commanded by the real gap. Otherwise, the two A'-chains violate Strong Crossover or Binding Theory (C). Condition (15) indicates that the NO of the PG must be O-subjacent to the licensing gap. Look at the example below.

(16) * Who$_i$ [$_{IP}$ t$_i$ [$_{VP}$ met you [$_{PP}$ before [$_{CP}$ O$_j$ you recognized e$_j$]]]]

O in (16) is 1-subjacent to the licensing trace since only VP is a barrier. O-subjacency, which requires that no barrier at all intervenes, is violated and hence correctly predicts (16) to be ungrammatical.

Now consider the barrierhood of PP.

(17) Which report$_i$ did you file t$_i$ [$_{PP}$ O$_j$ [$_{PP}$ without [$_{CP}$ t$_j$ [$_{IP}$ PRO reading e$_j$]]]]

According to the notion of "Barriers", a category PP is a barrier since it is not L-marked and so there is l-subjacency between the real gap and O_j. Therefore, Chomsky proposes PP-adjuction, as shown in (17), in order to nullify the barrierhood of PP.

Provided that PP is not a barrier due to PP-adjuction, O_j is O-subjacent to the licensing gap in (17). O_j is not c-commanded by the licensing gap. Thus, the PG is licensed.

Let us consider the following examples.

(18) a. * a man who$_i$ [t$_i$ looks old [$_{PP}$ whenever [$_{CP}$ O$_i$ I meet e$_i$]]]

   b.   a man who$_i$ [$_{PP}$ whenever [$_{CP}$ O$_i$ I meet e$_i$]] [$_{IP}$ t$_i$ looks old]

The structure in (18a) is ungrammatical because t c-commands the adjunct claluse PP containing O and e, while the structure in (18b) shows grammaticality since t does not c-command O.

Where the subject is more deeply embedded, it can regularly license a PG, as in the following examples.

(19) a. * Which$_i$ [t$_i$ were unavailable [$_{PP}$ before [$_{CP}$ O$_i$ [$_{IP}$ you discovered e$_i$]]]]

   b.   Which papers$_i$ did John decide [$_{PP}$ before [$_{CP}$ t$_i$' [$_{IP}$ reading e$_i$]]] to tell his secretary [$_{CP}$ t$_i$'[$_{IP}$ t$_i$ were unavailable]]

   c.   Which papers$_i$ did John decide to tell his secretary t$_i$ were unavailable before reading e$_i$

   d. * Which papers$_i$ did John decide to tell his secretary t$_i$ were unavailable [$_{PP}$ before [$_{CP}$ O$_i$ [$_{IP}$ reading e$_i$]]]

   e.   Which papers$_i$ did John decide to tell his secretary [t$_i$ were unavailable] [$_{PP}$ before [$_{CP}$ O$_i$ [$_{IP}$ reading e$_i$]]]

The structure in (19a) is excluded as ungrammatical since t c-commands O. The sturcture in (19b) is grammatical since the adjunct clause is associated with the matrix clause and the embedded subject t does not c-command the PG e and licenses it.   The position of the before-phrase in (19c) is ambiguous in two ways.   If the before-phrase is associated with the matrix clause, as in (19e), the PG is licensed since it is not c-commanded by the embedded subject t; if the

before-phrase is construed with the embedded clause, as shown in the structure in (19d), so that e is c-commanded by t, the construction is excluded.

Consider the contrast in the examples below.

(20) a. * These are the articles$_i$ [$_{CP}$ O$_i$ that [$_{IP}$ you knew [$_{CP}$ t$_i$ [$_{IP}$ t$_i$ were written by bill]]][$_{PP}$ even without [$_{CP}$ O$_j$ [$_{IP}$ PRO analyzing e$_j$]]]]]

   b. This are the articles$_i$ [$_{CP}$ O$_i$ that [$_{IP}$ you knew [$_{PP}$ without [$_{CP}$ O$_j$ analyzing e$_j$]][$_{CP}$ t$_i$' [$_{IP}$ t$_i$ were written by Bill]]]]]

The structure in (20a) indicates that the adjunct clause is associated with the matrix clause headed by that since PRO is controlled by you. Therefore, t does not c-command O and the sentence is prodicted to be grammatical.   This is problematic.

Preposing the adjunct clause in (20b) makes the sentence grammatical although it seems to have about the same effect as (20a), which means that t does not c-command O$_j$. This seems to concern the other factors that enter into acceptability of PG constructions.

Conceptually, the chain composition analysis based on O-subjacency is suspect in view of the claim that grammar does not contain principles the sole purpose of which is to license PG structures. Chomsky remarks that the property of O-subjacency is essentially government minus the c-command requirement.   However, as Browing notes, there is no other instance in grammar in which government without c-command is relevant.

3. Complex Chain Analysis

Browning (1987) argues that NOs as predicate variables are null pronominals, that is, a NO is base-generated as pro in an A-position at DS and moves to Spec of CP in the mapping from DS to SS.

The operator A' pro in predicational NO constructions is licensed and identified via vertical binding and agreement chain.   Therefore, the complex predicate containing the A' pro is saturated by its antecedent NP under non-thematic predication.

(21) a. the man [CP pro_i [IP Bill met t_i]]

　　 b. John bought it [CP pro_i [IP PRO to try [CP [IP PRO to convince
　　　 Bill [CP [IP PRO to play with t_i]]]]]]

　　 c. John is easy [CP PRO [C' for [IP us to please t_i]]]

For example, A'-pro in (21a) is base-generated in the object position
if met and moves to the Spec of CP.　The A'-pro is a predicate
variable creating a complex predicate from CP. The CP and its potential
subject the man m-command each other.　Thus, the CP is saturated by
the man under non-thematic predication. The operator A' pro in the
other examples above is licensed and identified under non-thematic
predication, in the same way that we have seen in (21a).　　The
agreement chain which licenses which licenses predication is sufficient
to identify A'-pro.　　Since A'-pro in predicarional NO constructions
receives phi-features via the agreement chain, it is licensed as the head
of an A'-chain.

However, the A'-pro in PG structures is not licensed and identified
under non-thematic predication.　　That is, the PG A'-pro does not
participate in an agreement chain and terefore, does not receive
phi-features[5].　In　other　words,　in　Browning's　analysis,　pro　is
base-generated with phi-features in an A-position within the parasitic
domain and moves to an A'-position in the mapping from D-structure
to S-structure, leaving behind a trace. At some point in the mapping,
the trace receives phi-features borne by the A'-pro are not licensed
because the A'-pro is not in an agreement chain. Therefore, the PG
(the trace of A'-pro) must find another antecedent at S-structure.

(22) ? Which articles_i did you review t_i[PP PRO_j [PP without [CP pro_j
　　 [IP PRO reading t_j]]]]

In (22), since the clausal object CP of a preposition is not a predicate,
no agreement chain exists which could license or identify pro in the
Spec position of CP.　　That is, the A'-pro . cannot be licensed or
identified via non-thematic predication. Therefore, the A'-pro moves to

---

[5]phi-feature contains [number, gender, person]

the Spec position of the predicate PP where non-thematic prdication is possible.   The A'-pro agrees with CP by Head-Projection agreement and Spec-Head agreement.   The A'-pro is vertically bound by CP.   PP is a predicate; a pro in the Spec position of CP would be in position to agree with an antecedent.   However, the PP in (22) is not predicated of an NP, but of the sentential E(vent) position.   Since the A'-pro in the Spec of a predicate within which it resides, the E-position is the only antecedent   candidate   for   the   A'-pro   in   (22).   According   to Higginbotham[6], the E-position cannot license or identify pro since E-position is not an NP containing phi-features.   Another problem occurs in the structure of (22).   PP in this structure is not predicated of the real gap t, its potential subject since the maximal projection VP dominates t but excludes PP and thus PP is a barrier.

Let's look at a subject-internal PG construction.

(23) ? an artist$_i$ [$_{CP}$ who$_i$ that [$_{IP}$ [$_{NP}$ pro$_j$ [$_{NP}$ close friends of t$_i$]] admire t$_i$]]

Chomsky (1986b) assumes that the NO moves only to the Spec of the relative clause CP as in (23), adopting the VMH, which allows subject relative pronouns to remain in situ at SS.

Browning proposes the alternative assumption that the NO moves to the Spec if NP (or DP, building on Abney (1987)). A'-pro in the Spec of NP in (23) might be in position to involve an agreement chain, depending on the structure of NP.   NP, the subject of IP, agrees with AGR by subject-predicate agreement.   The head N agrees with its maximal projection NP, and the Spec of NP (pro) agrees with the head N by Spec-Head agreement.   The NP containing pro in (23) is not predicate, but the pro can participate in the agreement chain since there is no stipulation that pro may be identified by an agreement chain only when it is in the Spec if a predicate.   However, the pro is not licensed or identified by the subject NP _an artist since the pro (and the variable it binds) are coreferential with the subject NP close frien of e rather than an artist, the head of the relative.   Thus, the agreement chain fails to assign the PG A'-pro the phi-features needed for it to be

---

[6]Higginbotham (1983, 1985).

a licensed head of a chain. For this reason, Browning assumes that the PG A'-pro may be licensed as an intermediate link in an A'-chain without being licensed via the agreement chain, as long as other conditions on A'-chains are satisfied.

Lasnik and Saito (1984) argues that the intermediate A'-t of the trace in argument position may delete by Affect-a[7]. The trace in argument position is γ-marked prior to the point in the derivation where the ECP is checked. The argument t does not require the intermediate traces to be present throughout derivation and hence they may delete prior to the application of the ECP Filter. In analogy with this, we moght assume that a PG A'-pro deletes in the mapping from SS to LF. The PG A'-pro is not an argument since they appear in A'-position. Therefore, the deletion of the PG A'-pro violates neither the θ-Criterion nor the Projection Principle (nor even the Extended Projection Principle)[8].

Intermediate traces are not operators on the basis of the Principle of Full Interpretation. In a structure such as (24) where A'-t_i is an intermediate trace with operator status, this follows if who does not bind a variale and thus is not licensed, since the only variable is bound by t_i.

(24) Who$_i$ did you [$_{NP}$ t_i' [$_{VP}$ see t_i]]

PG A'-pro is not an operator, either, in terms of non-thematic predication. PG A'-pro is not licensed to head a chain via an agreement chain, which can apply to predicational NO constructions. In other words, PG A'-pro has no role in identifying its variable. Therefore, its deletion does not violate the licensing condition for the operator of the variable.

In this respect, instead of adopting the construction-specific process

[7]Affect-a (Lasnik/ Saito 1984): anything can be to anything in syntax or LF. Affect-a is a generalization of Move-a, Delete-a, or Insert-a, and therefore we can move, delete or insert anything anywhere unless some principle of grammar is violated.

[8]Extended Projection Principle: A θ-role assigned at LF must be maintained at D-structure and S-structure.

of Chain Composition Analysis of Chomsky (1986b), Browning proposes "Complex Chain" under which a PG construction is regarded as one which contains a single A'-chain with a single head. Like any other SS A'-chain, a Complex Chain must meet the Subjacency Condition, i. e., Chain Link Condition as follows:

(25) Chain Link Condition
   a. If (α_i, α_i+1) is a link of a chain, α_i+1 is l-subjacent to α_i.
   b. β is n-subjacent to α iff there are fewer than n+a barriers for β which excludes α.

This accounts for why the PG A'-pro, which is to be deleted by Affect-α at LF, is generated by a PG movement. Since the PG itself is an empty category to be licensed or identified by an A'-anrecedent, it must be in a fully licensed complex chain headed by the matrix operator. That is, it must form an A'-chain with the A'-antecedent via the PG A'-pro.

4. A Unified Account of Null Operators in Parasitic Gap Structures

Contreras (1989) shows that the properties of NO constructions follow from the general proncioles of Universal Grammar with no stipulations. If the NO is ungoverned, as in predicational NO structures and subject PG structures, it can only surface as [+pronominal, +anaphor], i.e. PRO. If the NO is governed, as in PG structures contained in PP adjuncts, it can only surface as [-a, -p], i.e., as a variable[9].

Consider now the properties of the NO in subject-internal PG constructions, adopting Contreras(1989) assumption that the NO is ungoverned and can surface as PRO, is in predicational NO structures.

(26) a man [CP whoi [IP [NP Oi close friends of ei] admire ti]]

---

[9]Thus, he provides a unified account of NO constructions, and hence does not exclude PG constructions from NO constructions.

In (26) O in the subject is ungovened, and therefore PRO under a directional defiition of government such as Strowell's (1981)[10] or under Brody's (1984) free determination of empty categories, with the assumption that it is placed in the Spec if NP or DP, an ungoverned position.   Following Chomsky (1982), the S-sturcture indexing for (26) is applide as in (27).

(27) a man$_j$ [$_{CP}$ who$_i$ [$_{IP}$ [$_{NP}$ PRO$_j$ close friends of e$_i$] admire t$_i$]]

The controller for PRO in (27) is <u>a man</u> at S-sturcture, which functions as th subject of CP, under Chomsky (1982)'s predication analysis[11].

Consider the following examples.

(28) a. the man$_j$ [$_{CP}$ who$_i$ [$_{IP}$ [$_{NP}$ PRO$_j$ everybody who meets e$_i$] admires t$_i$]]
   b. He is a man$_j$ [$_{CP}$ that [$_{IP}$ [$_{NP}$ PRO$_j$ anyone who tells people to talk to e$_i$] usually likes t$_i$]]

Similarly, in (28) the ungoverned empty category 'PRO' is controlled by the argument '<u>the man</u>', '<u>a man</u>', repectively at S-sturcture, via predication.

Contreras (1988) argues that adjunct PGs show no asymmetry between questions and relative clausesm, as shown by the following

---

[10]Stowell (1981) formulates this notion as described below.

<Directional Government>

In the configuration (i) or (ii) -- choice of (i) or (ii) parametric -- a category P governs a category Q in R, where;

a. R is an X'projection of P, and

b. there is no category D, D = X, such that Q is contained within a projection of D and D governs Q.

(i) [$_R$ . . P . . . Q .]   (ii) [$_R$ . . Q . . . P .]

Here, the first condition means that P is a head of the projection R as shown in (i) or (ii). Since   English has the head-first parameter and thus a head precedes its complement, it chooses (i) automatically.   In (i), government holds only to the right as P governs Q. By the second condition, an element cannot be simultaneously contained in more than one head domain.   It guarantees unique government of an element by the head.

[11]Predication: Non-argument XP must be linked to argument XP.

examples.

(29) a. Which articles; did you file t; [CP without [CP O; [IP PRO reading e;]]]
b. the articles which; you filed t; [PP without [CP O; [IP PRO reading e;]]]

However, PGs in subjects seem to be limited to relative clauses, as can be seen from the ungrammaticality of the corresponding question in (30b) below.

(30) a. the man who; everybody who meets e; admires t;
b. * Who; does everybody who meets e; admire t;

Contreras suggests that the difference between (30a) and (30b) follows from the principle of the Closed-Chain Condition, defined as follows[12].

(31) the Closed-Chain Condition
1) A Closed A'-Chain cannot contain unlicensed elements in its domain.
2) a is in the domain of an A'-Chain φ iff a occurs between the operator and the variable of φ.

Althogh wh-movement is essentially the same independently of whether it applies to an interrogative or a relative phrase, one difference between the two seems to be that a relative wh-pharase may not remain in situ at SS although an interrogative wh-pharase may, as evidenced by the following examples.

(32) a. * the man close friends of e; admire who;
b. ? Do close friend of e; admire who;

Adopting the convention, then, of marking interrogative wh-pharase with the feature [+WH], and relative-pharase with the feature [-WH], we are allowed to distinguish 'open' and 'closed' A'-chains as follows:

---

[12]See Contreras(1988), pp. 41-52.

(33) a. An A'-Chain is open iff it is headed by a -WH operator.

b. An A'-Chain is closed iff it is headed by a +WH operator.

Then (30b), but not (30a), contains a Closed A'-Chain. The Closed A'-Chain formed by the interrogative who and the rightmost variable contains an element in its domain, namely the intermediate variable without being licensed in this structure. (30a) involves an open A'-Chain headed by a -WH operator, the relative wh-phase with the feature [-WH]. As for (30a), therefore, the Closed-Chain Condition is inapplicable, since its A'-Chain is open.

In the same way, (32a) and (32b) show another case of asymmetry between the quetion and the relative clause, as shown below.

(34) a. the man who$_i$ close friends of e$_i$ admire t$_i$

b. * Who$_i$ do close friends of e$_i$ admire t$_i$

(34a) involves an open A'-Chain. However, (34b) contains a Closed A'-Chain. The Chain formed by who and t contains the intermediate PG e, an unlicensed element in its domain. Consequently, it violates the Closed-Chain Condition. So then, the PGs in relative clauses must be licensed under the same special mechainsm, different from the general licensing mechanism which operates in adjunct PG structures.

The Closed-Chain Condition, however, has problems. One of the problems comes from the structure in (35) where the intermediate trace in (30b) is replaced by a noun (Mary).

(35) Who$_i$ does everybody who meets Mary admire t$_i$

Chomsky (1982) suggests that the rule which coindexes the head of a relative clause with the operator in COMP applies at LF. If so, the structure in (35) should be ungrammatical, since the unlicensed head everybody is in the domain of a Closed A'-Chain. Adopting Aoun's (1985) argument that predication doesn't apply only at LF, Contreras abandons Chomsky's account and allows predication at SS in English. In view of this, the sentence in (35) is no longer problematic: everybody is licensed at S-structure and at LF, and there is no violation of the

Closed-Chain Condition.

The Modified Strong Binding Condition provides an account for the contrast between the following examples.

(36) a. [[$_{NP}$ Whos] books]$_i$ did you read t$_i$ without [$_{CP}$ O$_i$ buying e$_i$]

   b. * [$_{NP}$ [$_{NP}$ Whos]$_j$ books]$_i$ did you read t$_i$ without [$_{CP}$ O$_j$ meeting e$_j$]

Generally, the licensing operator must c-command a NO. thus, in (36a), O$_i$ can only be licensed by the larger NP, not by the NP in Spec (N) position. The lager NP in (36b) c-commands O$_j$, but does not license it because of non-coreferentiality between them. Under the Modified Strong Binding Condition, O in (36a) is subjacent to the chain (whose books, t$_i$) since there is only one barrier (PP). O is strongly c-commanded by the interpretable chain since the licensing operator (the head of the chain) c-commands O. In (36b), the head of the potential interpretable chain cannot be 'whose' but must be 'whose book' since O$_j$ cannot be c-commanded by 'whose' itself, for this would violate the structural requirement on the Modified Strong Binding Condition. However, the potential licensing operator whose books is not subcategorized for as the object complement of 'meet'. Therefore, (36b) is excluded as ungrammatical.

The Modified Strong Binding Condition elucidates the following examples.

(37) a. a book [$_{CP}$ O$_i$ that I copied from t$_i$ [$_{PP}$ without [$_{CP}$ O$_j$ PRO buying e$_j$]]]

   b. * a book [$_{CP}$ [$_{PP}$ from [$_{NP}$ which]$_i$]$_k$ [$_{IP}$ copied t$_k$[$_{PP}$ without [$_{CP}$ O$_j$ PRO buying e$_j$]]]]

These examples indicate that a PG cannot be licensed by a PP trace. That is, a PG structure is not allowed if PP moves to the Spec of CP and the PG is an NP. In (37a), O$_j$ is subjacent to and strongly c-commanded by the interpretable chain (O$_i$, t$_i$), and hence the Modified Strong Binding Condition is met. However, The variable e in (37b) does not meet this condition. O$_j$ is subjacent to t$_k$, as only one barrier (PP) intervenes, but the chain (which, t$_i$) does not constitute an interpretable chain since which does not c-command t$_k$ and O$_j$.

5. Summary and Concluding Remarks

On the basis of all these considerations we have made, we adopt Contreras' (1989) Modified Strong Binding Condition for the licensing of adjunct PG structures.   As a supporting theory for this suggestion, we also take the idea of A'-chain antecedents of Bordelois (1987). Bordelois does not accept the NO hypothesis, especially in adjunct PG structures, but she argues that A'-chains are plausible antecedents for PGs.   She argues that a PG is an anaphor and the antecedent for this anaphor is the whole A'-chain formed by the martix operator and the licensing real gap.

The matrix operator, the head of the chain, assigns the PG its status as a variable, while the licensing gap, the foot of the chain, provides an anaphoric indexing for the PG.   The θ-Criterion is not violated since no movement is involved, except within the A'-antecedent chain.

However, the Modified Strong Binding Condition has some problems.

Empirically,   it   does   not   account   for   the   so-called   quasi-PG constructions where no real gap appears, as shown below.

(38) a. ? the man$_i$ that I went to England [$_{PP}$ without [$_{CP}$ O$_i$ taking to e$_i$]]
   b. ? Whose mother$_i$ did you go to England [$_{PP}$ without [$_{CP}$ O$_i$ taking to e$_i$]]
   c. ? Which professor$_i$ did you go to England [$_{PP}$ in order [$_{CP}$ O$_i$ to impress e$_i$]]
   d. ? Who$_i$ did you they leave [$_{PP}$ before [$_{CP}$ O$_i$ speaking to e$_i$]]

The structural properties of these constructions are not subsumed under the structural requirements of the Modified Strong Binding condition at S-structure.   For the wh-phrases or the NOs in relative clauses do not consititute interpretable A'-chains since they do not bind any variable within the matrix clause.   The structures they do not provide the structural requirement of Chain Composition either, since they lack the higher A'-chain to license the PG chain.

The Modifed Strong Binding Condition involves some theoretical problems.   First, it entails the violation of the Bijection Princople, as shown below.

(39) Which articles$_i$ did you file t$_i$ [$_{PP}$ without [$_{CP}$ O$_i$ reading e$_i$]]

In (39), the Modified Strong Binding Condition requires that O must be strongly c-commanded by the higher chain (Which articles, t$_i$). This chain strongly c-commands O, since its head strongly c-commands O. That is, the operator of higher chain A'-binds not only t$_i$, but also the governed O, defined as a variable. Thus, Bijection pronciple is violated since one operator A'binds two variables.   Therefore, the only way to avoid this problem is to assume that the Bijection Principle must be restricted to variables in A-positions in accordeance with Koopman and Sportiche's (1982) definition of variables.   The assumption that a governed NO is a variable seems to be specific to adjunct-internal PG structures.   But if we do not put any restriction on the Bijection Principle, typical adjunct PG structures will wiolate it.   Furthermore, there are some secceptional adjunct PG structures for which the MOdified Strong Biding Condition is not applicable.   For example, consider the following sentence.

(40) a. *Which papers$_i$ did you file t$_i$ [$_{PP}$ right after [$_{CP}$ O$_i$ e$_i$ arrived]]
     b. *Which papers$_i$ did you file t$_i$ [$_{PP}$ right after [$_{CP}$ O$_i$ e$_i$ arriving]]

The two examples correspond to the configurations of typical PG structures.   However, they are excluded from the application of the Modified Strong Binding Condition: in (40b), the position occupied by e is ungoverned and an ungoverned empty category, i.e. PRO, which cannot be a variable, while in (40a) the empty category in subject position violates the ECP. Thus, the Modified Strong Binding Condition turns out to be applied rather restrictively.

We also see a problem with the complex V reanalysis related to ECP. For example, if we assume that file t without in (39) is reanalysed as a V in order for O to be antecedent-governed, then file t before in (41) would also have to be reanalysed as a V:

(41) Which articles$_i$ did you file t$_i$ [$_{PP}$ before [$_{CP}$ O$_i$ you read e$_i$]]

This reanalysis, however, must be somehow blocked in cases

involving <u>before</u>-clauses that violate the Adijunct Condition. Otherwise, we cannot account for Adjunct Condition phenomena.

It is to be further explored how Contreras' (1989) approach to PG constructions can be extended.

.

References

Abney, S. 1985. "Functional Elements and Licensing," *GLOW*.

Abney, S. 1987. *The English Noun Phrase in Its Sentential Aspect.* Ph.D. dissertation, MIT.

Aoun, J. & R. Clark. 1984. "On Non-overt Operators," ms., USC/UCLA.

Aoun, J. 1985. *A Grammar of Anaphora.* MIT Press, Cambridge.

Aoun, J. and D. Sportiche. 1982. "On the Formal Theory of Government," *The Linguistic Review*, 2-3.

Authier, J. 1989. "Two Types of Empty Operators," *Linguistic Inquiry*, 20-1, 117-125.

Bordelois, I. 1986. "On the Vacuousness of Vacuous Operators," in *MIT Working Papers in Linguistics*, Anniversary Volume.

Browning, M. 1987. *Null Operator Constructions*, Ph.D. dissertation, MIT.

Browning, M. 1986. "Null Operators and Their Antecedents," *NELS* 17.

Chomsky, N. 1976. "Conditions on Rules of Grammar," *Linguistic Analysis* 2, 203-351.

Chomsky, N. 1977. "ON Wh-Movement," in P. Culicover, T. Wasow and A. Akmajian, eds., *Formal Syntax*, Academic Press.

Chomsky, N. 1980. " On Binding," *Linguistic Inquiry* 11, 1-46.

Chomsky, N. 1981. *Lectures on Government and Binding.* Foris.

Chomsky, N. 1982. *Some Concepts and Consequences of the Theory of Government and Binding.* MIT Press.

Chomsky, N. 1986a. *Knowledge of Language : Its Nature, Origin and Use.* New York: Praeger.

Chomsky, N. 1986. *Barriers.* MIT Press.

Clark, R. 1985. *Boundaries and the Treatment of Control.* Ph.D. dissertation, University of California.

Contreras, H. 1984. "A Note on Parasitic Gaps," *Linguistic Inquiry* 15, 704-713.

Contreras, H. 1987. "Parasitic Chains and Binding," In C. Neidle & R. Numez Cedeno, eds., *Studies in Romance Languages.* Dordrecht, Foris.

Contreras, H. 1988. "Operators, Binding and Subjacency," ms., University of Washington.

Emonds, J. 1976. A *Transformational Approach to English Grammar*. New York: Academic Press.

Engdahl, E. 1983. "Parasitic Gaps," *Linguistics and Philosophy* 6, 5-34.

Epstein, S. 1987. *Empty Categories and Their Antecedents*. Ph.D. dissertation, University of Connecticut.

Han, H. S. 1990. *An Introduction to GB Syntax* (in Korean). Seoul: Hanshin Publishing Co.

Higginbotham, J. 1980. "Pronouns and Bound Variables," *Linguistic Inquiry* 11, 679-708.

Hornstein, N. and A. Weinberg. 1981. "Case Theory and Preposition Stranding," *Linguistic Inquiry* 12, 55-91.

Huang, C. T. J. 1982. *Logical Relations in Chinese and the Theory of Grammar*. Ph.D. dissertation, MIT.

Huybrets, R. & H. Van Riemsdijk. 1985. "Parasitic Gaps and ATB," *NELS* 15, 168-187.

Jones, C. 1984. "Empty Operators and Parasitic Gaps," *NELS* 14.

Kim, S. A. 1991. *A Study of Parasitic Gap Constructions in English*. Ph.D. dissertation, Seoul National University.

Kim, Y. S. 1989. *A Unified Theory of Control in English*. Ph.D. dissertation, Seoul National University.

Koopman, H. & D. Sportiche. 1982. "Variables and the Bijection Principle," *The Linguistic Review* 2, 139-161.

Lasnik, H. & M. Saito. 1984. "On the Proper Government," *Linguistic Inquiry* 15, 235-289.

Lasnik, H. & J. Uriagereka. 1988. *A Course in GB Syntax: Lectures on Binding and Empty Categories*. MIT Press.

Lee, G. H. 1988. *A Theory of Parasitic Gaps*. Ph.D. dissertation, Hanguk University of Foreign Studies.

Levin, J. 1984. "Government Relations and the Distribution of Empty Operators," *NELS* 14, 294-305.

Lobeck, A. C. 1986. *Syntactic Constraints on VP Ellipsis*. Ph.D. dissertation, University of Washington.

Manzini, R. 1983. "On Control and Control Theory," *Linguistic Inquiry* 14, 421-446.

Park, S. H. 1990. "PRO is Still Case-Ungoverned," *Language Research*, 26-2, 101-108. Language Research Institute, Seoul National University.

Pesetsky, D. 1982. *Paths and Categories*. Ph.D. dissertation, MIT.

Radford, A. 1981. *Transformational Syntax*. Cambridge University Press.

Rizzi, L. 1986. "Null Objects in Italian and the Theory of pro," *Linguistic Inquiry* 17, 501-558.

Ross, J. 1967. *Constraint on Variables in Syntax.* Mimeo, Indiana University Linguistics Club.

Rothstein, S. 1983. *The Syntactic Forms of Predication.* Ph.D. dissertation, MIT.

Safir, K. 1987. "The Anti-C-Command Condition on Parasitic Gaps," *Linguistic Inquiry,* 18-4, 678-683.

Shlonsky, U. 1987. "Donkey-Parasites," *NELS* 17, 569-579.

Speas, M. 1986. *Adjunctions and Projections in Syntax.* Ph.D. dissertation, MIT.

Stowell, T. 1981. *Origins of Phrase Structure.* Ph.D. dissertation, MIT.

Stowell, T. 1985. "Null Antecedents and Proper Government," *NELS* 16, 476-493.

Stowell, T. & H. Lasnik. 1987. "Weakest Crossover," ms., University of Connecticut.

Williams, E. 1980. "Predication," *Linguistic Inquiry,* 11-1, 203-238.

Williams, E. 1983. "Against Small Clauses," *Linguistic Inquiry* 14, 283-308.

Yang, D. W. 1987. "Barriers and Relativization," *Language Research,* 23-2, 1-38. Seoul National University.

Department of English Education
Wonkwang University
344-2, Sinyong-Dong, Iksan
Chonbuk 570-749, Korea