A Survey of Empty Categories in GB, GPSG, and LFG

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Abstract

Current researches in syntax have produced three competing syntactic theories: Government-Binding Theory (GB), Generalized Phrase Structure Grammar (GPSG), and Lexical-Functional Grammar (LFG). In each theory the description of empty categories has its own distinguishing feature. In GB (Chomsky 1982:78), empty categories are classified into four natural classes by the anaphor-pronominal distinction, namely, NP-trace, pro, PRO, and variable. In GPSG (GKPS 1985), the empty category is represented by the NULL feature to put it into a code that an element is phonologically empty, often called by the name 'trace'. In LFG (Bresnan 1982), the empty category is portrayed by employing the theory of control to deal with the missing subject and displaced phrase constructions in functional structure. The purpose of this paper is to compare the similarities and differences of empty categories among these three theories, and to show how their treatment of empty categories reflects their assumptions.**

Key words: Empty category, Anaphor, Pronominal, Governing Category

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1. INTRODUCTION. Three influential syntactic theories were brought before the linguistic public in the 1980s: Government-Binding Theory (GB) mainly by Noam Chomsky, Generalized Phrase Structure Grammar (GPSG) mainly by Gerald Gazdar, and Lexical-Functional Grammar (LFG) by Joan Bresnan and Ronald Kaplan. GB, further developed from Chomsky's earlier theory of grammar "Transformational Grammar", presents a 'modular' type of syntactic description, consisting of such a set of different subcomponents (or modules) as in (1) :

(1) a. Binding Theory
b. X-Bar Theory
c. Case Theory
d. Theta Theory
e. Government Theory
f. Bounding Theory
g. Control Theory

Each module can have grammatical requirements independent of the others. A sentence that is well formed, therefore, must meet the grammatical conditions required in every subsystem in (1) . In structure GB posits three syntactic levels: D-structure, S-structure, and Logical Form. A sentence's derivation is principally operated by a transformational device called Move-α, denoting a movement that moves anything to anywhere, in the limits of these three levels . Fundamentally, the description of the theory of GB argues for the concept of Universal Grammar, knowledge of language claimed to be shared by all human beings. Thus, the same grammatical features that act in all human languages are PRINCIPLES, while those variations within languages are PARAMETERS. The two approaches together construct the basic framework of Government and Binding.

Unlike GB's three levels of structural distinction, the theory of GPSG presents only one surface structure, involving no transformations of any kind.

The distinguishing feature GPSG holds is that it claims that without theorizing a transformation device, its one level of structure representation could provide satisfactory accounts to the problems required to involve rules of movement. Structurally, as a replacement for phrase structure rules, GPSG employs Immediate Dominance rules (i.e. ID-rules) to indicate that a mother node can have daughter nodes that do not specify their linear order. And by Metarules which draw a conclusion regarding syntactic rules, an ID-rule can be derived from another ID-rule to demonstrate an inter-sentence relation. GPSG in addition employs several different principles to work together with ID-rules: Feature Cooccurrence Restrictions, Feature Specification Defaults, Head Feature Convention, Foot Feature Principle, Control Agreement Principle, and Linear Precedence Statements. By interacting with one another, these rules formulate Well-Formedness Definition deciding whether a local tree (i.e. a single node and its daughters only) is well formed. Piecing these processes together explains how the grammar works.

Lexical-Functional Grammar (LFG), as its name suggests, emphasizes the function of lexicon in its grammatical description. That is, the lexicon plays a greater role in the grammar than that of GB and GPSG. For example, a sentence that is required to be operated by a transformation device to derive its surface structure in a framework like GB can be performed simply by lexical rules in LFG. In addition to the lexicon, two levels of syntactic representation are proposed in this theory: c(onstituent)-structure and f (unctional) structure. The former, used in a similar way as the Phonetic Form in GB and surface structure in GPSG, represents how words are ordered and what properties a phrasal structure has; while the latter demonstrates a sentence's grammatical functions: SUBJ(ECT), OBJ(ECT), OBL (IQUE), ADJUNCT, etc. As opposed to GB, each individual level of syntactic structure in LFG has its own grammatical requirements to obey; and c-structures decide what properties f-structures contain. It does not, therefore, show

one-to-one uniformity between these two levels.

In recent years, GB and GPSG have both gone through individual modifications: the former, the Minimalist Program by Chomsky (1989, 1992); the latter, Head-Driven Phrase Structure Grammar (HPSG) by Carl Pollard and Ivan Sag (1987). However, the survey presented in this paper will make no attempt to cover these two new developments. They will be the next focuses in a series of discussions with regard to empty categories.

2. EMPTY CATEGORIES IN GB. In GB theory, four types of empty category are identified by means of the anaphor-pronominal distinction. This approach suggests the following four categories of expressions:

(2) a. [+ana, -pron]
b. [-ana, -pron]
c. [+ana, +pron]
d. [-ana, +pron]

In this system, anaphors must have an antecedent since NPs in this class do not have independent reference. Take for example a reciprocal anaphor.

(3) Paul and Alice$_i$ hate each other$_i$

Since 'each other' here in (3) lacks independent reference, it must get its reference from its antecedent 'Paul and Alice'. On the other hand, pronominals may or may not have an antecedent because NPs in this class can have two functions in English. Example (4) makes this theory clear.

(4) Mary thinks she is beautiful

Here the pronominal 'she' may refer either to the matrix subject 'Mary' or to someone other than 'Mary'. Thus, as far as overt NPs are concerned, overt anaphors (i.e. reciprocals and reflexives) are [+ana, -pron]; personal pronouns (i.e. the forms I, you, he, etc.) are [-ana, +pron]; and referring expressions (i.e. any overt NPs that are neither anaphors nor pronominals such as John, Mary, etc.) are [-ana, -pron]. Following Chomsky (1982), the class of [+ana, +pron] has no any overt element, since it would bring about

the violation of the Case Filter.

As just mentioned, there are four empty categories recognized in GB theory by the anaphor-pronominal distinction. They are in fact parallel to the four categories of expressions above. The four types of empty category, thus, can be exhibited in (5) :

(5) a. [+ana, -pron] NP-trace
b. [-ana, -pron] variable
c. [+ana, +pron] PRO
d. [-ana, +pron] pro

These four types of empty category will be discussed in more detail in the following subsections of section 2.

2.1. THE CHARACTERISTICS OF NP-TRACE IN GB. A typical case of NP-Movement in English is in a passive construction, though this rule applies in a number of different constructions. Hence, in a passive sentence like

(6) The man was killed – in the house

the underlined NP was moved to the matrix subject position from the place marked – by operation of NP-Movement. The rule might be outlined as follows:

(7) NP-Movement
Move an NP into an empty NP-position

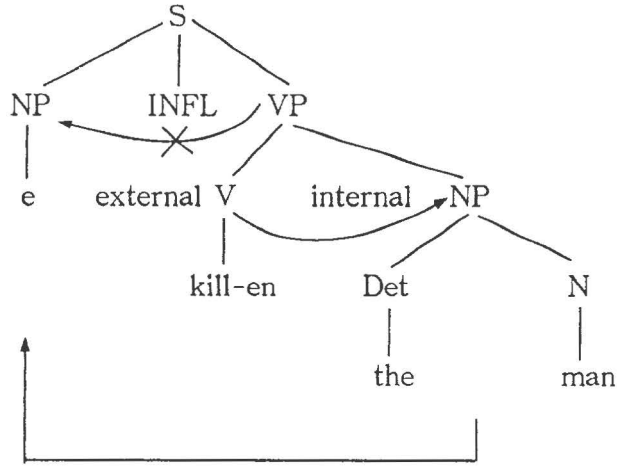
A more recent GB analysis of passive sentences such as (6) may be stated this way:

(8) Move a d-structure object to become an s-structure subject

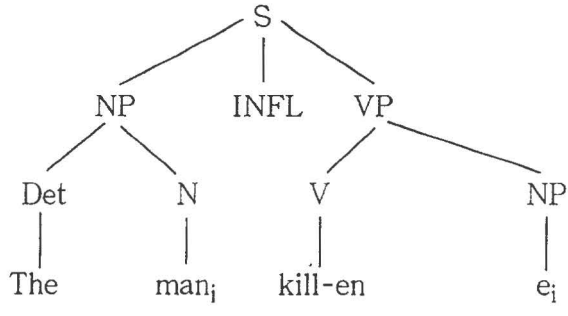
Since the verb kill is a transitive, it assigns two θ-roles. However, the subject position at d-structure is still empty because the passive morphemen -en adds to the verb which takes away the ability of the verb to assign the

externals θ -role. This process can be exemplified in (9) :

(9) a. d-structure



b. s-structure



Move- α then takes place moving the object the man into the subject position in accordance with the Extended Projection Principle, which requires that all clauses have subjects. The coindexed empty node left behind by NP-Movement is usually referred to as NP-trace in the GB framework. The target of NP-Movement must be a non- θ position (i.e. A-position), because no movement is from one subcategorized position to another subcategorized position, for that would result in the violation of the θ -Criterion which says:

(10) Each argument bears one and only one θ -role, and each θ -role

is assigned to one and only one argument.

In brief, the θ -Criterion is designed to prevent an NP from getting two different θ -roles. In GB, to indicate the relation between the NP-trace and its antecedent is achieved by using indices in a sentence to represent the coreference relation. A very general indexing rule is therefore given as follows:

(11) Assign every NP in a sentence an index (where the index is a random integer)

Indeed, (11) is unconventional by virtue of the fact that any random pair of NPs in a sentence may either share or not share the same index. For example:

(12) a. Mary_i thinks she_i is beautiful
b. Mary_i thinks she_j is beautiful

The over-general prediction may be worse, cf (13) :

(13) John_i like myself_i

To cope with the problem, thus, a kind of semantic filter (i.e. Matching Condition) is provided to rule out those impossible interpretations such as (12) and (13) above. However, only offering such a 'filter' will not suffice to solve the problem completely, since the rule in (11) can still generate impossible interpretations, as shown in (14) :

(14) a. Mary_i hates herself_j
b. Mary_i hates her_i
c. Mary_i hates Alice_i

Chomsky (1981) thus proposes the following three principles, known as 'Binding Theory', to deal with the interpretive relations between NPs in a sentence.

(15) a. An anaphor ([+ana]) is A-bound in its governing category
b. A pronominal ([+pron]) is A-free in its governing category
c. An R-expression ([-ana, -pron]) is A-free in its governing category

The term 'governing category' here in (15) means that it is the smallest NP or S containing an element and a governor of the element. Thus, Binding Principle A simply says that an anaphor must be coindexed with an NP which is in an argument position and c-commands the anaphor within its governing category. Principle B requires that a pronominal not be coindexed with any others in its governing category. And Principle C entails that, apart from lexical NPs' being free from coindexing, a wh-trace is coindexed with its antecedent in COMP which is a non-argument position.

Since Binding Principle A specifies that an anaphor must be bound in its governing category, NP-trace, similarly, is subject to this condition by virtue of the fact that it is also [+ana, -pron]. Hence, in sentences like

(16) a. Joe_i seems t_i to be sick
b. *Joe_i seems that t_i is sick

the NP-trace in (b) violates Principle A, as it is not bound in its governing category.

2.2. THE CHARACTERISTICS OF 'VARIABLES' IN GB. Following Chomsky (1982), if a category is a 'variable', then it is in an A-Position and is locally A'-bound. For instance, the wh-trace in the following sentence is a variable.

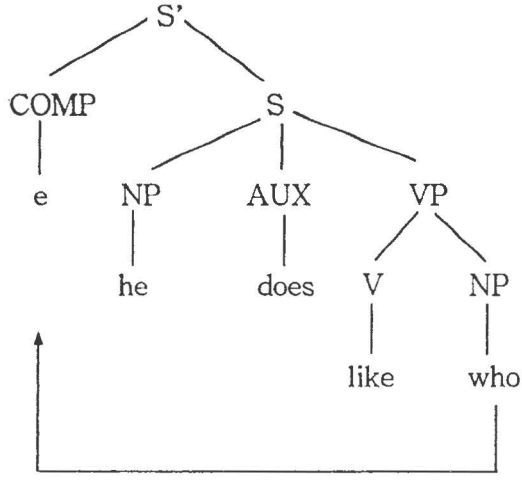
(17) Who_i are you looking for t_i

The trace 't' in (17) is coindexed with 'who' which is in a non-argument position. Thus, it behaves neither like an anaphor nor a pronominal, so by definition, this wh-trace is understood as a variable. In GB, the category 'variable'

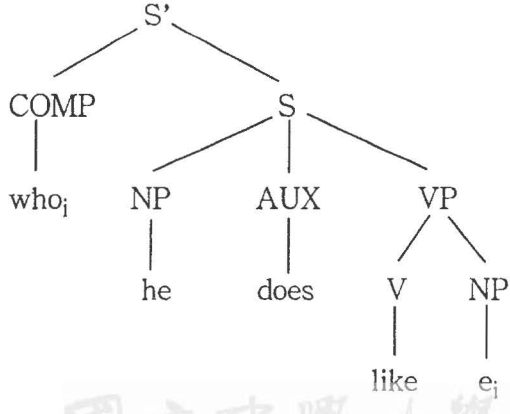
refers to traces of WH-movement. Typically, WH-movement is movement from a subcategorized position to a non-subcategorized position (because a COMP can never be subcategorized), and from a θ -position to a θ'-position. An illustration of WH-movement is exhibited in (18) below:

(18) who_i does he like e_i?

a. d-structure



b. s-structure



Unlike NP-movement, the antecedent of a wh-trace can not be Case-marked by virtue of being in COMP position, so it must inherit the Case from its trace. With reference to θ -marking, on the other hand, the antecedent of a

wh-trace again must inherit the θ-role from its trace. The antecedent of an NP-trace, however, must get Case from Tense rather than inheriting from its trace. The distinction between NP-trace and wh-trace may be illustrated in Table (19).

(19)

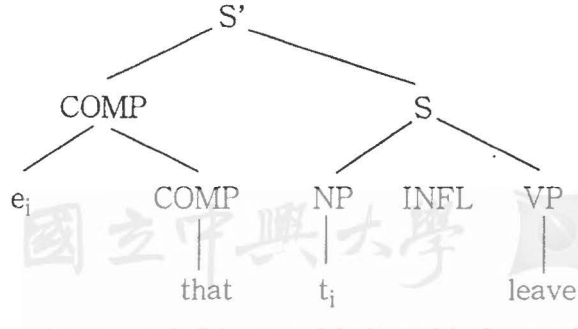
	Governed	Case-Marked	θ – Marked	A-Position
Position of wh-trace	Yes	Yes	Yes	Yes
Landing site of wh-trace	No	No	No	No
Position of NP-trace	Yes	No	Yes	Yes
Landing site of NP-trace	Yes	Yes	No	Yes

When discussing 'trace' in GB theory, whether NP-trace or wh-trace, one can not avoid mentioning the Empty Category Principle (ECP). The idea of the ECP is to license the existence of a 'trace' left behind in the subject position by movement, since INFL is not a proper governor. The ECP is defined as follows: A trace must be properly governed. For example,

(20) *who$_i$ do you think that e$_i$ came

The relevant structure of sentence (20) is shown in (21):

(21)



Since there is a branch in COMP, the empty category in COMP therefore can not c-command the trace which is left behind in subject position of the lower clause by movement. It thus can not satisfy the requirement of the following Proper Government Condition:

(22) Proper Government
A properly governs B iff
① A governs B and A is lexical (N,V,V, or P), or
② A locally A'-binds B.

Sentence (20) therefore is an ECP violation in that 'e_i' in COMP can not locally A'-bind t_i in the lower subject position and hence t_i is not properly governed.

2.3. THE CHARACTERISITCS OF PRO IN GB. Unlike 'traces' formed by Move-α the concept 'PRO' in GB falls under the theory of Control; and unlike 'traces', which must be properly governed, 'PRO' can never be governed. Since the feature specification of PRO is [+ana, +pron], it is subject to Binding Principles A and B simultaneously. If PRO were governed, then it would have to have a governing category. By Binding Principles A and B, PRO must be both free and bound in its governing category. This is obviously a conflicting situation. PRO, thus, is ungoverned. This is in fact the basic property of PRO in GB theory. This property reflects the distribution of PRO in sentence structure. In English, an ungoverned position in a sentence is the subject of an infinitival clause, so PRO can occur there, as in example (23) :

(23) I want [PRO to win]

Since 'want' here is a verb which takes an S-bar infinitival complement, which is assumed to be an absolute barrier to government, it thus requires PRO as subject of the infinitival complement in virtue of its being ungoverned. Due to PRO's ungoverned feature, the Binding Theory therefore

fails to describe the relation of PRO to its antecedent in a sentence. Instead, PRO is subject to the theory of Control. Because of its performing in both ways, PRO is classified into the class of [+ana, +pron]. When PRO behaves like an anaphor, it has to be obligatory controlled by the matrix subject, as in a sentence like:

(24) $Bill_i$ wants PRO_i to leave

On the other hand, PRO may not necessarily be controlled (i.e. non-obligatory control) by the matrix subject, and may also refer to someone outside of the sentence. Thus it can behave like a pronoun, as in (25):

(25) Bill thought that it is possible PRO to finish the assignment in time

Also, 'trace' can not exist in a position where PRO is allowed, since it would cause the violation of θ-Criterion which can be illustrated by the controlled infinitival complement verbs such as 'seem' and 'try', as in the following sentences:

(26) a. Joe_i seems [$_S$ e_i to be sick]
b. Joe_i tried [$_{S'}$ [$_S$ PRO_i to leave]

'Joe' in (a) inherits the θ-role from its trace in the embedded clause. 'Joe' in (b), however, is assigned the Agent θ-role from the verb 'try'. Since the subject position of an infinitival clause may be assigned a θ-role from the lower VP, PRO here in (b) is assigned a θ-role. Thus, if the empty category in the embedded subject position of (b) is regarded as a 'trace' rather than a PRO, 'Joe' in (b) would get two θ-roles, and violate the θ-Criterion.

2.4. THE CHARACTERISTICS OF pro IN GB. Chomsky (1982:81) has recognized the empty category 'pro' as the fourth type of EC in GB theory, and it has the feature specification [-ana, +pron]. The overt NP 'him', for example, is the counterpart of EC 'pro' since pronouns are also[-ana, +pron]. Consider sentences (27a-b):

(27) a. Joe$_i$ thinks that [everyone doesn't like him$_i$]
b. *Joe$_i$ believes him$_i$ to be unhappy

According to Binding Principle B, a pronominal must be A-free in its governing category. Here in (a), the governing category for the pronoun 'him' is the lower clause, and its antecedent 'Joe' is outside that area; accordingly 'Joe' can not bind 'him' because it fails to c-command it. The pronoun 'him' is therefore A-free and the sentence is grammatical. However, in (b), the pronoun 'him' is within that domain, 'Joe' this time does A-bind 'him', for the c-command condition can be satisfied. It is therefore ruled out by virtue of the fact that the structure (b) violates the Principle B.

Ross (1982) suggests that English may be regarded as a 'hot' language according to Marshall McLuhan's (1964) "hot-cool" division of the media, since in English the only position for an empty pronoun is the subject of an infinitival clause, as the certain examples shown in (23) , (24) and (26b). However, 'pro' has to respect the Binding Principle B due to its Binding feature [-ana, +pron]. In other words, small 'pro', unlike big PRO, must have a governing category (i.e. it can be governed). As is known, the subject position of an infinitival clause can never be governed (in English). Thus, 'pro' can not be allowed in that position. In fact, English sentence structure does not authorize the use of 'pro'. The following examples, quoted from Huang (1984:532) clearly show such a claim:

(28) Speaker A: Did John see Bill yesterday?
Speaker B: a. Yes, he saw him.
b. *Yes, e saw him.
c. *Yes, he saw e.
d. *Yes, e saw e.
e. *Yes, I guess e saw e.
f. *Yes, John said e saw e.

This is because the verb-inflectional system in English is not as rich as many other languages (Spanish, for example) to be able to identify 'pro'. In Spanish, empty pronouns in the subject position of a tensed clause are allowed because of its rich system of verb-subject agreement. Following Huang (1984: 533), an example is in (29) :

(29) a. Jose sabe [$_{S'}$ quel el ha sido visto por Maria]
Jose know that he has been seen by Maria
'Jose knows that he has been seen by Maria.'

b. Jose sabe [$_{S'}$ quel pro ha sido visto por Maria]
Jose know that has been seen by Maria
'Jose knows that (he) has been seen by Maria.'

The other property of 'pro' is that it can also serve as an 'expletive'. Sells' (1985:72) examples describe this feature, as in (30) :

(30) a. pro$_i$ llego Juan$_i$ 'Juan arrived.'
b. pro llueve 'It rains.'
c. pro parece que Juan esta enfermo
'It seem that Juan is sick.'

The 'pro' is free in (a) for it is not bound by 'Juan', and in (b) and (c) 'pro' is also free in virtue of there being no antecedent.

2.5.SUMMARY OF EMPTY POSITIONS AND EMPTY CATEGORIES IN GB. The related characteristics of empty positions and empty categories in GB may be briefly illustrated in Table (31) and (32) , respectively:

(31)

	A	B	C	D	E	F
Wh-Move to?	No	No	Yes	No	No	No
Wh-Move from?	Yes	No	Yes	Yes	Yes	No
Case-Marked by?	Tense	No	inherit	Tense	verb	No
θ – Role from?	inherit	verb	inherit	verb	verb	lower verb
Governed by?	Tense	verb	No	Tense	verb	seem
A-position?	Yes	Yes	No	Yes	Yes	Yes
NP-Move to?	Yes	Yes, but can't stop	No	No	No	Yes, but can't stop
NP-Move from?	Yes	Yes	No	No	No	Yes

The English capitals in Table (31) correspond to the following:

A: Subject of 'seem' or a passive

B: Object position in passive

C: COMP

D: Normal subject position

E: Normal object position

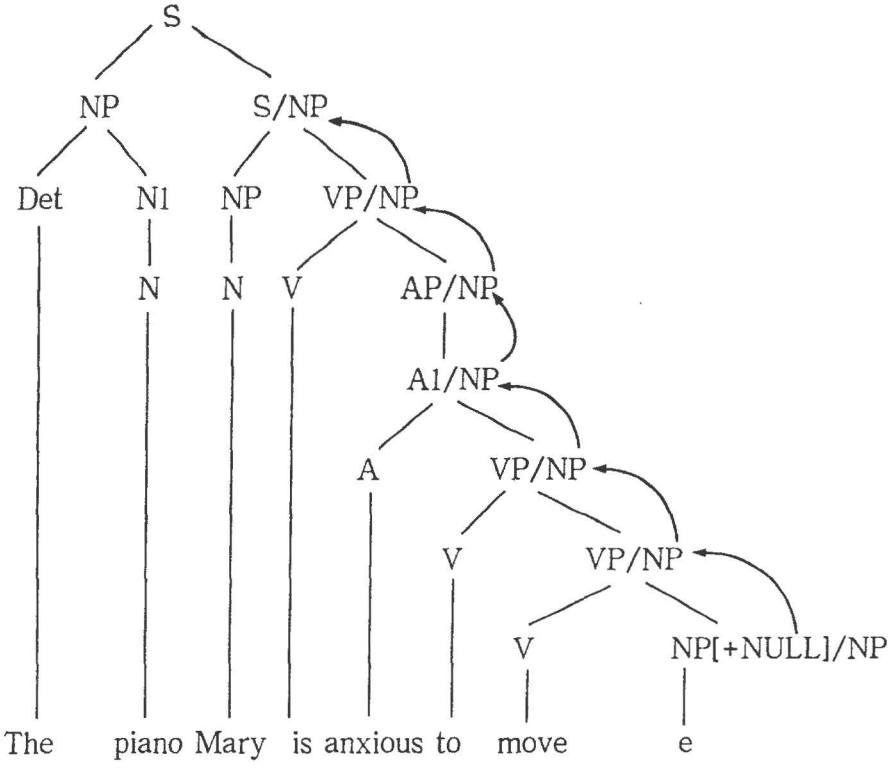
F: Subject of an infinitival clause under 'seem'

(32)

NP-trace (reciprocals and reflexives)	left by NP-Movement
Variables (nonpronominal NPs)	left by Wh-Movement
pro	missing subjects
PRO	understood subjects

3. EMPTY CATEGORIES IN GPSG. The term NULL in GPSG framework is the same as the term Empty Category in GB, though they may not function exactly the same way. GPSG, following GKPS (1985), has the use of the feature NULL to put it into a code that an element is phonologically empty. That is to say, there is a one-to-one match relation between a moved phrase and the trace. This idea can be exemplified diagrammatically in (33) :

(33)



It is simply the case that the feature NULL has to trigger the FOOT feature, SLASH, by Feature Coocurrence Restriction 19, as in (34) :

(34) FCR 19: [+NULL] ⊃ [SLASH]

FCR 19 implicitly says that if something is null, then it has to introduce the FOOT feature SLASH. Thus, the appearance of SLASH, which, being a

FOOT feature, will require that the SLASH feature instantiated on a daughter be also instantiated on the mother; as a result, there will be a going up direction in the tree. This 'path' can be seen clearly in (33).

It is necessary to explain some terminology here. In the GPSG framework, features are used to pass information around the tree. There are such features as CASE, COMP, NULL, CONJ, GER, POSS, ...etc. There are also HEAD features and FOOT features:

(35) a. HEAD features: AGR, ADV, SLASH, PFORM, AUX, SUBCAT, ...etc.
b. FOOT features: RE, SLASH, WH.

If a feature is a HEAD feature, then it must conform the Head Feature Convention (HFC), which is stated as follows (GKPS 1985:26):

(36) HFC: The head features on a mother category are the same as the head features on any daughter which is a head.

Similarly, if a feature is a FOOT feature, it must conform the Foot Feature Principle (FFP), which says that:

(37) FFP: A feature that is instantiated on a daughter is also required to be instantiated on the mother.

The Feature Cooccurrence Restrictions (FCR) is used to define the possible extensions of categories. For example,

(38) FCR 2: [VFORM] ⊃ [+V, -N]

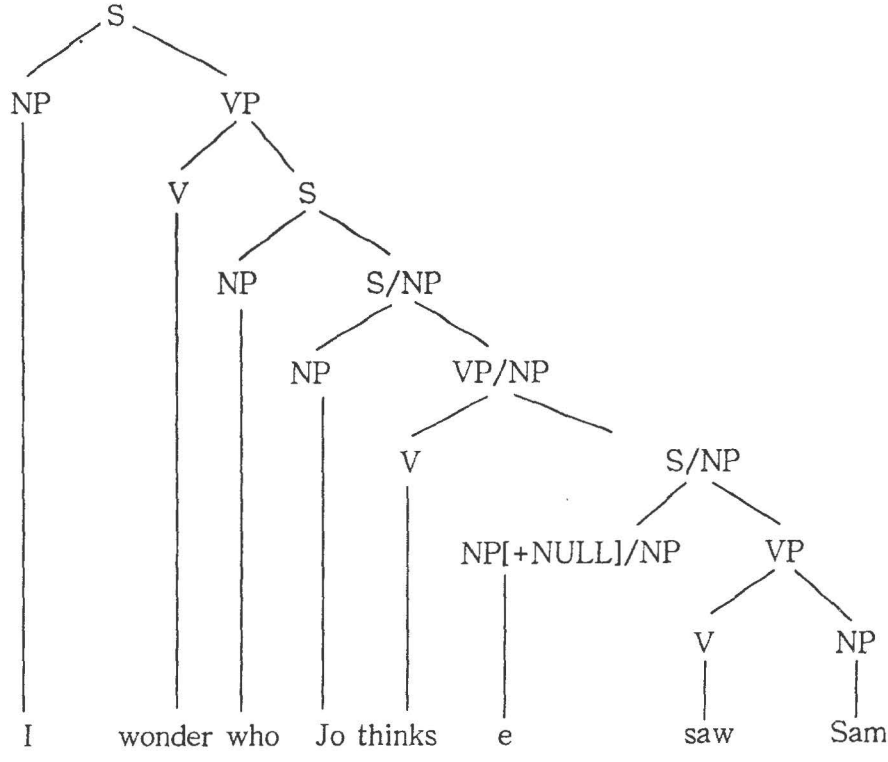
By FCR 2, the VFORM values are limited to verbs only. In other words, any category with a VFORM feature specification must be a verb.

According to GKPS, the feature NULL defaults to being absent, so it can only appear in a tree when sanctioned by a rule. Such a rule will be derived by the application of Slash Termination Metarule 1 (STM 1) to a non-lexical ID rule, if NULL is in subject position. For example,

(39) I wonder who Jo thinks e saw Sam

GPSG, however, cannot assign the structure of (39) in (40) below:

(40)

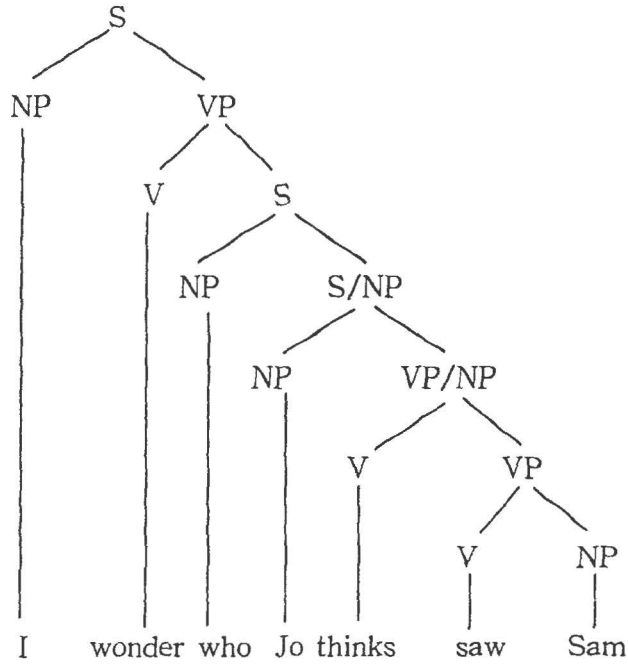


Since, in GPSG, a subject can only be introduced by a non-lexical ID rule, a null subject needs to be derived by the application of STM 1. However, there is a constraint on the application of STM 1: the Lexical Head Constraint, which states the following restriction on metarule application (GKPS 1985, P. 59):

(41) Metarules map from lexical ID rules to lexical ID rules.

Therefore, the GPSG analysis of structure (38) should be corrected as follows:

(42)



This analysis also shows that a zero pronoun (i.e. pro, in terms of GB) in GPSG is not allowed (or, GPSG cannot handle such structure).

The analysis of missing-object constructions in GPSG is based on the following rule:

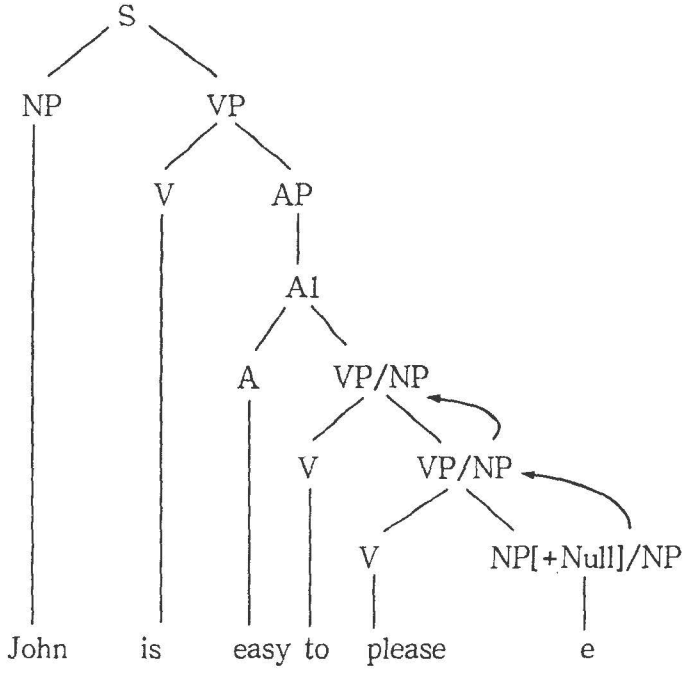
(43) $A^1 \rightarrow$ H[42], V2[INF]/NP[Case Acc]

This rule permits some adjectives to have a slashed infinitive VP or S complement. For example, the rule can account for the sentences such as:

(44) a. John is easy to please
b. John is easy for us to please
c. John is easy for us to make Joe accept

Following GKPS (1985: 151), sentence (44a), for example, has the structure of (45) :

(45)



Structure (45) may look like structure (33) . Yet, they are two different constructions: the former is a missing-object structure, and the latter a topicalization construction. In GPSG, the rule in (46) is responsible for the topicalization.

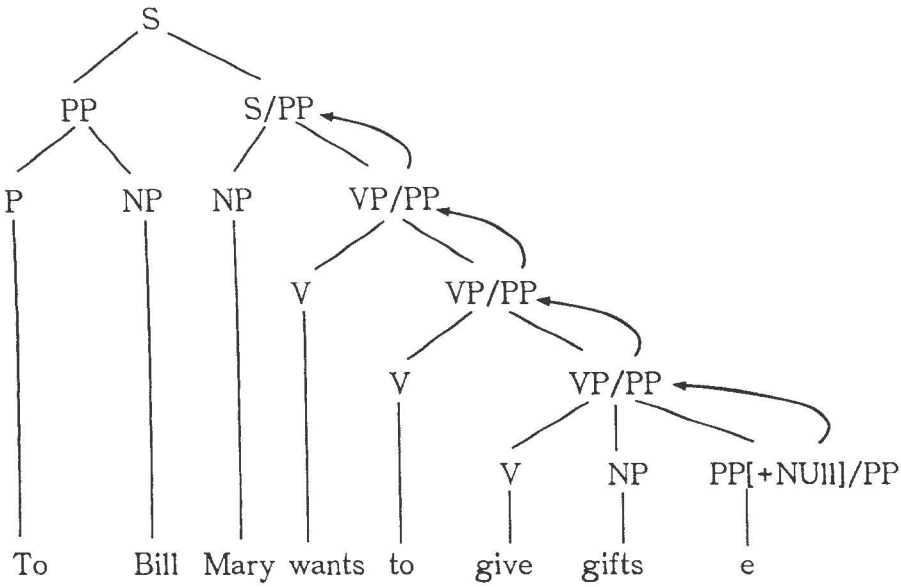
(46) S → X2, H/X2

This rule means that it is possible to have a tree consisting of any Bar2 category followed by an S which contains a null Bar2 category. Thus, in a sentence like

(47) To Bill, Mary wants to give gifts

the GPSG analysis of the tree diagram in (48) , which represents the structure of (47) , may exemplify the difference between the two constructions.

(48)



In structure (48) , a SLASH feature is projected through the tree from the position of the gap, along the 'path' indicated. Basically, each of the two structures requires its own rule to project a tree which is able to reflect each own assumption in GPSG framework. As a result, the projection of a SLASH feature in the tree is different.

To summarize: Apart from using the feature NULL to encode that a constituent is phonologically empty in the structure, the feature SLASH is also required to be taken to be a FOOT feature, and its distribution in trees in accordance with the FFP. These two features play an important role in the analysis of 'Unbounded Dependencies' in GPSG framework, since no construction missing an element can be without them. Essentially, the analysis of empty categories in GPSG is always involved in 'trace' only.

4. EMPTY CATEGORIES IN LFG. Empty categories in LFG are handled by way of the theory of Control, which is classified into two parts: functional control and anaphoric control. In functional control, XCOMP (or XADJ) is used to control the relation between the missing subject and its

antecedent in functional structure. Typically, in a sentence like

(49) Joe$_i$ seems e$_i$ to hate himself

the control relation between the matrix subject 'Joe' and the XCOMP subject (i.e. the subject of infinitival complement) is that of functional control. The f-structure of sentence (49) in (50) illustrates this concept.

(50)

```
⟨ PRED 'seem ⟨ ( ↑ XCOMP) ⟩ ( ↑ SUBJ)'
  SUBJ ⟨ PRED 'Joe'
         NUM  SG
         PERS 3
         GEN  MASC ⟩
  XCOMP ⟨ PRED 'hate ( ↑ SUBJ) ( ↑ OBJ)'
          SUBJ [              ]
          OBJ  PRED 'PRO'
          REFL +                ⟩
  seem V ( ↑ PRED) = 'seem ⟨ ( ↑ XCOMP) ⟩ ( ↑ SUBJ)'
  (XCOMP SUBJ) = ( ↑ SUBJ) ⟩
```

Here, 'Joe' is both the subject in the outer and inner f-structures by virtue of the fact that the control relation between the matrix subject and the missing subject of infinitival complement is specified by the curved line. In fact, the function of XCOMP or XADJ simply implies that this clause does not have a subject, so it has to get one from some place in the f-structure. Other examples of this kind can be illustrated in (51).

(51) a. Bill saw a snake$_i$ e$_i$ near him (XADJ)
b. Mary$_i$ decided e$_i$ to help (XCOMP)
c. Mary$_i$ enjoyed sports e$_i$ as a girl (XADJ)
d. We painted it$_i$ e$_i$ red (XCOMP)

Anaphoric control, on the other hand, involves an anaphor (PRO) in f-structure which is not realized in c-structure. Notice that the term PRO in GB attempts to represent properties of both anaphors and pronominals. In LFG, however, PRO is not a bound anaphor, but an unexpressed pronominal. Thus, it may, or may not, be understood as controlled by the matrix subject. For example,

(52) Bill thought that it is possible PRO to finish the assignment in time

As noted earlier, PRO here in (52) can be interpreted either as Bill or anyone rather than Bill. In the f-structure presentation, therefore, there will be no curved line to indicate the relation. The relevant part of f-structure illustration of (53) explains the difference.

(53)

$$\begin{bmatrix} \text{PRED} & \text{'finish} < (\uparrow \text{SUBJ})(\uparrow \text{OBJ}) > \text{'} \\ \text{SUBJ} & [\text{PRED 'PRO'}] \\ \text{OBJ} & \begin{bmatrix} \text{PRED} & \text{'assignment'} \\ \text{DEF} & + \end{bmatrix} \\ \text{ADJ} & \text{'in time'} \end{bmatrix}$$

LFG also employs the functions of Focus and Topic to handle the moved phrase structure (same as 'unbounded dependency' in GPSG). Hence, in a sentence like

(54) That book I read e yesterday

'That book' is a topic. The mechanism of functional control is therefore used to match the both parts in the f-structure as in (55).

(55)

$$\begin{bmatrix} \text{TOPIC} & \begin{bmatrix} \text{PRED} & \text{'book'} \\ \text{DEF} & + \end{bmatrix} \\ \text{PRED} & \text{'read} < (\uparrow \text{SUBJ})\ (\uparrow \text{OBJ}) > \text{'} \\ \text{TENSE} & \text{PAST} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{'PRO'} \\ \text{PERS} & 1 \\ \text{NUM} & \text{SG} \end{bmatrix} \\ \text{OBJ} & [\quad\quad] \\ \text{ADJ} & \text{'yesterday'} \end{bmatrix}$$

LFG allows the same types of empty categories as GB. The following brief illustration may further explain the notion.

(56)

LFG		In terms of GB
Functional Control	XCOMP XADJ	NP-trace PRO(obligattory control)
	Focus Topic	Wh-trace Topicalization
Anaphoric Control		PRO (non-obligatory)

With regard to the Table in (56), one thing requires an explanation. XCOMP is not really equivalent to NP-trace, nor XADJ to PRO because either

XCOMP or XADJ may behave like NP-trace on the one hand, and PRO on the other. For example, XCOMP can be the subject of an infinitival complement of verbs 'seem' and 'try', the former an NP-trace and the latter PRO.

Principally, the theory of functional control in LFG is designed to provide the antecedent somewhere in the sentence for a 'missing subject' in an XCOMP or XADJ, or a 'displaced phrase' in a Focus or Topic. On the other hand, the theory of anaphoric control is involved in a non-obligatory control, i.e., there need not find the antecedent. These processes are exhibited in the functional structure.

5. CONCLUSION. In this paper I briefly describe the characteristics of empty categories in the three most influential contemporary syntactic theories. GB in this respect presents a thorough syntactic account of empty category. The theory categorizes four types of empty category, in which NP-trace, variable (or wh-trace), and pro fall into the domain of Binding Theory, while PRO the theory of Control, thereby explaining the missing constituents in sentence structure. GPSG, on the other hand, theorizing only one syntactic level, proposes the feature NULL to interpret empty structures. The most well-known and critical point GPSG holds is its analysis concerning movement type constructions, which generally calls for the help of transformational mechanisms. Nevertheless, GPSG, free from any single transformational device (by using metarules, instead), shows its potential strength in the interpretation of sentences involving movement. Finally, a different means dealing with empty categories taken by LFG is the theory of Control (not the same one as GB proposes), which embodies two components: functional control and anaphoric control, each responsible for different missing elements. In a sense, lexical rules employed in LFG behave just like GB's Move-α and GPSG's metarules.

On the whole, the survey done in this paper may not be very thorough with respect to empty categories; however, it shows how each theory's treat-

ment of empty categories reflects its basic assumption. Generally speaking, each theory exhibits its own strong argument and its own type of description. Essentially, nevertheless, the nature of empty categories in each theory is very much the same.

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管制捆綁理論，一般性詞組語法和詞彙功能語法之虛範疇理論探討

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摘 要

當代語言學主流的句法理論研究，基本上可區分為三大派別：管制捆綁理論，一般性詞組語法，和詞彙功能語法。而每個派別的虛範疇理論皆有其獨特之處。譬如，管制捆綁理論根據重複詞和代詞的區別來把虛範疇分為四類：名詞片語的遺跡，小虛詞，大虛詞，和疑問詞的遺跡。一般性詞組語法的虛範疇，則使用零成分來表示一個成分在表面結構上的遺缺，亦即一般所謂的'遺跡'。而詞彙功能語法的虛範疇，是透過'控制理論'在功能結構裡，處理主詞省略和移位的詞組結構，予以說明。

本篇論文主要在比較虛範疇於此三種句法理論之異同處，並進一步探討各個理論處理虛範疇的基本假設。**

關鍵詞：虛範疇，重複詞，代詞，管制範疇

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