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Unbounded dependencies in Korean

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Summary

In this thesis, unbounded dependency constructions in Korean will be discussed within the Head-driven Phrase Structure Grammar framework. English unbounded dependency constructions, that is, relative clauses, and topic clauses will be compared to Korean counterparts. Korean *wh*-interrogatives are not investigated as they are not syntactic dependency constructions we have adopted in this thesis. The *wh*-words and the constituents in question occupy the same places, that is, *wh*-words are *in situ*. There is some kind of dependencies between *wh*-elements and the interrogative suffixes. This is a semantic dependency between *wh*-elements and its scope.

One might assume topic clauses are unbounded dependencies but they are not in three reasons. First, the LOCAL value of the missing constituent is not identical to that of the topic. Second, topic clauses with no gap exist. Third, a gap can appear without topic. Topic clauses will be generated anyway without a SLASH mechanism. For these reasons, it follows that topic and gap are not syntactically connected. Korean topic clause constructions are neither filler-gap construction proposed by Pollard and Sag (1994) nor adjunction suggested by Gunji (1987). The left-dislocation in Catalan analysed by Engdahl and Vallduvi (1996) in Information Packaging could be more satisfactory. But English *as for* construction is more like Korean topic clause constructions.

Unlike, topic clauses and wh-interrogatives, Korean relative clauses are real unbounded dependencies. An important piece of evidence is that missing constituents can be embedded deeply and the relative suffix *nun* is in the highest verb next the head noun. This is similar to missing constituent and relative pronouns in English relative clauses.

Unlike externally-headed relative clauses, internally-headed relative clauses are not real relative clauses in two reasons: internally-headed relative clauses do not stem from those of *nun*-marked verbs and they are not modifiers as only a single IHRC can combine with *kus*.

Contents

Abbreviations

Acc	Accusatives
ARG-ST	Argument Structure
CAT	Category
COMPS	Complements
CON	Content
Dat	Dative
De	Declaratives
EHRC	Externally-Headed Relative Clause
FUT	Future tense
HON	Honorific form
IHRC	Internally-headed relative clause
MOD	Modified
NMN	Nominaliser
LOC	Local
Nom	Nominatives
PRE	Present tense
PST	Past tense
REL	Relative suffix
SS	Synsem
STYPE	Sentence Type
SUBJ	Subjects
TOP	Topic
Qu	Questions

Introduction

The term *unbounded dependency constructions* was introduced by Gazdar (1981). Unbounded dependencies are constructions which involve the movement to the nonargument position, the specifier of CP, in transformational grammar (Chomsky 1986b). In English unbounded dependency constructions are divided into two types. In one, an overt constituent exists in a higher position and associated with a missing constituent in the lower position. It would be either a topic or an expression containing *wh*-words. In the other, there is no such an overt constituent in the higher position. The former is the case in topicalisation sentences, *wh*-relatives, *wh*-interrogatives, *it*-clefts with *wh*-words, pseudo-clefts with *wh*-words, and the latter is the case in *tough* sentences, relative clauses which do not contain *wh*-words, called zero relative clauses (Radford 1988), and *it*-cleft without *wh*-words. Despite of their differences, both types of unbounded dependencies always involve missing constituents. Both types of unbounded dependencies must meet two conditions. First, the dependencies in question must respect the syntactic category requirements obliged by the local environment of the gaps. Second, the dependencies in question are unbounded. They can extend across many clause boundaries.

The term 'unbounded dependency construction' could be used broadly as a construction involving a dependency between a certain sort of structure and its scope. For instance, *wh*-interrogatives involve some kind of dependency between an *in-situ wh*-element and its scope. This is a semantic dependency. The term 'unbounded dependency construction' could be used more narrowly as a construction involving a syntactic dependency between a certain sort of structure and an associated gap. For instance, English relative clauses involve unbounded dependencies between a *wh*-pronoun and a gap or between a head noun and a gap. This is a syntactic dependency. We will adopt this definition of unbounded dependency construction in our thesis. Therefore, Korean *wh*-interrogatives are not

an unbounded dependency construction. In addition, they are not unbounded dependency constructions of kind discussed by Pollard and Sag (1994) as they do not involve gaps. As seen in (1) and (2), gaps are always involved in unbounded dependency constructions in English:

(1) Emma-ka Harry-rul joahanta.
Nom Acc like
'Emma likes Harry.'

(2) Emma-ka nwuku-rul joahani?
Nom who Acc like
'Who does Emma like?'

Therefore, we assume that the Korean *wh*-interrogative constructions are not syntactically unbounded dependency constructions. Therefore, we will not consider Korean wh-interrogatives in detail in our thesis. Wh-interrogative constructions in Korean will be briefly mention in section 2.5.

In this thesis, relative clause constructions and topic clause constructions in Korean and English will be compared. Relative clause constructions and topic clause constructions are investigated within the Head-driven Phrase Structure Grammar not within transformational grammars. One type of transformational grammar, the Principles and Parameters theory, is devised by Chomsky for the past two decades. This theory includes a set of universial principles of grammatical structure and a set of structural parameters which impose constraints on different structures in different languages. (Radford 1997) Webelhuth (1995) points out that Syntactic relationship are better exprssed without transformations, and that most explanatory grammar is monostratal. Head-driven Phrase Structure Grammar, also monostratal, will be overviewed extensively in Chapter 1. Chapter 2 provides the background information of Korean. Some specific topics, such as, suffixes, will be discussed in detail. In Chapter 3, unexpressed arguments, which are interesting and complicated matters, will be examined. Both unexpressed arguments in finite clause involving

extraction and unexpressed arguments in finite clause involving no extraction will be dealt. In Chapter 4, relative clause constructions are discussed. In Chapter 5, another type of relative clauses, called internally-headed relative clauses, will be discussed. Whether internally-headed relative clauses behave the same way as externally-headed relative clauses will be examined. In Chapter 6, topic clause constructions will be investigated. Why topic clauses are not unbounded dependencies will be explained in this chapter.

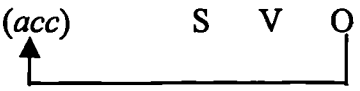
Chapter 1

Head-Driven Phrase Structure Grammar

1.1 Introduction

We will consider two important characteristics in Head-Phrase Structure Grammar (HPSG). The first one is that HPSG is a monostratal framework while in Transformational Grammar sentences have a number of levels of structures. (Borsley 1996, Webelhuth 1995) In Transformational Grammar, there are at least two syntactic levels, that is, Deep structure (D-structure) and Surface structure (S-structure). D-structure reflects the lexical properties of the constituents of the sentence. It represents the argument relations in the sentence. S-structure encodes the more superficial properties of the sentence. It represents the ordering of the sentence and their case, as in (1).

(1) Whom does [Harry like ____]?



In (1), the verb *like* takes two arguments to which it assigns a theta role, the semantic relationship between heads and arguments. A subject is an external argument since the verb externally assigns a theta role to the subject argument of the sentence. An object is an internal argument since the verb assigns a theta role to the object argument internally. There is no internal argument in (1). *Wh*-interrogatives are treated in terms of movement transformations. This means an external argument, an internal argument or an adjunct has been moved somewhere at S-structure. In (1), the internal argument has moved to the front of the sentence. Both the case of the internal argument and that of *wh*-word are the same, accusative. However, Gazdar

(1982) argues that there is no need to assume a movement analysis. Originally Gazdar (1982) assumes that phrase structure (PS) rules, which are a simple means of specifying how constituents can be concatenated to form larger constituents, define the single level of structure. This constructs the basis of the Generalised Phrase Structure Grammar (henceforth GPSG) which is the major influence on the HPSG framework. As in GPSG, there is a single level of structure in HPSG.

A second characteristic is that syntactic categories are complex in HPSG. With simple categories, the expressions would be assigned to different categories, and many different rules would be necessary. Thus, the generalisation would be missed. However, with complex categories, the generalisation can be formulated as a simple statement. All types of generalisation are described in complex syntactic categories. In Principles and Parameters framework, categories are complex but the potential of complex categories is not really exploited. They do not make use of complex categories as HPSG does. In Principles and Parameters, it is assumed that all features are binary, with two possible values '+' and '-'. For instance, Case takes binary features, + or - nominative, + or - objective as its value. Case does not take a single feature, such as, nominative, objective, as its value. It looks as if syntactic categories are sets of binary feature specifications. We will follow Borsley's (1996) method to show the advantage of complex categories. The following example shows that the NPs in (2) need four different categories:

(2) an apple = NP1 = indefinite singular noun phrase
apples = NP2 = indefinite plural noun phrase
the apple = NP3 = definite singular noun phrase
the apples = NP3 = definite plural noun phrase

With complex categories, we can have a single simple statement. That is, the NPs in (2) can be formed as a single rule in 0:

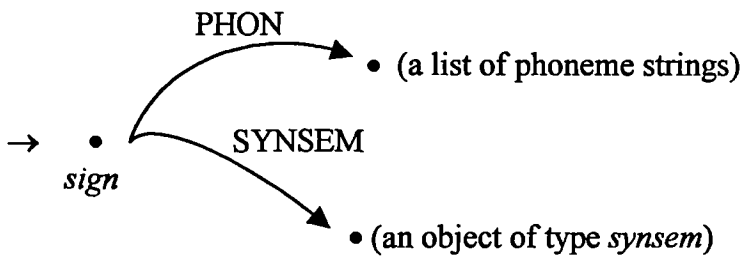
(3) NP $\begin{bmatrix} \text{nominal} + \\ \text{phrasal} + \end{bmatrix}$

A category in a tree must have all the above feature specifications and it may have additional feature specifications. For example, an indefinite singular noun phrase, *an apple* in (2) will have the feature specification [nominal+] and [phrasal+], as in 0, and also have the additional feature specification [definite -] and [singular]. If we have simple categories, one generalised category as in (3) is not possible. With simple categories, the NPs in (2) still have four separate categories.

1.2 Feature Structures

The linguistic expressions, or signs, include words, phrases, discourses as well as sentences. Signs are complexes of phonological information, syntactic information, semantic information, discourse information and internal structural information. In HPSG all signs are modelled in terms of feature structures. These Feature structures constitute linguistic information in terms of feature and their own values. Let us consider a feature structure of sign, as given in (4):

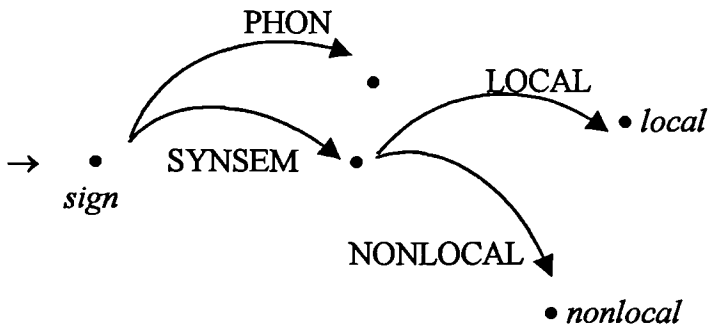
(4) The feature structure for sign (Pollard and Sag 1994:16):



Each node is labelled with a type symbol.[1] This type symbol informs what kind of object the structure is modelling. Types have subtypes. For instance, the type *sign* has two subtypes, *word* and *phrase*. Capitals are used for features, such as SYNSEM and PHON, while lower case italics are used for feature structures which are values, such as *sign* and *synsem*. The value of the feature can be atomic or complex. We will

consider complex/atomic value later in this section. Signs have at least two features, PHON and SYNSEM. The feature PHON includes a sign's phonological and phonetic information while the attribute SYNSEM includes complex syntactic and semantic information. We will mainly consider the feature SYNSEM in this thesis. The feature SYNSEM which is divided into two attributes: LOCAL and NON LOCAL, as illustrated in (5):

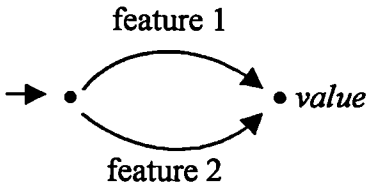
(5)



The LOCAL features are dealt within the maximal phrase constituent while the NONLOCAL features are anything larger than the maximal phrase constituent. The NON LOCAL information plays a central role in unbounded dependency constructions. The LOCAL values are shared between a gap and the associated filler in unbounded dependencies. The features NONLOCAL and LOCAL will be discussed in detail in Chapter 4.

Now we will consider some important mechanisms in the HPSG feature structures, such as, *structure sharing* and *complex feature structure*. First, we will see *structure-sharing*. Structure-sharing means that two features have the same feature structure as their value, and that value is token-identical, as illustrated in (6):

(6)



[1] In Pollard and Sag the term *sort* is used while in Ginzburg and Sag the term *type* is used. These terms can be interchangeable. We will use the term *type* in this thesis.

Feature 1 and feature 2 are different features but they share their value. Feature structures are described in attribute-value matrices (AVMs). Structure-sharing is represented with identical boxed numerals, called *tags* □ in AVMs. In this thesis, [1] is used instead of □ due to the technical reason. It does not matter whether the full value is represented or just a tag is represented in structure-sharing. They are the same, as shown in (7):

(7)
$$\begin{bmatrix} F1\ [1] & \begin{bmatrix} F4 & V1 \\ F5 & V2 \\ F6 & V3 \end{bmatrix} \\ F2\ [1] & \\ F3\ [1] & \end{bmatrix}$$

:'F' stands for feature and 'V' stands for value.

The above AVM are the descriptions of the same feature structures. Feature 1 has full value description. That is, Feature 1 takes Feature 3, Feature 4, and Feature 5 as its value. The values of Feature 4, 5 and 6 are V1,V2 and V3, respectively. Feature 2 and Feature 3 have only tags indicated with [1]. In a case of structure sharing Feature 2 and Feature 3 also take Feature 4, Feature 5 and Feature 6 as its value since they are indicated with the same tag as Feature 1. This means that Feature 1 and Feature 2 and Feature 3 share their values. This can be illustrated as follows:

(8)
$$\begin{bmatrix} F1\ [1] & \begin{bmatrix} F4 & V1 \\ F5 & V2 \\ F6 & V3 \end{bmatrix} \\ F2\ [1] & \begin{bmatrix} F4 & V1 \\ F5 & V2 \\ F6 & V3 \end{bmatrix} \\ F3\ [1] & \begin{bmatrix} F4 & V1 \\ F5 & V2 \\ F6 & V3 \end{bmatrix} \end{bmatrix}$$

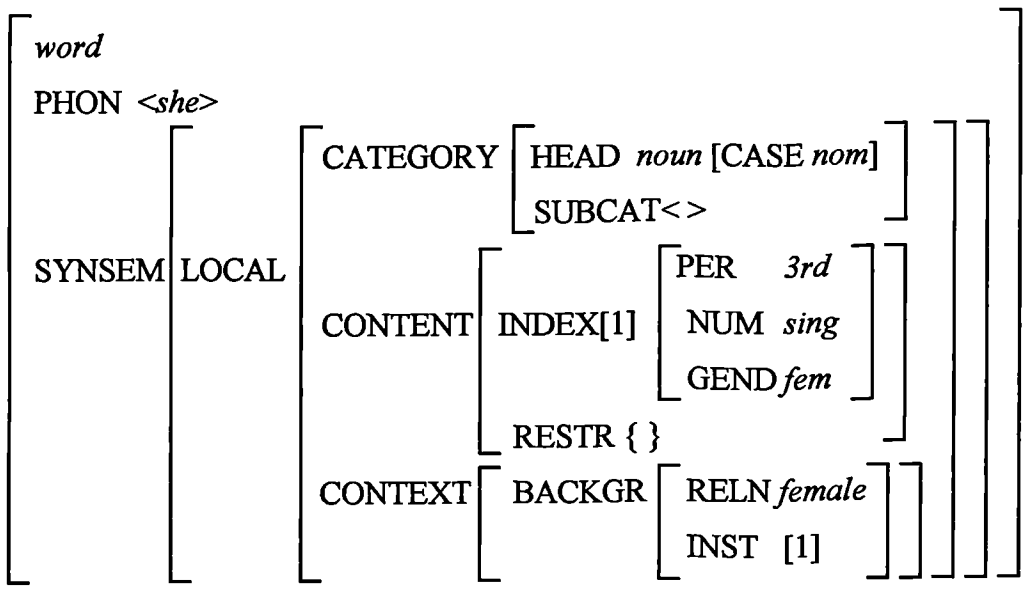
Feature 1, Feature 2 and Feature 3 have the same value. The structure-sharing plays a vital role in all dependencies. It accommodates all kinds of dependencies, such as,

complement selection, case-marking, agreement. The structure-sharing will be considered in detail in Chapter 4.

1.3 Words

Signs, that is, *word* and *phrase*, are modelled in terms of feature structures that are described in AVMs. We will first consider a lexical entry for a noun then consider a verb later in this section. The following is the lexical entry for the nominal object *she* (Pollard and Sag 1994:20):

(9)



Before considering the lexical entry for *she* in detail, an important mechanism, complex feature structures will be discussed. As noted earlier, the value of the feature can be atomic or complex. The atomic value is written in italic lower cases, as in (10):

(10) [FEATURE *value*]

For instance, the value of the feature NUMBER is atomic, that is, singular or plural, and the value of the feature PERSON is also atomic, that is, 1st, 2nd or 3rd, as illustrated in (10) and (11):

(11) [NUMBER *singular*]
(12) [PERSON *3rd*]

In (11) and (12), the atomic value of the feature NUMBER and PERSON are written in italic lower cases. Features also have a variety of complex values. Many features have a feature structure as their value. For instance, in (5), the feature SYNSEM takes the feature LOCAL as one of its values, as in illustrated in (13):

(13) [SYNSEM|LOCAL]

In turn, the feature LOCAL takes the feature CATEGORY as one of its values, as the following:

(14) [SYNSEM|LOCAL|CATEGORY]

The feature CATEGORY takes the HEAD feature as one of its values, as shown in (15):

(15) [SYNSEM|LOCAL|CATEGORY |HEAD]

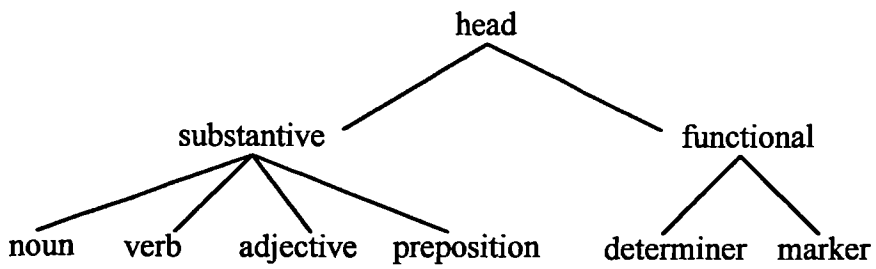
The feature HEAD takes complex values with internal structure. The feature HEAD takes the part of speech as its values. Different features are appropriate for different types. For instance, the feature CASE is appropriate for nouns while the feature VFORM, INV and AUX is appropriate for verbs. The feature HEAD of nouns includes the feature CASE as one of its values. The CASE value is atomic, as in (16):

(16) [SYNSEM|LOCAL|CATEGORY |HEAD|CASE *nom*]]

In (9), the feature CONTENT and the feature CONTEXT take also complex values. The value of the feature CONTENT of nouns is an index which in turn takes the feature PERSON, NUMBER and GENDER as some of its values. The feature CONTEXT takes the feature BACKGROUND as one of its values.

Let us consider two types of value descriptions: list and set. List descriptions are appropriate when the thing being described as itself a list of objects, with < >. Set description are in order when thing being described is itself a set of objects, with {}. The order of elements in a list description is significant while the order of elements in a set description is not significant. These notions are introduced by Pollard and Sag (1987). We will now come back to the lexical entry for *she* in (9). The structure of the feature LOCAL has three attributes: CATEGORY (henceforth CAT), CONTENT (henceforth CONT) and CONTEXT (henceforth CONX). The feature CATEGORY includes the information of argument structure as well as syntactic category. The HEAD feature takes a feature structure of type *head* as its value. The subtypes of the type *head* are *substantive* and *functional*. The subtypes of the type *substantive* in turn are *noun*, *verb*, *adjective* and *preposition* and the subtypes of the type *functional* are *determiner* and *marker*. We can formulate this as a type hierarchy, as it is shown as below:

(17)



The feature HEAD takes parts of speech as its value since all those types can be referred as *parts of speech.* The feature HEAD does the work assigned to parts of speech. Most types have their own feature structures since most features have complex values. For instance, noun has the feature CASE, verb has the feature VFORM, AUX, INVERTED(INV), and preposition has the feature PFROM. In other words, the feature CASE is appropriate for the type *noun* and the feature VFORM is appropriate for the type *verb*. In (9), the HEAD feature is specified as *noun*[CASE *nom*]. The value of the feature HEAD is complex since the feature HEAD takes complexes of type *noun* as its value. A SUBCAT feature indicates both what kind of subject a head requires and what kind of complements a head takes. This SUBCAT feature is replaced by the feature SUBJECT (henceforth SUBJ) and the feature COMPLEMENTS (henceforth COMPS) in Pollard and Sag (1994) chapter 9. Pollard and Sag initially had one feature for complements including subjects but later they follow Borsley's (1987) proposal of separating subjects from complements and being encoded in two different features, SUBJ and COMPS (see Pollard and Sag 1994 chapter 9). Pollard and Sag call two features SUBJECT (henceforth SUBJ) and COMPLEMENTS (henceforth COMPS). The COMPS and SUBJ value of *she* in (16) will be empty since pronouns do not require any complements. The original SUBCAT feature is retained for other purposes and renamed as ARGUMENT-STRUCTURE (henceforth ARG-ST) in some current HPSG work. We will see more about the feature COMPS, the feature SUBJ and the feature ARG-ST in a lexical entry for a verb later in this section.

The CONTENT value contains semantic information. The CONTENT value includes the feature INDEX and the feature RESTRICTION (RESTR) of nominals. Semantic roles are assigned to indices. The type *index* has three subtypes, *referential*, *there* and *it.* The latter two types are used for expletive pronouns, *there* and *it*, respectively. Nominal-objects are further divided into the two subtypes, *pronoun(pron)* and *nonpronoun(npro)*. The former type has the two subtypes, *personal-pronoun(ppro)* and *anaphor(ana)*. The latter type has two subtypes, *reflexive(refl)* and *reciprocal(recp)*. The attribute INDEX in turn has three

agreement features: PERSON(PER), NUMBER(NUM) and GENDER(GEND). A semantic restriction on its index will be represented in the RESTRICTION attribute of the nominal-objects whose value is a set of *parameterized-state-of-affairs (psoa)*. That is, '.....psoa in the RESTRICTION value is interpreted as placing semantic conditions on the entities that the indices appearing them can be anchored to in a given context' (Pollard and Sag 1994:26). The term *anchor* is used in the situation semantics where *anchors* play a role similar to that of variable assignment functions in logic. In Pollard and Sag's analysis, the referent of a linguistic expression token is the anchor of its index.

The RESTRICTION feature of expletive pronouns takes an empty set as its value since expletive pronouns are always non referential. Let us take an example with a nonempty restriction, as given in (18) (Pollard and Sag 1994:26):

(18)
$$\begin{bmatrix} \text{INDEX[1]} & \begin{bmatrix} \text{PER} & \textit{3rd} \\ \text{NUM} & \textit{sing} \\ \text{GEND} & \textit{neut} \end{bmatrix} \\ \text{RESTRICTION} & \begin{bmatrix} \text{RELATION} & \textit{book} \\ \text{INSTANCE} & [1] \end{bmatrix} \end{bmatrix}$$

When the noun *book* is used referentially as *a book*, the index [1] must be bound to a book, thus the value of the RESTRICTION feature is not empty, as above. When quantification, *every book*, binds the index, it will range over some set of books.

The feature CONTEXT contains context dependent linguistic information. It has the attribute BACKGROUND whose value is also a set of *psoa*. Both RESTRICTION *poas* and BACKGROUND *poas* restrict the possible anchor of indices. But the difference between the two is that the former represents literal meaning as a part of the CONTENT value while the latter corresponds to presuppositions or conventional implicature as a part of CONTEXT value. For example, the single

background *psoa* corresponds to the presupposition that the English pronoun *they* must be plural. The BACKGROUND value of the proper NP *Emma* would contain the *psoa*, as shown in (19):

(19)
$$\begin{bmatrix} \text{CONTEXT} \mid \text{BACKGROUND} \begin{bmatrix} \text{RELATION} & \textit{naming} \\ \text{BEARER} & [1] \\ \text{NAME} & \textit{Emma} \end{bmatrix} \end{bmatrix}$$

The atomic value *Emma* refers to a name *Emma* not to an individual person named *Emma.* The background psoa corresponds to the presupposition that referent can be identified by the name *Emma* in the utterance context. The feature CONTEXT is important in topic clauses. This will be discussed in detail in Chapter 6.

Having considered the lexical entry for a noun, we will now see lexical entries for verbs. The lexical entry for a verb *loves* can be the following:

(20)
$$\begin{bmatrix} \textit{word} \\ \text{PHON} \ \langle \text{loves} \rangle \\ \text{SYNSEM} \mid \text{LOCAL} \begin{bmatrix} \text{CATEGORY} \begin{bmatrix} \text{HEAD} & \textit{verb}[\text{VFORM } \textit{fin}] \\ \text{SUBJ} & \langle [1]\text{NP}[\text{CASE } \textit{nom}]_{[3]} \rangle \\ \text{COMPS} & \langle [2]\text{NP}[\text{CASE } \textit{acc}]_{[4]} \rangle \\ \text{ARG-ST} & \langle [1],[2] \rangle \end{bmatrix} \\ \text{CONTENT} \begin{bmatrix} \text{RELATION} & \textit{push} \\ \text{PUSHER} & [1] \\ \text{PUSHED} & [2] \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

The CATEGORY of verbs has four attributes: HEAD, SUBJ, COMPS and ARG-ST. In English all tensed verbs take the [VFORM *fin*] specification as their HEAD value. Unlike COPMS value, the value of the feature SUBJ is never more than a singleton list wherever it appears. The SUBJ value and the COMPS value of the verb *loves* is the verb's valence. The specification of the SUBJ and COMPS values of the verb *loves* must be combined with the SYNSEM value of the subject and the complement

selected by the verb *loves* to be saturated. It is only the SYNSEM value of complements that is selected. Not any of their other attributes, such as, PHON and DTRS is selected. The values of the feature COMPS, the feature SUBJ and the feature ARG-ST are a list of *synsem* objects, the combination of syntactic information and semantic information, not a list of signs. If the feature COMPS and the feature SUBJ were a list of signs, the head could require subjects and complements with phonological properties or immediate constituents which would not be necessary. The list of *synsem* objects shows what kind of subjects and complements the expression requires. The SUBJ <NP[CASE *nom*]$_{[3]}$> specification and the COMPS <NP[CASE *acc*]$_{[4]}$> specification mean that the verb *loves* takes a NP with index [3] as its subject and an NP with index [4] as its complement. The abbreviation of the NP$_{[3]}$ in the SUBJ list and NP $_{[4]}$ in the COMPS list will be the following:

(21)

$$\text{NP}_{[3]} \rightarrow \begin{bmatrix} \text{LOC} \begin{bmatrix} \text{CATEGORY} \begin{bmatrix} \text{HEAD } \textit{noun} \\ \text{ARG-ST} < > \end{bmatrix} \\ \text{CONTENT|INDEX}_{[3]} \begin{bmatrix} \text{PER } \textit{3rd} \\ \text{NUM } \textit{sing} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

The NP $_{[1]}$ is a NP with index [1] which is written as a right subscript. Here the INDEX values are 3rd singular. The [HEAD *noun*] specification ensures that this is a noun. The ARG-ST specification ensures that the NP is already saturated. The NP$_{[4]}$ means the SYNSEM value of a saturated noun with index [4]:

(22)

$$\text{NP}_{[4]} \rightarrow \begin{bmatrix} \text{LOC} \begin{bmatrix} \text{CAT} \begin{bmatrix} \text{HEAD } \textit{noun} \\ \text{ARG-ST} < > \end{bmatrix} \\ \text{CONTEN|INDEX}_{[4]} \end{bmatrix} \end{bmatrix}$$

The values of the feature ARG-ST are also a list of *synsem* objects. That is, the value of the feature ARG-ST is a list of the SUBJ value and the COMPS value. The ARG-ST feature appears only in the word level but not in the phrase level. Null arguments and unbounded dependency gaps appear in ARG-ST but not in valence features. Null argument and unbounded dependency gaps will be examined in

Chapter 3. The feature ARG-ST plays a central role in binding theory. In addition, the feature ARG-ST allows an account of anaphors. It has been assumed that anaphors, reflexives and reciprocals, are referentially dependent and are bound by an antecedent. That is, anaphors need a local antecedent, as shown in (23):

(23) [Sophie]*i* loves herself*i*.

This is guaranteed by binding theory. We will not go into detail regarding binding theory (see Sag and Wasow (1999) Chapter 7 for detail).

Pollard and Sag (1994) assume that it is within the lexical entry of a finite verb, as in (20), where the selection of complements and subjects, the assignment of their cases and the assignment of semantic roles take place. We will consider first the selection of complements and subjects. In HPSG, verbs select subjects as well as non subject complements. In the lexical entry above the verb *loves* selects a subject and a complement. A third person singular verb requires the [PER 3^{rd} , NUM *sing*] specification in the index of the subject. Thus, a verb in third person singular reveals that the verb has selected a third person singular subject.

The assignment of case also takes place within the lexical entry of the verb *loves*. Case assignment to complements and subject is treated as a part of the argument structure. Pollard and Sag assume that there is no separate case theory. In (20), the SUBJ<NP[CASE *nom*]> and COMPS <NP[CASE *acc*]> specifications are revealing that the verb requires a nominative as its subject and an accusative as its complement, respectively. Thus, there seems to be no need for any special case-marking convention. As in Principles and Parameters, Pollard and Sag (1994) also lies on the assumption that the CASE value is not specified in the SUBJ element of nonfinite verb. There is no difference between the selection of a VP complement with the VFORM specification and the selection of a PP complement with the PFORM specification.

The semantic roles of the subject and complements are also assigned within the lexical entry of the verb. Under a Principles and Parameters criterion, in a clause, an argument outside a VP is an external argument, while an argument inside VP is an

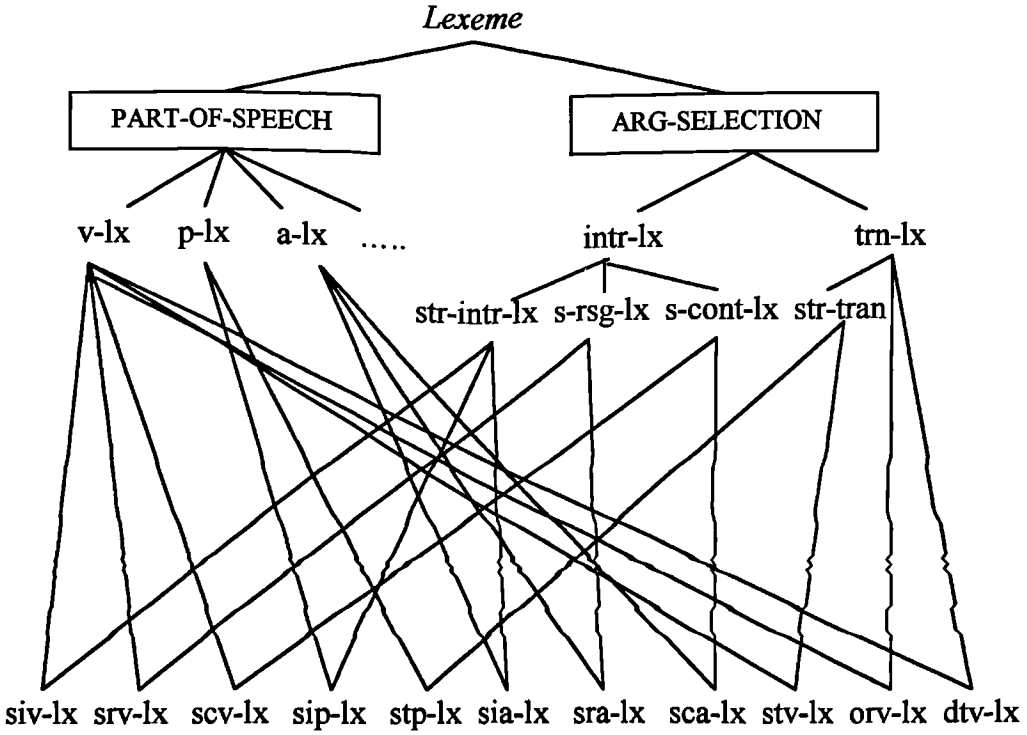
internal argument. The semantic role of the subject, an external argument, is assigned externally while the semantic role of the complement, an internal argument, is assigned internally. In HPSG there is no such internal and external assignment. The assignment of semantic roles occurs as structure sharing. That is, the index of the SUBJ and COMP elements is structure-shared with the value of some attribute in the CONTENT value of the verb. The semantic roles are assigned to the indices of subjects and complements not directly to subjects and complements. In (20), the CONTENT feature of the verb *loves* makes reference to the push relation. The index of the subject [1] is assigned to the PUSHER role of the push relation and the index of the complement [2] is assigned to the PUSHED role of the push relation. That is, the index of the subject and the PUSHER role are identical, indicated with [1], and the index of the complement and the PUSHED role are identical, indicated with [2].

1.3.1 Multiple Inheritance Hierarchies in words

As noted earlier this chapter, all categories are complex. This is not a problem because much of the makeup of any word is predictable once words are classified. One device that makes this possible is an inheritance hierarchy. Hierarchy of lexical types are introduced by Pollard and Sag (1987). Lexical types are subject to lexical rules, a classificatory scheme for English lexicon in terms of shared syntactic and semantic properties. Ginzburg and Sag (2000) suggest more complicated multiple inheritance in lexicon. They eliminate lexical rules instead they introduce constraints on each types. They Ginzburg and Sag (2000) also suggest multiple inheritance in phrase which will be considered in section 1.4. Let us take an example for lexicon. The verb form *loves*, in (20), is a third person singular present tense transitive verb. This means that it shares part of its feature makeup with other third person singular verbs, part of its feature makeup with other present tense verbs and part of its feature makeup with other transitive verbs. This shared information can be stored in lexical type and subtypes of the type *word.* Words are classified into families whose members share properties stated as constraints on lexical types. Constraints on supertypes affect all subtypes. Each feature takes a value of a

particular type whose information includes which features are appropriate for each type, which types of value are appropriate for each feature, the immediate supertype of each type. A lexical entry contains very little information in the lexicon since lexical types, type inheritance and theory of linking allow complex lexical information. Most of information in a typical lexical category is inherited from various types that it is a member of. Ginzburg and Sag (2000) classify lexemes in terms of two independent dimensions of their part of speech type and argument selection, as illustrated in (24) (Ginzburg and Sag 2000:23):

(24)



Types written in capitals within the rectangular boxes like PART-OF-SPEECH and ARG-SELECTION, mean that their supertype *lexeme* inherits constraints to both subtypes PART-OF-SPEECH and ARG-SELECTION. Both the types PART-OF-SPEECH and ARG-SELECTION are independent dimensions of classification. Types written in lower case without rectangular boxes like verb-lexeme and preposition-lexeme, mean that their supertype

PART-OF-SPEECH inherits constraints either to verb-lexeme or to preposition lexeme. Each type of lexemes is cross-classified. That is, each maximal lexeme type at the bottom of the hierarchy inherits constraints from both PART-OF-SPEECH and ARG-SELECTION.

The abbreviated maximal lexeme types at the bottom of the hierarchy are seen in the following list. Each type illustrated with an example in curved brackets (Ginzburg and Sag 2000:23):

(25) a. siv-lx : strict-intransitive-verb-lexeme (die)
b. srv-lx : subject-raising-verb-lexeme (seem)
c. scv-lx : subject-control-verb-lexeme (try)
d. sip-lx : strict-intransitive-preposition-lexeme (of)
e. stp-lx : strict-transitive-preposition-lexeme (in)
f. sia-lx : strict-intransitive-adjective-lexeme (big)
g. sra-lx : subject-raising-adjective-lexeme (likely)
h. sca-lx : subject-control-adjective-lexeme (eager)
i. stv-lx : strict-transitive-verb-lexeme (prove)
j. dtv-lx : ditransitive-verb-lexeme (believe)

A second device which allows the simplification of the lexicon is lexical rules but lexical rules are replaced by constraints on lexical types in Ginzburg and Sag (2000). Certain types of words obey type-specific constraints. Constraints on words in the bottom of hierarchies are more specific while those in the higher part are more general. Some are more general while others are more specific. Hence, it allows the capturing of generalisation of various degrees of generality. The maximal lexemic types in (25) which are in the bottom of the hierarchy in (24) inherit constraints from their types and all their super types. This means that, for any lexeme, very little information needs to be listed apart from what it is a subtype of. Let us take some examples. The *strictly-intransitive-verb-lexeme*, such as *laugh*, inherits the constraints from its type and from all its supertypes, that is, *verb-lexeme* and

strict-intransitive-lexeme. The constraints on *verb-lexeme* and *strict-intransitive-lexeme* are illustrated in (27) and (28), respectively: [2]

(26) Emma laughed.

(27)
$$\textit{v-lxm} \rightarrow \left[\text{SS}|\text{LOC}|\text{CAT} \left[\begin{array}{ll} \text{HEAD} & \textit{verb} \\ \text{SPR} & \langle\rangle \\ \text{SUBJ} & \langle \text{XP} \rangle \end{array} \right] \right]$$

(28) *str-intr-lx* → [ARG-ST<NP>] (Ginzburg and Sag 2000:24)

The constraint on verb lexeme in (27) reflects the fact that any member of the *verb-lexeme* is a verb and requires a subject. The constraint on *strictly intransitive lexeme* in (28) means that any member of the *strictly-intransitive-lexeme* requires only a subject. Thus, a lexeme which satisfies both constraints in (27) and (28) is a verb with a single member of the ARG-ST feature, that is, any member of the *strictly-intransitive-verb-lexeme.* The *strictly-transitive-verb-lexeme*, such as *read,* inherits the constraints from its type, and from all its supertypes, that is, *verb-lexeme* and *strict-transitive-lexeme.* The constraint on *strict-transitive-lexeme* is shown in (30):

(29) Emma reads a book.

(30) *str-tran-lx* → [ARG-ST <NP, NP>] (Ginzburg and Sag 2000:24)

Those constraints express the fact that any member of the *strictly-transitive-verb-lexeme* is a verb and requires a subject and a complement. The *subject-control-verb-lexeme*, such as *try*, inherits the constraints from its type, and from all its supertypes, that is, *verb-lexeme* and *subject-control-lexeme.* The

[2] In Ginzburg and Sag (2000) the single arrow → is used for the constraints on lexeme and the double arrow ⇒ is used for the constraints on phrases and clauses. We will use the single arrow → for all

constraint on *verb-lexeme* and *subject-control-lexeme* are illustrated in (27) and (32), respectively:

(31) Emma tries to reach the book.

(32) *s-ctrl-lx* → [ARG-ST <NP*i*, [SUBJ<NP*i*>]>] (Ginzburg and Sag 2000:24)

Those constraints express the fact that any member of the lexeme *scv* is a verb and requires a subject and a sentential complement whose subject is coindexed with the subject. The *strictly-transitive-lexeme* like *on* inherits the constraints from both its types and supertypes, that is, *preposition-lexeme* and *strict-transitive-lexeme*. The constraints on *preposition-lexeme* and *strict-transitive-lexeme* are given in (34) and (35), respectively:

(33) He ate [the apple on the table].

(34) *p-lx* → [SS|LOC|CAT|HEAD *p*] (Ginzburg and Sag 2000:24)

(35) *str-tran-lx* → [ARG-ST <NP, NP>] (Ginzburg and Sag 2000:24)

The *subject-raising-verb lexeme* like *seem* inherits the constraints from both its type and supertypes, that is, *verb-lexeme* and *subject-raising-lexeme*. The constraints on *verb-lexeme* and *subject-raising-lexeme* are shown in (27) and in (37), respectively:

(36) Emma seems to be nice.

(37) *s-rsg-lx* → [ARG-ST <[LOC[1]], [SUBJ<[LOC[1]]>]>]
(Ginzburg and Sag 2000:24)

There is a constraint on all words which relates ARG-ST lists to valence features. As we saw in the previous section, the ARG-ST value is a list of the SUBJ value and the

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occasions.

COMPS value. Ginzburg and Sag (2000) formalise the relation between the ARG-ST list and the valence features as a constraint on words, as shown in (38):

(38) Argument Realisation Principle (ARP) (Ginzburg and Sag 2000:25):

$$word \rightarrow \left[\begin{array}{ll} \text{SS}|\text{LOC}|\text{CAT} & \left[\begin{array}{ll} \text{SUBJ} & [\text{A}] \\ \text{SPR} & [\text{B}] \\ \text{COMPS} & [\text{C}] \end{array}\right] \\ \text{ARG-ST} & [\text{A}] \oplus [\text{B}] \oplus [\text{C}] \end{array}\right]$$

The symbol ⊕ designates list append. Ginzburg and Sag (2000) use capital letters to distinguish tags designating lists. This constraint shows that all arguments are realised on the appropriate valence list. The ARG-ST feature is only in the word level and the ARG-ST value is the union of the SUBJ list, the SPR list and the COMPS list. They revise the ARP which deals with extracted complements. The revised version of the ARP will be discussed in chapter 4. We will examine another type of sign, *phrases* in the following section.

1.4 Phrases

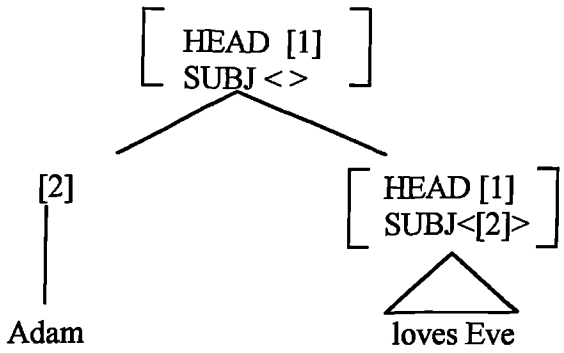
Unlike words, phrases have the attribute DAUGHTERS (henceforth DTRS) as well as PHON and SYNSEM. Phrases have daughters except a trace which is a phrase with no daughters. In Pollard and Sag (1994), in a headed structure the attribute DTRS includes HEAD-DTR, COMPLEMENT-DTR, ADJUNCT-DTR, FILLER-DTR and MARKER-DTR. Phrasal types are licensed through six Immediate Dominance Schemata (ID schemata). That is, any headed phrase must satisfy one of the ID schemata. They consider ID schemata as a small, universally available set of disjunctive constraints on the immediate constituency of phrases, for example, head-complement, head-adjunct and head-marker. However, since Sag (1997), it has been assumed that languages have a complex hierarchy of phrasal

types. This will be discussed after Pollard and Sag's ID Schemata. Let us consider these schemata one by one. Schema 1 is illustrated in (39):

(39) SCHEMA 1 (HEAD-SUBJECT SCHEMA) (Pollard and Sag 1994:347):
a phrase with DTRS value of type *head-subj-structure* in which the HEAD-DTR value is a phrasal sign.

Schema 1 licenses phrases that take a phrase as a head daughter and a single subject as a nonhead daughter, as illustrated in (40):

(40) Adam loves Eve.

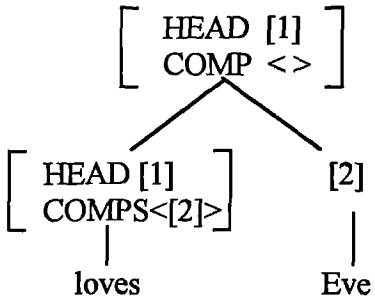


Schema 2 is illustrated as the following:

(41) SCHEMA 2 (HEAD-COMPLEMENT SCHEMA) :
a phrase with DTRS value of type *head-complement-structure* in which the HEAD-DTR value is a lexical sign. (Pollard and Sag 1994: 348)

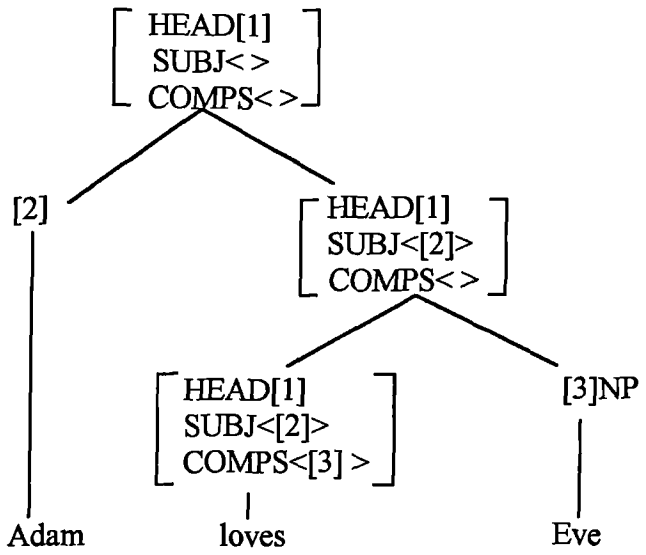
This schema licenses phrases that have a lexical head and zero or more complement daughters. Therefore a phrase licensed by Schema 2 can have the form shown in (42):

(42) Adam [VP loves Eve].



Schema 2 licenses the VP 'loves Eve'. In (41), Schema 1 licenses the phrase containing the head and the subject. Therefore, the whole sentence 'Adam loves Eve' is licensed by Schema 1 and Schema 2, as illustrated in (43):

(43) Adam loves Eve.



The VP *loves Eve* is licensed by Schema 2 and the phrase containing the head and the subject is licensed by Schema 1. Pollard and Sag (1994 chapter 9) add the SPECIFIER feature to the Valence feature since they distinguish specifiers from subjects, as given in (44-46):

(44) Emma is *a* painter.

(45) They consider Emma *very* smart.

(46) With Emma *so* clever, you'd better not cheat her.

The words in bold are classified as subjects while the words in italic are classified as specifiers. After separating specifiers from subjects, Pollard and Sag give a separate lexical rule for head-specifier-schema, as shown in (47) (Pollard and Sag 1994:362):

(47) Head-Specifier-Schema $X'' \rightarrow$ [1]Y", [2]X'[SPR<[1]>]
SPR HEAD

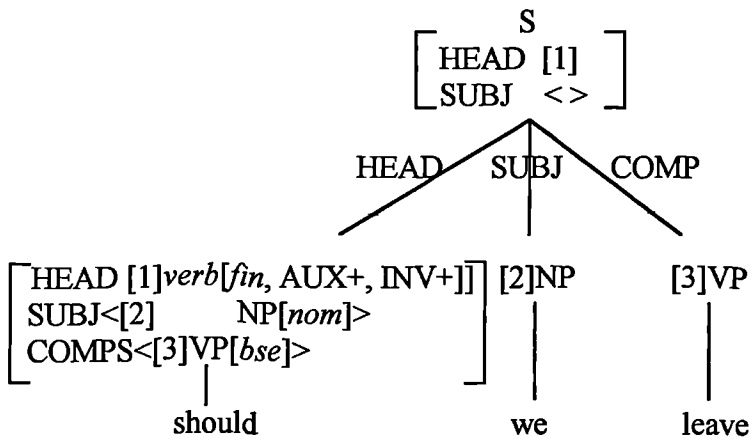
X" is a phrase where a specifier is already saturated, with the empty specification [SPR< >].

Schema 3 licenses English subject-auxiliary inversion clauses, clauses in free order languages, such as, Walpiri, and clauses in languages, such as, Korean, Japanese and German, where arguments can be relatively freely ordered. Schema 3 is illustrated in the following:

(48) SCHEMA 3 (HEAD-SUBJECT-COMPLEMENT SCHEMA) (Pollard and Sag 1994:352) :
A [SUBJ<>] phrase with DTRS value of type *head-subj-comp-structure* in which the HEAD-DTR value is a lexical sign.

Schema 3 is employed in inverted structure while Schema 1 in (40) and Schema 2 in (42) are employed in uninverted structure, as in (41) and (43), respectively. In Schema 3, both complements and subjects are realised as sisters of the lexical head. A subject-auxiliary inversion clause licensed by Schema 3 can be the form shown in (49):

(49) Should we leave?



The lexical head is a finite auxiliary *should* which subcategories for a nominative subject and a base-form VP complement like any other modals. Both the subject NP *we* and the complement VP *leave* are realized as sisters of the lexical head. The specification [INV+] allows one to identify verbs which can only appear in an inverted structure.

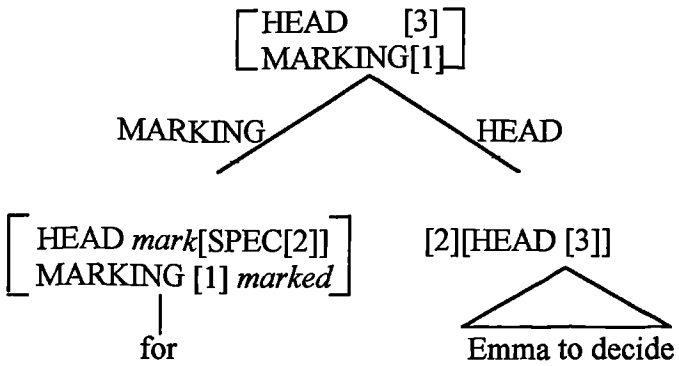
Schema 4 is for head-marker-phrases. Examples of markers include complementiser *that* and *for*, comparative words *than* and *as*, and case clitics of Korean and Japanese. Pollard and Sag (1994) assume that markers select the phrases they select, and that markers bear the head feature SPECIFIED (SPEC) whose value is of type *synsem*. The SPEC value of the marker will be token-identical with the SYNSEM value of the head daughter to form a phrase. This is illustrated as below:

(50) SCHEMA 4 (HEAD-MARKER SCHEMA) (Pollard and Sag 1994:46) :

A phrase with DTRS value of type *head-marker-structure* whose marker daughter is a marker whose SPEC value is structure-shared with the SYNSEM value of the head daughter, and whose MARKING value is structure-shared with that of the mother.

The head marker structure has no complement daughters and bears an additional attribute MARKER-DTR. Schema 4 licenses phrases of the form shown below:

(51) for Emma to decide



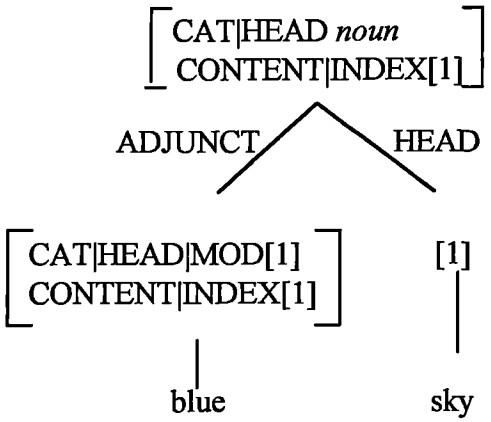
The SPEC value of the marker *for* is the same as the SYNSEM value of the head daughter *Emma to decide*, and the MARKING value of the marker *for* is the same as that of the mother. Therefore, this phrase is licensed by Schema 4. The complementisers like *for* have been analysed as heads in more recent work, for instance Sag (1997). In Pollard and Sag's analysis, clitics of Korean and Japanese are also classified as markers. However, in this thesis, Korean case particles are not categorised as markers since we will adapt Sells' argument that case suffixes are not markers but only suffixes. This will be discussed in Chapter 2.

Schema 5 is used for head-adjunct-structures. Relative clauses are one type of adjunct. Pollard and Sag assume that adjuncts select their head. To do this, they introduce the MOD feature that is analogous to the SPEC feature in head-marker phrases. That is, the MOD feature is a head feature and its value will be of type *synsem*. The MOD value will be token-identical with the SYNSEM value of the head daughter to form a phrase. This is illustrated as the following:

(52) SCHEMA 5 (HEAD-ADJUNCT SCHEMA) (Pollard and Sag 1994:56) :
a phrase with DTRS value of type *head-adjunct-structure*, such that the MOD value of the adjunct daughter is token-identical to the SYNSEM value of the head daughter.

This schema licenses phrases that have an adjunct and a head that it selects. The head adjunct structure has no complement daughters and bears an additional attribute ADJUNCT-DTR. Schema 5 licenses phrases of the form shown in (53):

(53) blue sky



The MOD value of the adjunct *blue* is the same as the SYNSEM value of the head daughter *sky*. This is licensed by Schema 5. In a head adjunct structure, the content of the mother is token-identical to that of the adjunct. Relative clauses are one type of adjuncts hence the same schema applies to relative clauses.

We will next see principles on those phrasal types. Among them, two of the most important principles to project phrases are the Head Feature Principle and the Valence Principle. Pollard and Sag (1994) propose the Head Feature Principle informally as below:

(54) HEAD FEATURE PRINCIPLE (Pollard and Sag 1994:34) :
The HEAD value of any headed phrase is structure-shared with the HEAD value of the head daughter.

This guarantees that the HEAD value of any headed phrase is the same as the HEAD value of its head-daughter, and that headed phrases are projections of their head daughters. The Valence Principle is equivalent to the Projection Principle in the

Principles and Parameters frameworks. Pollard and Sag (1994) formulate the Valence Principle, as seen in (55):

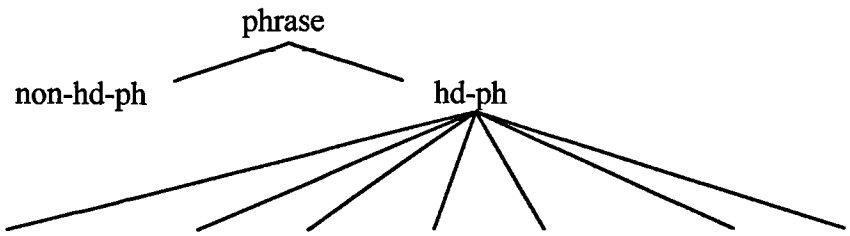
(55) Valence Principle (Pollard and Sag 1994:348) :
In a headed phrase, for each valence feature F, the F value of the head daughter is the concatenation of the phrase's F value with the list of SYNSEM values of the F-DTRS value.

The valence features are the features SUBJ, COMP and SPR. The principle ensures that, in a headed phrase, the VALENCE value of the head daughter is the concatenation of that of the head phrase with the SYNSEM value of the non head daughter. Thus, the VALENCE value of the head daughter is cancelled with the non-head daughter, and is not passed up to the head phrase.

However, Ginzburg and Sag (2000) following Sag (1997) propose an alternative approach to licensing phrases. That is, hierarchies of phrasal types and constraints associated with each type replace the Immediate Dominance Schemas. Sag (1997) proposes that phrases can be represented in terms of multiple inheritance hierarchies like those for words in the previous section. This involves hierarchical classification of phrases in terms of types. This allows phrases using the same technique for constraint inheritance as one in words to generalise phrases. Phrases are cross-classified in terms of clausality as well as headedness. This is the difference between the ID schemata and the complex inheritance hierarchy. The structure of the former is flat while that of the latter is cross-classified. As in the lexicon, certain types of phrases obey type-specific constraints. Constraints on phrases in the bottom of hierarchies are more specific while those in the higher part are more general. The new approach provides a more complex classification of phrases and allows generalisation of various kinds to be captured. As noted earlier, phrases are classified in terms of clausality as well as headedness. The former involves the information of clausality and the latter involves whether phrases are headed or not.

We will first see the inheritance hierarchy of phrases in terms of Headedness, as illustrated in the following (Ginzburg and Sag 2000:30):

(56)



The above hierarchy shows that phrases are classified as non-headed phrase or headed phrase. Headed phrase has seven subtypes. *head-complement-phrase, head-subject-phrase, head-specifier-phrase, subject-auxiliary-inversion-phrase, Head-adjunct-phrase, head-filler-phrase, head-only-phrase.* As with words, types in phrase have constraints. Ginzburg and Sag (2000) following Sag (1997) suggest a general constraint on all phrases, as the following:

(57) Empty Comps Constraint (ECC) (Ginzburg and Sag 2000:35):
phrase:
[CAT [COMPS < >]] → .....

[COMPS< >] abbreviates [SS|LOC|CAT|COMPS< >]. This guarantees that the lexical head of phrases has consumed all complements before it consumes subjects, specifiers, fillers or adjuncts. That is, in a phrase a complement is embedded more deeply than subjects, specifiers, fillers or adjuncts. Specifiers, filler and adjuncts are combined with head daughters which have the [COMPS< >] specification. Another constraint on phrase is the following:

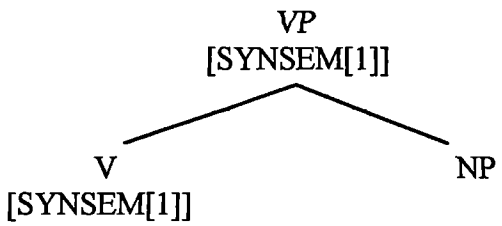
(58) [DTRS *nelist* (*sign*)] (Ginzburg and Sag 2000:35)

Nelist stands for non-empty-list. This constraint ensures that on phrase the daughter is a non empty list of sign. A more specific constraint will be a constraint on the subtypes of the type *ph.* For instance, the Generalised Head Feature Principle suggested by Ginzburg and Sag (2000) is a constraint on *hd-ph*, a subtype of type *ph.* The Generalised Head Feature Principle is illustrated in (59):[3]

(59) Generalised Head Feature Principle (GHFP) (Ginzburg and Sag 2000:60)
hd-ph:
[SYNSEM/[1]] → ..... H[SYNSEM/[1]].....

The symbol H indicates the head daughter of a given phrase. The '/' notation is used to indicate a default constraint. Thus, the constraint can be *paraphrased that the* SYNSEM value of the mother of a headed phrase is identical with that of its head daughter by default. This can be formed in the following tree diagram:

(60)

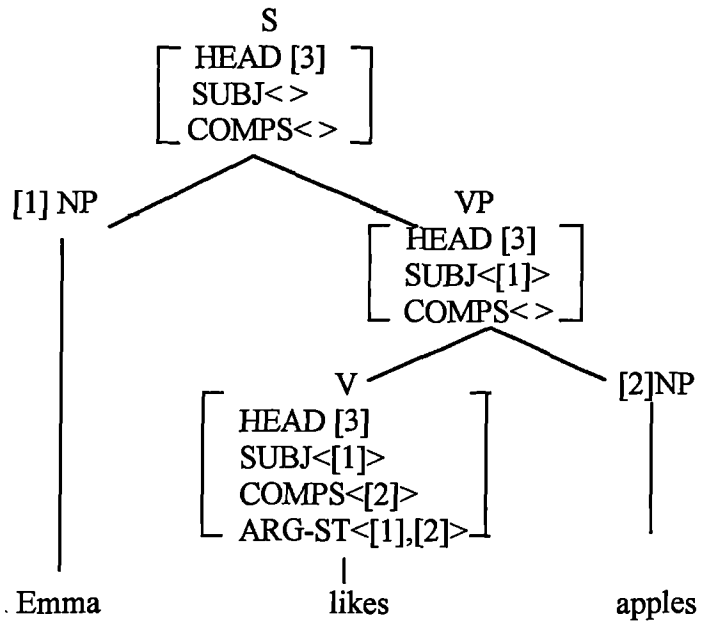


The Generalised Head Feature Principle in (59) replaces Head Feature Principle in (54) and the Valence Principle in (55) suggested by Pollard and Sag (1994). Valence values will be cancelled off or will be inherited to its mother by the Generalised Head Feature Principle. Since valence values are SYNSEM values, there is no need for a separate constraint for valence feature.

Let us take an example. A verb that requires a subject and a complement, such as *like,* can be illustrated as the following:

[3] The '/' notion was originally used in Lascarides and Copestake (1998).

(61)



In the bottom of the tree, the feature HEAD, the feature SUBJ, the feature COMPS and the feature AGR-ST are present in the verb *like*. The COMPS value of the head daughter, [1], is cancelled with the SYNSEM value of the non head-daughter, [1], and is not passed up to the head phrase. In turn, the SUBJECT value of the head daughter, [2], is cancelled with the SYNSEM value of the non head daughter, [2], and is not passed up to the head phrase. The HEAD value of head-complement phrase *likes apples* is the same as the HEAD value of its head-daughter, the verb form *likes*. In turn, the HEAD value of head-subject-phrase *Emma likes apples* is identical with the HEAD value of its daughter, head-complement-phrase *likes apples*. Those headed phrases are projections of their head daughters. These are all guaranteed by the Generalised Head Feature Principle.

More specific sub-types of the headed phrases are subject to specific constraints. Note that the five subtypes of the feature DAUGHTER in Pollard and Sag (94), that is, the feature DAUGHTER (DTR), the feature HEAD-DTR, the feature COMPLEMENT-DTR, the feature ADJUNCT-DTR, the feature FILLER-DTR and the feature MARKER-DTR, are replaced by just two subtypes of the feature DAUGHTER, that is, the feature HEAD-DTRS and the feature NON-HEAD-DTRS.

For example, the subtypes of the *hd-val-ph*, that is, *hd-comp-ph*, *hd-subj-ph*, *hd-spr-ph*, are distinguished in terms of the relations between the values of their valence features and a NON-HD-DTRS list. That is, in head-subj phrase, hd-comp phrase and head-specifier phrase, the value of the valence features in its head phrase is token-identical with the SYNSEM value of the NON-HD-DTRS. For instance, a head-complement-phrase allows more than one non-head daughter and the COPMS value of this non head daughter is the same as the COMPS value of the head. This is illustrated in (62):

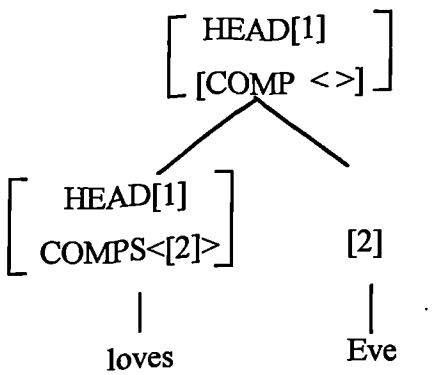
(62) Constraint on head-complement phrase (Ginzburg and Sag 2000:36)

hd-comp-ph:

$$[\,] \rightarrow \mathrm{H}\left[\begin{array}{ll} \textit{word} & \\ \mathrm{COMP} & \textit{nelist}\,([\mathrm{A}] \oplus \textit{list}) \end{array}\right], [\mathrm{A}]$$

The [ ] specification means head complement phrase. The synsems of the complement daughters are the same as the COMPS list of the head daughter. This constraint on head-complement phrases corresponds to Schema 2 in (41). The constraint licenses phrases that have a lexical head and zero or more complement daughters. Therefore, a phrase licensed by this constraint can be formed in the following tree diagram:

(63) Adam [VP loves Eve].



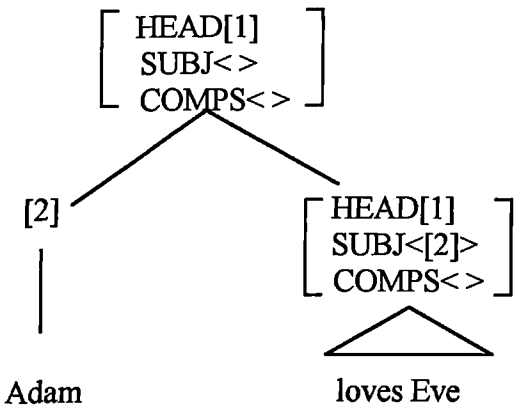
The following is a constraint on head-subject-phrase:

(64) Constraint on head-subject phrase (Ginzburg and Sag 2000:62):

hd-subj-ph:
[SUBJ< >]→ [SS[1]], H[SUBJ <[1]>]

The [SUBJ < >] specification means head-subject-phrases. Headed subject phrases allow just one non-head-daughter and the synsem value of the non head daughter is token identical with the SUBJ value of the head daughter. This constraint on head-subject-phrase is correspond to Schema 1 in (39). The constraint licenses phrases that take a phrase as their head daughter and a single subject as their non-head daughter. Therefore a phrase licensed by this constraint can be formed as follows:

(65) Adam loves Eve.



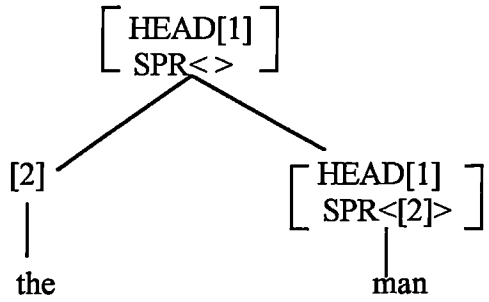
A head-specifier phrase allows just one head-daughter like head-complement phrases. This is illustrated in (66):

(66) Constraint on head-specifier phrase (Ginzburg and Sag 2000:37):

hd-spr-ph:
[SPR < >] → [SS[1]], H[SPR <[1]>]

The [SPR< >] specification means head-specifier-phrases. The synsem value of the non head daughter is token identical with the SPR value of the head daughter. This constraint on head-specifer-phrase corresponds to Head-Specifier-Schema in (47). A phrase licensed by this constraint can be formed as it is shown in (67):

(67) the man



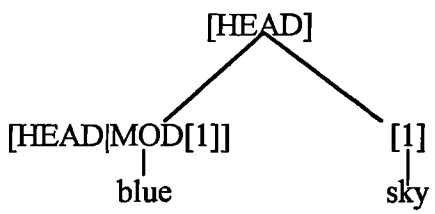
A head-adjunct phrase is also distinguished in terms of the relation between the value of its adjunct feature and a NON-HD-DTRS list, as illustrated in (68):

(68) Constraint on head-adjunct-phrase (Sag 1997:479):

$$\dot{hd}\text{-}adj\text{-}ph \rightarrow \begin{bmatrix} \text{HD-DTR} & [\text{SYNSEM}\ [1]] \\ \text{NON-HD-DTRS} & \langle [\text{HEAD}[\text{MOD}[1]]] \rangle \end{bmatrix}$$

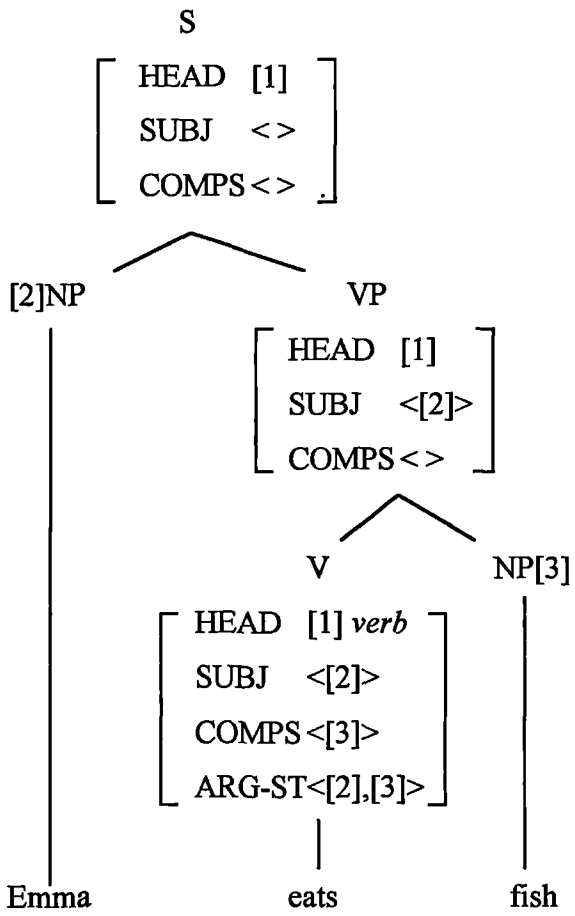
In a head-adjunct-phrase the synsem value of the head daughter is the same as the MOD value of the NON-HD-DTRS. The feature MOD allows adjuncts to select lexically the kind of element they modify. This constraint on head-adjunct-phrase corresponds to Schema 5 in (52). A phrase licensed by this constraint can be formed as follows:

(69) blue sky



As in words, every type is subject to the constraints on its supertype. All subtypes of phrases inherit constraints from its type and all its supertypes. Let's take an example. *Head-subject-phrase* inherits its constraints from its type *head-subject-phrase* and all its supertypes, *head-phrase* and *phrase*. That is, subject headed phrases inherit Empty Comps Constraint (ECC) in (57) and a constraint on phrase in (58), the constraint on headed phrase, Generalised Head Feature Principle (GHFP) in (59), the constraints on phrase, and the constraint on head subject phrase in (64). Let us take an example of a head subject phrase which satisfies all those constraints:

(70)

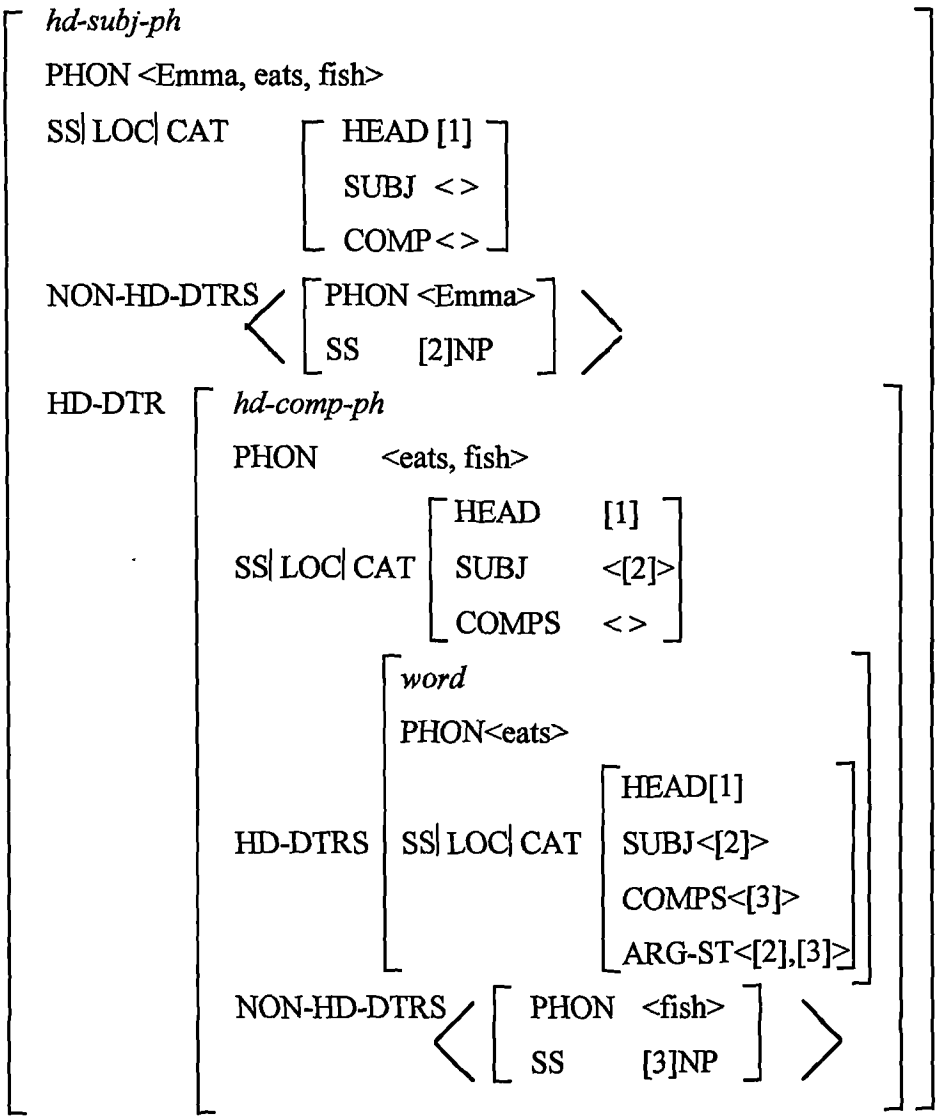


Let us consider this from the bottom. In the bottom part, the verb *eat* takes a complement and a subject. The ARG-ST of the lexical head selects the appropriate arguments as its values. The value of the valence features, SUBJ and COMPS, of the

lexical head are token-identical with the synsem value of the subject and complement. For example, the COMPS value of the lexical head and the synsem value of the complement are token-identical. In the middle part, the COMPS value of the VP contains the COMPS list of the head daughter minus the synsem of the non-head daughter. The HEAD value of the VP is token-identical with that of the lexical head. In the top part, the SUBJ value of the S has the SUBJ list of the head daughter minus the synsem of the non-head daughter. The HEAD value of the S is token- identical with that of the lexical head. These are guaranteed by the Generalised Head Feature Principle in (59).

In traditional generative grammar phrases are represented in tree diagrams, as in (70), while in HPSG phrases are represented in feature structure. The features HD-DTR and NON-HD-DTRS in HPSG are like branches in tree diagram. The differences between the feature structure representation and tree diagram are discussed by Sag (1997) and Ginzburg and Sag(2000). One of the most important advantages of the feature structure representation is that the feature structure representation allows to encode inexpressible generalizations about phrasal signs since it involves hierarchical classification of phrases in terms of types like words. This property of feature structure representations allows generalisations of varying degrees of generality. Therefore, there is no need to assume the bifurcation between core and periphery of language. This property of feature structure representations plays a central role in Sag's (1997) analysis of English relative clauses and Ginzburg and Sag's (2000) analysis of declarative clauses and interrogative clauses. We will consider the former in detail in Chapter 4 and the latter in Chapter 6. Let us take an example of a head subject phrases in terms of feature structures. A head-subject-phrase which satisfies all those constraints can be modelled in terms of feature structures, as the following:

(71)



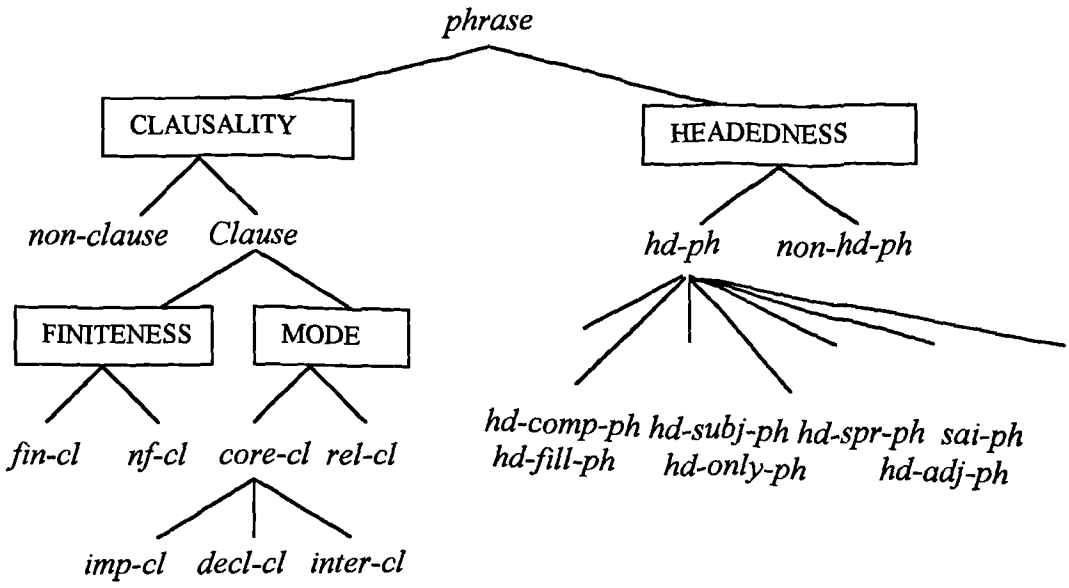
The HEAD value of the phrase is the same as the HEAD value of its head-daughter by the Generalised Head Feature Principle in (59). For instance, the HEAD value of the head complement phrase *likes apples* is token identical with the HEAD value of the its HEAD DAUGHTER *likes*, indicated with [1]. In turn, the HEAD value of the head subject phrases *Emma likes apples* is token identical with the HEAD value of the its HEAD DAUGHTER *likes apples*, indicated with [1]. The COMPS value of the VP contains the COMPS list of the head daughter minus the synsem of the non-head daughter by the Generalised Head Feature Principle in (59). The head complement phrase has the same value for the SUBJ feature as its head, indicated with [2], because the requirement for a subject is not met within the head

complement phrase. The value of COMPS feature in *head-complement-phrase* is the same as the synsem value of the NON-HD-DTRS, indicated with [3], by the constraint on *head-complement-phrase*. In head subject phrases, the SUBJ value is token-identical with the SS value of the non head daughters list by the constraint on *head-subject-phrase*. The HEAD value of the head subject phrase (S) is token-identical with that of the head complement phrase (VP) by the Generalised Head Feature Principle in (59). The SUBJ value remaining in the head complement phrase is cancelled in the head subject phrase. That is, the SUBJ value of the head subject phrase has the SUBJ list of the head daughter minus the synsem of the non-head daughter by the Generalised Head Feature Principle in (59). Having considered the HEADEDNESS types of *phrase*, we will see the CLAUSALITY types of *phrase* in the following section.

1.4.1 Clause Types

As noted in the previous section, phrases are cross-classified in terms of an independent dimension of clausality as well as headedness. This multiple inheritance hierarchy is illustrated in the following:

(72)



Each maximal phrasal type inherits constraints from both a CLAUSALITY type and a HEADEDNESS type. Ginzburg and Sag (2000) divide the CLAUSALITY type into two subtypes, the type *non-clause* and the type *clause*. The latter type is divided into two subtypes, a FINITENESS type and a MODE type, and inherits constraints to both its subtypes, FINITENESS and MODE. The MODE type has two sub clausal types, *core-clauses(core-cl)* and *relative-clauses(rel-cl)*. The former has the empty MODE specification while the latter has the nonempty MODE specification. It *Core clauses* are divided into three sub clausal types: *imperative-clauses (imp-cl)*, *declarative-clauses (decl-cl)*, *interrogative-clauses (inter-cl)*.

In much the same way as the phrase types, the clausal types are subject to specific constraints. For instance, there is a constraint on all clause types (Ginzburg and Sag 2000:44):

(73) clause:

[SYNSEM| LOCAL| CONTENT *message*] → .....

This constraint ensures that the semantic type of all clauses is *message*. Having separated from non-clauses, clauses are considered in terms of two independent dimensions of FINITENESS and MODE. The MODE feature has two subtypes, relative clauses and core clauses. In the former the MOD feature is realised while in the latter the MOD feature is not realised. Therefore relative clauses are the only clause which has the nonempty MOD specification. We will consider the constraint on relative clause in detail in chapter 4. Unlike *relative clauses*, another subtype of MODE, *core clause*, is an independent clause. This is formulated as shown below:

(74) *core-cl* :

$$\begin{bmatrix} \text{SS|LOC|CAT|HEAD} & \begin{bmatrix} \textit{verbal} \\ \text{VFROM } \textit{clausal} \\ \text{MOD } \textit{none} \end{bmatrix} \end{bmatrix}$$

(Ginzburg and Sag 2000:44)

This ensures that core clause is a clause in which the MOD feature is not realised. The constraint on *declarative clause,* the subtype of *core clause,* is the following:

(75) *del-cl*:

$$\left[\text{SS|LOC|CONT}\left[\begin{array}{l}\textit{austinian}\\ \text{SOA/[1]}\end{array}\right]\right] \rightarrow \ldots\ldots\ \text{H [CONT/[1]]}\ \ldots\ldots$$

(Ginzburg and Sag 2000:44)

This constraint ensures that in declarative clause the content of the head daughter is embedded as the SOA value of the mother by default. It also ensures that the semantic type is *austinian* which has two subtypes, *proposition* and *outcome.* See Ginzburg and Sag 2000 chapter3 for more detail. The *decl-cl* also inherits the constraint on all clauses, as in (73).

Ginzburg and Sag (2000) following sag (1997) assume that all overt signs have a SYNSEM value of type *canonical-synsem,* as illustrated in (76):

(76) Principle of Canonicality (Ginzburg and Sag 2000:43):

sign → [SYNSEM *canon-ss*]

Unexpressed arguments have a SYNSEM value of the type *noncanonical-synsem.* This will be examined in section 3.2.

1.5 Unbounded dependency Constructions

The term *unbounded dependency constructions* was introduced by Gazdar (1981). Unbounded dependencies are constructions which involve the movement to the nonargument position, the specifier of CP, in transformational grammar (Chomsky

1986b). In English unbounded dependency constructions are divided into two types. In one, an overt constituent exists in a higher position and associated with a missing constituent in the lower position. It would be either a topic or an expression containing *wh*-words. In the other there is no such an overt constituent in the higher position. The former is the case in topicalisation sentences, *wh*-relatives, *wh*-interrogatives, *it*-clefts with *wh*-words, pseudo-clefts with *wh*-words, and the latter is the case in *tough* sentences, relative clauses which do not contain *wh*-words, called zero relative clauses (Radford 1988), and *it*-cleft without *wh*-words, as illustrated in (77) and (78), respectively:

(77) a. Emma*i*, [Harry likes *ei*]. (topicalisation)
b. Emma who*i* [Harry likes *ei*]. (wh-relative)
c. Who*i* does [Harry like *ei*]? (wh-interrogative)
d. It is Emma who*i* [Harry likes *ei*]. (it-cleft)
e. [Who*i* [Harry likes *ei*]] is Emma. (pseudo-cleft)

(78) a. Emma*i* is easy to persuade *ei* . (*tough* construction)
b. She is the singer*i* Harry likes *ei* . (zero-relative)
c. It is Emma*i* [Harry likes *ei*]. (it-cleft)
: a missing constituent is indicated by *ei* .

Pollard and Sag (1994) call those examples in (77) strong unbounded dependency constructions and those examples in (78) weak unbounded dependency constructions. In the former, the overt constituent and the missing constituent share LOCAL features and form a filler-gap construction while in the latter no filler-gap construction is involved. But both types of unbounded dependencies must involve a gap. As we saw briefly in Introduction, Korean *wh*-interrogatives are not syntactically unbounded dependency constructions as they do not involve a gap. Why we suggest Korean wh-interrogatives are not an unbounded dependency construction will be discussed in section 2.5.

There are two important points to mention in connection with unbounded dependencies. Firstly, unbounded dependencies are unbounded. That is, the dependency can be extended across many clause boundaries, as shown in (79-84):

(79) Emma, Harry likes _____ .
(80) Emma, Sophie thinks Harry likes _____ .
(81) Emma, Sam believes Sophie thinks Harry likes _____ .

(82) On Emma, Harry depends _____ .
(83) On Emma, Sophie thinks Harry depends _____ .
(84) On Emma, Sam believes Sophie thinks Harry depends _____ .

The missing constituents are in an embedded complement clause and in a doubly embedded complement clause within a complement clause.
Secondly, the syntactic category of the filler matches with that of the gap at least in strong unbounded dependency constructions, as illustrated in (85) and (86):

(85) Emma, Harry talks to ____.
(86) To Emma, Harry talks ____.

In (85), the topic phrase is a noun phrase and the missing constituent requires a noun phrase. In (86), the topic phrase is a preposition phrase and the missing constituent requires a preposition phrase. It would be ungrammatical if the syntactic categories of the topic phrases did not match with that of the missing constituents, as shown in (87) and (88):

(87) *Emma, Harry talks ____.
(88) *To Emma, Harry like ____ .

In (87), the topic phrase is a noun phrase while the missing constituent requires a preposition phrase. In (88), the topic phrase is a preposition phrase while the missing constituent requires a noun phrase.

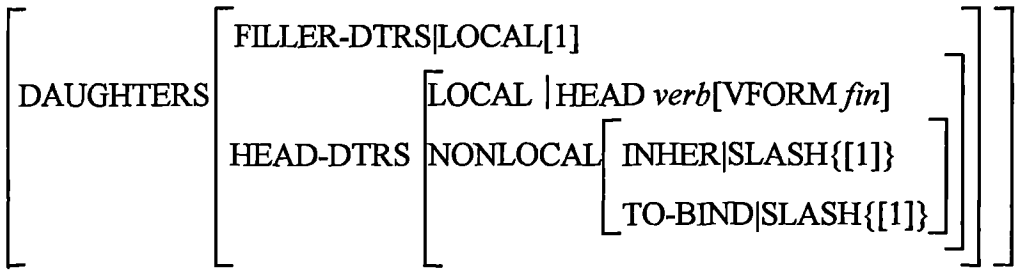
As mentioned earlier, the NONLOCAL feature, a sub attribute of the CATEGORY feature, plays an important role in unbounded dependency constructions. In Pollard and Sag (1994), the NONLOCAL feature contains three sub features, that is, the SLASH feature, the QUE feature, and the REL feature. The SLASH feature is employed to deal with gaps in unbounded dependency construction. The SLASH feature handles with missing constitutes, the QUE feature and the REL feature handle *wh*-phrases in *wh*-interrogatives and *wh*-phrases in relatives, respectively. The feature SLASH is involved in non-subject-*wh*-relatives, *wh*-relatives where an embedded subject is relativised, *wh*-interrogatives as well as topicalisation. They employ two SLASH features, INHERITED and TO-BIND to distinguish between unbounded dependencies that is bound off and those that is inherited further up. The INHERITED feature allows unbounded dependencies to pass up to its mother while the TO-BIND feature allows unbounded dependencies to be bound off. The NONLOCAL features take set values indicated as { }. This is illustrated as below:

(89) Internal structure of NONLOCAL value: (Pollard and Sag 1994:163)

$$\left[\text{NONLOCAL}\left[\begin{array}{ll}\text{INHERITED} & \left[\begin{array}{ll}\text{SLASH} & \{\text{set of } \textit{local} \text{ structures}\}\\ \text{REL} & \{\text{set of } \textit{ref} \text{ indices}\}\\ \text{QUE} & \{\text{set of } \textit{npros}\}\end{array}\right]\\ \text{TO-BIND} & \left[\begin{array}{ll}\text{SLASH} & \{\text{set of } \textit{local} \text{ structures}\}\\ \text{REL} & \{\text{set of } \textit{ref} \text{ indices}\}\\ \text{QUE} & \{\text{set of } \textit{npros}\}\end{array}\right]\end{array}\right]\right]$$

In head-filler-constructions, the SLASH value introduced by a gap is bound off with the local feature of the filler. The SLASH value of the head daughter and the local value of the filler are identical, as we saw in (83-86). The following is the internal structure of the head-filler construction:

(90) Internal structure of the head-filler construction (Pollard and Sag 1994:164):



The LOCAL value of the filler-daughter is identical with the SLASH value of the head daughter inherited from the missing constituent. The INHER|SLASH value and the TO-BIND|SLASH value are identical. This shows that the SLASH value inherited is bound off with the filler within the sentence and is not passed up to its mother.

Ginzburg and Sag (2000) following Sag (1997) divide unbounded dependencies in two kinds: Extraction and Pied-Piping. The former includes the filler-gap construction which involves the feature SLASH and the latter includes *wh*-words in *wh*-questions and relative clauses. That is, Extraction is treated in terms of the inheritance of the SLASH specification while Pied-piping is treated in terms of the inheritance of the REL and QUE specification in Sag (1997). This will be discussed in detail in Chapter 4 and Chapter 5.

1.6 Conclusion

There are two important characteristics in Head-Phrase Structure Grammar (HPSG): one is that HPSG is a monostratal framework and the other is that syntactic categories are complex in HPSG. Signs, *word* and *phrases*, are complexes of phonological information, syntactic information, semantic information, discourse information and internal structural information. In HPSG all signs are modelled in

terms of feature structures. These Feature structures constitute linguistic information in terms of feature and their own values. Pollard and Sag (1994) divide unbounded dependencies in two kinds: strong unbounded dependencies, that is, filler-gap constructions, and weak unbounded dependencies. Both types of unbounded dependencies must involve a gap. Thus, both types of unbounded dependency constructions always involve a SLASH feature. More recent version of HPSG, Ginzburg & Sag (2000) following Sag (1997) divide unbounded dependencies in two kinds: one is extraction dependencies which involve filler-gap constructions and the other is pied-piping effects which involves *wh*-phrases.

Chapter 2

Characteristics of Korean

2.1 Introduction

Universal grammar represents principles that are common to all human languages. Presumably it also specifies the ways in which languages can vary either through proposing a set of parameters or in some other way. In this Chapter, we will discuss some basic but important characteristics of Korean which are relevant to our thesis. The most significant difference between Korean and English is word order. Another difference can be found in suffixes. In Korean suffixes play important roles while in English they do not. On contrary, In English agreement is important while in Korean it is not. Interrogatives are another significant difference between two languages. In Korean, there is not much syntactic differences between interrogatives, in particular *wh*-interrogatives, and declaratives. There is no gap in *wh*-interrogatives. That is why we do not consider *wh*-interrogatives as unbounded dependency constructions of the kind discussed by Pollard and Sag (1994). In section 2.2, word order will be considered. In section 2.3, suffixes will be discussed. In section 2.4, agreement will be mentioned. In section 2.5, interrogatives will be examined.

2.2 Word Order

English belongs to the subject-verb-object (SVO) language category. In contrast, Korean belongs to the category of the subject-object-verb (SOV) language. This is illustrated in (1) and (2), respectively:

(1) [Emma] [likes] [the yellow umbrella].
S V O

(2) [Emma-ka] [noran usan - ul] [joahanta].
Nom yellow umbrella Acc like
S O V
'Emma likes the yellow umbrella.'

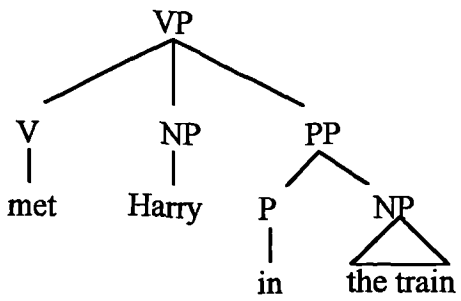
Korean is a head-final language whereas English is a head-initial language. This is illustrated in the following:

(3) Emma [VP [V met] [NP Harry] [PP in the train]].

(4) Emma-ka [VP [PP kicha-eseo] [NP Harry-rul] [V manassta]].
Nom train in Acc meet
'Emma met Harry in the train.'

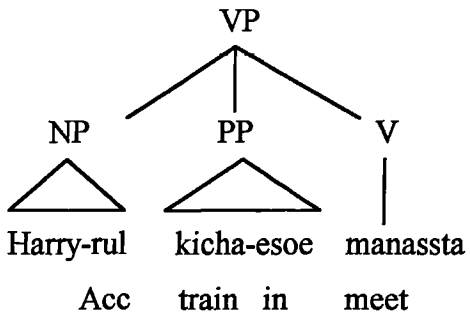
In (3), not only the head V precedes the complement NP *Harry*, but also the head P *in* precedes NP *the train*, that is, the heads are all in the initial position. This can be formed in the following tree diagram:

(5)



On the other hand, in (4), the head V *manassta* follows the complement NP *Harry-ul* and the PP *kicha-esoe*, as shown in (6):

(6)



In relative clauses, the head is also in an initial position in English whereas the head is a final position in Korean. In English relative clauses, the head noun is followed by relative clauses whereas in Korean relative clauses, the head noun is preceded by relative clauses, as given in (7) and (8):

(7) [NP the man] [S Emma met ____]

(8) [S Emma-ka _____ manan] [NP namja]
Nom meet man
'the man Emma met'

Korean sentences have a relatively flexible word order as compared to English which has a relatively strict word order, as illustrated in (9):

(9) a. Sally likes the yellow umbrella.
b. * The yellow umbrella likes Sally.

(9.b) is ungrammatical as the subject follows the verb and the complement precedes the verb.

The standard word order in Korean is the subject-object-verb order, but the object can place either before or after the subject position. This operation which places the object before the subject is called Scrambling. According to Fukui (1993), the definition of Scrambling is that a strictly optional movement operation that is responsible for flexible word order. This is illustrated in the following:

(10) [Sally-ka] [noran usan - ul] [joahanta].
Nom yellow unbrella Acc like
S O V
'Sally likes the yellow umbrella.'

(11) [noran usan -ul] [Sally-ka] [joahanta].
yellow umbrella Acc Nom like
O S V
'Sally likes the yellow umbrella.'

Although the object *noran usan- ul* can occur either after the subject *Sally-ka* as in (10) or before the subject *Sally-ka* as in (11), both sentences have the same meaning in the sense of truth conditional content.
In addition, any arguments can be omitted in finite clauses, as illustrated in (12-15):

(12) Emma-ka sakwa-rul joahnata.
Nom apple Acc like
'Emma likes apples.'
(13) Emma-ka ____ joahanta.
Nom like
'Emma likes someone/something'
(14) _____ sakwa-rul joahanta.
apple Acc like
'Someone likes apples.'

(15) ____ ____ saranghe.
love
'(I) love (you).'

(12) is a finite clause. In (13), the object is unexpressed and, in (14), the subject is unexpressed. In (15), both arguments are unexpressed. (15) is no problem as long as the one who loves and the loved one are clear in discourse.

2.3 Suffixes

In Korean, noun and verb particles play an important role. There are some arguments about whether these particles are the head of their own phrase or not. We will adopt Sells' position that inflectional particles are not heads but suffixes. In section 2.3.1, Korean noun and verb particles are examined. In section 2.3.2, Sells' (1995) analysis will be discussed.

2.3.1 Noun and Verb suffixes

In English, noun and verb suffixes are attached to words to form entirely new words or as an inflexional formative, as given in (16-19):

(16) love-ly
(17) short-age
(18) apple-s
(19) small-er/est

In (16) the suffix *ly* is attached to the noun *love* and the noun becomes an adverb. In (17) the suffix *age* is attached to the adjective *short* and this makes the adjective a noun. In (18) the singular noun *apple* becomes the plural noun *apples* with the suffix

s. In (19) the adjective *small* becomes the comparatives *smaller* and *smallest* with the suffixes *er* and *est*, respectively.

On the other hand, in Korean suffixes play important roles, for example, in nouns, accusative and nominative cases are always overtly realised by particles attached to nouns in subject and object positions, as the following:

(20) Harry-ka Emma-rul joahanta.
Nom Acc like
'Harry likes Emma.'

(21) Harry-ka Emma-ege kkot -ul ponessta.
Nom Dat flower Acc send
'Harry sent flowers to Emma.'

The suffix *ka* in *Harry-ka* encodes a Nominative case and the particle *rul* in *Emma-rul* encodes an Accusative case. As noted in the previous section, Korean has a flexible word order. This may stem from the fact that grammatical functions such as "subject" and "object" are overtly marked by case endings, such as, *-ka, -ul*. This means that there is no need for fixed positions to identify the various grammatical functions.

Particles are also added to nouns to form adverbials, as shown in (22-23):

(22) Emma-ka London-*e* santa. (locative)
Nom Loc live
'Emma lives in London.'

(23) Emma-ka cha-*ro* oassta. (instrumental)
Nom car by come
'Emma came by car.'

In (22-23), the particles *e* and *ro* are attached to nouns.

In verbs, particles also play an important role in marking tense, aspect, and modality as well as subordinating sentences. (Lee 1993, Kwon 1985, Sells 1995) Consider morphological changes for tenses as in figure.2.1.

root	kata (go)	manata (meet)	boneta (send)
present	ka-n-ta	mana-n-ta	bone-n-ta
past tense	ka-ss-ta	mana-ss-ta	bone-ss-ta
future tense	ka-lkusi-ta	mana-lkusi-ta	bone-lkusi-ta

Figure.2.1. Morphological changes for tenses in main clauses

Let us take some examples with past tense as in (24), present tense as in (25) and future tense as in (26):

(24) a. Emma sent the letter to Harry.

b. Emma-ka Harry-ege pyeonji-rul pone -*ss* -ta. (past tense)
Nom Dat letter Acc send PAST De

As shown in figure.1.2, the particle for past tense *ss* and the particle for declaratives *ta* are attached to the verb stem *bone*:

(25) a. Emma sends letters to Harry.

b. Emma-ka Harry-ege pyeonji-rul pone -*n* -ta. (present tense)
Nom Dat letter Acc send PRE De

: PRE stands for present tense

As shown in figure 2.1, the particle for present tense *–n* and the particle for declaratives *ta* are attached to the verb stem *bone*:

(26) a. Emma will send a letter to Harry.

b. Emma-ka Harry-ege pyeonji-rul pone-*lkusi*-ta. (future tense)

Nom Dat letter Acc send FUT De

As shown in figure 2.1., the particle for future tense *–lkusi* and the particle for declaratives *ta* are attached to the verb stem *bone*. Present/ past perfect tenses are also attached to verb stems, as illustrated in (27):

(27) a. Emma has sent the letter to Harry.

b. Emma-ka Harry-ege pyeonji-rul pone-*oass*-ta. (present perfect)

Nom Dat letter Acc send PRP De

: PRP stands for present perfect

In interrogatives, the particle for interrogatives *ni* replaces the particle for declaratives *ta*, as illustrated below:

(28) a. Did Emma send the letter to Harry?

b. Emma-ka Harry-ege pyeonji-rul pone -*ss* -ni? (past tense)

Nom Dat letter Acc send PAST Qu

The difference between a past tense declarative in (25.b) and a past tense interrogative in (29.b) is merely the verb ending.

In addition, the 'be going to (planned future)' sentences, modality, negation, passive, conjunction are also expressed within verbs, that is, they are attached to verbs, as illustrated in (29-34):

(29) a. Emma is going to send a letter to Harry.

b. Emma-ka Harry-ege pyeonji-rul pone-*lyejungi*-ta. (be going to)
Nom Dat letter Acc send BGT De
: BGT stands for 'be going to'

(30) a. Emma must send a letter to Harry.

b. Emma-ka Harry-ege pyeonji-rul pone-*yamanhess*-ta. (must)
Nom Dat letter Acc send must De

(31) a. Emma does not send letters to Harry.

b. Emma-ka Harry-ege pyeonji-rul pone-*jiannun*-ta. (negation)
Nom Dat letter Acc send NEG De
: NEG stands for negation

(32) a. The letter was sent by Emma.

b. Pyeonji-ka Emma-euiheseo pone-*jess*-ta. (passive)
letter Nom by send PSV De
: PSV stands for past passive

(33) a. Emma likes apples and Harry likes pears.

b. Emma-ka sakwa-rul joaha-*ko* Harry-ka pe -rul joahanta. (and)
Nom apple Acc like and NOM pear Acc like

(34) a. Emma likes apples but Harry likes pears.

b. Emma-ka sakwa-rul joaha-*jiman* Harry-ka pe -rul joahan-ta. (but)
Nom apple Acc like but Nom pear Acc like De

In (29-34), 'be going to' clauses, modality, negation, passive, conjunction information are all attached to verbs.

English have neither case suffixes nor verb suffixes of kind Korean has. But there is no need to give a new feature for suffixes for case. As we saw in Chapter 1, in English the feature CASE is a HEAD feature.

(35) [HEAD|CASE *nom*]
(36) [HEAD|CASE *acc*]

As in English, case in Korean are realised as the values of the feature CASE. In Korean, the feature CASE is spelled out by various morphological rules. For instance, when a noun has nominative case then it has the suffixes for nominative, *ka* or *i*. When a noun has accusative case then it has the suffixes for accusative, *ul* or *rul*.

However, we propose a new feature for verb suffixes as verbs can have more than one particle. For instance, the verb *poneyamanhessta* 'sent' in (30) has *yama* for modality, *hess* for patst tense and *ta* for declarative. We need a new feature for verb suffixes mentioned above. We need a tense-modality feature and a mood-sentence type feature. A new feature SENTENCE TYPE (STYPE) might be an answer. For instance, the particles for conjunction *ko* in (33) and *jiman* in (34) can be realised as the STYPE values in (37) and (38), respectively:

(37) [STYPE *ko*]
(38) [STYPE *jiman*]

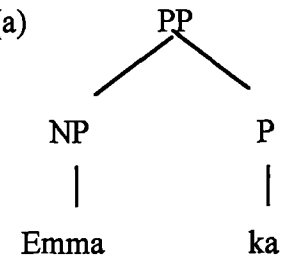
There have been several proposals in Korean and Japanese inflectional structures. This will be discussed in the following section.

2.3.2 Sells' (1995) analysis

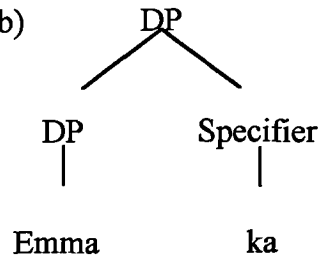
It has been assumed that the inflectional structures are right-headed in some languages such as Korean and Japanese, that is, in a phrase a head is located in the right position of its own phrase. (who???) Some researchers consider case particles

as the head of their phrases. Among the supporters of the latter, Gunji (1987) suggests that all noun phrases in Japanese are Postpositional Phrases (PPs) like prepositional phrases in English. Some linguists separate prepositional phrases from noun phrases, and insist that prepositional phrases are equivalent to their English counterparts. Whitman (1989) suggests that some suffixes are not heads but specifiers, and that their phrases are determiner phrases, and that determiner phrases exist in Japanese and Korean. Those proposals can be illustrated in the following:

(39) (a)

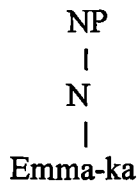


(b)



Sells rejects such proposals. He considers all nouns with noun particles as noun phrases. That is, noun particles are just suffixes not the head of their phrases. Sells argues that 'inflectional suffixes are all attached in the lexicon and they have no syntactic status, other than whatever features they contribute to the overall word containing them. (Sells 1995:281)'. Those particles are not phrasal heads, therefore those phrases are neither PP nor DP but NPs, as shown in (40):

(40)

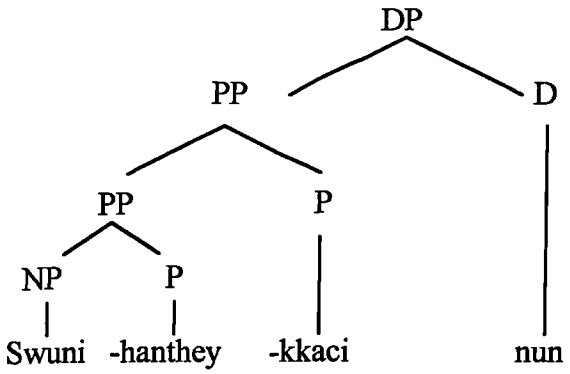


To support his analysis, he claims that not all of the relevant inflectional structures in Korean and Japanese are not right-headed. If the particles were syntactic heads, one would expect the rightmost particle to be the one selected by some external head. The following example shows that this is not what Sells finds:

(41) Swuni-hanthey-kkaci-nun cwu-ess-ta.
Dat even Foc give-Past-Decl
'I gave it even to Swuni.' (Sells 1995:285)

The property of the verb cwu-*ta* 'give' determines dative case expressed by '*hanthey*'. However, the particle '*kkaci*' and the focus marker '*nun*' intervene. Within the right head analysis, these particles are the heads of their own phrases, as illustrated in the following tree diagram:

(42) [[[Swuni NP]-hanthey PP]-kkaci PP]-nun DP]



This violates the idea of the verb selecting the dative. The problem that occurs is the verb *cwu-ta* 'give' is separated from its dative argument by two other elements that project phrases. If the particles are not syntactic heads, nothing is violated. The three particles, that is, *hanthey*, *kkaci* and *nun* as indicated as Sf1, 2 and 3 proceeded by the noun *Sooni* are merely suffixes:

(43) [[[[[Sooni N]–hanthey *Sf1*] –kkaci *Sf2*] -nun *Sf3*]]
to even
: *Sf* stands for suffixes.

Another piece of evidence is the intervening of the various particles between verb nouns and the verb, as shown in (44) and (45):

(44) Phantan -to hanta.
judgement even do
'even judge'

(45) Wuncen-man hanta
Drive only do
'only drive'

The verb *hata* 'do' selects for verb nouns. In (44), the particle *to* is separated from the verb noun *pantan* 'judgement' and the verb *hanta* 'do'. In (45), the particle *man* intervenes between the verb noun *wuncen* 'drive' and the verb *hanta* 'do'. If those particles were not heads, the intervention would not any cause problems. Sells argues against the possibility of the particles being specifiers. Thus, the only way to explain this is that particles have to be just nonhead suffixes.

Sells gives another piece of evidence for his proposal. One verb selects for a particular form of another verb. In (46), the verb *pota* 'try' selects for another verb *ilkta* 'read' with a particular form *e*. In (47), the verb *sipta* 'desire' selects for the verb *kata* with a particular form *ko*.

(46) Ilk-e po-ass -ta.
Read-Comp try-Past-De
'tried reading'

(47) Ka-ko sip -ta.
Go-Comp desire-DE
'want to go'

Sells questions how those selection could work if particles intervening between two verbs were phrasal heads, as shown in (48) and (49):

(48) ilk -e -*man* po-ass-ta. (Sells 1995:287)
read-Comp-only try-Past-De
'tries only reading'

(49) ka-ko -*man* sip -ta. (Sells 1995:287)
go-Comp-only desire-De
'want only to write'

In this thesis, we will adopt Sells's position that the morphology of the inflected verbs and nouns in Korean and Japanese are not the head of its own phrase.

2.4 Agreement

The Subject-Verb Agreement exists in English while it does not exist in Korean. In English, the present tensed verbs have to agree with the subject, as in (50):

(50) a. Emma likes pizza
b. They like pizza

In (50.a), the present tensed verb agrees with the third person singular subject *Emma*. In (50.b), the present tensed verb agrees with the third person plural subject *they*. If the subjects and the verbs did not agree each other, the sentences would be ungrammatical, as the following:

(51) a. *Emma like pizza
b. *They likes pizza

However, this agreement is not shown in Korean, as in (52).

(52) a. Emma-ka pizza-ul joahanta.
Nom Acc like
'Emma likes pizza.'
b. Kutul-i pizza-ul joahanta
they Nom Acc like
'They like pizza.'

Whether the subject is singular or plural, the verb remains the same. One exception is honorific forms. There are separate honorific forms for case and tense. The honorific suffix for nominative and the honorific suffix for tense have to agree, as shown in (53):

(53) halapuji -kkesoe yeon-ul mantu-sess -ta.
grandfather Nom(HON) kite Acc make Pst(HON) De
'The grandfather made the kite.'

The subject *halapuji* 'grandfather' has a honorific nominative suffix *kkeseo* and the verb contains the honorific past tense form *sess*. If the sentence has the honorific nominative suffix without the honorific tense suffix, the sentence would be ungrammatical. If the sentence has the honorific tense suffix without the honorific nominative suffix, the sentence would be ungrammatical, as in the following:

(54) *halapuji -kkesoe yeon-ul mantu-less -ta.
grandfather Nom(HON) kite Acc make Pst De
(55) *halapuji -ka yeon-ul mantu -sess -ta.
grandfather Nom kite Acc make Pst(HON) De

In addition, indirect object-verb agreement exists in honorific forms. The honorific suffix for indirect object and the honorific verb have to agree, as given in (56):

(56) sonyeon-i halapuji -kke sinmum -ul turessta.
boy Nom grandfather I.O(Hon) newspaper Acc give(Hon)
'the boy gave the newspaper to the grandfather.'

If the sentence has the honorific indirect object suffix without the honorific tense suffix, the sentence would be ungrammatical. If the sentence has the honorific tense suffix without the honorific indirect object suffix, the sentence would be ungrammatical, as illustrated in (57) and (58):

(57) *sonyeon-i halapuji -ege sinmum -ul turessta.
boy Nom grandfather I.O newspaper Acc give(Hon)
'the boy gave the newspaper to the grandfather.'

(58) *sonyeon-i halapuji -kke sinmum -ul juessta.
boy Nom grandfather I.O(Hon) newspaper Acc give
'the boy gave the newspaper to the grandfather.'

The flexible word order does not affect the agreement in the honorific form since the case is marked by the special suffixes, *as shown in (59) and (60)*:

(59) halapuji -kke sonyeon-i sinmum -ul turessta.
grandfather I.O(Hon) boy Nom newspaper Acc give(Hon)
'the boy gave the newspaper to the grandfather.'

(60) yeon-ul halapuji -kkeseo mantu -ssessta.
kite Acc grandfather Nom(Hon) make Pst(Hon)
'The grandfather made the kite.'

2.5 Interrogatives

One of the differences between declaratives and interrogatives in English is that subject-auxiliary inversion occurs in interrogatives, as illustrated in (61-63):

(61) a. They can come.
b. Can they come?
(62) a. They like apples.
b. Do they like apples?
(63) a. They make tables.
b. What do they make ____ ?

In English *wh*-interrogatives, *wh*-words are extracted from the subordinate clauses and always at the front of the sentences. *Wh*-words and missing constituents are token identical thus they construct a filler-gap construction, as shown in (64-66):

(64) Who*i* [_____*i* likes apples]?
(65) Whom*i* did [Harry meet ____*i*]?
(66) What*i* do [they like _____*i*]?

As we saw in section 1.5, unbounded dependencies are unbounded. The dependency in question can extend across many clause boundaries in *wh*-interrogatives, as repeated in (67-69):

(67) Whom*i* does [Emma like ____*i*].
(68) Whom*i* does Harry know [Emma likes ____*i*].
(69) Whom*i* does Sophie believe Harry knows [Emma likes ____*i*].

In (68), the missing constituent is in the embedded complement clause and the *wh*-word conindexed with the missing constituent is at the front of the sentences. In a doubly embedded complement, as in (69), the missing constituent is in the

embedded clause within a complement clause and the *wh*-word coindexed with the missing constituent is at the front of the sentences.

However, Korean interrogatives are different from English counterparts in three ways: firstly, the subject-auxiliary inversion does not occur in Korean interrogatives, instead, the suffix for interrogative *ni* is attached to the end of verbs, as given in (70):

(70) a. kutul-i sakwa-rul joahan-*ta.*
they Nom apple Acc like De
'They like apples.'
b. kutul-i sakwa-rul joaha-*ni*?
they Nom apple Acc like Qu
'Do they like apples?'

The only difference between a declarative in (70.a) and an interrogative in (70.b) is verb endings. The suffix *ni* is attached to all interrogatives except indirect questions.

Secondly, in *wh*-interrogatives, interrogative expressions occupy the same position as non-interrogative expressions. Thus, *wh*-words are *in situ.* There are no missing constituents to be coindexed with *wh*-words in Korean *wh*-interrogatives. This is illustrated as follows:

(71) a. Harry-ka Emma-rul joahan-ta.
Nom Acc like De
'Harry likes Emma.'
b. [Nuka] Emma-rul joaha-ni? (who)
who-Nom Acc like Qu
'Who likes Emma?'
c. Harry-ka [nuku-rul] joaha-ni? (whom)
Nom who Acc like Qu
'Whom does Harry like?'

(72) a. Harry-ka uija -rul mantuluss-ta
Nom chair Acc make De
'Harry made a chair.'

b. Harry-ka [muss-ul] mantuluss-ni? (what)
Nom Acc make Qu
'What did Harry make?'

(73) a. Harry-ka London-e san -ta.
Nom in live De
'Harry lives in London.'

b. Harry-ka [udi-e] sa -ni? (where)
Nom where live Qu
'Where does Harry live?'

(74) a. Harry-ka eje oass -ta.
Nom yesterday come De
'When did Harry come?'

b. Harry-ka [unje] oass -ni? (when)
Nom when come Qu
'When did Harry come?'

The verb ending for interrogatives *ni* is attached to verbs in *wh*-interrogatives since *wh*-interrogatives is a type of interrogatives. There are no missing constituents coindexed with *wh*-words. Thus, the main differences between declaratives and *wh*-interrogatives are *wh*-words and the verb ending.

Thirdly, no syntactic unbounded dependency is involved in Korean *wh*-interrogatives. There is a dependency between the *wh*-element and the interrogative suffix. The *wh*-element would not be acceptable without the suffix which presumably marks its semantic scope. This is a semantic dependency but not unbounded dependency of the kind suggested by Pollard and Sag (1994), as considered in section 1.5.

In English, what is embedded in *wh*-interrogatives is a clause containing a missing constituent, as in (67-69). Since *wh*-words replace the constituent in question, there is no missing constituent in Korean *wh*-interrogatives. What is embedded in Korean *wh*-interrogatives is the clauses containing *wh*-words, as illustrated in the following:

(75) [Emma-ka nuku-rul joaha-ni]?
Nom who Acc like Qu
'Who does Emma likes?'

(76) Harry-ka [Emma-ka nuku-rul joahanta-ko] sengkakha-ni?
Nom Nom who Acc like think
'Who does Harry think Emma likes?'

(77) Sophie-ka [Harry-ka [Emma-ka nuku-rul joahanta-ko] sengkakhanta-ko]
Nom Nom Nom who Acc like think
mit -ni?
believe Qu
'Who does Sophie believe Harry thinks Emma likes.'

(75) is a *wh*-interrogative. In (76) and (77), the clause *Emma-ka nuku-rul joahani* 'who does Emma like' is embedded as a complement. The suffix for subordinate clauses *ko* is attached to the embedded clause, thus, the embedded clause becomes *Emma-ka nuku-rul joahanta-ko*. This is similar to embedded declarative clauses. The differences between embedded *wh*-interrogative clauses and embedded declarative clauses are *wh*-words and verb endings. In the former, the *wh*-words exist and the sentence ending is *ni*, as seen in (76) and (77). In the latter, the *wh*-words do not exist and the sentence ending is *ta*, as shown in (79) and (80):

(78) [Emma-ka William-ul joahanta].
Nom Acc like
'Emma likes William.'

(79) Harry-ka [Emma-ka William-ul joahanta-ko] senkakhanta.
Nom Nom Acc like think
'Harry thinks Emma likes William.'

(80) Sophie-ka [Harry-ka [Emma-ka William-ul joahanta-ko] sengkakhanta-ko]
Nom Nom Nom Acc like think
mitnunta.
believe
'Sophie believes Harry thinks Emma likes William.'

(78) is a declarative. In (79) and (80), the clause *Emma-ka William-ul joahanta* 'Emma likes Harry' is embedded as a complement. The suffix for subordinate clause *ko* is attached to the embedded clauses.
There is some kind of agreement between the *wh*-element and the interrogative suffixes. The *wh*-element exists with the interrogative suffixes *ni*, as in (71-74) or *nunji* for the indirect questions as illustrated in (81):

(81) Emma-ka [Harry-ka nuku-rul joaha-*nunji*] anta. (indirect question)
Nom Nom who Acc like InQu know
' Emma knows who Harry likes'

As shown in (75-77), the interrogative suffix *ni* is in the highest verbs when the *wh*-element are embedded. This might stem from the fact that the interrogative suffix *ni* is a type of sentence ending. Thus, *ni* must come at the end of the sentences. This is like the declarative suffix *ta* as a sentence ending.

Pollard and Sag (1994) divide unbounded dependency constructions into two types, strong unbounded dependency constructions and weak unbounded dependency constructions. In the former, the overt constituent and the missing constituent share LOCAL features and form a filler-gap construction while in the latter no filler-gap

construction is involved instead a constituent in argument position is coindexed with the missing constituent. Despite of their differences, both types of unbounded dependencies have a common condition: they must involve a gap. Thus, both types of unbounded dependency constructions always involve a SLASH feature. Korean *wh*-interrogatives fail to meet this condition. The kind of unbounded dependency between *wh*-words and *ni* are not either type of unbounded dependency constructions suggested by Pollard and Sag (1994). We assume that the Korean *wh*-interrogative constructions are not syntactically unbounded dependency constructions of the kind discussed in our thesis. Therefore, we will not consider Korean *wh*-interrogatives in detail in our thesis.

2.6 Conclusion

We have discussed some of important characteristics in Korean in this chapter. The SOV word order in Korean is a significant difference from word order in English. In addition, word order in Korean is relatively free and missing constituents occur freely. An exception is verbs which must be in the end of the sentence and cannot be omitted. This might stem from the fact that in Korean suffixes play important roles. Unlike English, agreement is not commonly realised in Korean except some occasion, such as honorific forms.

We have explained why we do not consider *wh*-interrogatives in Korean as unbounded dependency constructions of kind suggested by Pollard and Sag (1994) for two reasons: first, in Pollard Sag's analysis, unbounded dependency constructions always involve the SLASH feature whether they are filer-gap constructions or not. But *wh*-interrogatives in Korean do not involve any gap. Thus, the SLASH feature is not involved. Second, if any dependency were involved in *wh*-interrogatives, it would be a semantic dependency.

Chapter 3
Unexpressed Argument Structures

3.1 Introduction

In this chapter, we will consider two different kinds of unexpressed arguments which are relevant to our discussion. One involves extraction and the other does not involve extraction. We will call the former unbounded dependency gaps and the latter non extraction gaps. As noted in section 2.2, Korean allows gaps in subject or object position as well as gaps somewhere inside a subject or object. In English, gaps in subject position and object position are also allowed. However, subject gaps in Korean are real gaps just like object gaps whereas there is evidence that they are not in English. Thus, English observes a subject-object asymmetry whereas Korean does not. We will assume that there is no need to distinguish complements from subjects as they behave in the same way. Thus, we will suggest that complements include subjects in Korean. We will also propose a unified analysis for unbounded dependency gaps and non extraction gaps in Korean. Unbounded dependency gaps in English and Korean will be considered in section 3.2. Non extraction gaps in both languages will be examined in section 3.3. Subject-object asymmetry in English and the absence of such an asymmetry in Korean will be observed in section 3.4. An HPSG analysis of unbounded dependency gaps will be discussed in section 3.5.1. An HPSG analysis of non extraction gaps will be considered in section 3.5.2. An HPSG analysis of gaps in Korean will be presented in section 3.5.3.

3.2 Unbounded dependency Gaps

We will first consider unbounded dependency gaps in subjects or complements and then unbounded dependency gaps within subjects or complements. As we saw in section 1.5, unbounded dependency constructions in English involve gaps in complement position, as repeated in (1-3):

(1) Emma*i*, Harry likes _____*i*.
(2) The painter who*i* Emma likes _____*i*
(3) Who*i* do you think that Emma likes ____*i* ?

In (1-3), an argument is extracted of complement position in the main clause. These extracted arguments and the gaps in the main clauses share properties like case, number, gender and number. This kind of gaps is called unbounded dependency gaps. Clauses involving gaps in complement position as in (1-3) are grammatical. But clauses involving gaps in subject position are not always grammatical. Gaps in subject position will be considered in detail in section 3.4 and 3.5.1. The following is examples with gaps in subject position:

(4) Who*i* do you think ____*i* likes Emma?
(5) *Who*i* do you think that ____*i* likes Emma?

(4) is grammatical. (5) is ungrammatical as a gap appears in subject position in a clause introduced by the complementiser *that*. But gaps in complement position are grammatical in clauses introduced by the complementiser *that*, as shown in (3). This is so-called the *that*-trace effect. The situation is the same with clauses proceeded by *whether* and *for*. Gaps cannot appear in subject position in clause introduced by *whether* or *for*. (Haegeman 1994 and Borsley 1996)

Unlike English, unbounded dependency gaps in Korean can be subjects or complements. We will take relative clauses as examples in this chapter and relative

clauses will be discussed in detail in Chapter 4. The following shows the extraction of subjects or that of complements in relative clauses are grammatical:

(6) [Emma-ka ____ saranghanun] kasu
Nom love singer
'the singer Emma loves'

(7) [_____ Emma-rul saranghanun] kasu
Acc love singer
'the singer who loves Emma'

(8) [Emma-ka [Harry-ka _____ saranghanun] sengkakhanun] kasu
Nom Nom love think singer
'the singer who Emma thinks Harry loves'

(9) [Emma-ka [_____ Harry-rul saranghantako] sengkakhanun] kasu
Nom Acc love think singer
'the singer who Emma thinks (he/she) loves Harry'

In (6), a complement is extracted in a relative clause while in (7) a subject is extracted in a relative clause. In (8), a complement is extracted in an embedded relative clause while in (9) a subject is extracted in an embedded relative clause. They are all grammatical.

We will now observe unbounded dependencies in gaps within subjects or complements. There are some constraints on extraction possibilities. For instance, unbounded dependency gaps within subjects are ungrammatical while gaps within complements are grammatical. This is originally pointed out by Ross (1967). Ross (1967) proposes that constituents can be extracted out of complement phrases, but not of subject phrases in English, that is, subjects are Islands while complements are not. These constructions constitute Islands, as given in (10):

(10) Island Condition (Ross 1967):
Subjects are islands while Complements are not

Let us consider relative clauses containing overt-relative pronouns, as illustrated in (11) and (12):

(11) the man *who* she exploited [the naivety of -]
(12) * the man *who* [the naivety of -] attracted many girls

(11) is grammatical since the *wh*-relative pronoun *who* is extracted from a complement phrase. On the other hand, (12) is ungrammatical since *who* is extracted from a subject. Thus, relative clauses containing overt relative pronouns observe Island Condition. The situation is the same in *wh*-interrogatives, as illustrated in (13-14):

(13) What does Sally think that children like [books about *e*]?
(14) * What does Sally think that [the price of *e*] is high

(13) is grammatical as a constituent is extracted out of the complement whereas (14) is ungrammatical as a constituent is extracted out of the subject. This observes Island Condition in (10).

On the other hand, neither subjects nor objects are islands in Korean. Constituents can be extracted out of subjects or complements. The following examples are the Korean translation of the English examples (11) and (12):

(15) [kunyeo-ka [_____*i* sunjinham]-ul iyonghan] namja*i*
she Nom naivety Acc exploit man
'the man who she exploited the naivety of'

(16) [[_____*i* sunjinham]-i manun sonyeo-rul meryocikin] namja*i*
naivety Nom many girl Acc attract man
'*the man who the naivety of attract many girls'

In (15), the head noun *namja* 'man' is relativised out of the complement in the relative clause. In (16), the head noun *namja* 'man' is relativesed out of the subject in the relative. This shows that gaps within subjects are grammatical just like gaps within complements.

There is an exception for extraction from subjects or complements. Postpositions cannot be stranded when extraction from subjects or complements occur, as shown in (17) and (18):

(17) *[[____*i* etehan iyaki-ka] saramtul-ul meryosikin] kasu*i*
about story Nom people Acc attract singer
'the singer that the story about attracts people.'

(18) *[saramtul-i [____*i* etehan iyaki-rul] mit-nun] kasu*i*
people Nom about story Acc believe singer
'the singer who people believe the story about'

In (17) the noun *kasu* cannot be extracted from the subject as the postposition *etahan* 'about' is stranded. In (18) the noun *kasu* cannot be extracted from the complement as the postposition *etehan* 'about' is stranded. When the whole subject or the whole complement is relativised, the relative clauses become grammatical, as illustrated in (19) and (20):

(19) [____*i* saramtul-ul meryosiki-n] [kasu -etehan iyaki]*i*
people Acc attract singer about story
'the story about the singer that attracts people'

(20) [saramtul-i ____*i* mit-nun] [kasu- etehan iyaki]*i*
people believe singer about story
'the story about the singer that people believe'

(19) is grammatical as the whole subject is extracted and (20) is grammatical as the whole complement is extracted. The situation is the same in non extraction gaps in Korean. The impossibility of proposition stranding in non extraction gaps will be considered in section 3.3.

This is different from English. For example, in English the NP *books about policemen* can be separated to *books about* and *policemen* in topic clauses and *wh*-interrogatives, as shown in (21-23):

(21) Harry likes [books about policemen].
(22) Policemen*i*, Harry likes [books about ____*i*].
(23) Which man*i* do you think Harry likes [books about ____*i*]?

In (22), *policeman* is separated from the NP *books about policeman* and is topicalised. In (23), *policeman* is separated in a *wh*-interrogative.

One of reason why postpositions in Korean are not stranded might stem from the fact that postpositions are always attached to words as suffixes. This means that they are not really postpositions. In section 2.3.2, we adopt Sells' position that the morphology of the inflected verbs and nouns in Korean are not the head of its own phrase but just suffixes which play an important role in Korean. Information is attached to words as suffixes. For instance in nouns, all case information, number information, agreement information in honourific form are attached to nouns as suffixes. In verbs, tense information, auxiliary information, negation information are contained within suffixes, as illustrated in (24):

(24) kasu -tul-i Emma-ege chotejang-ul pone-jiana-yamanhan-ta.
singer Pl Nom to invitation Acc send neg must De
'the singers must not send an invitation to Emma.'

Any elements in *kasu-tul-i, Emma-ege, chotejang-ul,* or *pone-jiana-yamanhan-ta* cannot be separated. For instance, all elements of the verb *pone-jiana-yamanhan-ta* must be attached to the stem of the verb. Those elements of the verb cannot appear independently since they are only suffixes, as the following:

(25) –yamanhan-
must
(26) –jiana-
neg

Consider another type of unexpressed arguments which do not involve extraction in the following section.

3.3 Non Extraction Gaps

In English, an unexpressed subject in non-finite clauses can occur. These unexpressed subjects are so-called big PRO in the principles and parameters theory. Big PRO is not literally in subject position in HPSG. It is a subject list member with no counterpart in constituent structure. But we will use the term big PRO in this thesis for reader's sake. This is illustrated in (27) and (28):

(27) Emma*i* tries [PRO*i* to call Harry].
(28) Emma*i* is glad [PRO*i* to see Harry].

PRO in (27) and (28) is coreferential with the subjects in the main clauses. Pollard and Sag (1994) suggest that two categories, PRO and the subject in the main clause

in (27) and (28), have to be the same, that is, PRO is an anaphor, more specifically a reflexive. They rule out the possibility of PRO being a pronominal. This is followed by many linguists like Sag 1997, Ginzburg and Sag 2000. Therefore, the interpretation of (27) is (29) not (30) and the interpretation of (28) is (31) not (32):

(29) It is Emma herself who tries to call Harry.
(30) *It is someone else rather than Emma who tries to call Harry.
(31) It is Emma herself who is glad to see Harry.
(32) *It is someone else rather than Emma who is glad to see Harry.

Korean also allows the unexpressed subjects in non finite clauses, as in (33) and (34):

(33) Emma*i*-ka [PRO*i* Harry-rul mana-ryeoko] citohessta.
Nom Acc meet try
'Emma tried to meet Harry.'

(34) Emma*i*-ka [PRO*i* nonmul-ul kkutne-seo] kippussta.
Nom thesis Acc finish be glad
'Emma was glad to finish the thesis.'

The verbs *mana-ryeoko* in (33) and *kkutne-seo* in (34) are not infinitive forms. But we assume that they are non finite verbs in three reasons. Firstly, the verbs in the embedded clauses, *mana-ryeoko* as in (33) and *kkutne-seo* as in (34), do not carry any tense information whereas the verbs in the main clauses, *citohessta* as in (33) and *kippussta* as in (34) are past tense forms. The verbs *mana-ryeoko* in (33) and *kkutne-seo* in (34) contain suffixes, *ryeoko* as in (33) and *seo* as in (34), for linking verbs, *manata* 'to meet' and *citohata* 'to try' as in (33) and *kkutneta* 'to finish' and *kipputa* 'to be glad' as in (34). Secondly, unlike English, no infinitive verb can appear in a clause. They have to be in inflectional forms. Thirdly, PRO can be

replaced by a reflexive but not by a pronominal. PRO in (33) is replaced by a reflexive and a pronoun, as illustrated in (35) and (36), respectively:

(35) Emma*i*-ka [kunyeojacin*i*-i Harry-rul mana-ryeoko] citohessta.
Nom herself Nom Acc meet try
'Emma tried to meet Harry.'

(36) *Emma*i*-ka [Jo*i*-ka Harry-rul mana-ryeoko] citohessta.
Nom Nom Acc meet try

For these reasons, it follows that the verbs *mana-ryeoko* in (33) and *kkune-seo* in (34) are non finite verbs.

There is another type of non extraction gap in Korean. It is possible to have unexpressed subjects in finite clauses, the so-called small *pro*, in many other languages, such as, Korean, Chinese, Japanese, Spanish, and Italian. To avoid confusion with big PRO, we call this type of gap a *null-pronoun*. Unexpressed subjects in finite clauses is illustrated as follows:

(37) Vivo en Londres. (Spanish)
live-1st in
'I live in London.'

(38) London-e sapnita. (Korean)
in live
'I/someone in discourse live in London.'

In Spanish, the subject can be omitted since the verb *vivo* 'live' is the first person singular form, as in (37). In Korean, subjects can be unexpressed, as in (38). However, English does not allow *null-pronouns*. In English, a subject is an obligatory requirement, as illustrated in the following:

(39) *live in London. (English)

It has been observed that unexpressed complements in finite clauses are also possible in certain languages. For instance, Dini (1998) discusses null complements in Italian. As observed in section 2.2, Korean allows not only *null-pronouns* in subject position but also *null-pronouns* in complement position in finite clauses, as repeated in the following:

(40) _____ _____ manassta.
meet
'someone in discourse met something/someone in discourse.'

(41) _____ Emma-rul manassta.
Acc meet
'Someone met Emma in discourse.'

(42) Harry-ka _____ manassta.
Nom meet
'Harry met someone/something in discourse.'

Korean also allows *null-pronouns* within subjects or complements, as illustrated in (43-44):

(43) Emma-ka [Harry-ka _____ mananunkus]-ul poassta.
Nom Nom meet Acc see
'Emma saw that Harry met someone (in discourse).'

(44) [Harry-ka _____ manankus]-i Emma-rul hwanakehessta.
Nom meet Nom Acc angry make
'That Harry met someone (in discourse) made Emma angry.'

In (43) a *null-pronoun* appears within the complement and in (44) a *null-pronoun* appears within the subject.

One might argue that English also have *null-pronouns* in complement position as in the following examples:

(45) I eat
(46) I eat lunch

When the verb *eat* is used as a non-transitive, the verb *eat* does not take any complement, as in (45). I eat means 'I eat something' whereas a null-pronoun refers to someone or something specific. When the verb eat is used as a transitive, the verb *eat* takes a complement, as in (46). This is limited to some verbs which can be either transitive or non-transitive, and gaps in complement position. However, this is different from *null-pronouns* in Korean in two ways. First, in Korean, arguments can be omitted with any verbs. It is not a matter of verbs being transitive or non-transitive. Second, as noted in section 2.2, subject, complement or both arguments can be omitted.

One might doubt whether *null-pronouns* in finite clauses are also PRO just like subject gaps in non-finite clauses in English. As noted earlier in this section, subject gaps in non-finite clauses, PRO, can be replaced by reflexives. If gaps in finite clauses were PRO, they could be replaced by reflexives. But *null-pronouns* in finite clauses can be replaced by pronominals not by reflexives. This is illustrated in the following:

(47) Emma-ka Tom-ul manassta.
Nom Acc meet
'Emma met Tom.'

(48) Emma-ka [Harry-ka Nicole-ul mananunkus]-ul poassta.
Nom Nom Acc meet Acc see
'Emma saw that Harry met Nicole.'

(49) [Harry-ka Nicole-ul manankus]-i Emma-rul hwanakehessta.
Nom Acc meet Nom Acc angry make
'That Harry met Nicole made Emma angry.'

In the context of (41-44), the gaps can be replaced by a pronominal, as given in (47-49), respectively. But they cannot be replaced by a reflexive, as shown in (50-53):

(50) *Harry-ka kunyeojacin-rul manassta.
Nom herself Acc met

(51) *nunyeojacin-i Harry-rul manassta.
herself Nom Acc meet

(52) *Emma-ka [Harry-ka knyeojacin-ul mananunkus]-ul poassta.
Nom Nom herself Acc meet Acc see

(53) *[Harry-ka kunyeojacin-ul manankus]-i Emma-rul hwanakehessta.
Nom herself Acc meet Nom Acc angry make

The interpretations of (50-53) are impossible in the context of (42-44). In (51) a reflexive occurs in the beginning of the sentence without its antecedents. A reflexive does not need to have its antecedent in the same clause. This is grammatical. In Korean, a reflexive in complement position can have its antecedent in subject position whereas a reflexive in subject position does not need to have its antecedent in complement position. In the latter, a reflexive can have its antecedent in discourse. This is illustrated in (54) and (55), respectively:

(54) Emma*i*-ka kunyeojacin*i*-ul joahanta.
Nom herself Acc like
'Emma likes herself.'

(55) kunyeojacin-i Emma-rul joahanta.
herself Nom Acc like
'*Herself likes Emma.'

In (54), the reflexive in complement position has its antecedent *Emma* in subject position. In (55), the reflexive in the beginning of the sentence does not share its referent with the complement *Emma*. Thus, the complement *Emma* is not an antecedent of the reflexive.

English reflexives and Korean counterparts are similar in two reasons. First, the reflexive and its antecedent must agree with the respect to the nominal features, person, gender and number. Second, a pronoun can function as an antecedent. This is illustrated in the following:

(56) *Emma*i* likes himself*i*.
(57) She*i* likes herself*i*.

As in English, a reflexive and its antecedent have to agree with the respect to the nominal features, person, gender and number if there is an antecedent in the same clause, and pronouns can function as antecedents in Korean, as illustrated in (58-60):

(58) Emma*i*-ka kunyeojacin*i*-ul joahanta.
Nom herself Acc like
'Emma likes herself.'

(59) *Emma*i*-ka kujacin*i*-ul joahanta.
Nom himself Acc like
'*Emma likes himself.'

(60) Kunyeo*i*-ka kunyeojacin*i*-ul joahanta.
she nom herself Acc like
'She likes herself.'

In (58), the subject *Emma* and the reflexive *kunyeojacin* 'herself' agree in nominal features. But (59) is ungrammatical as the reflexive and its antecedent do not agree in gender. (60) shows that the pronoun *kunyeo* 'she' can replace the antecedent *Emma* in (58).

As observed in 3.2, postpositions cannot be stranded when extraction from subjects or complements occur. The situation is the same with *null-pronouns*, as shown in (61-64):

(61) [tolkore etehan iyaki-ka] saramtul-ul meryosikinta
dolphins about story Nom people Acc attract
'The story about dolphins attracts people.'

(62) saramtul-i [tolkore etehan iyaki-rul] mitnunta
people Nom dolphins about story Acc believe
'People believe the story about dolphins.'

(63) *[____ etehan iyaki-ka] saramtul-ul meryosikinta
about story Nom people Acc attract

(64) *saramtul-i [____ etehan iyaki-rul] mitnunta
people Nom about story Acc believe

The subject in (61) and the complement in (62) involve preposition phrases. In (63) a pronoun is omitted within the subject and the postposition *etahan* 'about' is stranded. In (64), a pronoun is omitted within the complement and the postposition *etahan* 'about' is stranded. Both sentences are ungrammatical. When the whole subject or the whole complement is omitted, the sentences become grammatical.

In this section we observed that the omission of arguments and the omission from arguments are allowed. We also observed an exception of the omission of arguments which is the impossibility of the postposition stranding. This is the same as unbounded dependency gaps discussed in the previous section. Therefore, it follows that unbounded dependency gaps and *null-pronouns* can appear in subjects or complements, and that they can also appear within subjects or complements. Both type of gaps observe the impossibility of the postposition stranding.

3.4 Subject-object Asymmetries

English observe subject-object asymmetries. We will consider six subject-object contrasts which are relevant to our thesis. The first and most significant contrast between subjects and objects in English is the fact that either *that* or *wh*-element is required in a relative clause with a subject gap whereas neither is required in a relative clause with a non-subject gap, as illustrated in (65) and (66), respectively:

(65) Harry is the man who/that ____ likes Emma.
(66) Harry is the man Emma likes ____ .

In (65) the sentence would be ungrammatical if either *that* or *wh*-element is omitted in a relative clause with a subject gap, as the following:

(67) *Harry is the man likes Emma.

The second contrast between subjects and objects is the fact that subject-auxiliary inversion is required with a non-subject *wh*-interrogative but not with a subject *wh*-interrogative, as illustrated in (68-70):

(68) Who did Kim see?
(69) *Who Kim saw?
(70) Who saw Kim?

In (68), the auxiliary *do* is inverted in a non-subject *wh*-interrogative and the sentence is grammatical. Without the auxiliary *did*, the sentence will not be grammatical, as in (69). In a subject *wh*-interrogative, as in (70), the auxiliary *do* is not required.

The third contrast is that the agreement exists between subjects and verbs but not between objects and verbs, as shown in (71-74):

(71) Emma likes the singers.
(72) *Emma like the singers.
(73) The singers like Emma.
(74) *The singers likes Emma.

The fourth contrast is that the nominative forms of the personal pronouns are different from the accusative forms of the personal pronouns, as the following:

(75) I/she/he/we/they met Harry at the bar.
(76) Harry met me/her/him/us/them at the bar.

The fifth contrast is that constituents can be extracted out of complement phrases, but not of subject phrases, that is, subjects are islands while complements are not as observed in (11-14) in section 3.2.

The sixth contrast between subjects and objects can be found in complement clauses introduced by the complementiser *that*. Gaps in object position are grammatical in clauses introduced by the complementiser *that* whereas gaps in subject position are ungrammatical in those introduced by *that*. As we saw in section 3.2, this is so-called the *that*-trace effect. The following examples show the *that*-trace effect:

(77) Who do you think that the man invited _____ ?
(78) *Who do you think that _____ invited the man?

(77) is grammatical while (78) is ungrammatical since gap appears in subject position in a clause introduced by the complementiser *that*.

On the other hand, Korean does not show subject-object asymmetries. Unlike English, Korean observes neither subject-auxiliary inversion nor the subject-verb agreement, as noted in Chapter 2. Korean has no such contrast between the nominative forms and accusative forms either. Nominative and accusative forms differ in their suffixes for case, as shown in (79) and (80):

(79) ku-ka Emma-rul joahanta.
he Nom Acc like
'He likes Emma.'

(80) Emma-ka ku-rul joahanta.
Nom he Acc like
'Emma likes him.'

In (79) and (80) the NP *ku* 'he' is the same in nominative and accusative. But the suffix *ka* is attached to nominative while the suffix *rul* is attached to accusative. We will give four reasons why we assume Korean does not show subject-object asymmetries: Firstly, the extraction of objects or that of subjects is grammatical, as in (6-9). Secondly, the extraction from object or from subjects are grammatical, as in (15) and (16). As noted in 3.2, in Korean neither subjects or objects are islands.

Thirdly, *null-pronouns* in complement position or *null-pronouns* in subject position are grammatical, as in (40-42). Fourthly, *null-pronouns* within subjects or *null-pronouns* within objects are grammatical, as in (43) and (44). For these reasons, it follows that Korean does not observe subject-object asymmetries whether subjects and objects are gaps or they contain gaps, and whether gaps are unbounded dependency gaps or *null-pronouns*.

One might doubt that a subject-verb agreement in Korean honorific forms is an evidence of subject-object asymmetries. As noted in section 2.4, Korean observes an indirect object-verb agreement in honourific forms as well as a subject-verb agreement in honorific forms. Thus, Korean honorific forms do not really involve subject-object asymmetries, as repeated in (81) and (82):

(81) Halapuji *-kkeseo* yeon-ul mantu *-ssess*-ta.
grandfather Nom(Hon) kite Acc make Pst(Hon)
'The grandfather made the kite.'

(82) Tongseng-i Halapuji *-kke* sinmun -ul *turess*-ta.
brother Nom grandfather I.O(Hon) newspapers ACC give(Hon)
'The brother gave the grandfather the newspaper.'

In (81) the honourific suffix for nominative agrees with the honourific suffix for verb. In (82) the honourific suffix for indirect object agrees with the honourific verb.

One might raise another question that a subject-object asymmetry can be found in reflexives. As noted in (54) and (55), a reflexive in object position can have an antecedent in subject position while a reflexive in subject position cannot have an antecedent in object position. But this is not important contrast as reflexives have their antecedent anyway whether they are in the subject position in the same clause or they are in discourse.

Having proposed that Korean does not observe subject-object asymmetries in finite clauses, we will now move on to subject-object asymmetries in non finite clauses. We propose that subjects and objects in non finite clauses also behave in the same way as those in finite clauses in the sense that they do not observe subject-object asymmetries in two reasons. One is that non finite clauses in Korean do not observe the contrast between the nominative forms and accusative forms just like finite clauses. Two forms differ in their suffixes for case, as illustrated in (83-85):

(83) Ku*i*-ka [PRO*i* Harry-rul mana-ryeoko] citohessta.
he Nom Acc meet try
'He tried to meet Harry.'

(84) Emma*i*-ka [PRO*i* ku-rul manal] pilyokaissessta.
Nom Acc meet try
'Emma needed to meet him.'

(85) Emma-ka Jo*i*-ege [PRO*i* ku-ege onul chek-ul tolejurako] malhessta.
Nom to he to today book Acc return tell
'Emma told Jo to return the book to him today.'

The subject in (83), the complement in (84) and the dative in (85) have the same form of the pronoun *ku*. The difference is the suffixes for nominative in (83), accusative in (84) and dative in (85).

The other is agreement in honorific forms. An agreement between objects and verbs, and an agreement between subjects and verbs can only be found in honourific forms, as illustrated in (86) and (87):

(86) Halapuji*i*-*kkeseo* [PRO*i* Harry-rul mana-*ci*-ryeoko] citoha-*ssess*-ta.
Nom (Hon) Acc meet Hon try Hon
'The grandfather tried to meet Harry.'

(87) Emma-ka Jo*i*-ege [PRO*i* halapuji *-kke* cinmul-ul *turira*-ko]
Nom to grandfather I.O(Hon) paper Acc give(Hon)
malhessta.
tell
'Emma told Jo to give the paper to the grandfather.'

In (86) the non overt subject in the non finite clause is coreferential with the honourific subject in the main clause and it agrees with the honourific suffix for the verb. In (87) the honourific suffix for the indirect object agrees with the honourific verb in the non finite clause. Therefore, Any kind of agreement which could prove a subject-object asymmetry in non finite clauses or finite clauses cannot be found in Korean except in honourific forms. For these two reasons, it follows that neither finite subjects nor non-finite subjects differ from complements.
Next HPSG analyses of gaps will be discussed in the following sections.

3.5 HPSG analyses of Gaps

Having discussed unbounded dependency gaps and non extraction gaps in section 3.2 and 3.3, respectively, HPSG analyses of unbounded dependency gaps and non unbounded dependency gaps will be considered in this section. HPSG analyses of unbounded dependency gaps are discussed in section 3.5.1. Pollard and Sag's analysis including trace will be first considered and then Ginzburg and Sag's (2000) traceless analysis will be considered. In section 3.5.2, HPSG analyses of non extraction gaps will be discussed. Both PRO and *null-pronouns* will be examined. The type *gap-synsem* will be discussed in section 3.5.1 and the type *pro-synsem* and a new type for *null-pronouns* in Korean will be considered in section 3.5.2. In section 3.5.3, HPSG analysis of gaps in Korean will be examined. A unified analysis for both unbounded dependency gaps and non extraction gaps will be proposed.

3.5.1 HPSG analyses of unbounded dependency gaps

Pollard and Sag (1994) assume that an empty category which they call a trace is involved in gaps in unbounded dependency constructions. Pollard & Sag employ a SLASH feature in traces and also employ the feature INHERITED to allow unbounded dependencies to pass up from a constituent to its mother. The feature structure of a trace is as follows:

(88) The feature structure of traces (Pollard and Sag 1994:164):

$$\begin{bmatrix} \text{SYNSEM} & \begin{bmatrix} \text{LOCAL [1]} \\ \text{NONLOCAL}\,|\,\text{INHERITED}\,|\,\text{SLASH}\ \{[1]\} \end{bmatrix} \end{bmatrix}$$

This ensures that the LOCAL value of the trace is token-identical with the single member of its SLASH set value. The SLASH value goes up until it is bound off. This will be examined in section 4.4.1. However, Pollard and Sag suggest that traces are only in complement position not in subject position, as illustrated in (89) and (90):

(89) Who do you think the man likes ____ ?
(90) *Who do you think that ____ likes the man?

As noted in section 3.2, the presence of the complementiser *that* in (90) is the cause of the ungrammaticality of the sentence. Pollard and Sag (1994) propose the Trace Principle to rule out the extraction of subjects. The Trace Principle ensures that every trace must be strictly subcategorised by a substantive head. In other word, trace is a complement. The Trace Principle accounts for the grammaticality of gaps in complement position. It restricts gaps to complement position and predicts that they are ungrammatical elsewhere. Pollard and Sag (1994) assume that the Trace Principle also accounts for the ungrammaticality of (90).

However, the following examples appear to be problematic for the Trace Principle because they appear to involve a trace in subject position:

(91) Who do you think [____ invited the man]?
(92) Who do you think [____ likes the man]?

Pollard and Sag suggest a solution adapted from Gazdar (1981). That is, such sentences do not involve a finite sentence with a subject gap but a VP. To allow this, Pollard and Sag suggest the Subject Extraction Lexical Rule. This rule guarantees that any English verb that takes an S as its complement will have a new lexical entry in that the verbs take a VP without a SLASH feature as its complement. Thus, in (91) the VP *invited the man* does not involve the SLASH feature. As Borsley (1996) points out, this still leaves some examples unexplained in connection with Culicover's (1993) discussion:

(93) Who do you think that under those circumstances ____ would do this?

(93) illustrates that subject can be extracted when an adverb intervenes between *that* and subject position. Unlike (90), (93) is grammatical. Ginzburg and Sag following Bouma et al. (2000) give a possible explanation for the grammaticality of (93). We will not go into the detail of the Ginzburg and Sag's explanation.

Pollard and Sag (1994) propose the Subject Condition to account for the ungrammaticality of gaps within subjects. The Subject Condition ensures that a gap within a subject is allowed only when a complement involves a gap. The following examples show gaps within subjects. One is grammatical while the other is ungrammatical:

(94) *Who did [books about _____] attract Harry?
(95) Who did [books about _____] attract _____ ?

Subject Condition accounts for the ungrammaticality of the subject extraction in (94) and the grammaticality of the subject extraction in (95).

Having discussed Pollard and Sag's analysis involving trace, we move on to an approach with no empty categories proposed by Ginzburg and Sag (2000) following Pollard and Sag (1994), chap 9, and Sag (1997) in abandoning lexical rules. Ginzburg and Sag (2000) have no empty categories and eliminate lexical rules. Instead, they suggest that overt arguments can be locally realised through the relation between a head and its valences whereas unexpressed arguments cannot. As observed in section 1.4, Ginzburg and Sag suggest that all overt signs have a SYNSEM value of type *canonical-synsem.* Ginzburg and Sag suggest another SYNSEM value of type *noncanonical-synsem* for unexpressed arguments. Ginzburg and Sag (2000) divide the type *noncanonical synsem* into two subtypes, *gap-synsem* (henceforth *gap-ss*) and *pro-synsem* (henceforth *pro-ss*). They suggest that unbounded dependency gaps in finite clauses are referred to as *gap-ss* while unexpressed subjects of non finite clauses, *PRO*, are referred to as *pro-ss*. The former will be considered in this section and the latter in the following section.
The constraint on the type *gap-ss* assigned to unbounded dependency gaps of finite clauses is the following:

(96) *gap-synsem* (Ginzburg and Sag 2000:176):

$$\textit{gap-ss} \rightarrow \begin{bmatrix} \text{LOC} & [1] \\ \text{SLASH} & \{[1]\} \end{bmatrix}$$

This constraint shows the way that argument realisation treats canonical and gap synsems differently, which is crucial. This constraint guarantees that the type *gap-ss* always take a nonempty SLASH specification as its value, and that the LOCAL value of *gap-ss* is token identical with its SLASH value whose set value is the single member, indicated by the tag [1]. This is the same as the internal structure of the trace in Pollard & Sag (1994), as in (88), in the sense that the LOCAL value and the SLASH value are the same thing in trace and in missing constituent. (96) does not

involve the INHERIT feature as Ginzburg and Sag (2000) propose the Generalised Head Feature Principle as in (59) in section 1.4 to do the work of the INHERIT feature. The difference between two is that traces only appear in complement position while *gap-ss* can be assigned to non overt subjects and non overt complements. Even if Ginzburg and Sag allow *gap-ss* in subject position, they still treat subjects differently from complements. That is, the SUBJ list is never empty whether there is a gap in subject position or not. When gaps are in subject position, the *gap*-ss assigned to subjects appears both the ARG-ST list of the verb and the SUBJ list of the verb. In contrast, when gaps are in object position, the *gap-ss* assigned to complements appears only the ARG-ST list of the verb but not the COMPS list of the verb. Ginzburg and Sag revise the Arguments Realisation Principle in (38) in section 1.3 to exclude *gap-synsem* arguments from a COMP list of verbs, as illustrated in (97):

(97) Argument Realisation Principle (ARP) (Ginzburg and Sag 2000:177):

$$word \rightarrow \left[\begin{array}{ll} \text{SS}|\text{LOC}|\text{CAT} & \left[\begin{array}{ll} \text{SUBJ} & [\text{A}] \\ \text{SPR} & [\text{B}] \\ \text{COMPS} & [\text{C}] \ominus \textit{list}\,(\textit{gap-ss}) \end{array}\right] \\ \text{ARG-ST} & [\text{A}] \oplus [\text{B}] \oplus [\text{C}] \end{array}\right]$$

The symbol $\ominus$ designates the relation of list difference. All arguments are present in the ARG-ST whether they are overt or not. The [COMPS $\ominus$ *list (gap-ss)*] specification means the COMPS list is empty when the complement is not overt. The specification for COMPS ensures that *gap-synsems* do not appear in the COMPS list. But the SUBJ feature does not have this specification. This means that the SUBJ list is not empty even if the subject is not overt. The *gap-synsem* is only present on ARG-ST lists in the word level but not on COMPS list at any level. Thus, the ARG-ST list of a word must contain a nonempty SLASH specification if it is not realised in the (SUBJ or) COMPS list. This contrast provides a basis for accounting for subject-object asymmetries in English, as discussed in section 3.4.

The ditransitive verb *give* with a non overt complement satisfying the Argument Realisation Principle in (97) can be illustrated in the following:

(98) What did you give Emma _____ ?

[1] [2] [3]

$$give \rightarrow \begin{bmatrix} \text{SUBJ} & \langle [1] \rangle \\ \text{COMPS} & \langle [2] \rangle \\ \text{ARG-ST} & \langle [1] \oplus [2] \oplus [3] \rangle \end{bmatrix}$$

The ARG-ST feature, the SUBJ feature, and the COMPS feature are in the verb *give.* The ditransitive verb *give* takes two complements, indicated with [2] and [3] in the ARG-ST list. One complement which is not overt is present in the ARG-ST list, indicated with [3], but not present in the COMP list.

Ginzburg and Sag's (2000) proposal that the SUBJ list is not empty whether the subject is overt or not can account for the grammaticality of the sentence (91) and (92). The finite VPs 'invited the man' in (91) and 'likes the man' in (92) cannot combine with an overt subject since *gap-ss* on the SUBJ list would clash with *canonical-ss* on the overt subject. The verb *invited* with a non overt subject in (91) satisfying the Argument Realisation Principle in (97) can be shown as follows:

(99) Who do you think [____ invited the man]?

[1] [2]

$$\begin{bmatrix} \text{SUBJ}\langle [1] \rangle \\ \text{COMPS}\langle [2] \rangle \\ \text{ARG-ST}\langle [1]\text{NP}[\textit{gap-ss}], [2]\text{NP} \rangle \end{bmatrix}$$

This proposal that the SUBJ list is not empty can also account for the ungrammaticality of the sentences containing the overt complementiser *that*, as in (90). (90) is ungrammatical as the complementizer like *that* selects a complement

with an empty SUBJ list. We will consider HPSG analyses of non extraction gaps in the following section.

3.5.2 HPSG analyses of non extraction gaps

As noted in the previous section, unbounded dependency gaps are assigned to *gap-ss* whereas unexpressed subjects in non-finite clauses are assigned to *pro-ss*. Sag (1997) following Pollard (1989) provides three characteristics of PRO. First, PRO is accusative. Thus it cannot appear as the SUBJ value of a finite verb. Second, PRO is coreferential with the subject in the main clause. But this is not always right given examples like 'I persuaded Kim PRO to go home', where PRO is coreferential with Kim. Third, PRO is assumed to be a reflexive, which is also discussed by Pollard and Sag (1994) and followed by Ginzburg and Sag (2000), as we saw in section 3.3. The constraint on *pro-ss* is formulated in (100):

(100) The constraint on *pro-ss* (Ginzburg and Sag 2000:59)

$$\textit{pro-ss} \rightarrow \begin{bmatrix} \text{HEAD}\,|\,\text{CASE}\ \textit{acc} \\ \text{CONT} \begin{bmatrix} \textit{reflexive} \\ \text{INDEX}\ \textit{ref} \end{bmatrix} \end{bmatrix}$$

Ginzburg and Sag suggest that unexpressed subject in non finite clauses, PRO, cannot have the SLASH feature instead it has a singleton SUBJ list containing *pro-ss*. This prevents from constructing a phrase like *Jo to meet*.

Another type of non extraction gap is *null-pronouns* in Korean, shown in (40-44). The *null-pronouns* cannot be assigned to *gap-ss*. Unexpressed arguments of finite clauses in (1-3) are assigned to *gap-ss* which involves a SLASH feature. This means that unexpressed arguments assigned to *gap-ss* appear in unbounded dependencies. However, null-pronouns do not appear in unbounded dependencies. The

null-pronouns cannot be assigned to *pro-ss* either. Because only unexpressed subjects in non finite clauses are assigned to *pro-ss*. The fact that *null-pronouns* are pronominals not reflexives, as illustrated in (47-49) and (50-53), respectively, predicts that they cannot be identified with *pro-ss*. Therefore, a new subtype of the type *noncanonical-synsem* is needed for those *null-pronouns* in finite clauses in Korean. Ginzburg and Sag (2000) point out that there might be other subtypes of *noncanonical synsem* in other languages different from *gap-ss* and *pro-ss*. We call a new subtype of *noncanonical synsem* for Korean null-pronouns *null-pronoun-synsem* (henceforth *null-pronoun-ss*). *Null-pronoun* needs the same account as ordinary pronouns, which can be formed as follows:

(101) The constraint on *null-pronoun-ss*:

$$\textit{null-pronoun-ss} \rightarrow \begin{bmatrix} \text{CATEGORY}|\text{HEAD} & \textit{noun} \\ \text{CONTENT} & \textit{pronoun} \end{bmatrix}$$

3.5.3 HPSG analyses of gaps in Korean

In section 3.4, we have assumed that Korean observes no such subject-object asymmetries in English. What we mean is that subjects do not differ from complements in ways that would justify treating them as the realization of a separate feature. Then, Korean might not need the distinction between subjects and objects as they behave in the same way. We propose that in Korean the SUBJ list is eliminated and both subjects and complements are all realised in the COMPS list. The idea that subjects maybe extra members of the COMPS list is not a new one. Borsley (1989, 1995) proposes it for Welsh and Pollard (1994) adopted it for German. Subjects are easy to identify even if the SUBJ feature is not used. The subject of a verb is the first element on the COMPS list. We suggest that the COMPS list include subjects in finite clauses and non finite clauses whether gaps are unbounded dependency gaps or *null-pronouns* as we argued that Korean observes no subject-object asymmetries

in finite clauses and non finite clauses in section 3.4. In Korean, the feature CASE is spelled out by various morphological rules, such as, nominative nouns have the suffixes *ka* or *i* and accusative nouns have the suffixes *ul* or *rul*. Thus, the clause with a non overt subject and the clause with a non overt object can be distinguished without problems.

We will now consider the realisation of unexpressed arguments. Korean does not need separate constraints on subject and objects unbounded dependency gaps since we assume that there is no subject and object asymmetry in Korean. The constraint on the type *gap-ss* in English, as in (96), will be applied to unexpressed subjects as well as unexpressed objects of finite clauses in Korean. As observed in section 3.5.1, Ginzburg and Sag (2000) propose that the SUBJ list is never empty even if subjects are not overt whereas the COMPS list is empty when complements are not overt in English. This is different from the subject extraction in Korean. Korean does not need such a contrast as we treat subjects just like complements. Thus, when subjects or complements are not overt, their COMPS list is empty. The *gap-ss* is realised only in the ARG-ST when arguments are not overt.

The situation is the same in *null-pronoun*s in Korean as we also treat subjects just like complements in finite clauses. Therefore, the *null-pronoun-ss* is assigned to non overt arguments in finite clauses and only realised in the ARG-ST list but not in the COMPS list.

Non overt subjects in non finite clauses assigned to *pro-ss* are also realised only in ARG-ST lists not COMPS lists. As we assumed in section 3.4, subjects and complements in non finite clauses also behave in the same way, thus the COMPS list can include subjects in non finite clauses just like in finite clause. We propose that unexpressed subjects in non-finite clauses do not appear in COMPS list. As all arguments are present in the ARG-ST list, unexpressed subjects in non-finite clauses is realised also in the ARG-ST list. Therefore, non-overt non-finite subjects in Korean are quite different from non-overt non-finite subjects in English, which do not just appear in ARG-ST lists but also in the SUBJ lists.

Having suggested that in Korean the COMPS list includes subjects, and that unbounded dependency gaps and non extraction gaps are only realised in the ARG-ST list but not in the COMPS list, we propose the Argument Realisation Principle for Korean which is quite different from that for English in (97). One possible Argument Realisation Principle for Korean would be the following:

(102) Argument Realisation Principle (ARP) for Korean:

$$\textit{verb} \rightarrow \left[\begin{array}{l} \text{SS}|\text{LOC}|\text{CAT}\left[\text{COMPS[B]} \ominus (\textit{gap-ss} \cup \textit{null-pronoun-ss} \cup \textit{pro-ss})\right] \\ \text{ARG-ST [B]} \end{array}\right]$$

This is a principle which deals with both unbounded dependency gaps and non extraction gaps, *null-pronouns* and PRO, in finite and non finite verbs. This rule guarantees that the COMPS list includes subjects. This rule also guarantees that non overt arguments, whether they are unbounded dependency gaps or non extraction gaps, are only realised in the ARG-ST list but not in the COMPS list.

The following lexical description can be proposed for the transitive verb *saranghanta* 'love':

(103) *saranghan-ta* 'love'

$$\left[\begin{array}{ll} \text{CAT} & \left[\begin{array}{l} \text{HEAD [STYPE } \textit{ta}\text{]} \\ \text{COMPS <[1]NP[CASE } \textit{nom}\text{], [2]NP[CASE } \textit{acc}\text{]>} \\ \text{ARG-ST<[1]NP,[2]NP>} \end{array}\right] \\ \text{CONT} & \left[\begin{array}{ll} \text{RELN} & \textit{love} \\ \text{LOVER} & [1] \\ \text{LOVED} & [2] \end{array}\right] \end{array}\right]$$

In section 2.3.1, we have proposed a new type STYPE for sentence types. The [STYPE *ta*] means that the sentence is a declarative since *ta* is a verb suffix for declaratives. The SUBJ list is eliminated and both the subject and the complement are realised in the COMPS list. The first member of the COMPS list is a NP with a nominative, that is, a subject, and the second member of the COMPS list is a NP with an accusative, that is, a complement. We treat the COMPS feature and the ARG-ST feature as being list valued in this thesis even though the word order in Korean is flexible. Gunji (1986) proposes that in Japanese whose word order is also flexible, the COMPS feature and the ARG-ST feature are set-valued. We will leave this matter open. The CONTENT value states the fact that the verb *saranghanta* 'love' makes reference to the love relation, and that the LOVER role of the love relation is filled by the referential index of the subject and the LOVED role of the love relation is filled by the referential index of the object.

The lexical description for the transitive verb *saranghanta* 'love' with a gap in complement position in a relative clause satisfying Argument Realisation Principle for Korean in (102) is illustrated as follows:

(104) *saranghan-ta* 'love'

$$\begin{bmatrix} \text{LOCAL} \begin{bmatrix} \text{CAT} \begin{bmatrix} \text{HEAD} \begin{bmatrix} \text{STYPE } \textit{nun} \\ \text{MOD } \text{N'}_{[3]} \end{bmatrix} \\ \text{COMPS } \langle [1]\text{NP}[\text{CASE } \textit{nom}] \rangle \\ \text{ARG-ST} \langle [1]\text{NP}, [2][\textit{gap-ss}] \rangle \end{bmatrix} \\ \text{CONT} \begin{bmatrix} \text{RELN } \textit{love} \\ \text{LOVER } [1] \\ \text{LOVED } [2] \end{bmatrix} \end{bmatrix} \\ \text{NONLOCAL} \mid \text{SLASH } \{\text{NP}_{[3]}\} \end{bmatrix}$$

The verb suffix for relative clauses *nun* is realised as the STYPE value. The COMPS value has only one member, the NP with a nominative. This means there is a gap in the complement position. Thus, *gap-ss* is assigned to the complement and only realised in the ARG-ST list. This is ensured by Argument Realisation Principle for Korean in (102). Pollard and Sag (1994) introduce the MODIFIED (MOD) feature to allow an adjunct to select its head. The MOD feature will be considered in detail in section 4.4. The SLASH value is a single set which is coindexed with the MOD value of the relative clause. The love relation of the CONTENT value is the same as (103).

We will consider extraction gaps. The following lexical description can be proposed for the verb *saranghanta* 'love' with a gap in the subject position in a relative clause as in (7):

(105) *saranghan-ta* 'love'

$$\begin{bmatrix} \text{LOCAL} \begin{bmatrix} \text{CAT} \begin{bmatrix} \text{HEAD} \begin{bmatrix} \text{STYPE } \textit{nun} \\ \text{MOD } \text{N'}_{[3]} \end{bmatrix} \\ \text{COMPS } \langle [2]\text{NP}[\text{CASE } \textit{acc}] \rangle \\ \text{ARG-ST} \langle [1][\textit{gap-ss}], [2]\text{NP} \rangle \end{bmatrix} \\ \text{CONT} \begin{bmatrix} \text{RELN } \textit{love} \\ \text{LOVER } [1] \\ \text{LOVED } [2] \end{bmatrix} \end{bmatrix} \\ \text{NONLOCAL} \mid \text{SLASH } \{\text{NP}_{[3]}\} \end{bmatrix}$$

The COMPS list has just one member, the NP with an accusative. This means there is a gap in the subject position. The *gap-ss* is assigned to the subject and realised only in the ARG-ST list not in the COMP list. The rest is the same as (104).

We will now consider non extraction gaps, *null-pronouns*. The lexical description for the verb *saranghanta* 'love' with a *null-pronoun* in object position is shown in (106):

(106) *saranghan-ta* 'love'

$$\begin{bmatrix} \text{CAT} & \begin{bmatrix} \text{HEAD} & [\text{STYPE } \textit{ta}\,] \\ \text{COMPS} & \langle [1]\text{NP}[\text{CASE } \textit{nom}]\rangle \\ \text{ARG-ST} & \langle [1]\text{NP}, [2][\textit{null-pronoun-ss}]\rangle \end{bmatrix} \\ \text{CONT} & \begin{bmatrix} \text{RELN} & \textit{love} \\ \text{LOVER} & [1] \\ \text{LOVED} & [2] \end{bmatrix} \end{bmatrix}$$

In (106) there is a gap in the complement position. Thus, *null-pronoun-ss* is assigned to the complement and only realised in the ARG-ST list. This is guaranteed by the Argument Realisation Principle for Korean in (102). The love relation of the CONTENT feature is the same in (103).

The lexical description for the verb *saranghanta* with *null-pronouns* in subject and object position is shown in (107):

(107) *saranghan-ta* 'love'

$$\begin{bmatrix} \text{CAT} & \begin{bmatrix} \text{HEAD} & [\text{STYPE } \textit{ta}\,] \\ \text{COMPS} & \langle\rangle \\ \text{ARG-ST} & \langle [1][\textit{null-pronoun-ss}]\rangle, [2][\textit{null-pronoun-ss}]\rangle \end{bmatrix} \\ \text{CONT} & \begin{bmatrix} \text{RELN} & \textit{love} \\ \text{LOVER} & [1] \\ \text{LOVED} & [2] \end{bmatrix} \end{bmatrix}$$

The COMPS list is empty as both arguments are not overt. Thus *null-pronoun-ss* is assigned to the subject and the complements and realised only in the ARG-ST list. The rest is the same as (106).

We will now consider unexpressed subjects in non finite clauses, PRO. As we observed in the previous section, PRO is assumed to be an accusative in the SUBJ list in English. Both the subject's case and the complement's case contain suffixes for accusative. This is not a problem as a subject precedes an object in the ARG-ST list, as illustrated in (108):

(108) ARG-ST<[1][*pro-ss* [CASE *acc*]], [2]NP[CASE *acc*]>

The local value of (33) satisfying our proposal can be formulated as follows:

(109) *manaryeoko* 'meet'

$$\begin{bmatrix} \text{HEAD [STYPE } \textit{nonfin}\text{]} \\ \text{COMPS <[2]NP[CASE } \textit{acc}\text{] >} \\ \text{ARG<[1][}\textit{pro-ss}\text{[CASE } \textit{acc}\text{]], [2]NP[CASE } \textit{acc}\text{]>} \end{bmatrix}$$

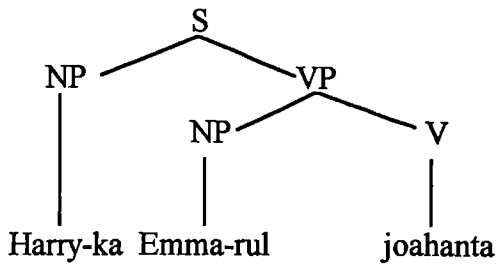
As we saw in section 3.5.2, Ginzburg and Sag suggest that unexpressed subjects in non finite clauses, PRO, have a singleton SUBJ list containing *pro-ss*. This prevents from constructing a phrase like *Jo to meet*. As we proposed earlier, non-overt subjects in a non finite clause appear in ARG-ST lists but not in COMPS lists. This is not a problem as the non finite sentence type is realised in the STYPE feature.

In the Ginzburg and Sag's (2000) classification of phrases, the type *head-valence-phrases* includes *head-subj-phrases* and *head-comp-phrases*. Complements are sisters of the lexical head, verbs, but subjects are not. English objects are consumed already guaranteed by the Empty COMPS constraint (ECC) in (57) in section 1.4. This means that complements are more deeply embedded than

subjects, specifiers, or fillers in headed phrases. If this were applied to Korean, the tree diagram for (110) would be (111):

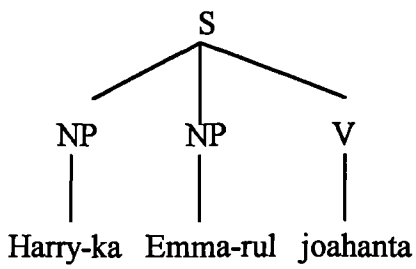
(110) Harry-ka Emma-rul johanta.
Nom Acc like
'Harry likes Emma.'

(111)



As we have assumed that Korean does not observe subject-object asymmetries, subjects are not distinguished from complements in Korean whereas they are in English. Therefore, they should not be distinguished either featurally or structurally. It follows that in Korean there is no need to distinguish between *head-subj-phrases* and *head-complement phrases*. The type *head-comp-phrases* includes the type *head-subj-phrases*. Thus, a clause satisfying this idea can be illustrated in the following tree diagram:

(112)

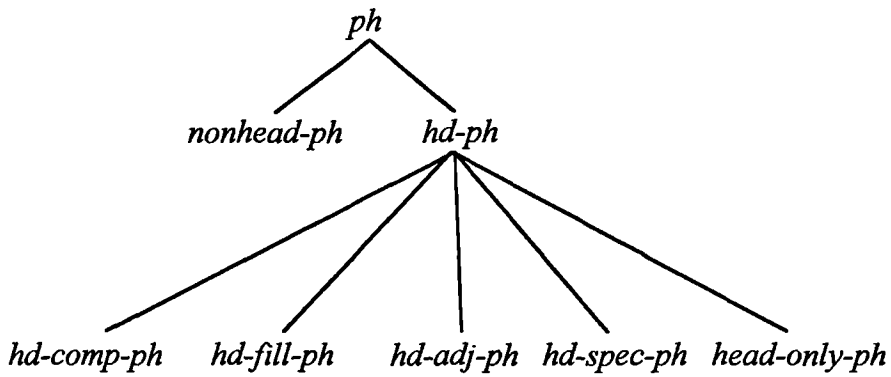


In (112), the verb *joahanta* takes two complements, the subject and the object. This is not a problem. As seen in section 1.4, a lexical head can select more than one complement. That is, a head-complement-phrase allows more than one non-head

daughter. This is guaranteed by the constraint on head-complement-phrases in (62) in section 1.4.

We have suggested that in Korean the type *head-complement-phrases* include subject. We do not need separate head-complement-phrases and head-subject-phrases since subjects and complements behave in the same ways. When we apply Ginzburg and Sag's multiple inheritance hierarchies to Korean, there would not be *head-subject-phrase, subject-auxiliary-inversion-phrase.* A possible version might be the following:

(113)



This hierarchy shows Korean head phrases has less subtypes of the type *head-phrase*. Thus, we assume that the structure of Korean head phrases is simpler than that of English phrases.

3.6 Conclusion

Both Pollard and Sag (1994) and Ginzburg and Sag (2000) treat subject unbounded dependency gaps quite differently from object unbounded dependency gaps in order to capture the observed differences. There are no such differences in Korean, and hence no need for different analyses. We have argued that Korean does not observe

subject-object asymmetries whether subjects and objects are gaps or contain gaps, and whether gaps are unbounded dependency gaps or *null-pronouns.* We have proposed a unified analysis for both unbounded dependency gaps and non extraction gaps. The COMPS list includes subjects and non overt arguments whether they are subjects or complements are only realised in the ARG-ST list but not in the COMPS list.

Chapter 4

Relative Clause Constructions

4.1 Introduction

In Korean, it has been observed that there are two kinds of relative clauses, that is, externally headed relative clauses and internally headed relative clauses. Externally headed relative clauses consist of a relative clause involving a gap and an external head that the relative clause modifies. Internally headed relative clauses are clauses with a nominal constituent in the position where a gap appears in the translation. Externally headed relative clauses will be examined in this Chapter while Internally-headed relative clauses will be investigated in Chapter 5. In this chapter, we will use the term 'relative clauses' meaning externally-headed relative clauses but in Chapter 5 we will use the terms externally-headed relative clauses and internally-headed relative clauses. Korean externally-headed relative clauses are interesting because they suggest that Korean has genuine unbounded dependencies which one might doubt looking at topicalisation and *wh*-interrogatives. As noted in section 2.5, we will not include *wh*-interrogatives in our discussion, as they are not unbounded dependency constructions of the kind discussed by Pollard and Sag (1994). Topicalisation will be considered in detail in Chapter 6. In section 4.2.1 and 4.2.2, we will examine the difference between Korean relative clause constructions and their English counterparts. We will look at some evidence for the unbounded dependency analysis in section 4.2.2. Extraction from relative clauses will be discussed in section 4.2.3. In section 4.3, the formation of relativisation is discussed within Keenan and Comrie's Accessibility Hierarchy (1997). In section 4.4, we will deal with HPSG analyses of English relative clause constructions. In section 4.4.1, Pollard and Sag's (1994) analysis involving a trace will be considered and in section 4.4.2, Sag (1997) and Ginzburg and Sag (2000)'s traceless analyses will be

discussed. In section 4.5 we will investigate HPSG analysis of Korean relative clause constructions.

4.2 The differences between Korean and English relative clauses

Before we go into the detail about the differences between Korean and English relative clauses, we will consider two main types of relatives, that is, prenominal relatives and postnominal relatives. It has been generally assumed that relative clauses are adjoined to the head NP. (Keenan and Comrie 1977, Keenan 1985) According to Downing (1978), the configuration of Prenominal relatives is [....S....]NP, where S is a relative clause and the included NP is the head or modified nominal, whereas Postnominal relatives occur in the position S in the configuration NP[....S...]. Thus, there are two rules in relative clauses with respect to the word order, that is, [...S...]NP for Prenominal relatives and NP[...S...] for Postnominal relatives. Downing (1978) generalised the relationship between the word order and relative pronouns. Postnominal relatives are usually found in SVO languages, such as English. For instance, in English, relative pronouns, namely, *who, whom, which, when, where, why* and *whose*, exist. On the other hand, Prenominal relatives are usually found in SOV languages, such as Korean and Japanese. For instance, in Korean, relative pronouns do not exist, instead the verb suffixes for relatives exists. Therefore, there are two important differences between English relatives and Korean relatives. One is the position of the relative with respect to the head. The other is that there are relative pronouns in English and there are verbal markings in Korean.

4.2.1 English Relative Clauses

In English, there are three kinds of relative clauses, that is, *wh*-relative clauses, *that*-relative clauses and relative clauses which contains neither *wh*-relative phrase nor *that*, called Zero Relative clauses. (Radford 1988) *Wh*-relative clauses are again

divided into two types: nonsubject *wh*-relative clauses and subject *wh*-relative clauses. Both types of relative clauses may contain relative pronouns, as illustrated in (1-2):

(1) The man [(who) Emma likes ____] (nonsubject *wh*-relative)
(2) The man [who ____ likes Emma] (subject *wh*-relative)

In (1), the verb *like* takes two arguments since it is a two place predicate. The subject *Emma* is present whereas the object is not present. In (2), the object is present while the subject is not present. The difference between nonsubject *wh*-relative clauses, as in (1), and subject *wh*-relative clauses, as in (2), is that, in the former, relative pronouns can be omitted while, in the latter, they cannot. The situation is the same in *that*-relative clauses, as the following:

(3) The man [(that) Emma likes _____] (*that*-relative)
(4) The man [that ____ likes swimming] (*that*-relative)

That in (3) has been considered as a complementiser. However, Hudson (1990) cites Van der Auwera's (1985) assumption that *that* in *that*-relative clauses is a relative pronoun. He treats *that* in *that*-relative clauses as a *wh*-relative word in *wh*-relative clauses. Therefore, there are no separate types of *that*-relative clauses. They are *wh*-relative clauses of the kind mentioned above. His view is adopted in the more recent versions of HPSG (Sag 97, Ginzburg and Sag 2000). Since *that*-relative clauses are treated as *wh*-relative clauses, English relative clauses will be either *wh*-relative clauses or zero relative clauses. Zero relative clauses involve gaps but do not involve gaps in the topmost subject position, as shown in (5) and (6), respectively:

(5) The man [Emma likes _____] (zero relative)
(6) The man *(who/that) [____ likes Emma]

In (5), a gap is in object position. When the gap is in subject position, it is not acceptable as a zero relative clause, as in (6). Thus, gaps in object position is allowed whereas gaps in subject position is not allowed in zero relative clauses. This is a piece of evidence of subject-object asymmetries in English, as discussed in section 3.4.

The structure of *wh-* relative clauses is similar to that of indirect questions, as in the following examples:

(7) Sally asked [who*i* Emma likes ____*i*].

(8) Sally is indifferent to the man [who*i* Emma likes ____*i*].

The indirect question *who Emma likes* in (7) and the relative clause *who Emma likes* in (8) are identical.

Relative clauses in English are unbounded dependency constructions as they meet the conditions for unbounded dependency constructions as shown in section 1.5. First, the local properties of the gaps are identical with those of the *wh*-pronouns. The wh-pronouns and the gaps construct a filler-gap construction, as given in (9-12):

(9) The woman [to whom]*i* Harry talked ____*i*

(10) *The woman whom*i* Harry talked ____*i*

(11) The woman whom*i* Harry phoned ____*i*

(12) *The woman [to whom]*i* Harry phoned ____*i*

In (9), the gap is in the complement position of the verb *talk*, which requires a PP. In (11), the gap is in the complement position of the verb *phone*, which requires a NP. (10) and (12) are ungrammatical as the gap and the filler do not have the same syntactic categories.

Second, the dependency between *wh*-relative pronouns and gaps is unbounded. Gaps in relative clauses can be deeply embedded but relative pronouns are next to the head NPs. This is illustrated in (13-15):

(13) The woman [whom*i* [Harry talked to ____*i*]].
(14) The woman [whom*i* [I thinks [Harry talked to ____*i*]]].
(15) The woman [whom*i* [[Jane believes [I thinks [Harry talked to ____*i*]]]].

In (13), the gap is an argument of the highest clause. In (14), the gap is an argument in an embedded clause. In (15), the gap is an argument of a deeply embedded complement clause. The situation is the same when relative pronouns are with prepositional phrases. Relative pronouns with prepositional phrases are next to the head NPs just like relative pronouns without prepositional phrases, as shown in (13-15). This is illustrated as follows:

(16) The woman [[to whom]*i* Harry talked ____ *i*].
(17) The woman [[to whom]*i* I thinks Harry talked ____*i*].
(18) The woman [[to whom]*i* Jane believes I thinks Harry talked ____*i*].

(16-18) shows that relative pronouns with prepositions gaps are next to the head NPs when gaps are embedded deeply.

4.2.2 Korean Relative Clauses

Korean relative clause constructions are not a filler-gap construction but they are an unbounded dependency construction. As we saw in section 4.2.1, English relative clause constructions are a filler-gap construction and a filler is a relative pronoun. However, relative pronouns do not exist in Korean. (Cho and Sells 1995, Lee 1993, and Sells 1995). Thus, Korean relative clause cannot be a filler-gap construction. But relative clauses in Korean are still unbounded dependency constructions in two

reasons. First, the dependency between head noun and gap is unbounded. Gaps in relative clauses can be deeply embedded. This is illustrated in (19-21):

(19) [Harry-ka _____*i* joaha-nun] yeoja*i*
Nom like woman
'the woman who(m) Harry likes'

(20) [Jo-ka [Harry-ka _____*i* joahanta-ko] sengkakha-nun] yeoja*i*
Nom Nom like comp think woman
'the woman who(m) Jo thinks Harry likes'

(21) [Emma-ka [Jo-ka [Harry-ka ____*i* joahanta-ko] sengkakhanta-ko]
Nom Nom Nom like comp think
mit -nun] yeoja*i*
believe woman
'the woman who(m) Emma believes Jo thinks Harry likes'

(19) is a relative. In (20) the gap is embedded in the subordinate clause. In (21) the gap is in the deeply embedded subordinate clause.
Second, the gaps and the head nouns share some local properties. In (20) and (21) the index value of the head nouns are identical with that of the gaps. The head noun agrees in person, number and gender with the gap. This allows the case of the gap to differ from that of the head noun. For these reasons, it follows that Korean relative clauses are unbounded dependency constructions.

We will now consider the difference between Korean relative clause constructions and their English counterparts. The first difference is that relative pronouns do not exist, as noted earlier this section. Keenan and Comrie (1977) suggested that a relative pronoun, namely, *-ui* exists in Korean. However, *ui* is not a relative pronoun in two ways: first, the possessive *ui* can exist without a relative clause. In addition, *ui*

has been analysed as a Genitive Case Marker. (Cho and Sells 1995) This is illustrated as follows:

(22) Sally-ui chinku-ka isakass-ta
Sally Gen friend Nom moved.
'A friend of Sally's moved.'

In (22), the possessive *ui* exists without relative clauses, and plays the role of Genitive Case Marker, thus, *ui* cannot be a relative pronoun. Second, the possessive *ui* is omitted when the NP *Sally* is relativized, as illustrated in (23):

(23) [chinku-ka isaka-n] Sally
friend Nom move
'Sally whose friend moved'

Therefore, relative pronouns do not exist in Korean. Instead, a verb in a relative clause is marked by the suffix *nun* for the present tense, as shown in (24):

(24) [Emma-ka ____ joaha-*nun*] namja
Nom like REL man
'the man Emma likes'
: REL stands for relatives

Some researchers argue that the verb particle *nun* is a complementiser but others assume that *nun* is only a suffix. Note that we have adapted Sells' argument of case particles being merely suffixes in section 2.3.2. We will consider the verb suffix *nun* in detail in the following section.

The second difference is that subject gaps in relative clauses behave in the same way as object in relative clauses in Korean. Note that we assume that Korean does not observe subject-object asymmetries in section 3.4. Thus, the difference between

relative clauses with complement gap, as in (24), and relative clauses with subject gap, as in (25), is merely the gap position:

(25) [_____ Emma-rul joaha-nun] namja
Acc like REL man
'the man (who) likes Emma'

The third difference is that the structure of indirect questions is not similar to that of relative clauses. This is illustrated in the following:

(26) Harry-ka [[Sally-ka _____ saranghan-un] namja]-rul anta.
Nom Nom love REL man Acc know
'Harry knows the man who Sally loves.'

(27) Harry-ka [Sally-ka nugu-ul sarangha-nunji] anta.
Nom Nom who Acc love comp know
'Harry knows who Sally loves.'

As seen in (7) and (8), in English, the structures of the relative clause and that of the indirect question are identical. However, in Korean, the relative clause *Sally-ga saranghanun* in (26) and the indirect question *Sally-ga nugu-ul saranghanunji* in (27) are dissimilar in two ways. Firstly, the verb suffix of relative clauses is different from that of indirect questions. In (26), the suffix *-nun* is used for relative clauses, whereas in (27), the suffix *-unji* is used for indirect questions. Secondly, relative clauses do not contain *wh*-relative pronouns while indirect questions contain *wh*-words which remain *in situ*. The indirect question (27) is similar to the *wh*-question except the verb endings, as shown in (28):

(28) Sally-ka nugu-ul sarangha-ni?
Nom who Acc love Qu
'Who loves Sally?'

The verb ending of the *wh*-question in (28) is *ni* while the verb ending of the indirect question in (27) is *unji*.

The fourth difference is that, in Korean, Internally-Headed-Relative-Clauses exist. We will investigate Internally-Headed-Relative-Clauses in detail in Chapter 5. The verb suffix *nun* for relative clauses will be considered in the following section.

4.2.2.1 The verb suffix *nun* in relative clauses

As explained in section 2.3.1, verb suffixes are important since they encode tense and sentence type. For instance, the suffix for declarative *ta*, the suffix for interrogative *ni*, the suffix for present tense *-n*, the suffix for past tense *-ss* and the suffix for future tense *-lkui* are attached to the stem of verbs. The order of those suffixes being that the verb stem is followed by tense, and sentence type always comes at the end of verbs, that is, *stem - tense - sentence type*, as in figure 4.1:

verb root	*ka*-ta (go)		*bo*-ta (see)	
sentence type	declarative	interrogative	declarative	interrogative
present tense	ka-*n-ta*	ka-*n-ni*	bo-*n-ta*	bo-*n-ni*
past tense	ka-*ss-ta*	ka-*ss-ni*	bo-*ass-ta*	bo-*ass-ni*
future tense	ka-*lku-ta*	ka-*lku-ni*	bo-*lku-ta*	bo-*lku-ni*

Figure 4.1. Morphological changes on verbs in declaratives and interrogatives

In declaratives, verbs always have both a verb stem and a suffix for declaratives *ta*. A declarative with a past tense appears in the following:

(29) Sally-ga younghwa-rul [*bo* -ass -ta.]
Nom movie Acc the stem of the verb *see* Past Delarative
'Sally saw a movie.'

In (29) the verb *bo-ass-ta* consists of the stem of the verb *bo*, the past tense suffix *–ass* and the declarative suffix *ta*. The following is an interrogative with a future tense:

(30) Sally-ga younghwa-rul [*bo -lku -ni*?]
Nom movie Acc *see* Future Question
'Will Sally see the movie?'

In (30), the verb *bo-lku-ni* contains the stem of the verb *bo* followed by the future tense suffix *–lku* and the interrogative suffix *-ni*.

Relative clauses are not an exception. Verbs in relative clauses also encode tense and sentence type information. The suffix *nun* (*un* after consonants) for relatives is attached to the stem of the verbs. The difference between verb suffixes of declaratives/interrogatives and that of relative clauses is that, in the former, the suffixes for the tense and the sentence types exist separately while, in the latter, they are combined. The following shows the morphological changes in verbs within relative clauses:

Verb root	ka-ta	mana-ta	bo-ta
present tense	*ka*-nun	*mana*-nun	*bo*-nun
past tense	*ka*-n	*mana*-n	*bo*-n
future tense	*ka*-l	*mana*-l	*bo*-l

Figure 4.2. Morphological changes in verbs within relative clauses

Let us compare the verb forms of relative clauses in Figure 4.2 with those of declaratives and interrogatives in Figure 4.1. The verb form of the past tense relative clause *bo-nun* in figure 4.2 and the verb form of the past tense declarative/interrogative *bo-ass-ta/ni* in figure 4.1 are illustrated below:

(31) a. bo -n
the stem of the verb *see* past tense relative clause form
b. bo -ass -ta/ -ni
the stem of the verb *see* past tense De/ Qu

In (31.a), the suffixes for past tense and relative clause are combined as *–n* while in (31.b) the suffixes for past tense and declaratives/interrogatives are separated as *–ass* and *-ta/-ni*, respectively. The verb form of the future tense relative clause *bo-l* in figure 4.2 also combines the suffixes for tense and relative clauses, while the verb form of the past tense declarative and interrogative *bo-ass-ta* and *bo-ass-ni* in figure 4.1 have two separate suffixes for tense and declaratives/interrogative, as illustrated below:

(32) a. bo -l
the stem of the verb *see* future tense relative clause form
b. bo -lku -ta/ -ni
the stem of the verb *see* future tense De/ Qu

In (32.a), the suffixes for future tense and relative clauses are combined as *–l* while in (32.b) the suffixes for future tense and declaratives/interrogatives are separated as *–lku* and *-ta/-ni*, respectively. Let us next compare relative clauses and declaratives within sentences. A present tense relative clause appears as a subordinate clause, as in the following:

(33) Emma-ka [[Sally-ga ____ bo-nun] younghwa]-rul chucheonhanta.
Nom Nom see Pre.REL movie Acc recommend
'Emma recommends the movie that Sally sees.'

As shown in figure 4.2, the present form of the verb *bonun* in the embedded clause consists of the stem *bo* and the present form of the relative suffix – *nun.* Thus, the embedded clause *sally-ga bo-nun* is a present relative clause. The verb *chucheonhanta* in the matrix clause contains the present form of the verb *chucheonhan* and the suffix for the interrogative *ta.* Thus the matrix clause is a present declarative clause. The following example contains a past tense relative clause as a subordinate clause:

(34) Emma-ka [[Sally-ga ____ bo -n] younghwa]-rul chucheonhessta.
Nom Nom see PST.REL movie Acc recommend
'Emma recommended the movie that Sally saw.'

The verb *bon* in (34) consists of the stem *bo* 'see' and the past suffix *-n* for relatives; thus, the verb in the relative clause is in the past tense. The following example contains a future tense relative clause as a subordinate clause:

(35) Emma-ka [[Sally-ga ____ bo -l] younghwa]-rul chucheonhanta.
Nom Nom see FutREL movie Acc recommend
'Emma recommends the movie that Sally will see.'

In (35) the verb *bol* contains the stem *bo* and the future suffix *-l* for relatives; thus, the verb in the relative clause is in the future tense.

It has suggested that *nun* for relatives is a complementizer. (Kwon 1985 and Beck and Kim 1996) The fact that the tense and the sentence types are combined in *nun* might be a piece of evidence against the idea that Korean has a relative

complementizer. We have adopted Sells' proposal that inflectional particles are merely suffixes in section 2.3.2. Therefore, we assume that *nun* is a suffix.

As noted earlier, no relative pronoun exists in Korean. We assume that the suffix for relative clauses *nun* plays the role of relative pronouns in two ways. Firstly, like a relative pronoun in English, *nun* identifies the clause containing *nun* as a relative clause. The relative suffix *nun* includes the tense and sentence type information. But, the verb suffix *nun* in other occasions does not include the tense information. Other occasions where the verb suffix *nun* is used will be considered in the following section. Secondly, the relative suffix *nun* appears always in the highest verbs. *Nun* is placed next to the head noun when gaps in relative clauses are deeply embedded, as illustrated in (19-21). In (20) the gap is embedded in the subordinate clause and the relative suffix *nun* is in the higher verb next to the head noun *yeoja* 'woman'. In (21) the gap is in the deeply embedded subordinate clause and the relative suffix *nun* is in the highest verb next to the head noun. This is similar to English relative clauses in the way that the relative pronoun is next to the head NP and the gap can be deeply embedded, as shown (11-13). This similarity between English relatives and Korean relatives suggests that like a relative pronoun in English, the relative suffix *nun* identifies the clause as a relative. Thus, the relative clause which contains the verb suffix *nun* modifies an N' that heads relative clauses. The difference is that English doesn't always have a relative pronoun whereas Korean always has a distinctive verb. We will consider the suffix *nun* in other clauses in the following section.

4.2.2.2 The suffix *nun* in other clauses

The suffix *nun* can appear in other situations. For example, it appears as a topic suffix which will be discussed in Chapter 6. The suffix *nun* in relative clauses and *nun* in topic clauses are different in the way that *nun* in relative clauses is attached to verbs while *nun* in topic clauses is attached to nouns. This is illustrated in (36) and (37), respectively:

(36) [.....V-nun] N (the suffix *nun* in a relative clause)

(37) N-nun [.....] (the suffix *nun* in a topic clause)

Apart from having the same form *nun*, there is no relation between two suffixes *nun*. They just happen to have the same form. This is rather like English with a plural suffix and a third person singular present tense verbal suffix which happen to be the same form, as shown in (38) and (39):

(38) a. singer (singular) - singers (plural noun)

b. know (1^{st}, 2^{nd}, plural) - knows (3^{rd} person singular present tense verb)

(39) a. Emma like*s* Harry

b. The singer*s* went fishing.

One is a noun form and the other is a verb form. There is no relation between two forms except the suffix *s*. To distinguish the suffix *nun* in topic clauses from the suffix *nun* in relative clauses, we will call the former the *nun*-marked NPs and the latter the relative *nun*.

The suffix *nun* can also appear in a nominalised clause, as illustrated in (40):

(40) [[Emma-ka nore-rul jal-purunta-nun] kus]-i Harry-rul nolakehanta.
Nom song Acc well sing Nom Acc surprise
'That Emma sings well surprises Harry.'

The nominalised clause *Emma-ka nore-rul japurunta-nun kus* consists of the clause *Emma-ka nore-rul jalpurunta-nun* and the nominaliser *kus*. The suffix *nun* is required to connect the verb and the nominaliser *kus* when a clause is nominalised. We will again consider the nominaliser *kus* when we investigate internally-headed relative clauses in Chapter 5.

The verb suffix *nun* appears in sentential complement of nouns which usually include NPs containing a relative clause. The difference between sentential complement of nouns and relative clauses is in the former gaps do not exist while in the latter they do. Sentential complement of nouns will again be discussed in the following section. The suffix *nun* which appears in sentential complements of nouns is shown in (41):

(41) Sally-ka [[Harry-ka sung -ul sassta -nun] somun] -ul tulessta.
Nom Nom castle Acc bought rumour Acc heard
'Sally heard the rumour that Harry bought a castle.'

One difference between relatives and sentential complement of nouns is that, unlike the relative suffix *nun*, the suffix *nun* in sentential complement of nouns does not contain tense information. In contrast, as illustrated in (33-35), the relative suffix *nun* does contain tense information. Another difference between relatives and sentential complement of nouns is the former is not an independent clause without the suffix *nun* while the latter is. Independent clauses must have a declarative suffix, such as, *ta* or an interrogative suffix, such as, *ni*. Sentential complement of nouns such as (41) without the suffix *nun* is an independent clause, as illustrated in (42):

(42) [Harry-ka sung -ul sass-ta.]
Nom castle Acc like De
'Harry bought a castle.'

The following examples show that relatives cannot occur as independent clauses without head nouns:

(43) a. [Sally-ga ____ bo -nun] younghwa
Nom see Pre.REL movie
'The movie that Sally sees is boring.'

(43) b. *Sally-ga _____ bo -nun
Nom see Pre.REL

(43.a) is a relative clause with present tense. (43.b) is ungrammatical since the relative clause without the head noun cannot be an independent clause. If the suffixes for declarative or interrogative sentences are added to the relative clause without the head noun, the sentence would still be ungrammatical, as shown in (44.a) and (44.b):

(44) a. *Sally-ka _____ bo -nun -ta.
Nom see Pre.REL De
b. *Sally-ka _____ bo -nun -ni?
Nom see Pre.REL Qu

Nevertheless, the sentence would be grammatical if the suffix for relative clause is replaced by the suffix for tense and the suffix for sentence type, as illustrated in (45.a) and (45.b), respectively:

(45) a. Sally-ka _____ bo -n -ta.
Nom see Prs. De
'Sally sees something in discourse.'
b. Sally-ka _____ bo -n -ni?
Nom see Prs Q
'Does Sally see something in discourse?'

Both sentences in (45) are independent clauses.

This is also a difference between the relative suffix *nun* and the general subordinating suffix. The following shows that a subordinate clause can be an independent clause without a subordinating suffix *ko*:

(46) a. Sophie-ka [Harry-ka Emma-ul joahanta]-ko sengkakhanta.
Nom Nom Acc like comp think
'Sophie thinks Harry likes Emma.'
b. [Harry-ka Emma-rul joahanta.]
Nom Acc like
'Harry likes Emma.'

As we saw in (41), in other subordinate clauses, such as sentential complement of nouns, subordinate clauses without the subordinate suffix *nun* can also form an independent clause.

In much the same way as with relative clauses, some subordinate clauses, for instance the *nunji*-clauses cannot be independent clauses without main clauses. The suffix *nunji* (after consonants *–unji*) is a suffix for indirect questions and is interpreted as *whether* in English, as shown in (47):

(47) a. Sally-ka [Harry-ka Emma-rul joaha-nunji] kungkumhata.
Nom Nom Acc like whether wonder
'Sally wonders whether Harry likes Emma.'
b. *Harry-ka Emma-rul joaha-nunji

(47.a) is a clause in which a *nunji*-clause is embedded. (47.b) shows that the *nunji*-clause cannot be an independent clause as its own. The difference between two interrogative suffixes *ni* and *nunji* is that *ni* appears at the end of the sentence while *nunji* appears in an embedded interrogative. When the suffix *nunji* is replaced by the interrogative suffix *ni*, (47.b) becomes an independent clause, as illustrated in (48):

(48) Harry-ka Emma-rul joaha-ni?
Nom Acc like Qu
'Does Harry like Emma?'

The suffix *nunji* can be replaced by the declarative suffix *ta* to become an independent clause, as given in (49):

(49) Harry-ka Emma-rul joahan-ta.
Nom Acc like De
'Harry likes Emma.'

Thus, relative clauses with the verb suffixes *nun* and with the verb suffixes *nunji/unji* in the embedded interrogatives cannot be independent clauses without these verb suffixes. However, subordinate clauses with the verb suffix *ko* and sentential complement of nouns, except relative clauses, with the verb suffix *nun* can be independent clauses without these verb suffixes. We will consider extraction from relative clauses in the following section.

4.2.3 The Complex NP Constraint

We have considered the island constraints related to subjects and complements in Section 3.2. In English, subjects are islands while in Korean subjects are not islands. In this section, we will consider another island constraint related to relative clauses referred to as the complex NP constraint, the constraint on the extraction of elements from sentential complement of nouns, the so-called complex NPs. We will continue to use the term 'sentential complement of nouns' rather than 'complex NPs'. As observed in section 4.2.2.2, sentential complement of nouns are NPs whose head nouns take sentences as their complements and includes 'NP's containing a relative clause. Ross (1967) proposes that a sentential complement of nouns is an island so that no element can be extracted from them. Ross suggests a constraint on sentential complement of nouns, as illustrated in the following:

(50) The Complex NP Constraint (CNPC) (Ross 1967):
No element contained in a sentence dominated by a noun phrase may be moved out of that noun phrase.

English observes the complex NP Constraint. As seen in section 3.2, the object extraction is allowed in English, as in (51) and (52):

(51) Who did [you meet ____ yesterday]?
(52) Who did Emma think [you met ____ yesterday]?

However, the object cannot be extracted from certain situations, such as, a sentential complement of nouns, as it is seen in (53):

(53) *Who did Emma make [the claim [you met ____ yesterday]]?

(53) is ungrammatical as the complement is extracted from inside a sentential complement of nouns.

The extraction from inside a relative clause will also violate the Complex NP Constraint as relative clauses are the parts of sentential complement of nouns, as shown in (54) and (55):

(54) *Which man*j* did you find a letter*i* [Emma gave ___*i* to ___*j*]]?
(55) *Which book*i* did you know the man*j* [who*j* [Emma gave ___*i* to ___*j*]]?

Therefore, sentential complement of nouns are islands as English observes the Complex NP Constraint.

However, it has been debated whether Korean allows the extraction from a sentential complement of noun. Some researchers suggest that the extraction from a sentential complement of noun is possible in Korean, and that Korean does not observe the

Complex NP Constraint (Kang (1988) and Yang (1989) among many researchers). Some other researchers argue that the extraction from a sentential complement of noun is not possible in Korean, and that Korean observes the Complex NP Constraint just like English (Kuno 1973 and Sirai and Gunji 1998, Kim 1999, Kim and Park 2000).

The researchers who support the analysis of the violation of the Complex NP Constraint find a piece of evidence from so-called double relative clauses. A double relative is a relative inside another relative with two gaps in the lower relative, a gap in subject position and a gap in object position. The structure of double relative clauses is illustrated in (56):

(56) [[R2 [R1 ..... ___*i* ... ___*j* .... V-nun] NP*j* .....V-nun] NP*i*]
:R1 stands for the lower relative and R2 stands for the higher relative

The gap in the complement position is bound by the head noun of the lower relative. The gap in the subject position is bound by the head noun of the higher relative. This violates the Complex NP Constraint in (50). This is illustrated in the following:

(57) [[____*i* ____*j* sarangha-nun] yeoja*j* -ka juk-un] namja*i*
love REL woman Acc die REL man
'(lit) the man*i* who the woman who (___*i*) loves is dead'

(58) [[____*i* ____*j* sarangha-nun] yeoja*j* -ka pewoo-in] namja*i*
love REL woman Nom actor REL man
'(lit) the man who the woman who (___*i*) loves is an actress'

These show that the head noun of the lower relative *yeoja* 'woman' is bound by the missing constituent in complement position in the lower relative, and that the head noun of the higher relative *namja* 'man' is bound by the missing constituent in subject position in the lower relative. It seems that the relativisation of the head

noun *namja* 'man' from the lower relative violates the Complex NP Constraint but the clause is grammatical.

However, there are non-extraction analyses of double relative clause constructions suggested by Kim 1999, Kim and Park 2000, Kuno 1973 and Sirai and Gunji (1998). Kim and Park (2000) following Kim (1999) propose that Korean does not violate the Complex NP Constraint. The central idea of Kim and Park (2000)'s analysis is that the crucial gap is outside the relative clause. Kim and Park propose that the subject gap in the lower relative is not an unbounded dependency gap but a *pro* whereas the complement gap in the lower relative is an unbounded dependency gap. The latter is bound with the lower head noun. But a *pro* is related to the unbounded dependency gap in the non overt specifier of the higher relative, in turn this unbounded dependency gap in the non overt specifier of the higher relative is bound with the higher head noun. Therefore, neither gap in the lower relative violates the Complex NP Constraint. This is illustrated in (59):

(59) [es *i* [pro*i* ____*j* ssun] sosel*j*-i inki -ka iss -nun] cakka*i*
write novel Nom fame Nom exist REL writer
'writer*i* who the novel that ____*i* wrote was popular'
: *es* stands for empty specifier. (Kim and Park 2000:165)

In (59), a *pro* is in the lower relative and an empty specifier indicated as *es* is in the higher position. A *pro* in the lower relative is related to the unbounded dependency gap in an empty specifier of the higher relative which is bound with the higher head noun *cakka* 'writer'. The unbounded dependency gap in the complement position in the lower clause is bound with the lower head noun *sosel* 'novel'.

Kim and Park (2000) assume that a double relative clause as in (59) is closely related to a double nominative clause which contains two NPs marked by suffixes for Nominative. More information about double nominatives can be found in Kiss 1981, Im and Lee 1983, Doran and Heycock 1998. Kim and Park (2000) suggest that in double nominative constructions, the first nominative NP is a focused phrase

and an empty specifier exists between two nominatives NPs. They also suggest that the first nominative NP is identical with the non overt specifier, as illustrated in (60):

(60) [cakka*i*-ka] [es *i* [___ ___ ssun] sosel-i inki -ka iss -ta].
writer Nom write novel Nom fame Nom exist
'writer*i* who the novel that ___*i* wrote was popular'
: *es* stands for empty specifier. (Kim and Park 2000:165)

In (60) the first nominative *cakka* is a focused phrase and the specifier of the rest of the sentence *sosel-i inki-ka issta* is empty. The first nominative *cakka* is identical with the empty specifier, *es*. (59) is the relativisation of the first nominative *cakka* 'writer'.

Kim and Park suggest the fact that *pro* can be replaced by the pronoun or reflexive is a piece of evidence that the non overt subject in the lower relative is a *pro*. This is illustrated in (61):

(61) [___*i* [ku/caki*i* ____*j* ssun] sosel*j*-i inki -ka iss -nun] cakka*i*
he/self write novel Nom fame Nom exist REL writer
'writer*i* who the novel that ___*i* wrote was popular'
(Kim and Park 2000:166)

We adopt Kim and Park's analysis of a subject gap within the lowest relatives as a *pro* which is related to the unbounded dependency gap in the specifier of the higher relative, and that Korean does not violate the Complex NP Constraint.

In the following section, we will discuss the Accessibility Hierarchy proposed by Keenan and Comrie (1997).

4.3. Keenan and Comrie's Accessibility Hierarchy (1977)

Keenan and Comrie (1977) discuss the formation of relative clauses in fifty languages and present several generalisations concerning which NP positions can be relativised. They propose the Accessibility Hierarchy that determines universally the degree of accessibility to Relative Clause Formation. (62) shows that subjects can be relativised in all languages, while objects of comparison cannot be relativised in many languages, and therefore occur lower in the Accessibility Hierarchy.

(62) The Accessibility Hierarchy (Keenan and Comrie 1977, p.66)
SU > DO > IO > Obl > GEN > OCOMP

'>' means 'is more accessible than', and SU stands for subject, DO for direct object, IO for indirect object, OBL for major oblique case NP, GEN for genitive and OCOMP for object of comparison.

Keenan and Comrie (1977) also suggested that all languages have a primary strategy, that is, a relative clause-forming strategy in a language. The primary strategy in English with respect to the Accessibility Hierarchy is shown in (63):

(63) Primary Strategy in English (Keenan and Comrie 1977, p.75)
i) the restricting clause is placed to the right of the head NP.
ii) the pronoun is retained in all positions.
iii) Case is shown in IO, OBL, GEN, OCOMP
iv) Object of comparison can be relativised.

We will examine whether these Primary strategies are correct in English. The types of relative clauses with respect to the Accessibility Hierarchy are given in (64-69):

(64) SU (subject relatives)
The man [*who* ___ wears a pink tie] is an English professor.

(65) DO (direct object relatives)
Sally liked the nutcracker [*which* I gave her ____].

(66) IO (indirect object relatives)
Sally likes Jeremy [to *whom* I write letters ____].

(67) Obl (oblique relatives)
Sally made the chair [on *which* I sat ____].

(68) GEN (possessive relatives)
Sally loves the man [*whose* car is yellow].

(69) OCOMP (object of comparison relatives)
London is the city [*which* Liverpool is smaller than ____].

As we have seen in (64-69) above, first of all, relative clauses in English are placed in the right of the head NP. Second, SU, DO, IO, Obl, GEN, OCOMP all can be relativized and retain relative pronouns, indicated in *italics*. Third, Case is shown in IO, Obl, GEN, OCOMP. Therefore, it seems that the Primary Strategy is correct. The following is the Primary Strategy in Korean with respect to the Accessibility Hierarchy:

(70) Primary Strategy in Korean (Keenan and Comrie 1977, p.74)
i) The restricting clause places to the left of the head NP, separated from it by the suffix *-nun*.
ii) The pronoun is only retained when genitives are relativised.
iii) Case is only shown in genitive position
iv) Object of comparison can not be relativized.

Let us examine whether these Primary strategies are correct in Korean. Relative clauses with respect to the Accessibility Hierarchy are illustrated as follows:

(71) SUBJECT

[___ Punhong tie-ul megoiss-nun]namja NP]-ka younge kyosu –ita.
pink tie Acc is wearing man Nom English professor is
'The man who wears a pink tie is an English professor.'

The NP *namja* 'man' in the subject position in a sentence is relativised.

(72) DIRECT OBJECT

Sally-ka [[ne-ka Harry-ege ___ ju -*n*] hodokkaki NP]-ul joahahessta.
Nom I Nom Dat gave nutcracker Acc like
'Sally liked the nutcracker that I gave to Harry.'

The NP *hodokkaki* in the direct object position is relativised. On the other hand, Indirect Object does not have the object marker *-ul* as more than one object in a clause is banned in Japanese type languages (Larson 1988). This is shown in (73):

(73) INDIRECT OBJECT

Sally-ka [ne-ka _____ pyeonji-ul ssu -*n*] kasu NP]-ul joahanta.
Nom I Nom letter Acc write singer Acc like
'Sally likes the singer to whom I write letters.'

The NP *Jeremy* in the indirect object position is relativised. It is said that Korean has clear indirect objects: the suffix *-ege* plays the role of the indirect object marker (or Dative marker) (Cho and Sells 1995), as given in (74):

(74) OBLIQUE CASE NP

Sally-ka [ne-ka _____ anjat-un] uija NP]-ul mantulussta.
Nom I Nom sat chair Acc made
'Sally made the chair on which I sat.'

The NP *uija* within the PP *uija-e* is relativised. Genetive is relativised in (75) :

(75) GENITIVE

Sally-ka [_____ umma-ka kasui -*n*] namja NP]-rul saranghanta.
Nom mother Nom singer man Acc love
'Sally loves the man whose mother is a singer.'

When a genetive is relativised, the suffix for genetive *–ui* is deleted, as shown in (76):

(76) Namja-ui umma -ka kasui -ta.
man PO mother Nom singer De
'The man's mother is a singer.'

According to Keenan and Comrie's (1977) Primary Strategy, only the above first five positions can be relativised, excluding OCOMP. But, the relativisation of OCOMP is possible in Korean as it is shown in (77).

(77) [Edinburgh-ga huelssin jaktago sengkaktoieji-nun]doci-nun London-ita
Edinburgh N far smaller is thought city London is
'London is the city that it is thought that Edinburgh is far smaller than.'

It follows that all NPs in the Accessibility Hierarchy in (62) from subject to objects of comparison can be relativised in Korean. Thus, (70.iv) of the primary strategy should be revised. As noted in section 4.2.2.1, the highest verb bears the suffix *nun*. Thus, (70.i) of the primary strategy should also be revised. In addition, (70.ii) and (70.iii) of the primary strategy have some problems. In (70.ii) there is a relative pronoun in Korean. What Keenan and Comrie analyse as a relative pronoun is the possessive *ui* in *namja- ui umma-ga* in (74). However, we assume that no pronouns are retained in Korean as the possessive *ui* can exist without relative clauses, as discussed in section 4.2.2. If our assumption is correct, the primary strategy (70.ii) must be ruled out together with (70.iii). Therefore, the Primary Strategy (70.i), (70.ii), (70.iii), (70.iv) and (70.v) must be revised as in (78):

(78) Primary Strategy in Korean (*revised*)

i) The restricting clause is placed to the left of the head NP and the highest verb in the clause bears the suffix *–nun*.

ii) No pronoun is retained in any position.

iii) Case is not shown in any position

iv) Objects of comparison can be relativised.

We will discuss HPSG analyses of relative clause constructions in the following sections.

4.4. HPSG analyses of English relative clause constructions

Pollard and Sag (1994) assume that a relative clause is just one kind of adjunct, thus, a relative clause and the head that relative clause modifies, construct a head-adjunct structure. The basic idea of Pollard and Sag's (1994) analysis is that in a head-adjunct structure, the content of the mother is token-identical to that of the adjuncts. To allow an adjunct to select its head, Pollard and Sag (1994) introduce the head feature MODIFIED (henceforth MOD). The following is the lexical entry for an adjunct, *red*:

(79) LOCAL value of the lexical entry of the adjective *red* (Pollard and Sag 1994: 329):

$$\begin{bmatrix} \text{CATEGORY} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{MOD N'} & \begin{bmatrix} \text{INDEX} & [1] \\ \text{RESTR} & [3] \end{bmatrix} \end{bmatrix} \\ \text{SUBCAT} & \langle\rangle \end{bmatrix} \\ \text{CONTENT} & \begin{bmatrix} \text{INDEX} & [1] \\ \text{RESTR} & \left\{ \begin{bmatrix} \text{QUANTS} & \langle\rangle \\ \text{NUCLEUS} & \begin{bmatrix} \text{RELN} & \textit{red} \\ \text{INST} & [1] \end{bmatrix} \end{bmatrix} \right\} \cup [3] \end{bmatrix} \end{bmatrix}$$

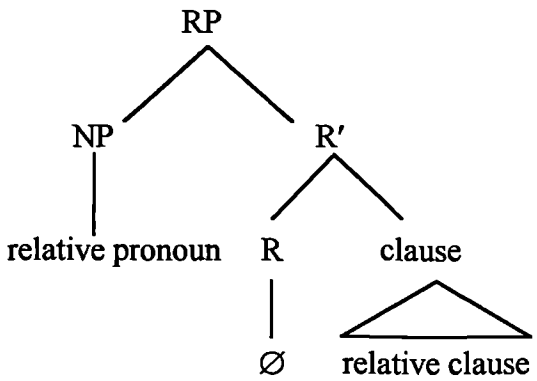
The INDEX value of the CONTENT feature [1] is structure-shared with that of the head noun that the adjunct *red* modifies. The RESTRICTION values of the CONTENT feature have two attributes; QUANTS for Quantificational information and NUCLEUS for non-quantificational information. The RESTRICTION set value includes one from the adjective *red* and one from the head noun, indicated as [3].

Pollard and Sag (1994) first propose that a trace exists in the bottom part of unbounded dependencies, but they later (chapter 9) suggest a traceless analysis where they introduce a lexical rule. (Sag and Fodor 1994) The traceless analysis has been developed further in recent versions of HPSG (Sag 1997, Ginzburg and Sag 2000 and Bouma, Malouf and Sag 2001). We will consider the trace analysis in section 4.4.1 and the traceless analysis in section 4.4.2.

4.4.1. HPSG analyses of relative clauses with traces

Pollard and Sag (1994) adopt the Principles and Parameters view of relative clause constructions that a null complementiser exists in a Relative Phrase (RP) and relative pronouns are placed in the specifier of the relativiser (R). This can be illustrated in (80):

(80)

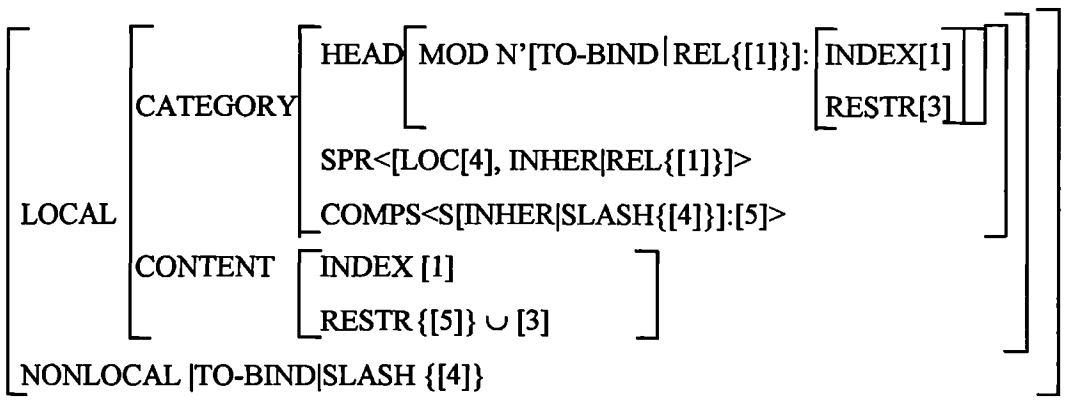


In relative clause constructions, the SLASH feature and the REL features are employed to deal with gaps and relative pronouns. All gaps are associated with the

SLASH feature and all relative pronouns are associated with the REL feature whose value is a single member set in English. As observed in section 3.5.1, the SLASH feature encodes information about the gaps contained in the phrase involving the SLASH feature. The feature INHERITED allows the SLASH value to pass up from a constituent to its mother while the feature TO-BIND allows the SLASH value to be bound off.

Consider now a non-subject-relative clause. Pollard and Sag (1994) assume that non-subject relatives involve the SLASH feature as well as the REL feature. Pollard and Sag (1994) assume that the properties of relative clauses stem from the null relativisers that head relatives. The following is the SYNSEM value for the null relativiser in non-subject *wh*-relatives:

(81) SYNSEM value for null relativiser in non-subject *wh*-relatives (Pollard and Sag 1994: 216)



The only difference from the Pollard and Sag's (1994) version is the SPR and COMPS features replaced from the SUBCAT feature as observed in 1.3. The relative clause modifies N'. The non-empty specification INHER|REL in SPR means that the specifier is a relative pronoun. The TO-BIND|REL specification in the modified N' guarantees that the single set of the REL value in SPR is bound off with the REL value in the modified N'. This ensures that the combination of N' and the relative clause is [INHER|REL { }]. The non-empty SLASH specification in the

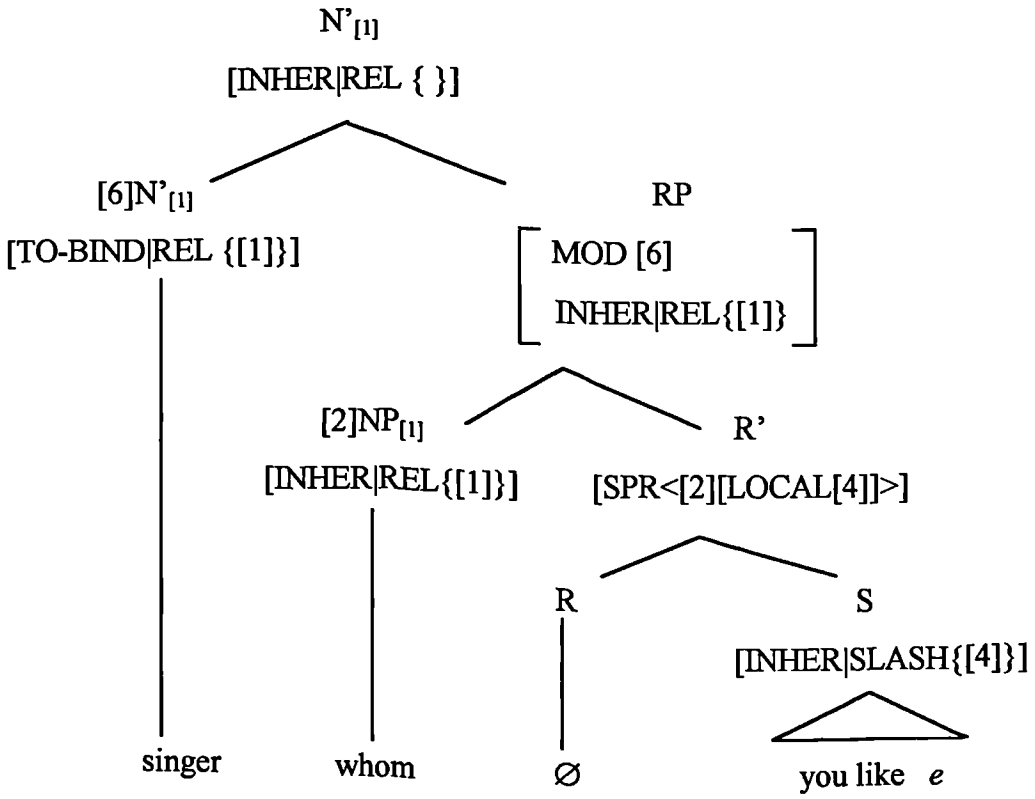
COMPS list means that there is a gap in the complement position. The SLASH value is token-identical to the LOCAL value of the specifier. The single set of the SLASH value in the COMPS list is bound off and its mother has an empty SLASH set. This is guaranteed by the TO-BIND|SLASH specification of the NONLOCAL feature. The index in the CONTENT of the modified N' and the relative index are token identical. This guarantees that modified N' agrees with the relative pronoun. This predicts the ungrammaticality of the following examples:

(82) *the man who like Emma

(83) *the men who likes Emma

The CONTENT value of the relativiser contains the restriction from the head noun, indicated as [3] and from the relative, indicated as [5]. The tree satisfying the above constraints will be the following:

(84)



The non-subject relative clause has two components, the filler-head structure and the head-adjunct structure. The filler-head construction can be divided into three parts: the bottom part, a middle part, and a top part. It may be convenient in describing the mechanism to start at the bottom. In the bottom part, a constituent is missing in the sense that there is no overt constituent in a position where there would normally be one. The basic idea of the trace analysis is that the SLASH feature originates from the trace. As we saw in section 3.5.1, the value of SLASH is a set whose single member is token identical with the LOCAL value of the trace. The value of the LOCAL feature depends on the position of the trace, for example, NP in an NP position and PP in a PP position. Since the verb *like* takes a nominal object as its complement, the local structure of the missing constituent required by the verb *like* will be [CAT| HEAD *noun* [CASE *acc*]].

The middle part consists of local trees with a SLASH feature specification on a daughter and on its mother. The SLASH value is passed from the missing constituent NP in the bottom part to its mother V, V's mother VP, and VP's mother S until the point where the SLASH value is bound. This is guaranteed by the SLASH Inheritance Principle and the Nonlocal Feature Principle suggested by Pollard and Sag (1994) :

(85) SLASH Inheritance Principle (Pollard and Sag 1994:186):
Every member of the INHER | SLASH set must be inherited from a daughter.

(86) NONLOCAL FEATURE PRINCIPLE (Pollard and Sag 1994:164):
For each nonlocal feature, the INHERITED value on the mother is the union of the INHERITED values on the daughters, minus the TO-BIND value on the head daughter.

This guarantees that the nonlocal features, that is, the feature SLASH, the feature REL, the feature QUE, are inherited from their daughter to their mother until they are bound off by the TO-BIND feature.

In the top part, the SLASH value is bound off with the filler, the LOCAL value of the relative pronoun *whom,* and is not passed up to its mother any more.

In certain relative clauses, the feature REL is assigned to the relative pronoun *whom* in the specifier of the null relativiser and is passed up to the top of the phrase that dominates it, that is, RP. The REL value is bound off with the REL value of the modified N' and is not passed to its mother. The feature MOD appears on the relativizer and its projections and is bound off with the head noun it modifies. The REL feature is also inherited in terms of the features INHERIT and TO-BIND and the NONLOCAL feature principle. This is the same as the inheritance of the feature SLASH in the filler-head structure since the features SLASH and REL are members of the feature NONLOCAL.

Unlike non-subject-*wh*-relatives, subject-relatives involve only the REL feature. Pollard and Sag assume that the SLASH feature is limited to a missing constituent in a complement position or in an embedded subject position, thus, the null relativiser takes a VP as its complement. The SPR value of the null relativiser is identical to the SUBJ value of the null relativiser's complement, thus, the SUBJ value is bound off with the relative pronoun. The inheritance and binding of the REL value in subject relatives are the same as those in non-subject relatives.

In zero relatives, it is the null relativiser that contains the REL value since there is no relative pronoun. The relativiser takes only a complement, not a specifier, since there is no relative pronoun. The inheritance of the SLASH feature and that of the REL feature, follow the same procedure as in non-subject-*wh*-relatives.

Pollard and Sag (1994) later (in chapter 9) propose a traceless analysis influenced by psycholinguistic work of Pickering and Barry (1991). Their basic idea is that the SLASH value does not originate from a trace, but the SLASH value originates from the head that licences a missing constituent. They introduce a lexical rule to handle a

missing constituent in the bottom of the dependencies. Sag and Foder (1994) suggest the following lexical rule to handle complement:

(87) Complement Extraction Lexical Rule (Sag and Foder 1994:12):

$$\begin{bmatrix} \text{COMPS}\langle \ldots,[1],\ldots.\rangle \\ \text{SLASH}\langle\rangle \end{bmatrix} \Rightarrow \begin{bmatrix} \text{COMPS}\langle \ldots., \ldots..\rangle \\ \text{SLASH}\langle[1]\rangle \end{bmatrix}$$

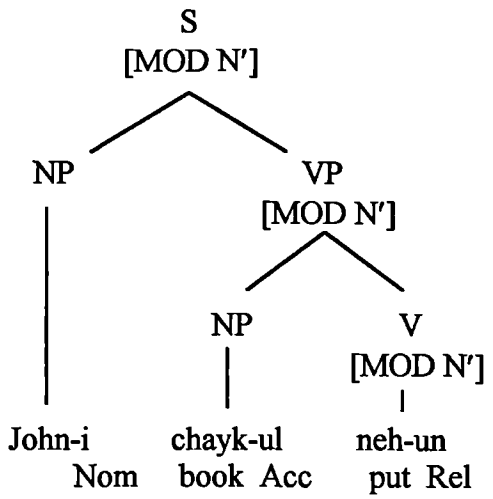
Sag and Fodor (1994) assume the SLASH value is list valued but we replace list value, < >, with set value, { }, following Pollard and Sag's (1994) assumption. This lexical rule shows that a lexical entry takes an empty set as its value of the SLASH feature by default but an element of the value of the COMPS feature is removed from the COMPS list and placed into the value of the SLASH feature. The SLASH value is identical to the LOCAL value of the missing constituent. However, in more recent works the Complement Extraction Lexical Rule is abandoned. The traceless analyses have been developed further in more recent works. (Sag (1997), Bouma, Malouf and Sag, Ginzburg and Sag 2000) In the following section, we will examine Sag (1997) and Ginzburg and Sag's (2000) analyses involving neither lexical rules nor traces.

4.4.2. Sag's (1997) and Ginzburg and Sag's (2000) analyses without traces

Sag (1997), and Ginzburg and Sag (2000) both discuss unbounded dependency constructions. Sag (1997) examines mainly relative clause constructions. Ginzburg and Sag (2000) revise the analysis of unbounded dependency constructions but they do not discuss relative clause constructions in detail. In this section, we will apply Ginzburg and Sag's (2000) new features wherever possible in Sag's (1997) analysis of relative clause constructions.

Sag (1997) argues that empty categories of all kinds are undesirable. The null relativiser is not an exception. Sag (1997) proposes an alternative analysis of relative clauses which do not involve an null relativiser. Sag suggests that a relative clause is not a projection of an invisible complementiser. What heads the clause is the highest verb. Since all modifiers bear a specification for the HEAD feature MOD, the highest verb in relative clauses will bear the [MOD N] specification. This makes the point that the main verb of a relative clause may have a distinctive marking. Sag uses a Korean example to support this assumption as illustrated in (88):

(88) [John-i chaky-ul neh-un] sangca (Sag 1997:435)
Nom book Acc put Rel box
'The box in which John put the book'



As noted in section 4.2.2, no relative pronouns exist in Korean relatives. Instead, a relative suffix *nun* is morphologically realised in the highest verb as a relative marker. Sag (1997) suggests that the highest verb bears the MOD feature like any other modifiers, and that the head feature MOD is passed up to the top of the structure, S. Sag assumes that any English verb can also have the MOD feature. Before we consider this in detail, we will explain what N′ in MOD N′ stands for in (88). Sag (1997) adopts Weisler's (1987) analysis of the zero relatives. Weisler's proposal is that *wh*-relatives modify N″constituent while non-*wh*-relatives (zero

relatives) modify N′ constituent. Sag puts Weisler's proposal in a different form. The MOD value of a *wh*-relative is a NP in which a specifier is already saturated while the MOD value of a non-*wh*-relative is a N′ in which a specifier is not saturated. The MOD value of *wh*-relatives and that of zero relatives can be illustrated in (89) and (90), respectively:

(89) [MOD NP[SPR< >, COMPS< >]]
(90) [MOD N′[SPR<DET>, COMPS< >]]

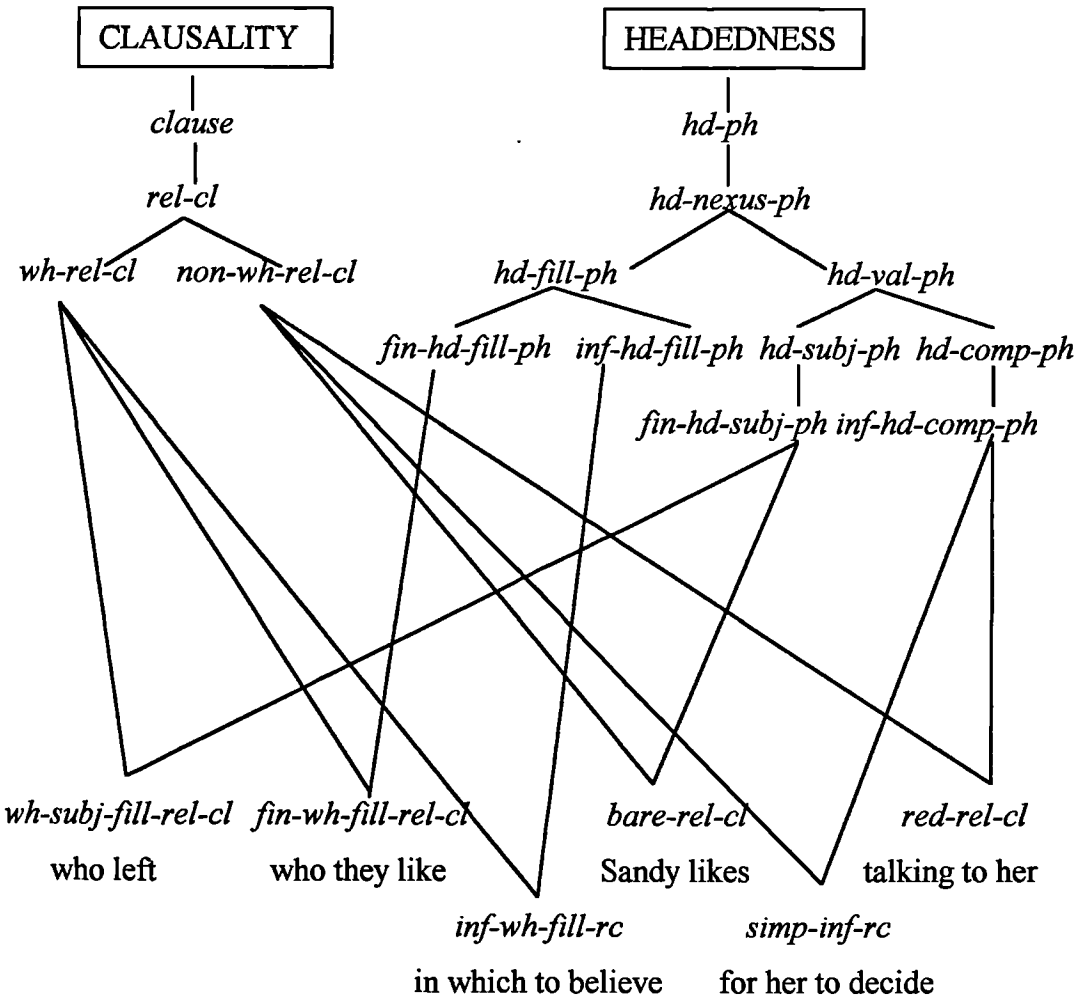
A *wh*-relative modifies an NP with the specification [SPR< >] and [COMPS< >] whereas a non-*wh*-relative modifies an N' with the specification [SPR<DET>] and [COMPS< >].

Ginzburg and Sag (2000) following Sag (1997) assume that there are two kinds of unbounded dependencies relevant to relative constructions, one is extraction dependencies which involve filler-gap constructions and the other is pied-piping effects which involves relative pronouns. Extraction is treated in terms of the inheritance of the SLASH specification while Pied-piping is treated in terms of the inheritance of the REL and QUE specification in Sag (1997). Ginzburg and Sag (2000) replace the REL and QUE features with the WH feature. We will not consider the feature WH for three reasons. Firstly, Korean does not have *wh*-relative pronouns. Secondly, relative clause construction is not similar to indirect question constructions. Thirdly, as we have assumed in section 2.5, *wh*-interrogatives in Korean are not unbounded dependency constructions of kind discussed by Pollard and Sag (1994).

As noted in the previous section, Pollard and Sag (1994) suggest that the properties of the relatives stem from the various null relativisers that head relatives thus the null relativisers bear the MOD feature, as seen in (81). Ginzburg and Sag (2000) following Sag (1997) proposes the properties of relatives stem from constraints on phrases. As we saw in section 1.4, the hierarchical classification of phrases is

involved in the recent works of HPSG (Sag 1997, Ginzburg and Sag 2000). The hierarchy of relative clauses can be illustrated as the following: [4]

(91)



Zero relatives inherit constraints from both phrase types and the clause types, that is, its super types *non-wh-relative-clauses, finite-head-subject-phrases, head-subject-phrases, head-valence-phrases, head-nexus-phrases* and *head-phrases. Wh-subject-relatives* inherit constraints from both clause types and phrase types, that is, its super types *wh-relative-clauses, relative clauses, finite-head-subject-phrases, head-subject-phrases, head-valence-phrases,*

[4] Ginzburg and Sag use the term bare relatives which are identical to the term zero relatives used by Bradford. The term zero relatives will be used in this thesis.

head-nexus-phrases and *head-phrases. Finite-wh-filler-relatives* inherit constraints from its super types *wh-relative-clauses, relative-clauses, finite-head-filler-phrases, head-filler-phrases, head-nexus-phrases* and *head-phrases.* The various subtypes of clauses and phrases are ruled by constraints.

The following is the Ginzburg and Sag's (2000) version of the constraint on relative clauses to allow a relative clause to be a modifier[5]:

(92) *rel-cl* :

$$\begin{bmatrix} \text{SS|LOC} & \begin{bmatrix} \text{CAT|HEAD} & \begin{bmatrix} \text{IC} & - \\ \text{INV} & - \\ \text{MOD}[\textit{noun}] & \end{bmatrix} \\ \text{CONT} & \textit{fact} \end{bmatrix} \end{bmatrix}$$

:*IC* stands for *Independent Clause, INV* for *Inverted,* and *MOD* for *Modified.*

(Ginzburg and Sag 2000:44)

The CONT value is *fact.* Ginzburg and Sag adapt Uszkoreit's Independent Clause (IC) feature. But they limit the definition to 'a phrase can appear independently only if it is [IC+] but certain embedded environments allow [IC+] phrases (Ginzburg and Sag 2000:68)'. The [IC -] specification guarantees that relative clauses cannot be an independent clause. The [INV -] specification ensures that a relative clause cannot be an inverted clause. The [MOD [HEAD *noun*]] specification means that a relative clause modifies a head noun.

We will examine *wh-relative-clauses* and *non-wh-relative-clauses* in turn. Consider now the constraint on *wh-relative-clauses.* The type *wh-relative-clauses* has two subtypes, *non subject wh-relatives* and *subject wh-relatives.* The former involves the SLASH feature and the REL feature whereas the latter involves only the REL feature. Thus both types of *wh*-relatives involve the REL feature. This is ensured by the constraint on *wh-relative clauses* proposed by Sag (1997) as follows:

---

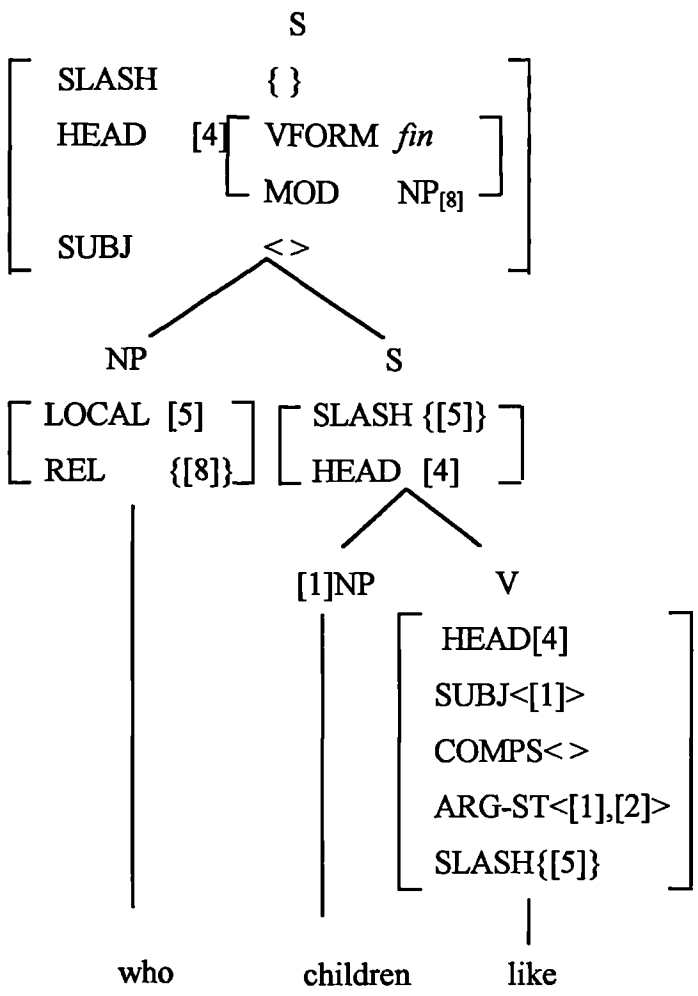
[5] Uszkoreit (1987) originally uses the feature Independent Clause (IC) as a variant of his MAIN-CLAUSE feature.

(93) the constraint on *wh*-relative-clauses (Sag 1997:451) :

$$\textit{wh-rel-cl} \rightarrow \begin{bmatrix} \text{HEAD [MOD NP}_{[1]}\text{]} \\ \text{NON-HD-DTRS <[REL \{[1]\}]>} \end{bmatrix}$$

This constraint guarantees that the non-head-daughter of a *wh*-relative clause has a single REL value which is token-identical with the index on the MOD value of the *wh*-relative clause. This guarantees that the non-head daughter contains a relative pronoun within it. The following is an example of a non subject *wh*-relative clause:

(94) the singer [who children like ____]



In the bottom of the unbounded dependency construction, Ginzburg and Sag (2000) following Sag (1997) propose a new type of *synsem* and assigns the corresponding ARG-ST element to the type *gap*-ss. The constraint on the type *gap-ss* suggested by Ginzburg and Sag (2000) following Sag (1997) is shown in (96) in section 3.5.1. The constraint on *gap-ss* ensures that the type *gap-ss* involves SLASH feature as a non overt argument in unbounded dependency constructions must be realised in the SLASH feature. The constraint also ensures that the LOCAL value of the gap and the SLASH value of the gap are token identical, indicated by the tag [5] in (94). All arguments whether over or not are realised in the ARG-ST list while the non overt argument in complement position is not realised in the COMPS list. This is ensured by the Argument Realisation Principle in (97) in section 3.5.1.

In the middle of the unbounded dependency construction, the realisation of the SLASH values is guaranteed by the SLASH amalgamation constraint proposed by Ginzburg and Sag (2000) following Sag (1997), as follows:

(95) SLASH Amalgamation Constraint (Ginzburg and Sag 2000:175):

$$\text{Word} \rightarrow / \begin{bmatrix} \text{SS}|\text{SLASH}\ [\Sigma_1] \cup \ldots\ldots \cup\ [\Sigma_2] \\ \text{ARG-ST}\langle[\text{SLASH}\ [\Sigma_1]], \ldots\ldots, [\text{SLASH}[\Sigma_2]]\rangle \end{bmatrix}$$

They use the indexed [Σ]s to denote sets. '/' indicates a default constraint. The basic idea of their analysis is that SLASH dependencies are mediated by heads. This means that the SLASH value of a word is the SLASH values of the members of their ARG-ST list. If a verb's complement has a nonempty SLASH specification, then the verb itself also has a non empty SLASH specification. It follows that if a word's argument has a nonempty SLASH value, the word has a nonempty SLSAH value. Ginzburg and Sag (2000) suggest that the inheritance of the SLASH value is ensured by the Generalised Head Feature Principle which is mentioned in section 1.4, as repeated in (96):

(96) Generalised Head Feature Principle (GHFP) (Ginzburg and Sag 2000:60)

hd-ph:

[SYNSEM/[1]] → ..... H[SYNSEM/[1]].....

The symbol H indicates the head daughter of a given phrase. The constraint guarantees that the SYNSEM value of the mother of a headed phrase is identical with that of its head daughter by default. Therefore, the SLASH feature is inherited until it is bound with the appropriate phrase containing a relative constituent. Ginzburg and Sag (2000) eliminate the SLASH Inheritance Principle in (85) and the Nonlocal Feature Principle in (86). The SLASH amalgamation Constraint in (95) and the Generalised Head Feature Principle in (96) do the work of the Nonlocal Feature Principle and the SLASH inheritance Principle.

In the top of the unbounded dependency construction, the single set of the SLASH value of the head daughter is bound off with the LOCAL value of the *wh*-pronoun. This is a filler-head construction. Thus the constraint on *head-filler-phrases* applies to *non-subject wh-relatives*. The following is a recent version of the constraint on head-filler-phrases suggested by Ginzburg and Sag (2000) following Sag (1997):

(97) The constraints on head-filler-phrases (Ginzburg and Sag 2000:182):

hd-fill-ph:

$$[\text{SLASH } [\Sigma_2]] \rightarrow [\text{LOC } [1]], \text{H} \begin{bmatrix} \textit{phrase} \\ \text{HEAD } v \\ \text{SLASH } \{[1]\} \cup_+ [\Sigma_2] \end{bmatrix}$$

Originally the notion ∪ is used. We use ∪+ for a technical reason. The constraint guarantees that in a head filler phrase, the head daughter, here head-filler phrase, is headed by a verb. This also guarantees that one member of the SLASH value is identical to the local value of the filler and is not inherited anymore. This constraint ensures that other members of the SLASH value in the head daughter, if there are

any, form the SLASH value of the *head-filler-phrase*. In (94), the single member of the SLASH value of the head daughter is bound off with the local value of the filler, here a relative pronoun *who*. Thus, the SLASH value of the head-filler-phrase is empty.

The relative pronoun *who* in (94) also contains a nonempty specification for the REL feature. The realisation and inheritance of the REL feature are ensured by the REL amalgamation constraint suggested by Sag (1997) and the Genaralised Head Feature Principle in (96). The REL amalgamation Constraint guarantees that a word has a nonempty REL value if its complement has one. This is like the SLASH Amalgamation Constraint in (95). The REL amalgamation constraint can be formulated as follows:

(98) the REL amalgamation constraint

$$word \rightarrow \begin{bmatrix} \text{ARG-ST}\langle[\text{REL}[1]],\ldots..,[\text{REL}[n]]\rangle \\ \text{REL}\ ([1]\cup\ldots\cup[n]) \end{bmatrix}$$

The REL value is inherited from the relative pronoun through the head that selects it to its mother, then to larger constituents until it meets the non-head daughter that contains the same index at the top level of the relative clause. In (94), the single REL value of the non head daughter is coindexed with the MOD value of the clause. This is ensured by the constraint on the *wh-relative clause* in (93).

Let us now consider *wh*-subject-relative clauses. The type *wh-subj-rel-cl* inherits constraints from its supertypes, *wh-rel-cl*, as in (93), and has its own constraint, as illustrated in (99):

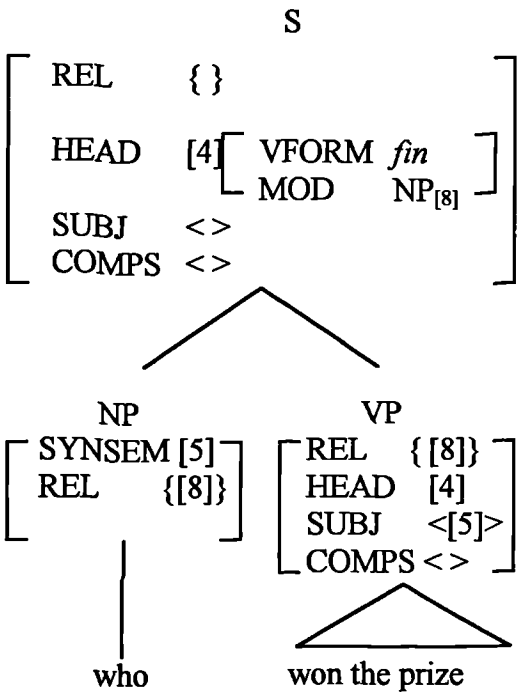
(99) the constraint on *wh*-subject relative clauses (Sag 1997):

$$wh\text{-}sub\text{-}rel\text{-}cl \rightarrow \begin{bmatrix} \text{HD-DTR}\ [\text{REL}[3]] \\ \text{NON-HD-DTRS}\langle[\text{REL}[3]]\rangle \end{bmatrix}$$

This guarantees that in a *wh*-subject relative clause, the REL value of the head-daughter is token-identical to the REL value of the non-head-daughter. The effect of this constraint is to make the REL value of *wh-sub-rel-cl* [REL{}].

Sag (1997) assumes that *wh*-subject-relatives do not involve the SLASH feature as no gap is involved. Instead, he assumes that the SUBJ value is coindexed with the SYNSEM value of the relative pronoun. A tree diagram of a subject relative satisfying the constraints will be the following:

(100) who won the prize (Sag 1997:453)



The constraint on *wh-sub-rel-cl* in (99) ensures that the head daughter and the non-head daughter bear the same REL specification, as indicated [8]. The REL amalgamation constraint in (98) ensures that the head daughter has the non-empty REL value if the non head daughter, here the subject, has the non empty REL value. The constraint on *wh*-relative-clauses in (93) guarantees that the single REL value is token-identical to the MOD value of the *wh*-relative clause.

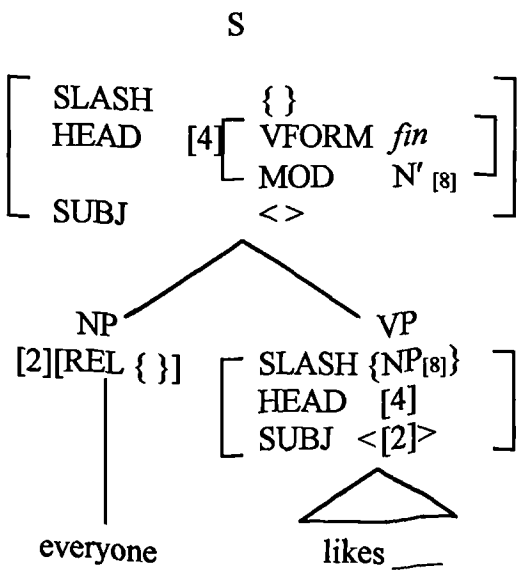
Consider now non-*wh*-relative-clauses. The following is the constraint on non-*wh*-relatives:

(101) A constraint on non-*wh*-relative-clauses (Sag 97:468):

$$\textit{non-wh-rel-cl} \rightarrow \begin{bmatrix} \text{HEAD [MOD N'}_{[1]}\text{]} \\ \text{SLASH } \{\ \} \\ \text{HD-DTR [SLASH } \{\text{NP}_{[1]}\}\text{]} \end{bmatrix}$$

This constraint ensures that the MOD value is not a noun phrase but an N', which may be more than a noun, as all zero relatives will be combined with the N', as we saw in (90). The constraint also ensures that in a non-*wh*-relative, the SLASH value of the head-daughter is a single set which is coindexed with the MOD value of the relative clause. There is no pronoun to bind off the SLASH value in non-*wh*-relative-clause. Instead, the [SLASH {}] specification ensures that non-*wh*-relatives must 'bind off' the SLASH value of the head-daughter. This guarantees that the gap in a non-*wh*-relative-clause will be linked to the head noun. The [SLASH { }] specification does the work of TO-BIND in Pollard and Sag's (1994) analysis mentioned in section 4.4.1. A tree diagram of a non-*wh*-relative satisfying these constraints will be the following:

(102) everyone likes _____. (Pollard and Sag 1994)



The feature REL is empty since no *wh*-pronoun is involved. The SLASH feature is involved as a gap is in the complement position. The single member of the SLASH value is coindexed with the MOD value, indicated as [8]. This guarantees that the gap in the non-*wh*-relative clause will be linked to the head noun.

Having considered the HPSG analyses of English relative clauses constructions, we will now move on to the HPSG analyses of Korean counterparts in the following section.

4.5. HPSG analysis of Korean relative clauses constructions

Korean relative clauses are neither filler-gap construction nor *wh*-relative clauses as relative pronouns do not exist, as observed in section 4.2.2. We will compare Korean relatives to English zero relatives since English zero relatives do not contain any relative pronouns. As we argued in section 3.5.3, the COMPS list includes subjects as Korean does not observe subject-object asymmetries. Subject extraction is dealt with in the same way as object extraction in relative clauses. Whether a gap in a relative clause is a subject gap or an object gap, they are realised in the ARG-ST list just like extraction gaps in English. But subject gaps are not realised in the valence list, which is different from English counterparts.

As observed in section 4.4.2, the *nun* verb in externally-headed-relative-clauses plays the role of relative pronouns. One might suggest that the properties of externally-headed-relative-clauses might stem from those of *nun*-marked verbs. The *nun*-marked verb has certain properties. When it is in a certain context, it will have more properties, such as, relative clauses. However, the fact that the verb suffix *nun* can also appear in other clauses cast some doubts on this, as observed in section 4.2.2.2. But the fact that *nun*-marked verbs in externally headed relative clauses vary in form whereas those elsewhere do not is still important. This suggests that there are two sorts of *nun*-marked verbs. We propose a constraint for the *nun*-verbs

in externally headed relatives but not for the *nun*-verbs in elsewhere. Unlike the variant *nun*, the invariant *nun* is just a suffix which combines with a tensed verb like other suffixes. As observed in section 2.3.1 and 3.5.3, a new feature SENTENCE TYPE (STYPE) for verb suffixes is introduced. The *nun*-verbs in externally headed relatives is realised in the SENTENCE TYPE feature, as illustrated in the following:

(103) *nun*-verb in externally-headed relatives→ [STYPE *nun-variable* (*nun-var*)]

The properties of externally-headed-relatives stem from the constraint on externally-headed-relatives. As noted in section 4.4.2, Sag (1997) suggests the highest verb in relative clauses will bear the [MOD N′] specification as all modifiers bear a specification for the HEAD feature MOD. In Korean, the suffix *nun* is morphologically realised in the highest verb which bears the MOD specification. An externally headed relative clause bears the MOD specification and satisfying (103) can be formulated in (104):

(104)

$$\textit{ext-hd-re-cl}\rightarrow \begin{bmatrix} \text{HEAD} \begin{bmatrix} \text{STYPE} & \textit{nun-variable} \\ \text{MOD} & \text{N}' \end{bmatrix} \end{bmatrix}$$

This ensures that in an externally-headed-relative, the clause containing the verb marked by a variant *nun* also bears the MOD feature.

As we saw in (101), English has the constraint on non *wh*-relative clauses. This constraint applies to Korean relatives in two ways: first, a Korean externally-headed relative adjoins to N′, second, in a Korean externally-headed relative clause, one member of the SLASH value of the head daughter is coindexed with the MOD value of the clause. This guarantees that the gap in Korean externally-headed relatives will be linked to the head noun. When combining this with the constraint on externally headed relatives in (104), one possible constraint for Korean relatives would be the following:

(105) The constraint on Korean externally-headed-relative-clauses:

$$\textit{ext-hd-rel-cl} \rightarrow \left[\begin{array}{l} \text{SS}\left[\text{LOC}\left[\text{CAT|HEAD}\left[\begin{array}{l}\text{IC -}\\ \text{STYPE } \textit{nun-var}\\ \text{MOD N}'_{[1]}\end{array}\right]\right]\right] \\ \quad \text{NONLOCAL|SLASH } \{[i]\} \\ \text{HD-DTR|SS} \mid \text{NONLOCAL|SLASH } \{\text{NP}_{[1]}\} \cup [i] \end{array}\right]$$

:IC stands for *Independent Clause* and *MOD* for *Modified.*

The constraint guarantees that the CONTENT | INDEX value of the SLASH single set is identical with that of the MOD value of the clause, indicated as [1]. This guarantees that the modified N' agrees in person, number and gender with a member of the SLASH set. This allows the case of the SLASH value to differ from that of the MOD value. The [SLASH $\{NP_{[1]}\} \cup [i]$] specification allows the SLASH set of the head to has more than one member. All members of the SLASH value except one coindexed with the MOD value appear the SLASH set of the mother. The [STYPE *nun-var*] specification ensures that the verb of the relative clause has the suffix *nun*. The IC specification ensures that a relative clause is not an independent clause just like English as in (90). The INV feature in (90) is eliminated in Korean relatives since inversion does not take place in Korean, as observed in section 2.5.

As observed in section 3.4, we assume that Korean does not observe subject-object asymmetries. Therefore, subject extraction in relative clause is dealt with in the same way as in the case of complement extraction. Consider now a complement gap in a relative clause as shown in section 4.2.2 as repeated in (106):

(106) [Emma-ka ____ joaha-nun] namja
Nom like REL man
'the man Emma likes'

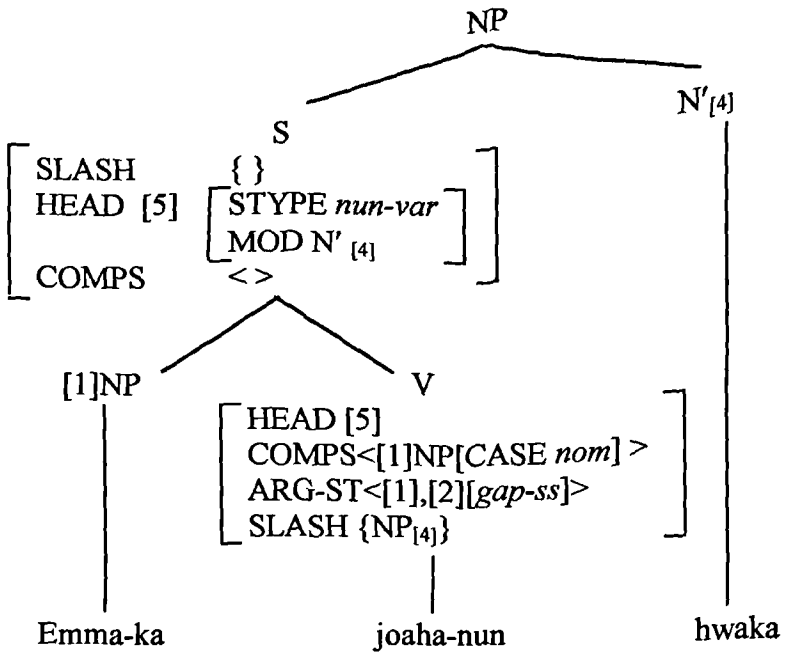
In (106), the relatives suffix *nun* is on the verb and a gap is in the complement position. The category that *joaha-nun* 'like-MOD' has in (106) can be the following:

(107)

$$\begin{bmatrix} \text{HEAD|MOD } N'_{[4]} \\ \text{COMPS<[1]NP[CASE } \textit{nom}\text{]>} \\ \text{ARG-ST<[1], [2][} \textit{gap-ss}\text{ LOC[3], SLASH}\{NP_{[4]}\}\text{]>} \\ \text{SLASH}\{NP_{[4]}\} \end{bmatrix}$$

As discussed in section 3.4, we assume that in Korean there is no separate SUBJ list, and that the COMPS list includes subjects. The first member of the COMPS list is a subject. The verb *like* takes two arguments but there is only one member in the COMPS list, the NP which is nominative. This means that a gap is in the complement position. As examined in section 3.5.3, either *gap-synsem* or *null-pro-synsem* can be assigned to gaps in finite clauses in Korean. As relative clauses involve unbounded dependencies, the *gap-synsem* is assigned to a complement in relative clauses. Thus, the unexpressed complement has a non-empty SLASH value. This is ensured by the constraint on the *gap-ss* as in (96) in section 3.5.1. The *gap-synsem* appears in the ARG-ST list but not the COMPS list. This is guaranteed by the Argument Realisation Principle for Korean in (102) in section 3.5.3. The verb has the nonempty SLASH value as one of the verb's arguments has the non-empty SLASH value. This is guaranteed by the SLASH Amalgamation Constraint in (95). The single set of the SLASH value is coindexed with the MOD value. (106) satisfying (107) can be illustrated in a tree diagram as follows:

(108)



The constraint on the *nun*-verb in externally-headed relatives in (103) ensures that the clause is a relative. The CASE specification of the COMPS member and the assignment of *gap-ss* in ARG-ST ensure that a gap is in the complement position. The verb of the clause has the non-empty SLASH value as its complement has one. This is guaranteed by the SLASH amalgamation constraint in (95). The SLASH value is passed up to its mother, S. This is guaranteed by the Generalised Head Feature Principle in (96). The REL value is not indicated as Korean externally-headed relative clauses do not have relative pronouns. The single member of the SLASH value $\{NP_{[4]}\}$ is coindexed with the MOD value of the phrase. The empty SLASH specification of the relative ensures that SLASH value $\{NP_{[4]}\}$ is bound off in the relative and is not passed up to the head noun the relative modifies. This ensures that the gap in relatives is linked to the head noun the relative modifies. These are guaranteed by the constraint on *externally-headed-relative-clauses.*

Consider now relative clauses with a gap in the subject position. Since we assume that gaps in subject position are just like gaps in object position, we treat gaps in subject position in the same way as gaps in complement position. The following shows a gap in subject position:

(109) [*e* Emma-rul joaha-nun] hwaka
Acc like painter
'the painter (who) likes Emma'

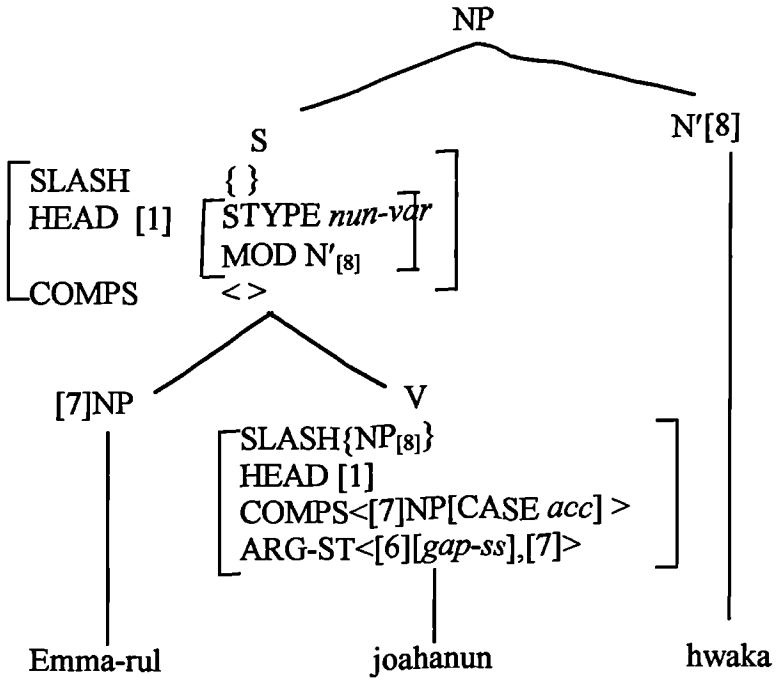
In (109), the verb is marked by the suffix *nun* for externally-headed-relatives and the subject is missing. This means this is a subject externally-headed-relative. The category that *joaha-nun* 'like-MOD' has in (110) can be the following:

(110)

$$\begin{bmatrix} \text{HEAD[MOD } N'_{[8]}\text{]} \\ \text{COMPS<[7]NP[CASE } \textit{acc}\text{]>} \\ \text{ARG-ST<[6][}\textit{gap-ss}\text{ LOC[9], SLASH\{NP}_{[8]}\text{\}],[7]>} \\ \text{SLASH\{NP}_{[8]}\text{\}} \end{bmatrix}$$

The verb *like* takes two arguments but there is only one member in the COMPS list, the NP which is accusative. This means that a gap is in the subject position. The *gap-synsem* is assigned to a gap in subject position just like gaps in object position in the relative clause as we saw in (106). The subject has a non-empty SLASH value just like the complement. The SLASH Amalgamation Constraint ensures that the verb has a nonempty SLASH value. The single member of the SLASH value of the verb is coindexed with the MOD value. This can be illustrated in a tree as follows:

(111)



In the bottom part, *gap-ss* is assigned to the first member of the ARG-ST value. The SLASH amalgamation constraint in (95) guarantees that the verb has a non-empty SLASH value as its argument has one. The Generalised Head Feature Principle in (96) ensures that the SLASH value is passed to its mother. The constraint on externally-headed-relative-clauses in Korean guarantees that the single member of the SLASH value $\{NP_{[8]}\}$ is coindexed with the MOD value of the phrase, and is not passed up to the head noun the relative modifies. This is just like the gap in the complement position in (106).

As we saw in section 4.2.3, the relatives suffix *nun* is on the highest verb when a clause containing a gap is deeply embedded. Since neither subjects nor objects are islands, gaps in both positions can be deeply embedded. The relative clause with a gap in the embedded complement position is repeated in the following:

(112) [Harry-ka [Emma-ka *e* joahantako] sengkakhanun] hwaka
Nom Nom like think painter
'the painter who Harry thinks Emma likes'

The category that *sengkakha-nun* 'think-MOD' has in (113) can be the following:

(113) the lexical entry for *sengkakha-nun*:

$$\begin{bmatrix} \text{HEAD} \mid \text{MOD } N'_{[8]} \\ \qquad\quad \text{STYPE } \textit{nun-var} \\ \text{COMPS}\langle[5], [6]\rangle \\ \text{ARG-ST}\langle[5]\ \text{NP[CASE } \textit{nom}], [6]\ \text{S [SLASH}\{NP_{[8]}\}]\rangle \\ \text{SLASH } \{NP_{[8]}\} \end{bmatrix}$$

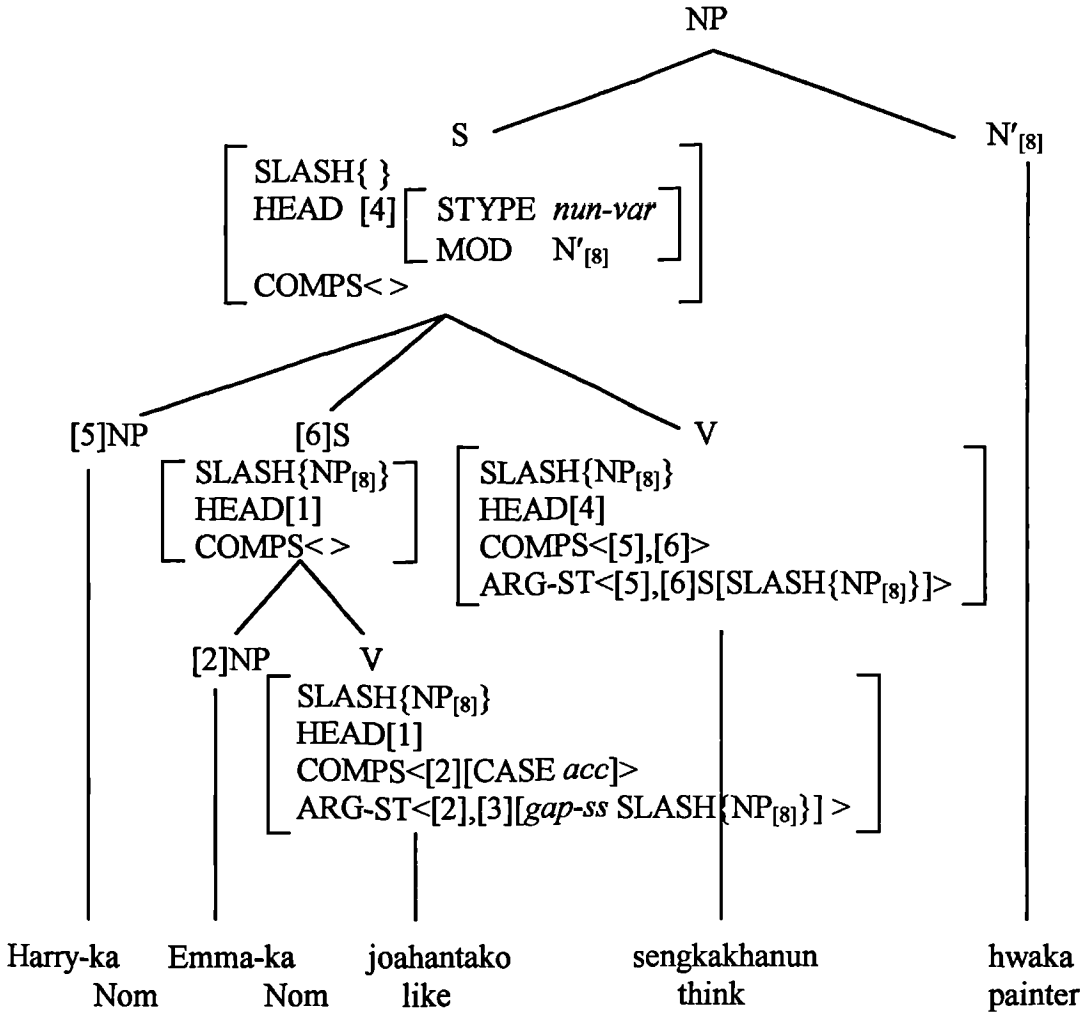
The verb *sengkakhanun* takes a noun phrase as its subject and a sentence as its complement. The verb has the nonempty SLASH value since the complement S has a non-empty SLASH value. This is guaranteed by the SLASH Amalgamation Constraint in (95). The highest verb bears the MOD feature and the MOD value is identical to the single member of the SLASH value of the verb. The category that the embedded verb *joahantako* has in (112) can be the following:

(114) the lexical entry for *joahantako*:

$$\begin{bmatrix} \text{HEAD} \mid \text{STYPE } \textit{ko} \\ \text{COMPS}\langle[2]\ \text{NP[CASE } \textit{nom}]\rangle \\ \text{ARG-ST}\langle[2], [3][\textit{gap-ss}\ \text{LOC}[7], \text{SLASH}\{[7]NP_{[8]}\}]\rangle \\ \text{SLASH } \{NP_{[8]}\} \end{bmatrix}$$

The [STYPE *ko*] specification means that this is a subordinate clause. The *gap-ss* is assigned to one argument of the verb which is missing. The constraint on *gap-ss* as in (96) in section 3.5.1 ensures that the local value of the gap is identical with that of the single member of the SLASH set, indicated as [7]. The SLASH Amalgamation Constraint guarantees that the verb has the SLASH feature as its complement has one. This can be illustrated in the following diagram:

(115)



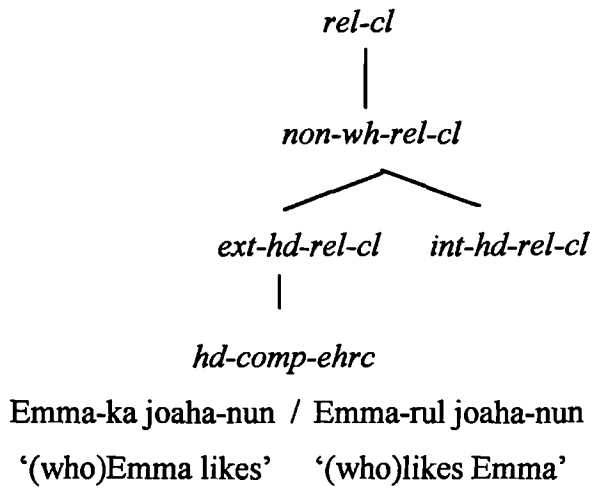
The SLASH feature is assigned to the complement in the embedded clause. The embedded verb *joahantako* has the SLASH value by the SLASH Amalgamation Constraint in (95). The single member of the SLASH value is inherited to the top of the embedded clause. The inheritance of the SLASH value is guaranteed by the Genaralised Head Feature Principle in (96). Then the SLASH value is passed to the matrix verb *sengkakhanun* by the SLASH amalgamation constraint. The single member of the SLASH value is bound off with the coindexed MOD value.

The situation is the same in subject gaps in embedded clauses in three ways. Firstly, the relative suffix *nun* is on the highest verb when subject gaps are deeply embedded. Second, the SLASH feature is assigned to the subject in the embedded clauses but

does not appear in the COMPS list. Thirdly, the SLASH value is inherited to the top of the matrix clause then bound off with the coindexed MOD value. Therefore, we will not consider the relative clauses with subject gaps in embedded clauses in detail.

As we suggested in section 3.5.3, Korean does not have *head-subject-phrases* as Korean observes no subject-object asymmetries. We have examined the gaps in subject position and complement position, and gaps in embedded subject position and embedded complement position in externally-headed-relative-clauses. In both situations whether gaps are in main clauses or embedded clauses, gaps in subject position and gaps in complement position are realised in the ARG-ST list but not in the COMPS list. It follows that Korean externally-headed-relative-clauses have only head-complement-externally-headed-relatives but not head-subject-relatives. When we apply the multiple inheritance hierarchy for English relative clauses, suggested by Sag (1997), as in (91), to Korean relative clauses, it can be formulated as in the following diagram:

(116)



Our version of the multiple inheritance hierarchy for Korean relative clauses in (116) is simpler than one for English in (91).

4.6. Conclusion

We have suggested that there is no difference between subject gaps and complement gaps in Korean externally-headed relatives. Thus, the *gap-ss* assigned to subject gaps or complement gaps only appears in the ARG-ST list but never the COMPS list.

Externally-headed-relatives in Korean are neither the filler-gap nor the *wh*-relatives as Korean does not have relative pronouns whose LOCAL values share with that of the gaps in English relatives. We have suggested that Korean externally-headed relative clauses are unbounded dependency constructions for two reasons: first, the dependency between the gaps and the head nouns relatives modify are unbounded, and second, the gaps and the head nouns share the agreement in person, number and gender. We have assumed that the properties of externally-headed-relatives do not stem from the verb marked by the suffix *nun* as the verb suffix *nun* appears in other situations. But the fact that *nun* in relatives contains tense information whereas *nun* in elsewhere does not is important since you have a type of verb that is restricted to relative clauses, variable *nun* verbs. Thus, this is realised in the STYPE feature. The properties of externally-headed-relatives stem from the constraint on externally-headed-relatives, as we proposed in (104). The constraint ensures the gap is linked to the head noun.

Chapter 5

Internally-Headed Relative Clause Constructions

5.1 Introduction

Internally-headed-relative-clauses (henceforth IHRCs) are clauses with no modified nominal constituent but with a nominal constituent in the position where a gap appears in the translation. It has been noted that Internally-Headed Relative Clauses only occur with N-final relatives. (Cole 1987, Downing 1978, Keenan and Comrie 1977, Keenan 1985, Kayne 1994) It has been also suggested that a relative word is not present in those languages where internally-headed relative clauses occur. Korean meets these two conditions, that is, Korean relatives are N-final relatives and relative words do not exist in Korean, as noted in section 4.2.2. The structures of externally-headed relative clauses and internally-headed relative clauses are formed, as illustrated in (1) and (2):

(1) [[.....gap ....] NP] (EHRCs)
(2) [[.....NP.....] C] (IHRCs)

C stands for a nominalizing element. The structures of EHRCs and IHRCs are different in three ways. Firstly, in EHRCs, the NP, called a head noun, is outside relative clauses whereas in IHRCs, the NP understood as a head is within IHRCs. The NP within IHRCs is called an internal head or an understood head. In this thesis we will call it an understood head. Secondly, there is a gap in EHRCs while there is no gap in IHRCs. Thirdly, in EHRCs, what relative clauses modify is the head noun, while in IHRCs, what relative clauses modify is controversial. Cole (1987) proposes that an internally-headed relative clause is not internally headed but involves an empty external head. What an IHRC modifies is an external head. Culy (1990)

argues against Cole's analysis involving an empty head. Instead, Culy suggests that an internally-head relative clause is a nominalised sentence which modifies a nominal internal to the sentence. Culy's argument is accepted by Pollard and Sag (1994). Kathol (2000) proposes that the relationship between an internally-headed relative clause and the following noun is not an adjunct and a head, but a complement and a head. Thus, those following nouns take internally-headed relative clauses as their complements. We will argue against Cole's analysis which involves an empty head. We will suggest that IHRCs are headed by a verb with the relative *nun* suffix just like EHRCs as discussed in chapter 4. But unlike EHRCs, Korean IHRCs do not modify the following constituent which forms a NP. We will adopt Kathol's analysis that the relationship between IHRC and the following constituent is a complement and a head. Therefore we will propose an analysis for IHRCs which is different from one for EHRCs. The general characteristics of Korean internally-headed relative clauses will be examined in section 5.2. Pollard and Sag's (1994) analysis based on Culy's (1990) argument will be considered in section 5.3.1. Kathol's (2000) proposal will be examined in detail in section 5.3.2. The HPSG analysis of Korean internally-headed relatives will be investigated in section 5.4.

5.2 Internally Headed Relative Clauses in Korean

Before we go into the detail of IHRCs in Korean, we will compare the structure of EHRCs with that of IHRCs. The structures of EHRCs and IHRCs in Korean can be formed, as shown in (3-6):

(3) [[……gap ….V-nun] NP] (EHRCs)

(4) [[……NP……V-nun] kus] (IHRCs)

(5) Emma-ka [[____ kukjang-eseo nao -nun] pewoo]-rul poassta. (EHRC)
Nom theatre from come REL actor Acc see
'Emma saw the actor who came from the theatre.'

(6) Emma-ka [[pewoo-ka kukjang-eseo nao -nun] kus] -ul poassta. (IHRC)
Nom actor Nom theatree from come REL NMN Acc see
'Emma saw the actor who was coming from the theatre.'

(3) and (4) are the same as (1) and (2) except the verb suffix *nun* and *kus*. There are two common characteristics of two kinds of relative clauses. One is that both have the verb suffix *nun*. The other is that both relative clauses are followed by a constituent, as noted in the general differences between EHRCs and IHRCs in section 5.1. However, the structures of EHRCs and IHRCs in Korean are different in two ways. Firstly, in EHRCs, a head noun follows a relative clause with a gap whereas, in IHRCs, *kus* follows a relative clause without a gap. Secondly, in EHRCs, the constituent to form an NP is an external head while, in EHRCs, the constituent to form a NP is *kus*. For instance, in (5) and (6), the subject *pewoo* 'actor' is relativised. In (5), a gap is in the subject position, and the relative clause with the relative suffix *nun* in the verb *kukjang-eseo nao-nun* 'who came from the theatre' modifies the head noun *pewoo*. On the other hand, in (6), no gap exists, and the relative clause with the relative suffix *nun* in the verb *pewoo-ka kukjang-eseo nao -nun* 'the actor who came from the theatre' forms a noun phrase with *kus*. Here two important questions arise. One is what *kus* is and what the relationship between an internally-headed relative clause and *kus*. The other is whether *nun* in IHRCs behaves just like *nun* in EHRCs discussed in section 4.2.2.1. These will be examined in the following section.

5.2.1 The combination *nun* and *kus* in IHRCs

Consider first *nun* in IHRCs. The verb suffix *nun* in IHRC and EHRCs is similar in the sense that it contains tense information. Thus, it varies in forms. As noted in figure 4.2 of Chapter 4, the suffixes for the tense and those for relative clauses are combined in *nun* in EHRCs. This is the difference between *nun* in EHRCs and *nun* in elsewhere. For instance, the present tense form of the relative suffix is *nun*, the

past tense form of the relative suffix is *un* (*n* after vowels), and the future tense form of the relative suffix is *ul* (*l* after vowels). This is also true in *nun* in IHRCs, as illustrated in (7) and (8):

(7) Emma-ka [[pewoo-ka kukjang-eseo nao -nun]kus]-ul poassta. (IHRC)
actor Nom theatree from come REL NMN Acc see
'Emma saw the actor who came from the theatre.'

(8) Emma-ka [[pewoo-ka kukjang-eseo nao -l] kus] -ul kitarinta. (IHRC)
actor Nom theatree from come REL NMN Acc wait
'Emma waits the actor who will come from the theatre.'

In (6) the relative suffix *nun* shows that the verb is present tense. In (7) the relative suffix *n* shows that the IHRC is past tense. In (8) the verb suffix *l* shows that the IHRC is future tense. If we remove *–l* and other relative suffixes, we have a form with no tense suffix which cannot appear as in an independent clause. This is just like EHRC shown in section 4.2.2. The following shows that IHRCs in (6-8) cannot be an independent clause without *nun*:

(9) * *pewoo*-ka kukjang-eseo nao
actor Nom theatre from come

Other clauses which include the verb suffix *nun* can be independent clauses without *nun*, as shown in (10) and (11):

(10) [Emma-ka sung-ul sassta-nun] somun
Nom castle Acc buy rumour
'the rumour that Emma bought a castle'

(11) Emma-ka sung-ul sassta.
Nom castle Acc buy
'Emma bought a castle'

(10) is a sentential complement of noun. (11) shows that the clause can appear as independent clause without the verb suffix *nun*.

Another similarity between *nun* in IHRCs and *nun* in EHRCs can be found in headedness. As discussed in section 4.4.2 and 4.5, EHRCs are headed by the verb with the *nun*-suffix. One piece of evidence is that *nun* is on the highest verb next to the external head when gaps are embedded. We suggest that IHRCs are also headed by the verb with the *nun* suffix. One piece of evidence can be found in subordinate relative clauses. In many languages that have IHRCs, understood head may not be embedded in a subordinate relative clause. It has been noted that in Imbabura Quechua, understood head can be deeply embedded (Cole 1987, Pollard and Sag 1994), as given in (12):

(12) [Marya [Juan wawa-ta riku-shka] -ta ni-shka] llugsh-irka
Maria child Acc see Nominal Acc say-nominal leave past
'The child that Maria said that Juan saw left.' (1987:297)

The understood head *wawa* 'child' is in an embedded clause within the IHRC. In Korean understood head can be embedded in a subordinate relative clause. Rather like subject and object gaps in EHRCs in section 4.2.2, understood head in IHRCs can be embedded in a subordinate relative clause and the relative suffix *nun* is in the highest verb next to *kus*. This is illustrated as in the following:

(13) [[*pewoo*-ka kukjang-eseo nao -*nun*] *kus*
Actor Nom theatre from come REL NMN
'the actor who Emma said came from the theatre'

(14) [[*pewoo*-ka kukjang-eseo naoasstako]Su-ka malha-*n*] *kus*
Actor Nom theatre from come Nom say REL NMN
'the actor who Emma said came from the theatre'

(15) [[*pewoo*-ka kukjang-eseo naoasstako]Jo-ka poasstako]Su-ka malha-*n*] *kus*
actor Nom theatre from come Nom see Nom say REL NMN
'the actor who Harry said that Emma saw came from the theatre'

(13) is an IHRC. (14) shows that the understood head *pewoo* 'actor' is embedded and the relative suffix *nun* is in the highest verb next to *kus*. In (15) the understood head *pewoo* is deeply embedded and the relative suffix *nun* is in the highest verb next to *kus*. Therefore, *nun* is always on the highest verb when an understood head is embedded. This is exactly what happens to *nun* when gap is embedded in EHRCs. Therefore, IHRCs is also headed by the verb with the *nun*-suffix. In IHRCs, the relative marker is *nun* just like *nun* in EHRCs.

Having considered *nun* in IHRCs, we will move on to *kus* in IHRCs. It has been debated among linguists whether *kus* is a nominal or merely a suffix. As noted in Chapter 2.3.2, we adopt Sells's argument that inflectional particles are suffixes. One might doubt that *kus* is a suffix just like inflectional particles. We suggest that *kus* is not a suffix but a nominal. We will give three pieces of evidence why *kus* is a nominal. The first evidence is that *kus* can be used as the form meaning 'thing', as shown in (16-19):

(16) i *kus*
this thing
'this thing'

(17) unu *kus*
which thing
'which one'

(18) kun *kus*
big thing
'big one'

(19) [Emma-ka _____ joahanun] *kus*
Nom like thing
'the thing Emma likes'

(16) means this one and (17) means which one. The structure of (18) is similar to an NP modified by an adjective. The structure of (19) is similar to an externally-headed relative clause. If *kus* was a suffix, it could not be replaced by a noun. But *kus* in (16-19) can be replaced by a noun, *usan* 'umbrella', as shown in (20-23):

(20) i *usan*
this umbrella
'this umbrella'

(21) unu *usan*
which umbrella
'which umbrella'

(22) kun *usan*
big umbrella
'big umbrella'

(23) [Emma-ka ____ joahanun] *usan*
Nom like umbrella
'the umbrella Emma likes'

After replacing *kus* with a noun *usan*, (18) and (19) become an NP modified by an adjective as in (22) and an externally headed relative clause as in (23), respectively. Unlike *kus*, verb and noun suffixes mentioned in section 2.3.1 cannot be replaced by nouns, as illustrated in the following:

(24) Emma-*ka* Harry-*rul* twoci -*e* hwarang-*uro* mana-*ru-ka-yamanhan-ta.*
Nom Acc 2 hour at gallery to meet to go has to De
'Emma has to go to the gallery to meet Harry at two.'

In (24), none of the suffixes which are italicised can be replaced with nouns.
The second evidence is that *kus* functions as a nominaliser in other nominalised clauses where case suffixes follow *kus*, as in the following:

(25) [[Sophie-rul kipukehanun] kus] -i cipta.
Acc please NMN Nom easy
'To please Sophie is easy.'

(26) Emma-ka [[Sophie-ka London-e sanun] kus] -ul anta.
Nom Nom in live NMN Acc know
'Emma knows Sophie lives in London.'

In (25), the nominative suffix *i* is attached after *Sophie-rul kipukehanun kus* 'to please Sophie'. This means that *Sophie-rul kipukehanun kus* is a noun phrase since the nominative suffix *i* is only attached to a noun phrase. In (26), the matrix verb *anta* 'know' takes a NP as its complement. The embedded clause *Sophie-ka london-e sanun kus* 'that Sophie lives in London' is nominalised with *kus* then the accusative suffix *ul* is attached to it. The accusative suffix *ul* is only attached to a noun phrase.

The third evidence is that Lee, H. (1989) assumes that *kus* is a subtype of nouns. We will adopt his assumption of *kus* being a subtype of nouns. From these data, it follows that *kus* is a nominal and not a suffix. Therefore, an IHRC is combined with a nominal *kus* to form a NP. The combination of *nun* and *kus* can be found in other clauses. This will be considered in the following section.

5.2.2 The combination of *nun* and *kus* in other clauses

The combination of the verb suffix *nun* and the nominal *kus* can occur in other clauses, such as nominalised clauses, as mentioned in section 4.2.2 and in the previous section. Some verbs, such as, *anta* 'know', *huhoihanta* 'regret', *kketalta* 'realise', *palkyonhata* 'discover', take nominalised clauses headed by *kus* as its complement. But the difference between *nun* and *kus* in IHRCs and those in other clauses is that the former varies in forms as they include tense information, as illustrated in (27-30):

(27) Emma-ka [[Jane-i chek-ul ssussta-*nun*]-*kus*] -ul alassta.
Nom book Acc write NMN Acc know
'Emma knew that Jane wrote a book.'

(28) Emma-ka [[(jasin-i) jip -ul p-*an*]-*kus*] -ul huhoihessta.
self Nom house Acc sell NMN Acc regret
'Emma regretted that she sold her house.'

(29) Emma-ka [[Jane-i Harry-rul chodehajianassta-*nun*]-*kus*]-ul kketalassta.
Nom Acc invite NMN Acc realise
'Emma realised that Jane did not invite Harry.'

(30) Emma-ka [[Harry-ka jip -ul nagassta-*nun*]-*kus*] -ul palkyonhessta.
Nom house Acc leave NMN Acc discover
'Emma discovered that Harry left home.'

(27-30) are declarative clauses containing subordinate clauses. The verbs *alassta* 'know', *huhoihessta* 'regret', *kketalassta* 'realise', *palkyonhessta* 'discover', take the nominalised phrases *Jane-i check-ul ssussta-nun kus* 'that Jane wrote a book' *(jasin-i)jip-ul p-an kus* 'that she sold her house', *Jane-i Harry-rul chodehajianu-n*

kus 'that Jane did not invite Harry', *Harry-ka jip-ul naga-n kus* 'that Harry left home' as their complements, respectively.

Unlike with this kind of verbs, such as, *anta* 'know', some verbs, such as *sengkakhanta* 'think', *malhanta* 'say', cannot take nominalised clauses headed by *kus* as their complements. Instead, the verbs *sengkakhanta* 'think' and *malhanta* 'say' take clauses introduced by *ko* as their complements, as it is shown in (31) and (32):

(31) Emma-nun [Jane-i chek-ul ssussta-*ko*]
sengkakhessta/malhessta.
Nom book Acc write think/say
'Emma thought/said that Jane wrote a book.'

(32) *Emma-nun [[Jane-i chek-ul ssu-*n*]-*kus*] sengkakhanta/malhessta.
Nom book Acc write NOMI think

The accessibility to relativisation on Korean IHRCs will be considered in the following section.

5.2.3 NP Accessibility in IHRCs

Unlike EHRCs, it has been noted that IHRCs are limited to certain contexts. Jhang (1991) among researchers suggests that IHRCs appear only as the subjects of unaccusative verbs, the direct objects of verbs or the adjuncts of verbs. This can be illustrated in (33), (34) and (35), respectively:

(33) [[sakwa-ka takja-uie isstun] kus] -i patak-uro ttulusessta.
apple Nom table on exist NMN Nom floor on fell
'the apple that was on the table fell on the floor.

(34) Emma-ka Sophie-ege [[pewoo-ka kkot -ul sa -n] kus] -ul juessta.
Nom IO actor Nom flower Acc buy REL NMN Acc give
'Emma gave Sophie the flowers that the actor bought.'

(35) Emma-ka [[moksu -ka uija -rul matun] kus] -uro changmun-ul
Nom carpenter Nom chair Acc make NMN by window Acc
Kessta.
broke
'Emma broke the window with the chair that the carpenter made.'

IHRCs cannot appear as the indirect object of verbs, as in (36):

(36) *Emma-ka [[pewoo-ka kukjang-eseo nao -nun] kus]-ege kkot-ul juessta.
Nom Nom theatre from come REL NMN IO flower Acc give
'Emma gave the flowers to the actor who came from the theatre.'

In (36) the suffix for indirect objects *ege* is only combined with a noun meaning 'person'. Thus, *kus* cannot be combined with the suffix for indirect objects *ege*.

It has been noted that there is an ambiguity in the interpretation of IHRCs. As Keenan (1985) points out, the fact that relativised elements within relatives are not distinctively marked leads to an ambiguity of the interpretation in transitive verbs, as the following:

(37) ku-ka [[hwaka-ka jakka -rul mana -nun] -kus] -ul poassta.
he Nom painter Nom writer Acc meet REL Acc see
a) 'He saw the painter who meets the writer.'
b) 'He saw the writer who the painter meets.'

The IHRC in (37) can be interpreted as a subject IHRC or an object IHRC. This is the same in the case of ditransitive verbs, as illustrated in (38):

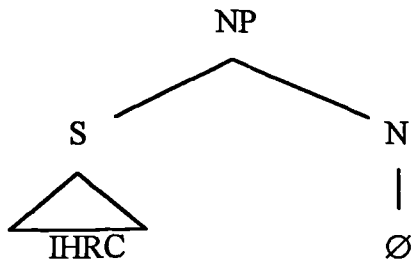
(38) ku-ka [[woochepu-ka ius -ege pyeonji-rul ju -nun] -kus] -ul
he Nom postman Nom neighbour Dat letter Acc give REL NMN Acc
poassta.
see
a) 'He saw the postman who gave the letter to the neighbour.'
b) 'He saw the neighbour who the postman gave the letter to.'
c) 'He saw the letter the postman gave to the neighbour.'

The IHRC in (38) can be interpreted as a subject IHRC, a direct object IHRC or an indirect object IHRC.
In the following sections HPSG analyses will be discussed.

5.3 HPSG analyses in IHRCs

As noted 5.1, IHRCs are clauses with a nominal constituent in the position where a gap appears in the translation. Cole (1987) among a number of other researchers assumes that IHRCs involve an empty external NP head, as it is below:

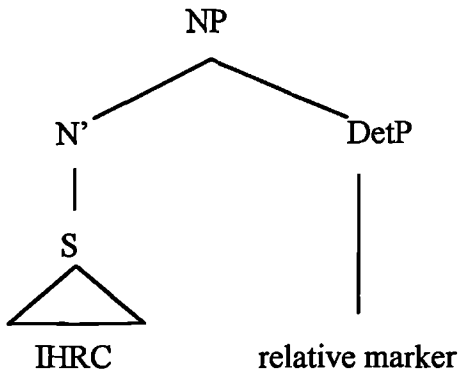
(39)



Culy (1990) argues that no such phonetically empty external NP head is involved in IHRCs. Culy (1990) defines an internally-headed-relative-clause as a nominalised sentence which modifies a nominal, overt or not, internal to the sentence. A nominal, an understood head, within the IHRC is modified by the IHRC containing it. In Culy's analysis of IHRCs, IHRCs demonstrate an exocentric construction type. That is, an IHRC, which is a sentence, is again categorised as a nominal. The relative

marker which Culy classifies as a determiner is placed in the specifier of the NP and combines with the relative clause N' to form an NP. This can be illustrated as in (40):

(40)



Pollard and Sag (1996) adapt Culy's (1990) analysis of IHRCs. Kathol (2000) also assumes that IHRCs do not involve an empty external head. But he argues against Culy's exocentric construction of IHRCs. Pollard and Sag's (1994) analysis will be discussed in section 5.3.1. Kathol's analysis of IHRCs in Lai will be examined in 5.3.2.

5.3.1 Pollard and Sag's (1994) analysis of IHRCs

Pollard and Sag (1994) take an example from Donna S (a variety of Dogon, a language of Mali):

(41) [ya indɛ mi wɛ gc] yimaa boli.
yesterday person 1sg see-PN-∅ DET die-PSP go-PN-3sg
'The person I saw yesterday is dead.' (Pollard and Sag 1994:223)

In (41) neither a head noun nor a relative word exist. The relative marker *gc*, a determiner, is combined with the IHRC to form a NP.

Pollard and Sag (1994) following Culy give a schema to satisfy this exocentric construction, as shown in (42):

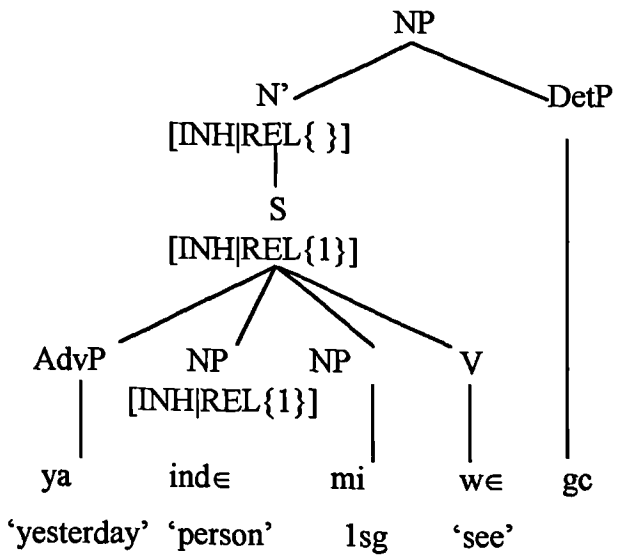
(42) Exocentric IHRC Schema (Pollard and Sag 1994:233):

$$\begin{bmatrix} N_{[1]} \\ \text{INH}\,|\,\text{REL}[3] - \{[1]\} \\ \text{CONTENT}\,|\,\text{RESTR}\{[2]\} \end{bmatrix} \rightarrow \text{S[INH}\,|\,\text{REL[3]]:[2]}$$

This schema ensures that IHRCs, an understood head, N, is associated with the REL feature. The understood head has a nonempty REL value and this REL value is inherited up to S through the NONLOCAL FEATURE PRINCIPLE shown in section 4.4.1. The schema ensures that the index of the N, [1], is removed from the INHER|REL value of the N. This set difference is indicated by '–'. The CONTENT of S is the same as the restriction on the index which is bound off with the index of N.

(41) satisfying the schema in (42) is illustrated in the following diagram (Pollard and Sag 1994:234):

(43)

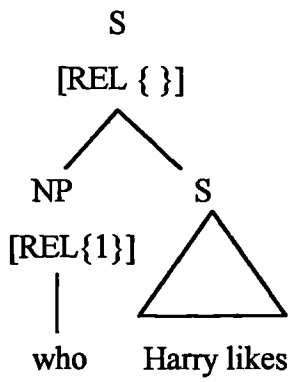


In (43), the NP *ind*∈ 'person' involves the feature REL. That REL value is inherited to S but not to N'. This is guaranteed by Exocentric IHRC Schema in (42). Pollard and Sag point out that this inheritance of the INHER|REL to the S violates the Clausal REL Prohibition in (44) since the INHER|REL value of the S contains a nonempty specification:

(44) Clausal REL Prohibition (Pollard and Sag 1994:220)
The INHER|REL value for S must be empty

Clausal REL Prohibition ensures that in a language like English the REL value is not passed up to S, as illustrated in (45):

(45) Emma [who Harry likes]



Pollard and Sag assume that the clausal REL prohibition does not apply to a language where internally-headed relative clauses are allowed. Therefore, Pollard and Sag predict that inheritance of the REL value should be possible from the subordinate clause. To support this prediction, they take an example from Imbabura Quechua cited in Cole (1987). In Imbarura Quechua the understood head is in an embedded clause within the IHRC, as shown in (46):

(46) [Marya [Juan *wawa*-ta riku-shka] -ta ni -shka] llugsh-irka.
Maria child-Acc see- NMN Acc say-NMN leave-past
'The child that Maria said that Juan saw left.' (Pollard and Sag 94:234)

The understood head *wawa* 'child' is placed in an embedded clause within an IHRC. That understood head bears the REL value which is inherited to the complement S within the IHRC then inherited to the embedded S. This also violates the clausal REL prohibition in (44) and requires a nonempty REL value in the embedded S. Pollard and Sag (1994) point out that there are cross-linguistically a number of further constraints on IHRCs. For instance, in many other languages that have IHRCs, such as Navajo, the understood head may not be embedded in a subordinate relative clause but in Lakhota it is allowed.

A more recent HPSG analysis of IHRC proposed by Kathol (2000) will be examined in the following section.

5.3.2 Kathol's (2000) analysis of Lai IHRCs

Kathol (2000) argues that relative clauses neither involve an empty head, as suggested by Cole (1987) nor involve the recategorisation of S as a nominal, as proposed by Culy (1990). He also argues against the classification of the relative marker as a determiner being placed in the specifier of the NP. Instead, Kathol (2000) assumes that IHRCs lack an external head but require a NP to provide a relative index within relative clauses. He takes examples from Lai (Hakha chin) which is a Tibeto-Burman language spoken in western Burma. Lai has the SOV order and has a special marker *mii* for both EHRCs and IHRCs, as illustrated in (47) and (48), respectively:

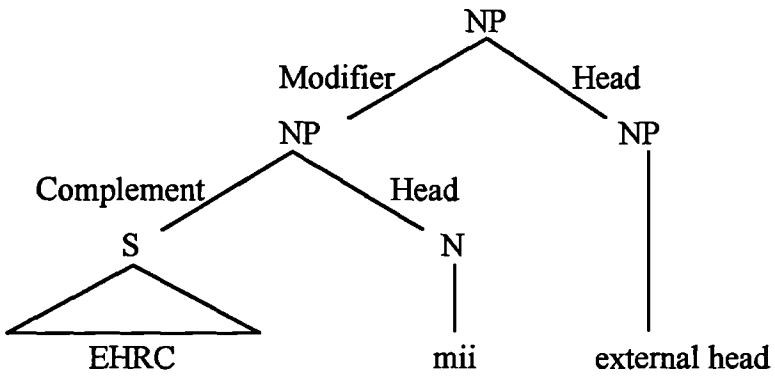
(47) [[Vok rool ?a pee] *mii* lawthlawpaa] ka mu?. (EHRC)
pig food 3sg-subj give REL farmer 1sg-subj see
'I saw the farmer [who gave food to the pig].' (Kathol 2000:137)

(48) [Lawthlawpaa vok rool ?a pee] *mii* ka mu?. (IHRC)
farmer pig food 3sg-subj give REL 1sg-subj see
'I saw the farmer [who gave food to the pig].' (Kathol 2000:141)

Both (47) and (48) have the relative marker *mii*. In (47), the subject *lawthlawpaa* 'farmer' is relativised, thus, *lawthlawpaa* 'farmer' is an external head. In (48), the subject *lawthlawpaa* 'farmer' is within internally-headed relative clauses and is understood as the patient of the verb *mu* 'see'.

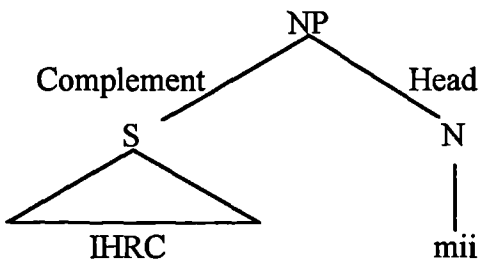
Kathol propose that the relative marker *mii* is a nominal and takes the preceding clause as its complement in EHRCs, and that relative marker *mii* modifies an external head like any other EHRCs. This is illustrated in (49):

(49)



Kathol proposes that the relative marker *mii* in IHRCs is also a subtype of nouns, and that the relative marker *mii* takes the preceding clause as its complement. The IHRC will have a nominal status since *mii* is a head of IHRC. This is similar to the proposal for EHRCs except an external head, as illustrated in (50):

(50)



Kathol argues against Culy's classification of relative markers as determiners. He gives two pieces of evidence for *mii* being a nominal. One is that, in standard classifications, demonstratives are classified as determiners. If relative markers were determiners, demonstratives and relative markers would not occur together. However, the relative maker *mii* can occur with demonstratives, such as, *kha* (that), as shown in (51):

(51) [Tsoo ?a that *(mii) kha] ka mu?
cow 3s.SUB kill-I REL DEM 1s.SUB see
'I saw that one who killed the cow.' (Kathol 2000)

The relative marker *mii* is obligatory. This shows that on relative clause without the relative marker *mii* does not have a nominal status.

A further piece of evidence is that the relative marker *mii* is historically related to a homophonous form meaning 'person'. The relative marker *mii* can occur as subject or as adjective, as in (52) and (53), respectively:

(52) Mii ?an raa.
Person 3PL-SUBJ come-I
'People are coming.' (Kathol 2000:144)

(53) a. mii nung
person living
'living person'
b. mii thii
person dead
'dead person' (Kathol 2000:144)

This is like *kus* in Korean IHRCs being used as the form meaning 'thing', as seen in section 5.2.1.

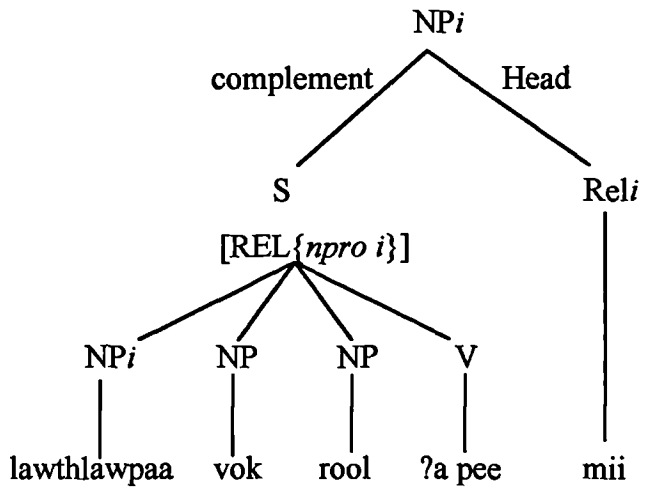
However Kathol suggests that the internal structure of the relative marker *mii* in IHRC is different from that in EHRC in the sense that the former lacks modificational properties. The lexical description for the relative marker *mii* in IHRCs is the following:

(54) lexical description for the relative marker *mii* in IHRCs (Kathol 2000:142) :

$$\begin{bmatrix} \text{HEAD} \quad \textit{noun} \\ \text{COMPS} \ \langle \text{S[REL}\{\textit{nom-obj i}\}] \rangle \\ \text{CONTENT|INDEX } \textit{i} \end{bmatrix}$$

Nom-obj means *nominal-object.* Unlike the relative marker *mii* in EHRC, the relative marker *mii* in IHRC has neither the modificational properties nor the constraint on the kind of nominals that provides the relative index. Instead, the relative index can be provided by a nominal within an IHRC. Kathol makes the REL value *nominal-object* whose value includes the RESTRICTION feature as well as the INDEX feature. (48) satisfying (54) can be illustrated in the following:

(55)



(Kathol 2000:142)

npro means non pronoun. As noted in section 1.3, non pronoun (npro) is a subtype of nominal-object. The subject *Lawthlawpaa* 'farmer' provides the relative index.

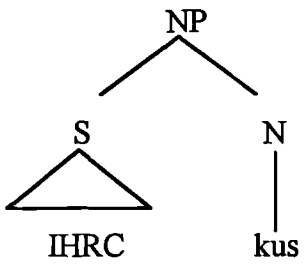
The relative index is identical with that of *mii* and is not passed to the further constituent. As illustrated in (50), the relative marker *mii* as the head of the IHRC guarantees the nominal status of the IHRC.

We have considered two HPSG analyses of IHRCs in different languages: Pollard and Sag's (1994) analysis and Katho's (2000) analysis. We will propose a HPSG analysis for Korean IHRCs in the following section.

5.4 HPSG analysis of Korean IHRCs

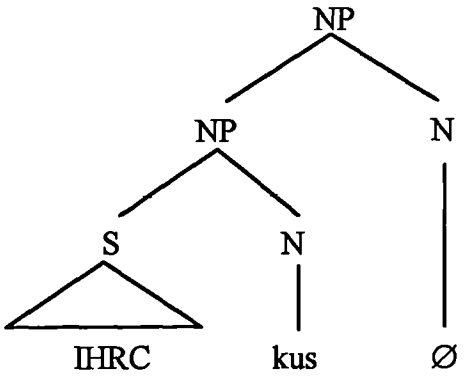
We will argue that Korean IHRCs involve neither an empty external head of the kind proposed by Cole (1987) nor an exocentric construction of IHRC suggested by Culy (1990). The nominal *kus* gives an IHRC a nominal status. We will adopt Kathol's (2000) proposal of the relative marker *mii* taking the preceding clauses, IHRCs, as its complements. The structural analysis of the IHRCs can be the following:

(56)



As discussed in section 5.2.1, *kus* is a nominal. The nominal *kus* is the head of the internally-headed-relative-clause. Since we assume that *kus* is a noun, we do not need an exocentric construction of IHRC suggested by Culy. If we applied Cole's analysis which involves an empty external head to Korean, the following would be a result:

(57)



Since the internally-headed-relative-phrase is already a NP, an additional empty external head is an unnecessary constituent. Therefore we assume that Cole's analysis does not apply to Korean IHRCs.

As noted in section 5.2.1, one important similarity between EHRCs and IHRCs is that both IHRCs and EHRCs are headed by the relative *nun*. One important difference between *nun* in relatives and *nun* in elsewhere is that the former varies in forms as it contains tense information in it. As we saw in section 4.5, the *nun*-verbs in externally headed relatives is realised in the SENTENCE TYPE feature. It can be applied to internally headed relative clauses. This can be illustrated in the following constraint:

(58) [STYPE *nun-variable*]

This constraint ensures that *nun*-marked verbs in EHRCs and IHRCs vary in forms. One might suggest that the properties of both types of relative clauses, EHRCs and IHRCs, might stem from those of *nun*-marked verbs. However, the fact that the verb suffix *nun* can also appear in other clauses cast some doubts on this, as noted in section 5.2.2 and section 4.2.2.2. In addition, it is not clear whether an IHRC has modificational properties. As noted in section 4.4.2, an EHRC involves a MOD feature in the highest verb. Thus, the relative clause which contains the relative suffix *nun* modifies a head noun. The question which arises is whether IHRCs

modifies *kus*. But the idea that IHRCs are modifiers is untenable because whereas more than one EHRCs can combine with a single ordinary noun, as in (58), only a single IHRC can combine with *kus*, as in (59):

(59) Jo-ka [[Emma-ka ssun] [Harry-ka ikun] chek]-ul sassta.
Nom Nom write Nom read book Acc buy
'Jo bought the book [Emma write] [Harry read]'

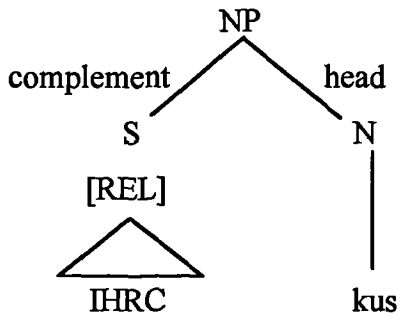
(60) *Jo-ka [[kasu -ka jip -eso nao -nun] [hwaka-ka jip -uro
singer Nom home from come out REL painter Nom home to
tuluka-nun] kus]-ul poassta.
go into REL Nom Acc see

Therefore, EHRCs are different from IHRCs in the sense that the former have modificational properties while the latter do not.

A question that raises here is whether an IHRC is an adjunct. Since we suggest that IHRCs do not modify the nominal *kus*, an IHRC is not an adjunct. Thus, the relationship between the nominal *kus* and IHRCs is not a head and an adjunct. The relationship between *kus* and a IHRC is a head and a complement as the nominal *kus* heads internally-headed relative phrases. That is, the nominal *kus* takes a preceding IHRC as its complement. The idea that the relation between an IHRC and the following constituent is a complement and a head is proposed by Kathol (2000) in section 5.3.2.

Unlike EHRCs, IHRCs do not have the MOD feature as an IHRC is not an adjunct. IHRCs do not have the SLASH feature either as an IHRC does not involve a gap. Instead, IHRCs involve the REL feature. As noted in section 5.3.1, Pollard and Sag (1994) following Culy (1990) assume that the REL index is provided by an understood head. Kathol (2000) also assumes this for Lai mentioned in section 5.3.2. The structural analysis of IHRCs can be illustrated in the following:

(61)



Kus is a nominal and take an internally-headed relative clause as a complement. The REL index is provided by an understood head in the IHRC.

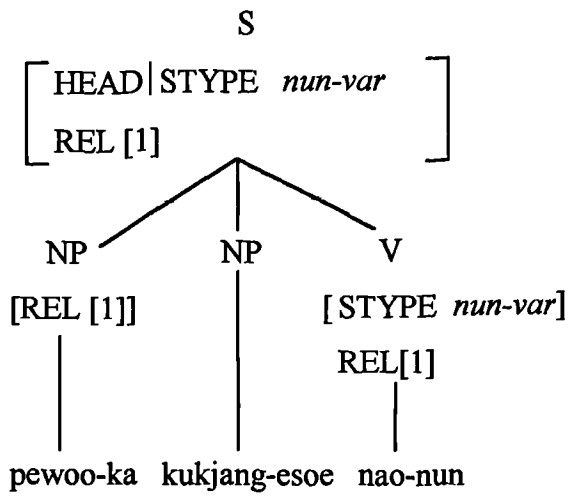
As IHRCs involve neither the SLASH feature nor the MOD feature, the constraint on IHRCs will be different from one on EHRCs in (105) in section 4.5. The constraint on internally headed relative clauses can be illustrated as below:

(62) the constraint on the internally-headed-relative-clauses for Korean:

$$\textit{int-hd-rel-cl} \rightarrow \left[\begin{array}{l} \text{SS}\left[\begin{array}{l} \text{LOC}\left[\text{CAT}|\text{HEAD}\left[\begin{array}{ll}\text{IC} & -\\ \text{STYPE} & \textit{nun-var}\end{array}\right]\right] \\ \text{NONLOCAL}|\text{REL}\ \{[1]\}\end{array}\right]\end{array}\right]$$

The 'IC - ' specification shows that IHRCs are not independent clauses. This constraint means, on one hand, that in an internally headed relative the suffix for relatives *variant nun* is attached to the highest verb, and, on the other hand, that the REL value is within the IHRC. (13) satisfying the constraint on IHRCs in (62) can be illustrated in the following tree diagram:

(63)



In (62), the REL value associated with the understood head appears on the head of the clause. This is guaranteed by the REL amalgamation constraint in (95) in section 4.4.2. The REL value is inherited to its mother. This is ensured by Genaralised Head Feature Principle in (96) in section 4.4.2. The [STYPE *nun-var*] specification ensures that this is a relative.

We will now consider the nominal *kus*. We adopt Kathol's idea that REL value is an index with its restriction. Thus, the relative index can be provided by an overt nominal within an IHRC. The lexical description for *kus* in IHRCs will be the same as one for *mii* in Lai IHRCs as in (54), as illustrated in the following:

(64) the lexical description for the nominal *kus*:

$$\begin{bmatrix} \text{HEAD} & \textit{noun} \\ \text{COMPS} & \langle \text{S[REL}\{\textit{nom-obj i}\}] \rangle \\ \text{CONTENT|INDEX} & \textit{i} \end{bmatrix}$$

This guarantees that it lacks any modificational properties and that relative index is provided by a nominal within an IHRC. The relative index is identical with the index of the nominal *kus*.

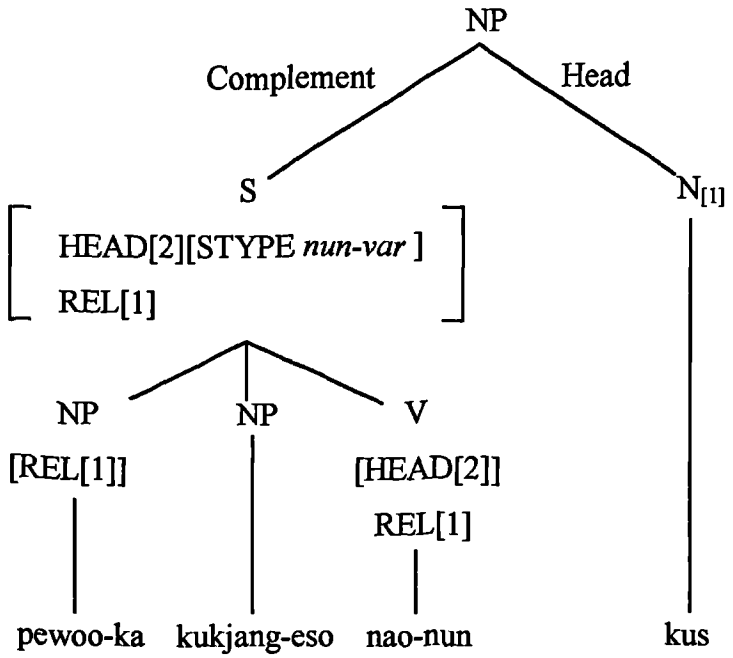
We have considered the constraint on IHRCs in (62) and the constraint on *kus* in (64). The relationship between *kus* and IHRC is a head-complement. Hence, the relationship between *kus* and IHRC can be drawn from the following constraint on internally-headed-relative-phrases:

(65) A constraint on internally-headed-relative-phrases (for Korean):

$$\textit{Int-hd-rel-ph} \rightarrow \left[\begin{array}{l} \text{HEAD } \textit{noun}\ [i] \\ \text{HD-DTR } \left[\begin{array}{l}\text{HEAD } | \text{NFORM } \textit{kus} \\ \text{COMPS<S [REL}\{\textit{nom-obj } i\}\text{]>}\end{array}\right] \\ \text{NON-HD-DTRS } \left\langle \left[\begin{array}{l}\text{STYPE } \textit{nun-var} \\ \text{REL } [i]\end{array}\right] \right\rangle \end{array}\right]$$

This constraint means that in an internally-headed-relative-phrase, the head is the nominal *kus*, and the suffix for relatives *variant nun* is attached to the highest verb of the non-head-daughter, that is, an IHRC. The [COMPS<S[REL]>] specification shows that the head *kus* takes the preceding clause involving the REL feature its complement. The REL index is identical with the index of the head noun. The structure analysis of (13) satisfying the constraint (65) can be illustrated in the following diagram:

(66)



The head *kus* takes the IHRC *pewoo-ka kukjang-ewo nao-nun* its complement. The [STYPE *nun-var*] specification ensures that this is a relative. The REL value associated with the understood head appears on the head of the clause. This is guaranteed by the REL amalgamation constraint in (95) in section 4.4.2. The REL value is inherited to its mother in accordance with the Generalised Head Feature Principle in (96) in section 4.4.2. The REL value is coindexed with the index of the noun *kus*. This is guaranteed by a constraint on internally-headed-relative-phrases for Korean in (65).

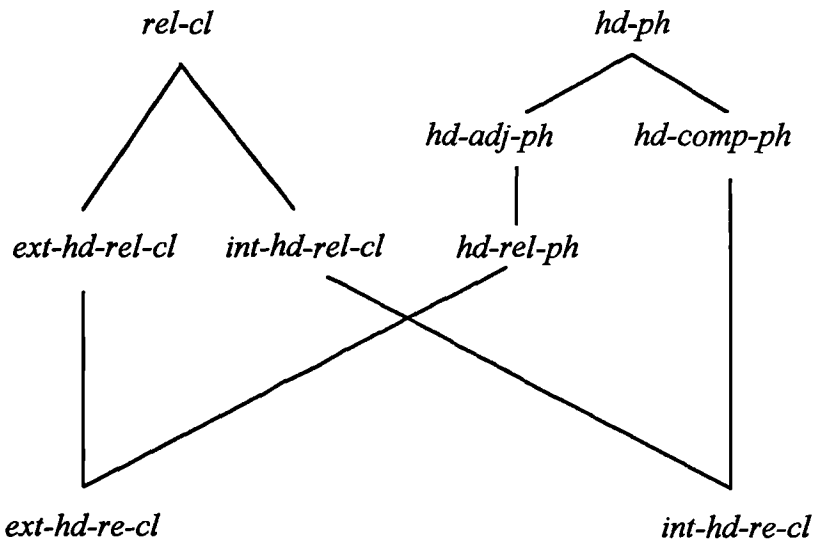
We have proposed a constraint on externally-headed-relative-phrases for Korean in section 4.5 and a constraint on internally-headed-relative-phrases for Korean in (65). The common characteristic between two relative clauses is that verbs vary in form. Therefore, the constraint on relative clauses is the same as the constraint on relative clauses in (60) as repeated in (67):

(67) the constraint on relative clauses

relative clauses → [STYPE *nun-variable*]

As discussed earlier in this section, the nominal *kus* takes the preceding IHRC as its complement. This means the combination of *kus* and an IHRC is a head-complement phrase not a head-adjunct phrase. This also means that IHRCs in Korean do not need to be a subtype of *head-adjunct-phrases*. Therefore, we suggest that IHRCs in Korean are a subtype of *internally-headed-relative-clauses* and *head-complement-phrases*. The hierarchy of Korean relative clauses can be illustrated in the following diagram:

(68)



Emma-ka joaha-nun kasu
Nom like REL singer
'the singer Emma likes'
Emma-rul joaha-nun kasu
Acc like REL singer
'the singer ikes Emma'

kasu-ka Jane-ul top -nun kus
singer Nom Acc help REL
'the singer who helps Jane'

This hierarchy shows that there are two types of relative clauses, *externally-headed-relative-clauses* and *internally-headed-relative-clauses* in Korean. The former inherits constraints from *externally-headed-relative-clauses, relative-clauses, head-relative-phrases, head-adjunct-phrases, head-phrases.* The latter inherits constraints from *internally-headed-relative-clauses, relative-clauses, head-complement-phrase,* and *headed-phrases. Internally-headed-relative-clauses*

do not inherit constraints from *head-relative-phrases* since they are not *head-adjunct phrases.* Korean internally-headed-relative-clauses would not be a head-relative-phrase unless we reclassify *head-complement-phrases* as a subtype of *head-relative-phrases.*

We have discussed the differences and similarities between Internally-headed relative clauses and externally-headed relative clauses. The similarity between two relative clauses is that they share the property of being headed by a variant *nun* verb. On the other hand, internally-headed relative clauses are different from externally-headed relative clauses in three reasons. Firstly, internally-headed-relative-clauses do not involve the MOD feature. Real relative clauses must have a MOD feature like English relative clauses and Korean EHRCs. Secondly, internally-headed-relative-clauses are head-complement-phrases not head-adjunct-phrases. Thirdly, internally-headed-relative-clauses are limited to certain contexts.
For these reasons, we propose that internally-headed relative clauses are not real relative clauses.

5.5 Conclusion

We have argued that Korean internally-headed-relative-clauses involve neither an empty external head of the kind suggested by Cole (1987) nor an exocentric construction of of the kind proposed by Culy (1990). In Korean, the nominal *kus* gives IHRCs a nominal status. We have suggested that the nominal *kus* takes the preceding IHRC as its complement.
We have also suggested a constraint on *nun*-verbs in relatives. *Nun* in IHRCs and EHRCs varies in forms as it contains tense information and relative information but *nun* in elsewhere does not. We have also suggested that the relative *nun* in IHRCs

heads IHRCs just like *nun* in EHRCs. One piece of evidence we have given is that *nun* in IHRCs and EHRCs is always in the highest verb next to *kus* (a head noun as in EHRCs) when an understood head (a gap as in EHRCs) is embedded. However, the fact that *nun* in IHRCs does not contain the MOD feature prevents a unified analysis for *nun* in both types of relative clauses. Therefore, we have suggested a constraint on internally-headed-relative-clauses for Korean in (68) which involves the REL feature but neither the MOD feature nor the SLASH feature.

Having proposed the relation between the nominal *kus* and the preceding IHRC is *head-complement*, we suggest that *internally-headed-relative-clauses* are *head-complement-phrases*. Thus, they do not inherit any constraints from *head-adjunct-phrases* but they inherit constraints from *head-complement-phrases*. We have assumed that they are not real relative clauses as internally-headed-relative-clauses do not involve the MOD feature,

Chapter 6

Topic Clause Constructions

6.1 Introduction

In Chapter 4 and 5, we have examined externally-headed-relative clause constructions, real unbounded dependencies, and internally-headed-relative clause constructions. In this chapter, we will consider topic clause constructions. As Lambrecht (1994) put it, in languages like English, "the term 'topicalisation' is commonly used with reference to syntactic constructions in which a noun phrase whose canonical position is after the verb appears in clause-initial position before the subject (Lambrecht 1994:31)". The noun phrase is called 'topic'. In other languages, such as, Japanese and Korean, a topic whose canonical position is before a verb can appear in sentence-initial position before a subject. One might assume that Korean topic clauses are also an unbounded dependency construction just like English counterparts. The fact that Korean topic clauses have the suffix *nun* and have no gaps casts a doubt on whether Korean topic clauses are unbounded dependency constructions. We will argue that a topic is not syntactically related to a gap in the following clause. This means that a topic clause does not involve a SLASH mechanism. Thus, Korean topic clauses are not an unbounded dependency construction. Korean topic clauses are rather like Catalan left dislocation constructions as discussed in Vallduvi and Engdahl (1996). But, the clitic left dislocation in Catalan still involves gaps and the agreement between clitic and detached phrase. We will suggest that the Korean topic clause constructions are more like the *as for* construction in English in the sense that the *as for* construction does not involve gap and does not need to involve a pronoun coreferential with an *as for* NP. The difference between English and Korean topic clauses will be discussed in section 6.2. The *nun*-marked NPs will be discussed in section 6.3. The difference

between topic clauses and relative clauses will be considered in section 6.4. English topic clause construction in HPSG will be considered in section 6.5.1. Gunji's analysis will be examined in section 6.5.2. Valluduvi and Engdahl's analysis will be examined in section 6.5.3. Our proposal will be suggested in section 6.5.4.

6.2 The differences between English and Korean topic clauses

There are some important differences between Topicalisation in English and Korean. In English topic clauses, topics are in sentence-initial position and associated with gaps in the following clauses, as in (1) and (2):

(1) Jeremy likes Emma.
(2) Emma*i*, Jeremy likes _____*i* .

(1) is a simple sentence. (2) consists of a topic and a following clause with an object gap which is coindexed with the topic. That is, English topic clause constructions involve a filler and a gap.
Second, the filler and the gap have the same LOCAL properties, as the following show:

(3) To Harry, Emma talked ___ .
(4) Harry, Emma talked to ___ .
(5) * Harry, Emma talked ___ .
(6) * To Harry, Emma talked to ___ .

The topics and the gaps in (3) and (4) have the same LOCAL properties, that is, PPs in (3) and NPs in (4). However, the topics and the gaps in (5) and (6) do not have the same LOCAL properties. In (5), the topic is an NP while the gap is a PP and in (6), the topic is a PP while the gap is an NP. Therefore, (5) and (6) are not grammatical. Since case is a LOCAL property, topics and gaps associated with topics must have the same case, as illustrated in (7-10):

(7) Him*i*, I saw ____*i*.

(8) * He*i*, I saw ____*i*.

(9) He*i*, I think ____*i* is clever

(10) * Him*i*, I think ____ *i* is clever

(8) and (10) are ungrammatical as the topics and the gaps have different cases. Third, the distance between the filler and the gap is unbounded, as below:

(11) Harry*i*, Emma likes ____*i*.

(12) Harry*i*, Jane thinks Emma likes _____*i*.

(13) Harry*i*, William believes Jane thinks Emma likes _____*i*.

In (11-13), the gaps are embedded deeply while the topic *Harry* is in sentence-initial positions. These three points were also made for English relative clauses in section 4.2.1 as both English relative clause and topic clause constructions are unbounded dependency constructions.

As in English topic clauses, topic in Korean topic clauses is in sentence-initial position. Apart from being in sentence-initial position, Korean topics have rather different characteristics from their English counterparts in three ways: The first main difference is that topics have the suffix *nun* (after consonants *un*). Korean topics have the same marking *nun* whatever position they are associated with in the following clause whereas English topics can have different cases. This is illustrated in (14) and (15):

(14) Emma-nun [Harry-ka _____ joahanta].
Top Nom like
'Emma, Harry likes.'

(15) Emma-nun [_____ Harry-rul joahanta].
Top Acc like
'As for Emma, she likes Harry.'

Top stands for Topic. As noted in section 2.3.1, in noun phrases, cases are marked by suffixes, for instance, *ka* and *i* for nominatives, *ul* and *rul* for accusatives, *ege* for datives. We consider the suffix *nun* for topic as a case marker. Topic in (14) is associated with accusative in the following clause whereas topic in (15) is associated with nominative in the following clause. But they have the same marking *nun.*

We have seen *nun* appearing in other places. As noted in section 4.2.2, the verb suffix have the same form *nun* in relative clauses where the suffix *nun* is attached to verbs and plays the role of a relative pronoun, as illustrated in (16) and (17):

(16) [Jeremy-ka _____ joaha- *nun*] sonye
Nom like REL girl
'the girl [(who) Jeremy likes]'

(17) [_____ noreha -*nun*] aitul
sing REL children
'the children [(who) sing]'

Nun in relative clauses and *nun* in topic clauses are different in the way that *nun* in relative clauses is attached to verbs while *nun* in topic clauses is attached to nouns. Apart from having the same form *nun*, there is no relation between two *nun.* They just happen to have the same form. This is rather like English with a plural suffix and a third person singular present tense verbal suffix which happen to be the same form, as shown in (18):

(18) a. singer (singular) - singers (plural noun)
c. know (1^{st}, 2^{nd}, plural) - knows (3^{rd} person singular present tense verb)

One is a noun form and the other is a verb form. There is no relation between two forms except the suffix *s*. To distinguish *nun* in topic clauses from *nun* in relative

clauses, we will call the former the *nun*-marked NPs and the latter the relative *nun*. The interpretation of the *nun*-marked NPs will be considered in detail in section 6.3. The second difference between Korean topic clauses and English counterparts is that in the former a gap can be filled with a reflexive or a pronoun, as in (19-22):

(19) Emma-nun Harry-ka _____ joahanta.
Nom like
'Emma, Harry likes.'

(20) Emma*i*-nun Harry-ka kuneyo*i*-rul joahanta.
Nom her Acc like
'As for Emma, Harry likes her.'

(21) Emma-nun _____ Harry-rul joahanta.
Acc like
'As for Emma, she likes Harry.'

(22) Emma*i*-nun jacin*i*-i Harry-rul joahanta.
self Nom Acc like
'As for Emma, she likes Harry.'

In (19) and (21), the topic clauses involve gaps. In (20), the pronoun can replace the gap and can be coreferential with the topic. In (22) the reflexive can replace the gap and can be coreferential with the topic. Korean reflexives have considered in section 3.4.

The third difference between Korean topic clauses and English counterparts is that topic clauses with no obvious gap exist in Korean, as illustrated in the following:

(23) Emma-nun [horangi-ka museopta].
Top tiger Nom frighten
'As for Emma, (she) is afraid of tigers.'

(24) Kkot -un [tulip-i yepputa].
flower Top N pretty
'As for the flower, tulip is pretty.'

(25) pata-nun [yeokci tonghe- ka jeil jokunyo]. (Lee and Im 1983:166)
sea T after all east sea N most good.
'As for the sea, (after all) the East sea is the best.'

(26) kihwu-nun [Seoul-i onhwu-hata].
weather T N mild is
'As for the weather, the area of Seoul is mild.'

In (23-26), there are no obvious gaps in the clauses preceded by topics. Having briefly considered the differences between Korean topic clauses and English counterparts, we will thoroughly examine the characteristics of the marker *nun* in the following section.

6.3 The *nun*-marked NPs

There are two types of the *nun*-marked NPs: one appearing in sentence-initial position and the other appearing in the middle of the sentences. It has been controversial whether the *nun*-marked NPs in different positions are interpreted in the same way or in different ways. Some (Lee H. S 1987, Lee H.W. 1986,1987) assume that the *nun*-marked NPs have just one category despite of their different positions in sentences. They interpret both types of the *nun*-marked NPs as the same category, topic. Others (Choe 1977, Wee 1995, Choe 1995, and Shin 1987) assume that the *nun*-marked NPs are divided into two different kinds, that is, one is a topic and the other is a contrast or a contrast focus. We will use the term contrast in this thesis. If we used the term 'contrast focus', one might confuse 'contrast focus' with

'focus', the latter meaning new information as proposed by Hallyday (1967). This would be against our assumption that the *nun*-marked NPs do not need to provide new information. We will adapt the latter assumption that the interpretations of topic are not the same as those of contrast even though both, topic and contrast, have the suffix *nun*. Kuno (1973) also suggests the distinction between topic and contrast for the Japanese suffix *wa*. The notion of topic and contrast will be considered in section 6.3.2. The interpretation of *nun*-marked topic and contrast will be discussed in section 6.3.3. Kuno's analysis will briefly considered in section 6.3.3. The *nun*-marked topic in subordinate clauses will be considered in section 6.3.4.

6.3.1 The formation of the *nun*-marked NPs

There are two kinds of the *nun*-marked NPs. One does not have the case suffix associated with the gap and the other does have the case suffix associated with the gap. The former includes subjects and objects. That is, subject and object suffixes must be omitted when they are marked by the suffix *nun*, as illustrated in (27) and (28):

(27) Jeremy-ka *kurim -ul* sassta.
Nom painting Acc bought
'Jeremy bought a painting.'

(28) *Kurim -un* [Jeremy-ka _____ sassta].
painting Top Nom bought
'The painting, Jeremy bought.'

(27) is a simple sentence. In (28), when the object *Kurim-ul* is topicalised, the object suffix *ul* is omitted. But it would be ungrammatical if the topic included the object suffix *ul*, as shown in (29):

(29) **Kurim -ul -un* [Jeremy-ka _____ sassta].
painting Acc Top Nom bought

Like object suffixes, subject suffixes are omitted when a subject is topicalised, as given in (30) and (31):

(30) *Jeremy-ka* kurim -ul sassta.
Nom painting Acc bought
'Jeremy bought a painting.'

(31) *Jeremy-nun* [_____ kurim -ul sassta].
painting Acc bought
'As for Jeremy, (he) bought the painting.'

(30) is a simple sentence and in (31) the subject *Jeremy* is topicalised and the suffix *ka* is omitted. It would be ungrammatical if the subject suffix *ka* were along with the topic suffix *nun*, as illustrated in (32):

(32) **Jeremy-ka -nun* [_____ kurim -ul sassta].
Nom painting Acc bought

Apart from subjects and objects, others contain case suffixes associated with gaps as well as the suffix *nun*, as shown in (33) and (34):

(33) Jeremy-ka *Kate-ege* kkot -ul juessta.
Nom Dat flower Acc gave
'Jeremy gave flowers to Kate.'

(34) *Kate-ege-nun* [Jeremy-ka _____ kkot -ul juessta]. (indirect object)
Dat Foc Nom flower Acc gave
'To Kate, Jeremy gave flowers.'

(33) is a simple sentence where the verb *juta* 'give' selects two complements, an indirect object *Kate-ege* 'to Kate' and a direct object *kkot-ul* 'flowers'. In (34) the indirect object *Kate-ege-nun* contains the suffix *ege* associated with the gap along with the suffix *nun*. The following examples are a locative *nun-marked NP*:

(35) Jeremy-ka *Bangor-e* santa.
Nom in live
'Jeremy lives in Bangor.'

(36) *Bangor-e-nun* [Jeremy-ka _____ santa]. (locative)
in Foc Nom live
'In Bangor, Jeremy lives.'

(35) is a simple sentence. (36) the *nun*-marked phrase *Bangor-e-nun* contains the case suffix *e* associated with the gap.

(37) Emma-ka chek -ul *uija -uie* noassta
Nom book Acc chair on put
'Emma put the book on the chair.'

(38) *uija -uie-nun* [Emma-ka chek-ul _____ noassta]
chair on Foc Nom book Acc put
'On the chair, Emma put the book.'

(37) is a simple sentence. In (38) the *nun*-marked phrase *uija-uie-nun* contains the case suffix *uie* together with the suffix *nun*. A time phrase in sentence-initial position is marked by the suffix *nun* in (39) and (40):

(39) Jeremy-ka *tu- ci- e* London-e kanta.
Nom two hour at to go
'Jeremy goes to London at two.'

(40) *tu- ci -e -nun* Jeremy-ka _____ London-e kanta. (time)
two hour at Nom to go
'It is at two Jeremy goes to London.'

The *nun*-marked phrase *tuci-e-nun* contains the case suffix *e* associated with the gap together with the suffix *nun*.

Having seen the *nun*-marked phrases in clause-initial position, we will move on to the *nun*-marked NPs in non clause-initial position, as illustrated in (41) and (42):

(41) Emma-ka sakwa-nun joahanta.
Nom apple like
'It is Emma who likes apples.'

(42) Emma-ka Harry-ege-nun sakwa-rul juessta.
Nom to apple Acc give
'It is Harry Emma gave an apple.'

Verbs can be *nun*-marked but the *nun*-marked verbs cannot be in sentence-initial position. They only appear when they are nominalised or in a light verb construction. It has been proposed that a *nun*-marked verb is interpreted as a contrast. (Beak 1984) The following illustrates the *nun*-marked verb:

(43) Jeremy-ka kurim -ul sa -ss -ta.
Nom painting Acc buy PST De
'Jeremy bought a painting.'

(44) Jeremy-ka kurim -ul sa -ki *-nun* -hessta.
Nom painting Acc buy NOMI do
'It is a buy that Jeremy did a painting'

NOMI stands for a nominaliser. (43) is a simple sentence. In (44), the *nun*-marked verb bears two suffixes, *ki* and *nun*. The suffix *ki* is a suffix for nominalisation and is added to the stem of the verb to make a verb a noun before adding the suffix *nun*. Since the verb is nominalised, the verb *hessta* 'did' appears in the verb position. *Nun* is not the only suffix to appear between the nominalised verb *saki* and the verb *hessta*. Other suffixes, such as, *man* 'only' and *to* 'too' can appear between the nominalised verb *saki* and the verb *hessta*. The verb *hessta* 'did' can play the role of English auxiliary verb *do*, as shown in the following:

(45) a. nu -ka hessni?
who Nom did
'Who did it?'
b. ne-ka hesse.
I Nom did
'I did'

When the *nun*-marked verb is in sentence-initial position, the sentence is hard to interpret, as given in (46):

(46) ??sa -ki -nun Jeremy-ka kurim -ul _____ hessta.
buy NOMI Nom painting Acc do

More that one *nun*-marked NPs can appear in a sentence, as shown in (47):

(47) Emma-ka Sally-ege-nun kkot -nun ponenta.
Nom Dat flower send
'It is flowers to Sally that Emma sends.'

Before discussing how these *nun*-marked NPs are interpreted as topic or contrast, we will consider the definition of the terms 'topic' and 'contrast' in the following section.

6.3.2 The notion of Topic and Contrast

The notion of topic is discourse-oriented. There is no uniformity in the definition of the term 'topic'. One finds the term 'topic' and also the term 'theme'. We use the term 'topic' and 'theme' interchangeable in this thesis. We understood the term 'topic' as the relationship between a sentence and a topic that the sentence is about, and as given information in sentence-initial position. We will now introduce relevant data. Let us look at the notion of topic in the topic-comment structure and then the notion of theme. Topic-comment research started in the second half of the nineteenth and the term 'topic' and comment was introduced by German linguists, in particular Gablenz. The notions of topic and comment is cited in the Encyclopedia of language and linguistics in the following way:

> The notions of topic and comment presuppose that a discourse unit, a sentence or a discourse, has the property of being directed at a restricted set of entities....This restricted set of entities is what a discourse unit 'is about' and constitutes the topic of a discourse unit. The contemporary notion of comment refers to what is newly asserted of the topic. (the Encyclopedia of language and linguistics 1994:4629)

The definition of topic cited in the Encyclopedia of language and linguistics is as follows:

> The topic of a sentence is formally defined as an entity in the world that the sentence is about. (Lyons 1968, Wason and Johnson-Laird 1972) Sentence 'aboutness' is thus assumed to be a two-place relation between a sentence and an entity that the sentence is about. The term 'topic' and 'theme' are applied to the entity. (the Encyclopedia of language and linguistics 1994:4630)

This definition shows that the term 'topic' and 'theme' are used as one meaning. The definition of topic in terms of the relation of aboutness between an entity and a proposition has been adopted in a form or another by many linguists including Kuno (1972), Gundel (1976), Chomsky (1977), Dik (1978), Reinhart (1982), Lambrecht (1994). Vallduvi and Engdahl's (1996) notion of link in Information Packaging is essentially a topic notion. They suggest that link-focus instruction type is correspond to the typical topic-comment structure. Vallduvi and Engdahl's (1996) analysis will be discussed in section 6.5.3.

The concept of theme, a concept which has been used in Czechslovakian writings about language, has been discussed by many linguists. The notion of theme as the element which comes first in a sentence is discussed in Prague School research and summarized in Firbas (1964). The importance of initial position for theme has been adopted by linguists, among which are Halliday (1967) and Fries (1983). The notion of theme proposed by Halliday (1967) as in the following:

> Theme is what comes first in the clause ....the point of departure of the clause as message. (1967:212)

In his suggestion, it is important that it is in sentence-initial position. Many linguists like Quirk, Greenbaum, Firbas, Fries, Chafe, van Dijk, Kuno also consider word order important when discussing the realisation of the meaning 'point of departure of the clause as message'.

Mathesius, a leading Prague School linguist, proposes the definition of theme in 1939. Firbas (1967) translates it as the following:

> Theme is 'that which is known or at least obvious in the given situation and from which the speaker proceeds' in his discourse. (Firbas 1967:268)

We will give three reasons why the *nun*-marked topic is given information. Firstly, the *nun*-marked topic cannot provide answers to wh-questions. A focused element, which is new information, can provide answers to wh-questions, as follows:

(48) A: Who saw John?
B: It was Bill that saw John.

If the *nun*-marked topic were new information, it could provide answers to wh-questions. But, the *nun*-marked topic cannot, as in the following:

(49) A: Nwu-ka John-ul poassni?
who Nom Acc see
'Who saw John ?'
B1: Bill-i John-ul poassta.
Nom Acc see
'It is Bill who saw John.'
B2: *Bill-un John-ul poassta.

In this context B2 is impossible.
Secondly, *nun* cannot be attached to *wh*-words because *wh*-words are requests for new information, as shown in (50) and (51):

(50) a: Nu -ka/ *Nuku-nun chek -ul sass -ni?
Who Nom who Top book Acc buy Qu
'Who bought the book?'
b: Emma-ka check-ul sass -ta
Nom book Acc buy De
'It is Emma who bought a book.'

(51) a: Emma-ka muus-ul/*muus-un sass -ni?
Nom what Acc buy Qu
'What did Emma buy?'
b: Emma-ka check-ul sass-ta.
Nom book Acc buy De
'It was a book that Emma bought.'

Thirdly, the *nun*-marked NPs may not appear in a construction equivalent to an English *there*-construction. Because the English *there*-construction introduces for new information, as illustrated in (52):

(52) han noin -i / *-un sal -koiss -uss -ta.
an oldman Nom live Pogress past De
'There lived an old man.'

Nun cannot be attached to the subject *han noin* 'an old man'.

Consider now the notion of contrast. We will adopt Chafe's (1976) notion of contrastiveness in this thesis. Chafe (1976) suggests that there are three factors involved in contrastiveness. The first factor is awareness. The second factor is the set of possible candidate. The third factor is the assertion of which candidate is the correct one. Chafe assumes that the background knowledge of awareness must be 'either given or quasi-given, the latter being a pretence on the speaker's part that giveness applies. (Chafe 1976:35)' For instance, there are people living in a house. One day they found a portrait of a lady in the attic. One was thinking about who painted the portrait all day. Then, he claimed that Picasso painted the portrait, as in (53):

(53) Picasso painted the portrait.

In that situation the speaker supposes the addressee(s) was thinking of it even if the addressee(s) did not.
In the second factor, he suggests that 'the speaker assumes that a limited number of candidates is available in the addressee's mind whether or not the addressee could list all of them. (Chafe 1976:35)' In (53), there are more than one candidate for who painted the painting in the addressee's mind, for instance, Monet or Cézanne.
Chafe considers the third factor as the real work a contrast sentence does. He assumes that a contrastive sentence says essentially 'I believe that you believe that someone did it, that you have a limited set of candidates (perhaps one) in mind and I am telling you that the someone is ..... (Picasso as in the case of (53)), rather than one of those others. (Chafe 1976:35)' He calls the asserted alternative, *Picasso* as in (53), 'the contrast of contrast'.

He suggests that the way of testing whether a sentence is contrastive is that the phrase *rather than* (instead of, not) can be inserted after the contrast of contrast. When the phrase *rather than* is inserted in (53), the sentence would be:

(54) Picasso *rather than Monet* painted the portrait.

This is a right interpretation for (53) in that situation. We will use the phrase *rather than* to test the sentences' constrastiveness.

Chafe (1976) argues that contrastiveness does not or need not provide new information, and that the speaker may assume that the addressee is already thinking about someone/thing, *Picasso* as in (53), either as a possible candidate or in connection with other occasions. He gives two reasons for this. The first reason is that pronouns can be the contrast of contrast. *Picasso* in (53) is replaced by a pronoun, as shown in (55):

(55) He painted the portrait.

Another reason is in connection with multiple foci. A sentence can have more than one contrast of contrast. Sentences with double contrast are common, as in (56) and (57):

(56) *Picasso* painted the *portrait.*
(57) *John* wrote the *song* but *Paul* wrote the *novel.*

All the contrast of contrast is italicised.
He adds that answers to *wh*-questions do not need to be contrastive, as follows:

(58) a: Who painted the portrait?
b: Picasso painted the portrait.

The new information *Picasso* does not need to be contrastive.

The *nun*-marked contrast does not provide new information either for two reasons. The first reason is that pronouns can be the *nun*-marked contrast, as shown in (59):

(59) Emma-ka ku/kunyeo-nun chodehessta.
he she Acc invite
'It is him/her who Emma invited.'

The second reason is that answers to wh-questions cannot be the *nun*-marked contrast, as illustrated in (60) and (61):

(60) Emma-ka kwuku-rul chodehess-ni?
Nom who Acc invite Qu
'Who did Emma invite?'
(61) Emma-ka Harry-rul/*nun chodehessta.
Nom Acc/Con invite
'Emma invited Harry.'

Chafe assumes that in English, contrastiveness can be expressed through high pitch and stronger stress, and through certain word order, such as, cleft-sentences and pseudo-cleft sentences, as shown in (62-64):

(62) *Picasso* painted the portrait.
(63) It is *Picasso* who painted the portrait.
(64) The one who painted the portrait is *Picasso*

The italicised *Picasso* is contrast.
Korean has neither a high pitch and stronger stress system nor cleft-sentences. Stronger stress might fall on contrastive elements but this is not necessary. In Korean, contrastiveness can be expressed morphologically, as in *nun*-marked NPs. The *nun*-marked contrast can be realised through certain word order. That is, the *nun*-marked contrast is normally in the middle of sentences but it can be in sentence-initial position when two clauses are compared.

From the data shown above, it follows that the interpretations of topic are not the same as those of contrast even though topic and contrast have the suffix *nun*. Thus, the nun-marked topic can only be in sentence-initial position whereas the *nun*-marked contrast can be either in the middle of sentences or in sentence-initial position. We will consider how the *nun*-marked Topic and the *nun*-marked contrast are interpreted in discourse context in the following section.

6.3.3 The interpretation of the *nun*-marked Topic and Contrast

We will take some discourse context examples to see which *nun*-marked NPs are interpreted as topic or contrast. The following is examples with a *nun*-marked NP in sentence-initial position:

(65) A is interested in John and asks about John.

A: John-etehe iyakiheboa.
about tell
'Tell me about John'

B: John-un piano-rul jalche. (topic)
sing Acc well play
(i)'As for John, he plays the piano very well.'
(ii)*'John rather than someone else plays the piano very well.'

In this context, in (65.B), the *nun*-marked NP John in sentence-initial position is given information. The sentence (65.B) is about John, thus, the *nun*-marked phrase is a topic. The interpretation (65.B.ii) is not possible in this context. The following is another example with a *nun*-marked NP in sentence-initial position:

(66) A does not know Emma very well and want to know Emma more.

A: Emma-nun utte?
about
'How about Emma?'

B: Emma-nun kukjang-e kanunkus-ul joahe. (topic)
pictures to go Acc like
(i)'As for Emma, she likes going to the pictures.'
(ii)*'Emma rather than someone else likes going to pictures.'

In this context, B is talking about Emma. The *nun*-marked phrase *Emma* in sentence-initial position is also given information thus *Emma-nun* is interpreted as a topic. The interpretation (66.B.ii) is not possible in this context. Both the *nun*-marked NPs in sentence-initial position in (65) and (66) are interpreted as topic. The *nun*-marked NPs in sentence-initial position can also be interpreted as contrast. When two clauses are compared, the *nun*-marked NPs in sentence-initial position can be interpreted as contrast, as illustrated in the following:

(67) Jo-*nun* muli -rul joahako Su-*nun* sengmul-ul joahanta.
physics Acc like biology Acc like
(i)'Jo rather than Su likes physics and Su rather than Jo likes biology.
(ii)'*As for Jo, he likes physics and as for Su, she likes biology.'

(68) Muli -*nun* Jo-ka joahako sengmul-*un* Su-ka joahanta.
physics Nom like biology Nom like
(i)'Jo likes physics rather than biology and Su likes biology rather than physics.
(ii)'*As for physics, Jo likes it and as for biology, Su likes it.'

In (67) the *nun*-marked NPs *Jo* and *Su* are compared and in (68) the *nun*-marked NPs *muli* 'physics' and *sengmul* 'biology' are compared. Thus, the *nun*-marked NPs *Jo* and *Su* in (67) and *muli* and *sengmul* in (68) are all interpreted as contrast. (67) is not about Jo or Su. Thus, the interpretation (ii) is not possible in this context. (68) is not about *muli* 'physics' or *sengmul* 'biology', either. Thus, the interpretation (ii) is not possible in this context. When the clauses are not compared, those *nun*-marked NPs in sentence-initial position can be interpreted as topic, as illustrated in (69-72):

(69) Jo-*nun* muli -rul joahanta.
physics Acc like
'As for Jo, he likes physics.'

(70) Su-*nun* sengmul-ul joahanta.
biology Acc like
'As for Su, she likes biology.'

(71) Muli -*nun* Jo-ka joahanta.
physics Nom like
'As for physics, Jo likes it.'

(72) sengmul-*un* Su-ka joahanta.
biology Nom like
'As for biology, Su likes it.'

Consider now examples with the *nun*-marked phrases in the middle of sentences:

(73) A and B invited Emma for lunch. They have some ingredients, fish, potatoes, courgettes, and beans, to cook.
A: Emma-ka sengsun-ul joahe.
Nom fish Acc like
'Emma likes fish'

B: Emma-ka kamja-nun anjoahe. (contrast)
Nom potatoes not like
(i)'Emma does not like potatoes (rather than fish).'
(ii) *'As for potatoes, Emma does not like them.'

In this context, in (73.B) *kamja* 'potatoes' in the middle of the sentence is contrast with *sengsun* 'fish' in (73.A) or with other ingredients. The sentence (73.B) is not about potatoes thus the interpretation (73.B.ii) is not possible. The following is another example with a *nun*-marked NP in the middle of the sentence:

(74) A and B know the fact that Emma is on a special diet.
A: Emma-ka an muknunkus-i manta.
not eat Nom many
'There are many things Emma does not eat.'

B: Emma-ka sakwa-nun muke. (contrast)
(i)'Emma eats apples (rather than many things she does not eat).'
(ii)*'As for apples, Emma eats them.'

The *nun*-marked NP *sakwa* in the middle of the sentence in (74.B) is compared with the things Emma does not eat. (74.B) is not about *sakwa* 'apple', thus, the interpretation (74.B.ii) is not possible. Both the *nun*-marked NPs in the middle of the sentences in (73) and (74) are interpreted as contrast.

Before moving on to more than one *nun*-marked NP in a clause, we will consider one of differences between the *nun*-marked topic and contrast, namely definiteness. One of the properties of Topic suggested by Li and Thompson (1976) is definiteness. Under the Chafe (1976)'s characteristics of definiteness, proper NPs and generic NPs are definite. As in English, the *nun*-marked topic must be definite.

(75) Kirin-un mok -i kilta.
giraffe neck Nom long
'As for giraffe, it's neck is long.'

(76) Emma-nun sakwa-rul joahanta.
apples Acc like
'As for Emma, she likes apples.'

(77) Nukunka-ka/*nun oassta.
someone Nom come
'Someone came.'

In (75) the topic is the generic NP *kirin* 'giraffe' and in (76) the topic is the proper name Emma. but in (77) *nukunka* 'someone' is not definite thus cannot be marked by *nun*. On the other hand, the *nun*-marked contrast does not need to be definite, as illustrated in (78):

(78) Nukunka-nun oass-jiman, amuto ku-rul morunta.
Someone come but nobody he Acc not know
'Someone came but no one knew him.'

In (77) *nukunka* 'someone' cannot be marked by *nun* but in (78) it can. This *nun*-marked NP is interpreted as contrast since the two clauses *nukunka-nun oass-jiman* and *amuto ku-rul morunta* are compared. If two clauses were not compared, *nukunka* 'someone' would not be marked by *nun*, as shown in (79):

(79) *Nukunka-nun oas-e, nore-rul pulussta.
Someone come and song Acc sing
'Someone came and sang.'

From these data, it follows that the *nun*-marked topic must appear in sentence-initial position while the *nun*-marked contrast can appear either at the beginning of the sentences or in the middle of the sentences. The topic as the constituent which comes first in a clause coincides with Halliday's (1967) proposal which we have adopted in our thesis.

Consider now more than one *nun*-marked NP appearing in a clause. It has been proposed by a number of researchers, among them Im and Lee 1983, that there is only one topic in a clause even though there can be more than one constituent marked by *nun* in a clause. Reinhart (1982) also suggests that a sentence can have only one topic. Since we assume that topic can only appear in sentence-initial position, a clause can have only one topic. When more than one *nun*-marked phrase appear in a sentence, the one at the beginning of the sentence is interpreted as a topic and any others are interpreted as a contrast, as given in (80):

(80) na-nun ne-nun mitnunta. (Im and Lee 1983)
I you believe
'As for me, it is you who I believe.'

In (80) there are two *nun-marked NPs*, *na-nun* and *ne-nun.* It can be assumed that the first *nun*-marked phrase is a topic since it is at the beginning of the sentence. But, the second *nun*-marked phrase is a contrast since it is not at the beginning of the

sentence and it is preceded by another *nun*-marked phrase. The following is a clause with three *nun-marked NPs*:

(81) Emma-nun Harry-ege-nun check-un juessta.
to book give
'As for Emma, she gave a book to Harry.'

The *nun*-marked phrase *Emma-nun* is a topic since it is in the beginning of the clause. The *nun*-marked phrase *Harry-ege-nun* and *check-un* are foci since they are in the middle of the clauses. When there is no *nun*-marked phrase at the beginning of the sentence in a multi-*nun*-marked clause, the *nun*-marked NPs are interpreted as contrast, as illustrated in (82):

(82) Emma-ka Harry-ege-nun check-nun juessta.
to book give
'It is book and to Harry that Emma gave.'

In (82), two *nun*-marked NPs *Harry-ege-nun* and *check-un* are in the middle of the clause and both *nun*-marked NPs are interpreted as contrast. As we saw earlier, the *nun*-marked phrase at the beginning of the sentence can be interpreted as a contrast not a topic when two clauses containing the *nun*-marked NPs are compared. In this kind of compared sentences all the *nun*-marked NPs would be foci, as shown in (83):

(83) Emma-nun suhak-un jalha -ko Jane-nun sengmul-un jalhanta.
math. is good at and biology is good at
'It is Emma and math that (she) is good at and it is Jane and biology that (she) is good at.'

The *nun*-marked NPs at the beginning of both clauses, that is, *Emma-nun* and *Jane-un* are interpreted as contrast since two clauses are compared in a sentence.

The other *nun-marked NPs* are also interpreted as contrast since they are in the middle of the sentences. Therefore, all four *nun*-marked NPs in (87) are interpreted as contrast.

In Japanese, Kuno (1973) argues that the suffix for topic *wa* has the two uses, topic/theme and contrast, rather like *nun* in Korean. The theme of Japanese sentences must be anaphoric or generic while the contrast of Japanese sentences can be non anaphoric. He uses the term anaphoric similar to the term definite. Thus, he assumes English topic is anaphoric. Gunji (1987) also assume that *wa* in sentence-initial position is interpreted as topic and the rest as contrast when there is more than one nun-marked *wa* in a clause. But *nun* in Korean is not exactly the same as *wa* in Japanese. The following example shows the difference between two suffixes in Japanese and Korean:

(84) i kus-*i* muss ipnika? (Korean)
this Nom what is
'What is this?'

(85) kore-*wa* nan desuka? (Japanese)
this what is
'What is this?'

Both sentences mean 'what is this?' but in Korean the subject *ikus* 'this' is marked by the suffix for nominative *i* while in Japanese the subject *kore* 'this' is marked by the suffix for topic *wa*. We will not consider this in detail. The *nun*-marked topic in subordinate clauses will be discussed in the following section.

6.3.4 The *nun*-marked Topic in subordinate clauses

The topic suffix *nun* does not normally occur in subordinate clauses, such as, relative clauses, if-clauses, while-clauses, nominalised clausese, as in the following examples from Im and Lee (1983) :

(86) [Jeremy-ka/*Jeremy-nun ku -un] cake- i masiss -essta. (relative clause)
Nom bake REL Nom delicious is
'The cake that Jeremy baked was delicious.'

(87) [Jeremy-ka /*nun o -meon], Emma-ka kippu-halkusita. (if-clause)
Nom /* come if Nom glad will
'If Jeremy comes, Emma will be glad.'

(88) [Emma-ka/*Emma-nun janun-tongan] Jeremy-ka ttunassta. (while-clause)
Nom sleep while Nom leave
'While Emma was sleeping, Jeremy left.'

(89) [ne jujang-i / *ne jujang-un olass-um] -ul uri-nun najungeya
your claim Nom /* right NOMI Acc we later
kedalassta. (nominalised clause)
realise
'Later we realised the rightness of your claim.'

(90) [Jeremy-ka/*Jeremy-nun on kus] -i Emma-ul kkipuke-hessta
Nom come NOMI Nom Acc glad made
'That Jeremy came made Emma glad.'

A sentence is odd when the topic occurs within a relative clause, as in (86), within *-myeon* conditionals, as in (87), within adverbial clauses, as in (88), and within nominalisation in *-um*, - *kus* as in (89) and (90), respectively .

As in (86) and (90), it is not acceptable when a topic occurs in the subject clause of a verb. Topics do not occur in complement clauses with some suffixes, such as, *-ul*. The verb *anta* 'know' takes a NP as its complement thus the embedded clause is nominalised, as follows:

(91) Jo-ka [Harry-ka Emma-ul joahantanun kus] -ul anta.
Nom Nom Acc like NOMI Acc know
'Jo knows that Harry likes Emma.'

(92) *Jo-ka [Harry-nun Emma-ul joahantanun kus] -ul anta.
Nom Acc like NOMI Acc know
'Jo knows that, as for Harry, (he) likes Emma.'

The verb *anta* 'know' takes a noun as its complement. The sentential complement is nominalised. (95) is a clause with the complement marked by the suffix for accusative *ul*. (96) is not acceptable since a topic occurs in the complement clause marked by the suffix for accusative *ul*.

However, there are some exceptions. The topic may occur in the complement clause of a verb where the complementiser is *–ko*. The following examples are complement clauses with the suffix *ko*, as shown in (93):

(93) Jo-ka [Harry-ka Emma-ul joahanta-*ko*] sengkakhanta.
Nom Nom Acc like comp think
'Jo thinks Harry likes Emma.'

When the embedded subject is topicalised the clause will be the following:

(94) ?[Harry *i*-nun] [Jo-ka [____*i* Emma-rul joahanta-*ko*] sengkakhanta].
Nom Acc like comp think
a. 'Jo thinks, as for Harry, (he) likes Emma.'
b. 'Harry thinks Jo likes Emma.'

In (94) a topic is alone extracted from the subordinate clause. (94) is hard to interpret. It is confusing to know who likes Emma. The sentence could be interpreted either as (a) or as (b). The sentence becomes better when the topic and the clause associated with it are fronted together. This is illustrated in the following:

(95) [Harry-nun [____ Emma-ul joahanta-*ko*]]*i* Jo-ka *ei* sengkakhanta.
Acc like comp Nom think
'Jo thinks that, as for Harry, (he) likes Emma.'

(94) shows that a sentence would be confusing when a topic alone is extracted from the subject in the subordinate clause. (95) shows that a sentence would be better when a topic and the clause associated with it are fronted together.
The following is an example of topic extraction from the subordinate clause:

(96) ? *Harry-nun* [Jo-ka [Emma-ka _____ joahanta-ko] malhessta].
Nom Nom like comp said
'Jo said that, as for him, Emma likes (him).'

In (96), the subordinate object is topicalised and is fronted. But it is confusing since it is not clear whether 'Harry said' or 'Jo said'. When the topic and the clause associated with are fronted together, the sentence becomes better and acceptable, as illustrated in (97):

(97) [Harry-nun [Emma-ka ____ joahanta-ko]]*i* Jo-ka _____*i* malhessta.
Nom like comp Nom said
'Jo said, as for Harry, Emma likes (him).'

For those data, it follows that topic cannot be extracted from the subordinate clause. If the topic were far from the gap, it would not be given a correct interpretation.

The situation is the same in deeply embedded clauses. When a subject in a deeply embedded clause is topicalised, the topic and the clause associated with it have to be fronted together. Otherwise the sentence becomes confusing. This is illustrated in the following:

(98) Sally-ka [Jo-ka [Harry-ka Emma-ul joahanta-ko] sengkakhanta-ko]
Nom Nom Nom Acc like comp think comp
malhessta.
say
'Sally said Jo thinks Harry likes Emma.'

(99) Sally-ka [Jo-ka[Harry-nun*i* [____*i* Emma-ul joahanta-ko]] sengkakhanta-ko]
Nom Nom Acc like comp think comp
malhessta.
say
'Sally said Jo thinks, as for Harry, (he) likes Emma.'

(100) ?? [Harry-nun]*i* [Sally-ka [Jo-ka [____*i* Emma-rul joahanta-ko]
Nom Nom Acc like comp
sengkakhanta-ko] malhessta.]
think say

(101) [Harry-nun [_____ Emma-ul joahanta-ko]]*i* [Sally-ka [Jo-ka ____*i*
Acc like comp Nom Nom
sengkakhantako] malhessta].
think say
'Sally said Jo thinks that, as for Harry, (he) likes Emma.'

In (98) two clauses are embedded. In (99) the subject in the lowest clause is topicalised. In (100) topic is fronted from the lowest clause but the sentence is confusing. The sentence will be acceptable when the topic and the associated clause

are fronted together, as in (101). This situation is the same when an object in the lowest clause is topicalised. That is, the sentence is confusing when the topic is fronted alone whereas the sentence is acceptable when the topic and the associated clause are fronted together, as shown in (102) and (103), respectively:

(102) ?? [Harry-nun]*i* [Sally-ka [Jo-ka [Emma-ka _____*i* joahanta-ko]
Nom Nom Nom like comp
sengkakhanta-ko] malhessta]
think say

(103) [Harry-nun [Emma-ka _____ joahanta-ko]]*i* [Sally-ka [Jo-ka _____*i*
Nom like comp Nom Nom
sengkakhantako] malhessta].
think say
'Sally said Jo thinks that, as for Harry, Emma likes (him).'

From those data, it follows that gaps cannot be embedded deeply. Therefore, we might assume that topic clauses cannot get a right interpretation since the topic is far from the gap. It is unlikely that the topic fronted and the matrix subject occurs next to each other. The sentence will be acceptable if the topic and the matrix subject are at a distance. Thus the subordinate topic and the clause associated with it are fronted together.

Having considered Korean Relativisation in chapter 4 and Korean Topicalisation in this section, we will compare the difference between the two in the following section.

6.4 The differences between topicalisation and relativisation in Korean

Korean topicalisation is different from its relativisation in three ways. The first difference is that gaps in relative clauses can be embedded deeply while gaps in topic clauses cannot be. The second difference is that the structure of the relative clauses and that of the topic clauses are different. The third difference is that in relatives, the relative clause without the noun cannot be an independent clause while in topic clauses, the clause which follows the topic can be an independent clause without the topic. Let us consider the first difference in detail. A gap can be more deeply embedded in a relative clause than in a topic clause. As discussed in section 6.3.4, a gap cannot be embedded deeply. On the other hand, in relative clauses a gap can be embedded deeply and the relative suffix *nun* is always on the highest verbs, as we saw earlier. That is, the relative suffix *nun* which identifies the clause as a relative is the modifier of an N' like English relative pronouns. This is illustrated in (104-106):

(104) [*Harry-ka* _____ *joaha-nun*] yeoja
Nom like REL woman
'the woman who(m) Harry likes'

(105) [Emma-ka [*Harry-ka* _____ *joaha*nta-ko] sengkakha-*nun*] yeoja
Nom Nom like comp think Rel woman
'the woman who(m) I think Harry likes'

(106) [Emma-ka [Jane-i [*Harry-ka* ____ *joaha*nta-ko] sengkakhanta-ko] mit-*nun*]
Nom Nom Nom like comp think believe Rel
yeoja
woman
'the woman who(m) Jane believes I think Harry likes'

(104) is a simple relative clause. In (105) and (106) the gaps are embedded and the relative suffix *nun* is separated from the gap and placed next to the head nouns. This difference may stem from the fact that in relative clauses the binder follows the gap that is crucial.

The second difference is that there are contrasts between the structures of relative clauses and topic clauses, as illustrated in (107) and (108):

(107) [....gap....V-nun]NP (relative clauses)
(108) NP-nun[.....gap.....] (topic clauses)

The common characteristics between relative clauses and topic clauses are that both involve *nun,* a gap in relative clauses and a NP outside a clause in topic clauses. *Nun* in relatives is a verb suffix while *nun* in topic clauses is a noun suffix. In relative clauses, the NP follows a clause containing the verb with the suffix *nun* and a gap. In topic clauses, the suffix *nun* is in the NP which precedes a clause containing a gap, as shown in (109) and (110):

(109) [uri-ka _____ joaha-*nun*] hwaka
we Nom like REL painter
'the painter (who) we like'

(110) hwaka-*nun* [uri-ka _____ joahanta].
painter TOP we Nom like
'the painter, we like'

(109) is a relative while (110) is a topic clause. In the former, the head noun *hwaka* follows the relative clause containing a gap and the verb with the relative suffix *nun.* In the latter, the topic *hwaka* contains the topic suffix *nun* and precedes the clause which involves a gap.

The third difference is that in relatives, the relative clause without the noun can not be an independent clause while in topic clauses, the clause which follows the topic can be an independent clause without the topic. As mentioned in Chapter 2, an independent clause can involve a missing argument/missing arguments. Compare the following examples to (109) and (110):

(111) [uri-ka _____ joaha-*nun*]
we Nom like REL
(112) [uri-ka _____ joahanta].
we Nom like
'we like someone/something in discourse'

(109) is a relative and (111) has no head noun. (111) is not an independent clause since it lacks the requirement of the independent clauses, that is, either declarative suffix or interrogative suffix. (110) is a topic clause and (112) has no topic. (112) is an independent clause since it has the declarative suffix *ta*.
We will consider Topic clause constructions in HPSG in detail in the following section.

6.5 Topic clause constructions in HPSG

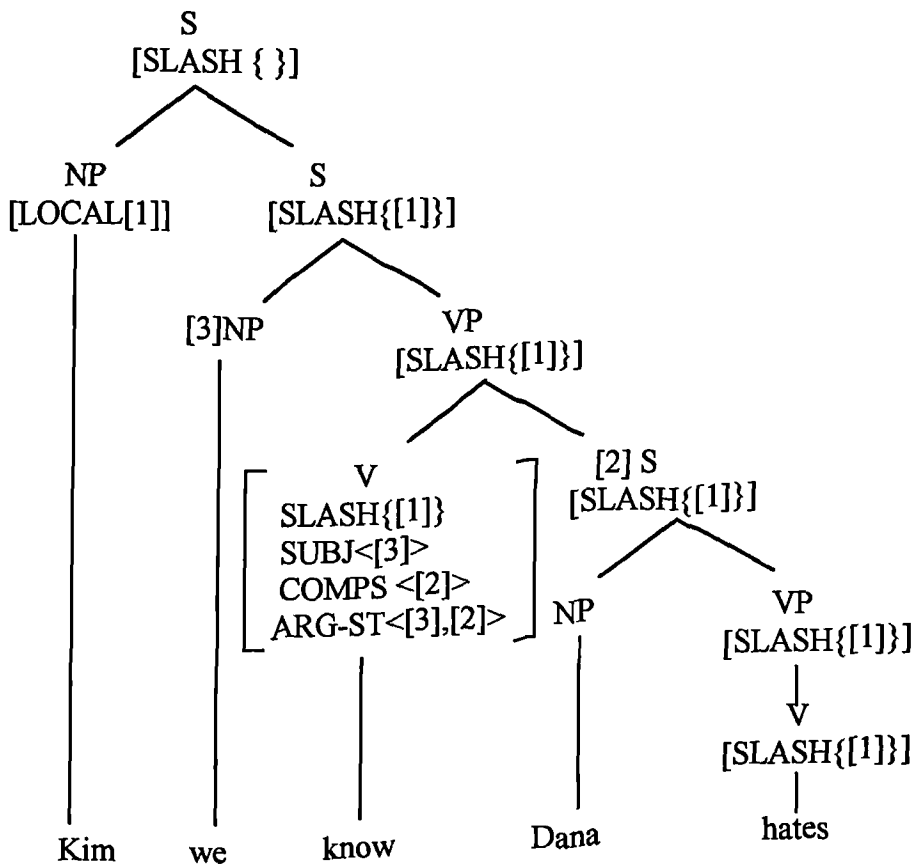
Topic clause construction in English is a filler-gap construction proposed by Pollard and Sag (1994). Topic clauses always involve a gap. Thus the SLASH feature is involved and the SLASH value is coindexed with the topic. We will argue that the topic clause does not involve the SLASH mechanism in Korean, and that topics and the following clauses are not syntactically connected. Thus they are not really unbounded dependency constructions. Nor can Gunji's assumption that topics are adjuncts be right. Instead, we suggest that the Korean topic clause construction is like Clitic left Dislocation in Catalan as analyzed by Vallduvi and Engdahl. The Korean topic clause construction is more like the English *as for* construction.

Pollard and Sag's analysis of English topic clause constructions will be discussed in section 6.5.1. Gunji's analysis of Japanese Topic clause constructions will be considered in section 6.5.2. Vallduvi and Engdahl's clitic left dislocation in Catalan will be discussed in section 6.5.3. The alternative analysis will be proposed in section 6.5.4.

6.5.1 Topic clause constructions in English

As we saw in relative clause constructions, the basic idea of the filler-gap construction is that filler and gap have the same *LOCAL* value, and that they are linked by the feature SLASH. In English, topic clauses are also the filler-gap construction. Having thoroughly discussed the filler-gap constructions in relative clauses in Chapter 4, we will briefly consider the filler-gap construction in topic clauses. Let us consider an example of English topic clause:

(113) Kim, we know Dana hates.



In the bottom part, a constituent is missing in the sense that there is no overt constituent in a position where there would normally be one. The constraint on gaps suggested by Ginzburg and Sag (2000) following Sag are assigned to a gap, as repeated in (114):

(114) Constraint on gap-synsem (Ginzburg and Sag 2000:74)

$$\textit{gap-synsem} \rightarrow \begin{bmatrix} \text{LOC} & [1] \\ \text{NLOC}|\text{SLASH} & \{[1]\} \end{bmatrix}$$

This guarantees that the type *gap-ss* always take a nonempty SLASH specification as its value, and that the LOCAL value of the gap and the SLASH value of the gap are token identical indicated by the tag [1]. The Argument Realisation Principle, as in (97) in section 3.5.1, will guaranteed that all arguments including non-overt argument must be realised either in the SUBJ/COMPS list or in the SLASH feature. The middle part consists of local trees with a SLASH feature specification on a daughter and on its mother. The SLASH value is passed from the missing constituent NP in the bottom part to its mother V, V's mother VP, and VP's mother S until the point where the SLASH value is bounded with the LOCAL value. This is guaranteed by the SLASH amalgamation Constraint (SLAC) in (95) and the Generalised Head Feature Principle (GHFP) in (96) in section 4.4.2. The GHFP ensures that the SYNSEM value of the mother of a headed phrase is identical with that of its head daughter by default. Thus, the SLSAH value is passed from the missing constituent NP to it mother V, V's mother VP and so on. The SLAC guarantees that a verb has a non empty SLASH value since its complement has one. That is why in (113) the higher verb *know* as well as the embedded verb *hates* has the nonempty SLASH specification. The verb *know* contains the SLASH feature since verb's complement contains the SLASH feature.

At the top of the unbounded dependency, the SLASH value of the daughter is not passed up to its mother, that is, the SLASH value of the gap is bound off with the

token identical local features of the filler, here the noun phrase. This is guaranteed by Constraint on head-filler-phrase suggested by Sag (1997):

(115) Constraint on head-filler-phrase (Sag 1997:478):

$$\dot{hd}\text{-}fill\text{-}ph \rightarrow \begin{bmatrix} \text{HD-DTR|SLASH } \{[1]\} \\ \text{NON-HD-DTRS}\langle[\text{LOCAL}[1]]\rangle \end{bmatrix}$$

When the SLASH value is a singleton set, as in (113), all elements in the SLASH value of the head daughter are matched by the LOCAL value of the non head daughter and not inherited to the phrase.

However, this HPSG analysis of English topic clause construction cannot provide a satisfactory account of the Korean counterparts in two reasons. First, the topic has a special suffix *nun* (after consonant *un*). Therefore, the topic and the gap do not have the same LOCAL properties assuming, as is standard, that CASE is a local property. It does not matter whether the *nun-marked NPs* have the case suffix associated with the gap or not. Neither type of *nun*-marked NP has the same LOCAL properties of the gaps in the following clauses. This is illustrated in the following:

(116) Emma-*nun* Harry-ka *e* joahanta.
Nom like
'Emma, Harry likes.'

(117) Harry-*nun* *e* Emma-rul joahanta.
Acc like
'As for Harry, he likes Emma.'

In (116) and (117), markers in topics and those in gaps are different. In (116), the topic *Emma* is marked by *nun* while the gap is marked by *rul*, as illustrated in (118.a) and (118.b), respectively:

(118) a. [HEAD[CASE <*top*>]]
b. [HEAD[CASE <*acc*>]]

As noted in 2.3.1, Case in Korean is realised as the values of the feature CASE. In (117), the topic *Harry* is marked by *nun* while the gap is marked by *ka*. This can be illustrated in (119.a) and (119.b), respectively:

(119) a. [HEAD[CASE <*top*>]]
b. [HEAD[CASE <*nom*>]]

When an indirect object is topicalised, the topic marker is different from the indirect object marker. That is, the topic is marked by *ege* and *nun* while the indirect object is marked by *ege*. This is illustrated as follows:

(120) Emma-*ege-nun* Harry-ka *e* yeopseo -rul ponessta.
Dat Nom postcard Acc send
'To Emma, Harry sends postcards.'

In (120), the *nun*-marked phrase *Harry-ege-nun* has the case suffixes *ege* and *nun* while the gap requires a dative. This can be illustrated in (121.a) and (121.b), respectively:

(121) a. [HEAD[CASE <*dat, top*>]]
b. [HEAD[CASE <*dat*>]]

Those above examples show that the *nun-marked NPs* and the gaps are not the same thing whether the *nun*-marked phrase has the case suffix associated with the gap or not. For this reason, unlike English topic clauses, we assume that Korean topic clauses are not filler-gap constructions.

Secondly, topic clauses without gaps exist. As noted in section 6.2, there are examples with a pronoun of some kind and examples with no constituent associated with the topic. It follows that Korean topic clauses do not always involve the SLASH mechanism. In addition, those clauses without gaps in (23-26) can be independent clauses without the topics, as shown in (122-125);

(122) horangi-ka museopta.
tiger Nom frighten
'Tigers frighten.'

(123) tulip-i yepputa.
Nom pretty
'Tulip is pretty.'

(124) yeokci tonghe- ka jeil jokunyo.
after all east sea N most good.
'(after all) the East sea is the best.'

(125) Seoul-i onhwu-hata.
Nom mild is
'Seoul is mild.'

The fact that topic clauses without gaps exist casts a serious doubt on whether Korean topic clauses involve a SLASH mechanism. The idea that topic clauses do not involve a SLASH mechanism is not new. Gunji (1987) proposes it for one type of Japanese topic clauses. One reason we compare Korean to Japanese is that Japanese is the closest language to Korean at least from one syntactic point of view, word order. Japanese Phrase Structure Grammar (henceforth JPSG) framework proposed by Gunji(1987) will be observed in the following section.

6.5.2 Gunji's (1987) analysis

Gunji analyses case suffixes as postpositions. That is, all constituents with case are preposition phrases (henceforth PPs). In section 2.3.2, we have adopted Sells analysis of NPs with case marking being all NPs in Korean. Case markers are just suffixes and do not have any syntactic status. Therefore PPs in Gunji's term would be equivalent to NPs in Korean.

Gunji (1987) divides topicalisation into two types: one is topic clauses with a gap (Type 1), and the other is without a gap (Type2). Gunji again divides Type1 into two subtypes: one is topic clauses involving a gap and the other is topic clauses involving a reflexive without involving a gap. Gunji also assumes that a topic clause, which involves a gap, binds with a gap, and that a topic clause, which involve a reflexive, binds with a reflexive. The following is examples of Type 1. All Japanese examples indicated by 'J' in this section are from Gunji (1987):

(126) Ken-no haeya-wa oba-ga ____ soozisita. (Type 1) (J)
Gen room Top aunt Nom clean
'As for Ken's room, his aunt cleaned (it).'

(127) Ken-wa zibun-no ie -ga Tokyo-ni aru. (Type 1) (J)
Top self Gen home Nom Loc exist
'As for Ken, his home is in Tokyo.'

As noted in section 7.3.3, Japanese has a topic marker *wa*. In (126), a gap is involved in the object position in the topic clause. The topic *Ken-no haeya* binds with the gap. In (127), what follows topic is a sentence without involving a gap. This is a complete sentence with a subject *zibun-no ie-ga*. The topic *Ken* binds with the reflexive *zibun* 'self'.

Unlike Type 1 topicalisation, Type 2 topicalisation involves neither a gap nor a reflexive. The topic is not bound with anything in the following sentence. An example of the topicalisation Type 2 can be as below:

(128) Nomi-wa Ken-ga 10 nen burini kaettekita. (Type 2) (J)
Top Nom year after came back
'As for Naomi, Ken has come back after 10 years' absence.'

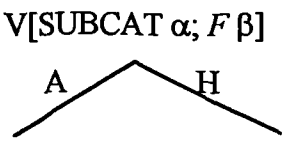
Gunji's (1987) central idea of topic clauses is that topic is an adjunction. Gunji suggests that a topic binds a gap by a FOOT feature, equivalent to Non Local feature in HPSG. By his version of the FOOT feature principle, the value of SLASH feature is passed up to the mother in complement but not in adjunction, as the following:

(129) FOOT Feature Principle (FFP) (Gunji:165)

a. In complementation: The value of a FOOT feature of the mother unifies with the union of those of her daughters.
b. In adjunction: The value of a FOOT feature of the mother unifies with the union of those of her daughters, with the possible exception that one of the categories in the FOOT values of the daughters unifies (*modulo* PFORM) with the adjunct and is not passed up to the mother.

The Foot Feature Principle guarantees that in topic clauses SLASH value is not realised in the mother since topic is an adjunction. The structure of topic clauses can be the following:

(130) Topicalisation (Gunji:168)



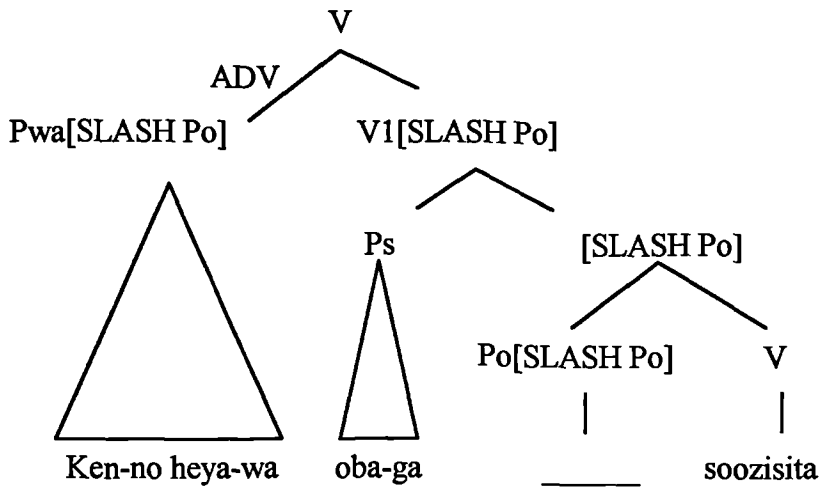
PP[wa; ADJUNCT V[*F* γ]] V[SUBCAT α; *F* γ]

: *F* stands for a FOOT feature.

Gunji's SUBCAT corresponds to the HPSG valence features discussed in Chapter 1. This SUBCAT value is a set thus it allows more than one topic in a clause. In Type 1 topicalisation with a gap, as in (126), one of the PPs in the value of a FOOT feature of the head, $F\gamma$, unifies with the topic PP and the rest is passed up to its mother. In Type 2 topicalisation without a gap as in (128), $F\gamma$ is passed up to the mother and is identical with $F\beta$. These are ensured by the FOOT feature principle for adjunction in (129.b).

In Type 1 topicalisation, topic binds with either a gap or a reflexive. As noted in section 6.2, in Korean it is problematic that the topic and the gap in the following clause have different case. But, Gunji's idea that topic is an adjunction together with (152.b) allow topic to have a different case from gap in Japanese topic clauses. The following example illustrates Japanese Type 1 topicalisation involving a gap (Gunji 1987:170):

(131) a.



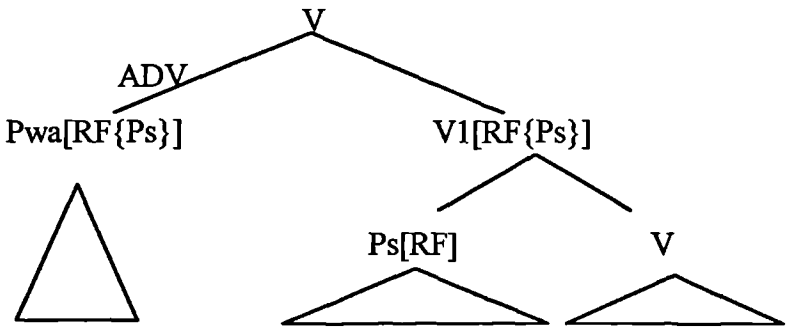
b. *R* (k's-room, clean(a, k's-room))

Pwa stands for a topic PP, Ps for a subject PP, and Po for an object PP. Since an object is missing, a Foot feature is employed, indicated as 'SLASH', as in [SLASH Po]. Gunji uses the symbol '/' for 'SLASH' but here we replace '/' with the feature

SLASH for reader's sake. Gunji proposes that the SLASH value is not a single category but a set of categories. The value of the Foot feature indicated as 'SLASH Po' is passed up to the V1 but not to its mother V by the Foot Feature Principle. That is, the FOOT value of the daughter, V1, is unified with an adjunct, the topic, and not passed up to its mother, V by the Foot Feature Principle. Gunji uses *R*, as in (b), as a contextually specified relation between an individual and a proposition. *R* in (b) shows some kind of relationship between *k's room* and *his aunt's cleaning it.* The situation is that Ken's room is cleaned by his aunt. The crucial point about (b) is that it allows the filler and the gap to have different PFORM values hence different cases.

The following tree diagram is Japanese Type 1 topicalisation involving a reflexive:

(132) a.

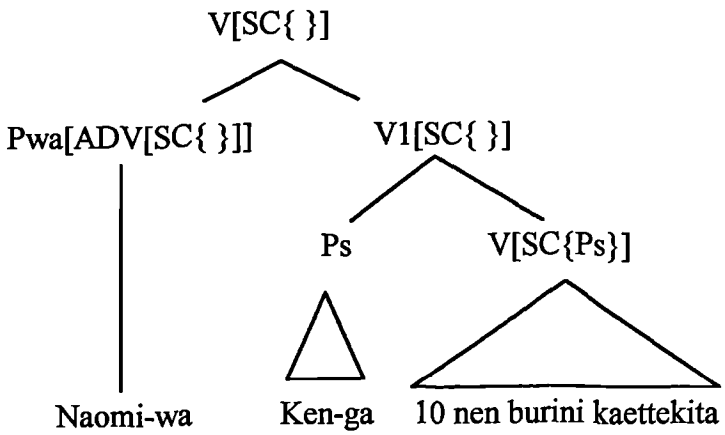


b. *R* (k, exist-in(k's home, Tokyo)) (Gunji 1987:171)

This does not involve the SLASH feature since there is no gap. Instead the reflexive feature RF is involved in the subject. The value of the RF feature is passed up to the V1 but not to its mother V by the Foot Feature Principle. That is, the FOOT value of the daughter, V1, is unified with an adjunct, the topic, and not passed up to its mother, V, by the Foot Feature Principle. *R* in (b) specifies some kind of relationship between *k* (= the topic *Ken*) and the following sentence *Zibun-no ie-ga Tokyo-ni aru.* The situation is that Ken's home is in Tokyo.

In Type 2 topicalisation, topic does not bind anything in the following clause. Instead, Gunji assumes that there is some kind of relationship between the topic and the following clause. For instance, in (133), there is some kind of relationship between the topic *Naomi* and the fact that Ken has come back after 10 year's absence. The following is an example of Japanese topicalisation Type II:

(133) a.

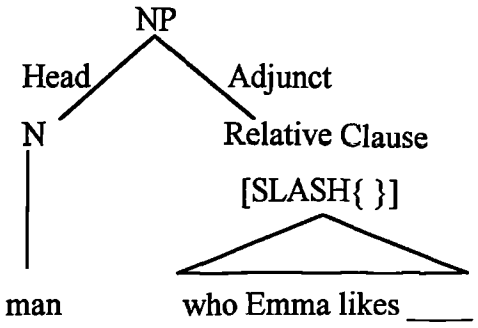


b. *R* (n, come-back-after-10-years-absence (k)) (Gunji 1987:172)

Since there is no gap in the clause, the feature SLASH is not employed. *R* in (b) shows some kind of relationship between *n* (= the topic *Naomi*) and the following sentence *Ken-ga 10 nen burini kaettekita.* The situation is that Naomi has been separated from Ken and has met him for the first time in 10 years.

However, we reject Gunji's analysis for three reasons: the first reason why we reject Gunji's analysis is that Gunji's version of the Foot Feature Principle is *ad-hoc.* Normally in a head-adjunct structure the head and the mother have the same value for the SLASH feature. The following is an example of the head-adjunct structure.

(134) man [who Emma likes _____]



The adjunct, here the relative clause, employs the SLASH feature since it involves a missing constituent. The empty SLASH specification of the relative means that the SLASH value has already been bound within the relative clause and is not passed up to its mother anymore. Therefore the head and the mother have the same value for the SLASH feature. Gunji modifies the FOOT feature principle to allow only his special kind of adjunct.

The second reason is that there is evidence that a topic is not a kind of adjunct. If Gunji's assumption that topic is an adjunct were right, more than one topics could exist in a clause. This is against our analysis that only one topic exists in a clause. As noted earlier in section 6.3.3, it is possible that more than one *nun*-marked phrase can exist in a clause. But, only the *nun*-marked phrase in sentence-initial position is realised as a topic whereas the other *nun-marked NPs* are realised as contrast, as repeated in the following:

(135) Emma-nun Harry-rul kumyoil-e mananta.
Acc Friday on meet
'As for Emma, she meets Harry on Friday.'

There is only one *nun*-marked phrase in sentence-initial position. Therefore, the *nun*-marked phrase is interpreted as a topic. There are two *nun-marked NPs* in a clause in the following example:

(136) Emma-nun Harry-nun kumyoil-e mananta.
Friday on meet De
'It is Harry not someone else that as for Emma, (she) meets on Friday.'

One *nun*-marked phrase is at the beginning of the sentence and the other *nun*-marked phrase is in the middle of the sentence. If Gunji's assumption were right, both *nun-marked NPs*, *Emma-nun* and *Harry-nun*, could be topics. But we can't have two topics in a clause. The first *nun*-marked phrase *Emma* is interpreted as a topic while the second *nun*-marked phrase *Harry* is interpreted as a contrast. From those data, it follows that only one topic appears in a clause while more than a contrast can appear in a clause. Thus, Gunji's analysis is unsatisfactory because it seems to predict that two topics are possible.

The third reason is that a gap can appear without a topic. The clause following the topic is grammatical on its own with a gap, as shown in (137) and (138):

(137) Emma-nun [Harry-ka ____ joahan-ta].
Nom like
'Emma, Harry likes.'

(138) Harry-ka _____ joahan-ta.
Nom like De
'Harry likes something/someone.'

(137) is a topic clause with a missing constituent in the object position. But (138) shows that the clause without the topic can be an independent clause even though a missing constituent exists in the clause. As noted in Chapter 2, Korean freely allows missing NPs. As noted in Chapter 3, the missing subject, object or both appear in Korean since Korean is a *Pro* drop language, as repeated below:

(139) _____ Emma-rul saranghe.
Acc love
'Someone/somepeople loves/love Emma'

(140) Harry-ka _____ saranghe.
Nom love
'Harry loves someone/something'

(141) ____ ____ Saranghe.
love
'(I) love (you)'

As shown in (131-134) in section 6.5.1, a topic clause can appear without a gap. In English topic clauses, the topic is associated with the missing constituent in the following clause. Unlike English topic clauses, there is another type, topic clauses with no obvious gap. From the given data, it follows that Korean topics do not always involve the SLASH mechanism since the feature SLASH is not involved without a gap. The fact that a topic clause can appear without a gap, and a gap can appear without a topic shows that the topic and the gap in the following clause will be generated anyway without the SLASH mechanism which is therefore redundant. Topics and the following clauses are not syntactically connected. Therefore, the Korean topic clause constructions are not unbounded dependency constructions.

We have argued that Korean topic clauses are neither a filler-gap construction suggested by Pollard and Sag (1994) nor adjunction proposed by Gunji (1987). Vallduvi and Engdahl's (1996) analysis of clitic left dislocation constructions in Catalan provides a more satisfactory option applicable to Korean Topic clauses. This will be considered in the following section.

6.5.3 Engdahl and Vallduvi's (1996) Information Packaging

Vallduvi (1992) suggests a particular formalization of ideas about information structure developed by a variety of people. This is called Information Packaging. The term information packaging is originally introduced by Chafe (1976). Vallduvi (1992) assumes that Catalan left-detachment is equivalent to English topicalisation or nonfocal preposing. In Catalan the syntactic position is significant for information structure. As noted in chapter 2., word order in Korean is quite flexible. However, the position of the topic is important as noted in section 6.2. Vallduvi and Engdahl (1996) point out that special morphemes are associated with linkhood in many languages, for instance, Japanese *wa* which is mentioned in section 6.3. They adopt Kuno's (1973) notion of *wa* where Kuno distinguishes two ways in which it can be used as a contrastive and as a theme. The former corresponds to contrastive link and the latter to link in Vallduvi and Engdahl's terms. As noted in section 6.2, Korean also has a special morpheme *nun* for topics. We adapt Vallduvi and Engdahl's view that special morphemes are associated with linkhood. Therefore, the *nun*-marked topic corresponds to link.

Engdahl and Vallduvi (1996) define the notion of Information Packaging:

> 'Information Packaging is a structuring of sentences by syntactic, prosodic, or morphological means that arises from the need to meet the communicative demands of a particular context or discourse.' (Engdahl and Vallduvi 1996:460)

In Information Packaging, sentences differ in how they are said, that is, they differ in the way how their contents are packaged, as illustrated in the following:

(142) a. Mary hates [F CHOCOLATE].
b. Mary [F HATES] chocolate.
c. Chocolate, Mary [F HATES]. (Engdahl and Vallduvi 1994:44)

Those sentences convey the same information but they are packaged in different ways.

In Information Packaging, sentences are divided into contrast-ground articulation which plays a central role. In a sentence, CONTRAST is an informative, new, dominant, or unexpected part while GROUND is a non informative, known, or expected part. Engdahl and Vallduvi (1994) consider CONTRAST as 'the only contribution that a sentence S makes to the information state of the hearer at the time of utterance. All sentences have a focal segment ....the GROUND is already subsumed by the input information state and acts as an usher for the contrast (Engdahl and Vallduvi 1994:44).' The GROUND is divided into two subtypes, LINK and TAIL 'Link indicates *where* the contrast should go in the input information state and Tails indicate *how* the contrast fits there'.

Engdahl and Vallduvi (1996) propose that this information Structure of the sentence is presented as part of the CONTEXT field in HPSG, as the following:

(143)
$$\begin{bmatrix} \text{CONTEXT} & \begin{bmatrix} \text{INDEX} & \\ \text{BACKGROUND} & \\ \text{INFO-STRUCT} & \begin{bmatrix} \text{FOCUS} \\ \text{GRUOUND|LINK/TAIL} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

In a sentence, every element must be associated with one of three primitives, contrast, link and tail. All instruction types include contrast since Engdahl and Vallduvi assume that every sentence has a focal segment. If a constituent is not a contrast, it must be a ground. Vice verse. These three informational primitives, CONTRAST, LINK and TAIL, are combined in four different instruction types: *link-focus, link-focus-tail, all-focus* and *focus-tail.* In this thesis, we will be mainly concerned with the first two instruction types, *link-focus* and *link-focus-tail* which include *link.* They assume that *link-focus* instructions correspond to the typical topic-comment structures.

The structure of those instruction types is realised differently in different languages. For example, in English, Information packaging is expressed through intonation rather than word order. In Catalan, it is syntactic position not intonation that is significant for informational structure. Nuclear stress appears in the sentential core in which word order is *verb-obj-subj* (also see Vallduvi 1993b). Every constituent within that sentential core is interpreted as focal. If an argument of a verb is detached away from the sentential core, it is interpreted as nonfocal. They call this clitic-dislocation or detachment. The clitic dislocation has been discussed in other languages such as Greek and Italian. The definition given to this clitic-dislocation is that of a configuration where a left or right sister of S binds a clitic or agreement in S. The left-dislocated phrases are related links while the right-dislocated phrases are related with tails, as in the following example:

(144) Catalan (V and E 1994:48)

a. link-contrast : El president*1* [F odia el joc de porcellana de DELFT *t1*.]
hate the Delft china set

b. link-contrast-tail:
El president*1* [F l2'ODIA *t2 t1*,] el joc de porcellana de Delft*2*.
hate the Delft china set

The sentential core is interpreted as contrast, indicated by [F...]. In (a) the subject of the verb *el president* is left-dislocated and interpreted as a link. There is no subject clitic but there is verb agreement with subjects. In (b) the subject *el president* is left-dislocated and is interpreted as a tail. The object *el joc de porcellana de DELFT* is also right-dislocated and bounds by a clitic in the sentential core. (b) shows that more than one argument can be left-dislocated or right-dislocated. This suggests that Catalan allows more than one topic.

Because we will assume that topics are related to *link* like the left-dislocated elements in Catalan.

Engdahl and Vallduvi argue that the dislocation construction in Catalan is different from the filler-gap construction of Pollard and Sag (1994). In the filler-gap schema a filler-daughter is matched up with a gap and the CONTENT of the FILLER-DTR is token-identical with the CONTENT of the gap. However, in Engdahl and Vallduvi's detachment constructions, 'a detached phrase co-occurs with a clitic or agreement marker. The detached phrase provides additional information concerning an argument which is realised as a clitic or constrained by a particular choice of subject agreement (Engdahl and Vallduvi 1994)'. This means that a detached phrase co-occurs with some kind of gap. Thus, Catalan does not have anything like the Korean gap-less topic clause constructions. A detached phrase and a clitic are not identical but agree with each other. That is, a detached phrase is not a filler. It is not acceptable if a detached phrase and a clitic do not agree with each other. This is illustrated as the following examples from Engdahl and Vallduvi (1996):

(145) El Pau*l* no el*l* conec.
the -masc Pau no CL-masc 1st-know
'Paul I don't know'

(146) *El Pau*l* no la*l* conec.
the -masc Pau no CL-fem 1st-know

In (145) the detached phrase *El Pau* does agree with the clitic *el* for masculine while in (146) it does not. Hence the latter is not acceptable.

Engdahl and Vallduvi propose an ID schema for Catalan in that left-detached phrases and right-detached phrases are introduced as sisters of S and they are determined as LINK and TAIL, respectively, and in that the relation required between the dislocated phrase and the gap is a binding relation.

However, Korean topic clauses are different from Catalan left-dislocation in four ways. First, dislocation constructions in Catalan involve a gap while Korean topic clauses do not.

Second, Calatan clitic and agreement system of the kind does not exist in Korean. Instead, topic has a marker *nun.* this is illustrated in (147) and (148):

(147) El Pau*1* [no el*1* conec.] (Engdahl and Vallduvi 1994:64)
the –masc Pau no CL-masc 1st-know
'Paul I don't know'

(148) Paul-un [ne-ka morunta].
I Nom not konw
'Paul, I don't know.'

Third, in Korean only one topic exists while in Catalan more than one dislocated phrase is allowed. Unlike Korean, no ordering restriction is given in Catalan. These are illustrated in the following:

(149) Emma-nun Harry-nun joahanta.
Top Foc like
'Emma, it is Harry who likes (her).'

(150) El president*1* [F l2'ODIA *t2* *t1*,] el joc de porcellana de Delft*2*.
the president hate the Delft china set
'The president hates the Delft china set.'

In (149) there is only one dislocated phrase *Emma-nun* even if there is more than one nun-marked NPs. Always it is located in sentence-initial position, that is, left-dislocated. In (150) there are two dislocated phrases. One is left-dislocated and the other is right-dislocated.

Fourth, only NP can be a topic. As noted in section 2.3.2, we have adopted Sells' analysis of suffixes not being phrasal heads. All NPs with case suffixes are interpreted as NPs.

The fact mentioned above suggests that we should set up a constraint on head-topic-phrases different from the head-dislocation schema in Catalan. One possibility might be the following:

(151) A constraint on the head-topic-phrases (for Korean):

$$\textit{hd-topic-ph} \rightarrow \left[\begin{array}{l} \text{CONTEXT|INFO-STRUCT}\left[\begin{array}{l}\text{FOCUS: [1]}\\ \text{GRUOUND|LINK: [2]}\end{array}\right] \\ \text{HD-DTR}\left[\begin{array}{l}\text{CATEGORY|HEAD| VFORM } \textit{fin}\\ \text{CONTEXT|FOCUS:[1]}\end{array}\right] \\ \text{NON-HD-DTR}\left[\begin{array}{l}\text{CATEGORY|HEAD|CASE } \textit{nun}\\ \text{CONTEXT|GROUND|LINK:[2]}\end{array}\right] \end{array}\right]$$

This rule can be paraphrased in that in a head-topic-phrase, the head-daughter is finite and the non-head-daughter, that is, a topic, is marked by *nun*. We consider the suffix *nun* as a case marker. The INFOR-STRUCTURE value is inherited to its mother. This rule does not contain any relation between the dislocated element, here, a topic, and a gap in the following clause.

We have argued that Korean topic clause constructions are different from the clitic left dislocation in Catalan in the sense that the latter involves a gap. Maybe Korean topic clause constructions are more like English *as for* constructions. This will be discussed in the following section.

6.5.4 Our proposal

We will propose that Korean topic clauses are like English *as for* sentences in two reasons: first, the *as for* NP construction does not involve gaps and second, it may involve a pronoun coreferential with the NP but it does not have to. Roughly *as for* corresponds to *–nun* and a pronoun corresponds to a Korean gap which is a null pronoun, as illustrated in the following:

(152) As for John*i*, I can't stand him*i*.

(153) As for England, the weather is terrible.

(154) Emma*i*-nun Harry-ka kunyeo*i*-rul saranghanta.
Nom she Acc like
'As for Emma, Harry loves her.'

(155) Madrid-nun kyeoul-i chupta.
winter Nom cold
'As for Madrid, the winter is cold.'

In (152) and (154), there is no gap but a pronoun coreferential with topic. In (153) and (155), there is neither a gap nor a pronoun coreferential with topic. (152-155) show that the English *as for* constructions and the Korean topic clause constructions do not involve gaps and need not contain a pronoun coreferential with a topic.
It has been noted that the *as for* construction might be related to topic. As Lambrecht (1994) points out, the *as for* construction can be used to test for determining the topic status of expression. In *as for* test, the referent of the topic expression first appears in pre-sentential position as the complement of *as for* and then is repeated in the following sentence as a pronominal. The *as for* NP can be used only if the referent NP is a potential topic in discourse at the time the phrase is used. It would be impossible to use the *as for* construction for a new referent, as illustrated in (156) and (157):

(156) *As for a strange guy, I saw him last night.
(157) *As for whom did they go to school?

One might think that the *as for* constructions are the same as the English topic clause constructions. But, the *as for* constructions are different from English topic clauses

constructions in the sense that the former involves gaps which are coindexed with topics while the latter does not. This is shown in the following:

(158) John*i*, I can't rely on ____*i* .
(159) As for John*i*, I can't stand him*i*.

Therefore, the English topic clause constructions involve a filler-gap construction while the English *as for* constructions do not.

6.6 Conclusion

Topic clause construction in English is a filler-gap construction proposed by Pollard and Sag (1994). A filler, here a topic, and a gap in the following clause have the same LOCAL properties. The fact that Korean topic has a special marker *nun* for topic which is different from the marker in the gap shows that the LOCAL properties of the topic and the gap are not the same. This casts a serious doubt on whether Korean topic clauses are a filler-gap construction. We have argued that the topic is not syntactically related to the gap in the following clause in two reasons: First, there are topic clauses involving no gaps. Thus, the SLASH mechanism is not always involved in the Korean topic clauses. Second, the clauses involving gaps can be independent clauses since Korean is a *pro* drop language. A topic clause can appear without a gap, and a gap can appear without a topic. From those points we assume that the topic and the gap in the following clause will be generated anyway without the SLASH mechanism. Therefore, Korean topic clause constructions are not unbounded dependency constructions. Gunji's (1987) assumption that topic is a kind of adjunction is not true. If his assumption were right, a clause could have more than one topic. But a topic clause can have only one topic in Korean. More satisfactory analysis can be found in a left-dislocation in Catalan in Information Packaging suggested by Vallduvi and Engdahl's (1996) analysis in the sense that the left dislocation in Catalan is not the filler-gap construction. But the clitic left

dislocation in Catalan still involves gaps and the agreement between clitic and detached phrase. Instead we suggest that the Korean topic clause constructions are more like the *as for* construction in English in the sense that the *as for* construction does not involve a gap and does not need to involve a pronoun coreferential with an *as for NP*. We have proposed a constraint for Korean topics which ensures that topic clauses do not involve the SLASH feature and topic is not syntactically related to the gap in the following clause.

Conclusion

In this thesis, we have discussed unbounded dependencies in Korean. Korean wh-interrogatives are excluded in this thesis. The reason is that we have defined the term 'unbounded dependencies' as syntactic dependencies in section 1.5. The *wh*-words are placed in the same place as the institutions in question, that is, wh-words are *in situ.* There is some kind of dependency between the *wh*-element and the interrogative suffix *ni.* But this is a semantic dependency. Therefore, English unbounded dependency constructions, mainly relative clauses and topic clauses, are compared with Korean counterparts.

One might assume that topic clauses are unbounded dependency. However, they are not unbounded dependency construction in three reasons: firstly, the LOCAL value of the gap is not identical to that of the topic. One important characteristic of Korean topic clauses is suffixes, *nun* and *un* (after consonants), for topics. This is unlike English where topics look just like ordinary phrases. Thus, the relationship between topic and gap is not the filler-gap construction. Secondly, topic clauses without gaps exist. This shows that topic clause do not always involve the SLASH mechanism. Third, gap can appear without a topic since Korean is a *pro* drop language. Thus, the topic and the gap in the following clause will be generated without the SLASH mechanism. This means that they are not syntactically connected.

Unlike topic clauses and wh-interrogatives, relative clauses are real unbounded dependencies in Korean. There are two types of relative clauses in Korean, externally-headed relative clauses and internally-headed relative clauses. There is no relative pronouns instead the relative suffix *nun* exists in both types of relative clauses. Thus, the verbs in both types of relatives have the [STYPE *nun-var*] specification. In Externally-headed relative clauses, the relative suffix *nun* plays the role of relative pronouns. When a gap is embedded deeply, the suffix *nun* is in the

highest verb next to the head noun. This dependency is unbounded. Another type of relative clauses, Internally-headed relative clauses, can also be embedded deeply. Since there is no gap in internally-headed relative clauses, what is embedded is that internally-headed relative clauses themselves and the relative suffix *nun* is always in the highest verb just like externally-head relative clauses. In both relatives, the MOD feature is in the highest verbs involving the suffix *nun*. But the fact that the *nun*-marked verbs can appear other situation cases some doubt on whether the properties of both types of relative clauses, EHRCs and IHRCs, might stem from those of *nun*-marked verbs. The idea that IHRCs are modifiers is untenable because whereas more than one EHRCs can combine with a single ordinary noun, only a single IHRC can combine with *kus*. Therefore, EHRCs have modificational properties while IHRCs do not. Since we suggest that IHRCs do not modify the nominal *kus*, an IHRC is not an adjunct. Thus, the relationship between the nominal *kus* and IHRCs is a head and a complement. On the other hand, Korean internally-headed relative clauses are not real relatives in two reasons: First, they do not have the MOD specification as internally-headed relatives cannot stack, second they are head-complement clauses thus they do not inherit constraints from head-adjunct clauses. They are not real relative clause constructions like externally-headed relative clauses.

We have suggested that complements include subject as Korean does not observe subject-object asymmetries in four reasons. First, either *that* or *wh*-element is required in a relative clause with a subject gap whereas neither is required in a relative clause with a non-subject gap. Second, subject-auxiliary inversion is required with a non-subject *wh*-interrogative but not with a subject *wh*-interrogative. Third, the agreement exists between subjects and verbs but not between objects and verbs. Fourth contrast is that the nominative forms of the personal pronouns are different from the accusative forms of the personal pronouns. We have also suggested that Korean does not observe subject-object asymmetries whether subjects and objects are gaps or contain gaps, and whether gaps are unbounded dependency gaps or *null-pronouns*. Thus, we have proposed a unified analysis for

both unbounded dependency gaps and non extraction gaps. The *gap-ss* is assigned to subject gaps or complement gaps. The COMPS list includes subjects and non overt arguments whether they are subjects or complements are only realised in the ARG-ST list but not in the COMPS list. Since we assume that Korean does not observe the subject-object asymmetry, When we apply Korean to inheritance hierarchy, the numbers of maximal lexical types are less than English.

Bibliography

Baek, E-J. (1984), *Modern Korean Syntax*, Canadian society for Korean linguistics and language teaching.

Beck, S. & S. S. Kim (1996), 'On Wh- and Operator Scope in Korea', *Sprachtheoretishe Grundlagen fur die Computerlinguistik*, Universitaet Stuttgart.

Borsley, R.D. (1987), 'Subject and Complements in HPSG', Technical report no 107, Stanford nuiversity.

Borsley, R.D. (1989), 'An HPSG approach to Welsh', *Journal of Linguistics* 25, 333-354.

Borsley, R.D. (1990), 'Welsh Passives', in M. J. Ball, J. Fife, E. Poppe and J. Rowland (eds.), *Celtic Linguistics: Reading in the Brythonic Languages*, Amsterdam, John Benjamins Publishing Company, 89-107.

Borsley, R.D. (1995), 'On some similarities and differences between Welsh and Syrian Arabic', *Linguistics* 33, 99-122.

Borsley, R.D. (1996), *Modern Phrase Structure Grammar*, Blackwell Publishers, Oxford.

Borsley, R.D. (1997), 'Relative Clauses and the Theory of Phrase Structure', *Linguistic Inquiry* 28, 629-647.

Borsley, R.D. (1999), *Syntactic Theory: a Unified Approach 2nd edition*, Arnold, London.

Brody, M. (1995), *Lexico-Logical Form: A Radically Minimalist Theory*, MIT Press, Cambridge, MA.

Chafe W.L.(1976), 'Giveness, constrativeness, definitiveness, subjects, topics and point of view', in C. Li (ed), *Subject and topic*, Academic Press, New York, 25-55

Cho, Y.M.Y. and P. Sells (1995), 'A Lexical Account of Inflectional Suffixes in Korean', *Journal of East Asian Linguistics* 4, 119-174.

Choe, J. W. (1987), 'LF Movement and Pied-Piping', *Linguistic Inquiry* 18, 348-353.

Chomsky, N. (1972), '*Language and Mind*' enlarged edition, Harcourt Brace Jovanovich, New York.

Chomsky, N. (1977), 'On Wh-Movement', in P.W. Culicover, T. Wasow, and A. Akamajian, (eds.), *Formal Syntax*, Academic Press, New York, 71-162.

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

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

Chomsky, N. (1986a), *Barriers*, MIT Press, Cambridge, MA.

Chomsky, N. (1986b), *Knowledge of Language*. Praeger, New York.

Chomsky, N. (1995), *The Minimalist Program. Cambridge*, MIT Press, Cambridge, MA.

Choo, M. (1993), 'Empty Pronouns in Korean Topic Constructions and Relative Clauses', in Kuno and Whitman (eds.), *Harvard Studies in Korean Linguistics V*, 262-273.

Chun, S.A. (1985), 'Possessor Ascension for Multiple Case Sentences', in S. Kuno, J. Whitman, I. H. Lee & Y. S. Kang (eds.), *Harvard Studies in Korean Linguistics* I, 30-39.

Cole, P. (1987), 'The Structure of Internally Headed Relative Clauses', *Natural Language and Linguistic Theory* 5, 277-302.

Cook, V. J. and M. Newson (1996), *Chomsky's Universal Grammar : An Introduction*, Blackwell, Oxford.

Culicover, P. (1993), 'Evidence against ECP accounts of the *that-t* effect', *Linguistic Inquiry* 24, 557-61.

Dini, L. (1998), 'Null Complement in Italian', in S. Balari and L. Dini (eds), *Romance in HPSG*, CSLI, 219-266.

Doron, E. & C. Heycock (1998), 'Filling and Licensing Multiple Specifiers', in Adger et al (eds), *Specifiers : Minimalist approaches*, Oxford University Press, 69-89.

Downing, B. T. (1978), 'Some Universals of Relative Clause Structure', in J. H. Greenberg (ed.), *Universals of Human Language Vol 4 Syntax.* Stanford University Press, 375-418.

Emond, J. (1980), 'Word Order in Generative Grammar', *Journal of Linguistic Research* 1.1.

Engdahl, E and E. Vallduvi (1994), 'information packaging and grammar architecture: a constraint-based approach (DYANA-2 report R.1.3.B)', in E. Engdahl (ed.), 39-79, ILLC, Amsterdam.

Engdahl, E and E. Vallduvi (1996), 'Information Packaging in HPSG', in C. Grover and E. Vallduvi (eds.), *Studies in HPSG*, Edinburgh working papers in cognitive science vol.12, 1-31.

Firbas, J. (1964), 'On defining the theme in functional sentence analysis', *Travaux Linguistiques de Prague* 1, 267-280.

Firbas, J. (1966), 'Non-thematic Subjects in Contemporary English', *Travaux Linguistiques de Prague* 2, 239-256.

Fries, P. (1983), 'On the Status of Theme in English: Argument from Discourse', in J. S. Petoefi and E. Sozer (eds.), *Micro and Macro Connexity in Texts*, Helmut Buske Verlag, Hamburg.

Fukui, N. (1993), 'Parameters and Optionality', *Linguistic Inquiry* 24, 399-420.

Gazdar, G. (1981), 'Unbounded dependencies and Coordinate Structure', *Linguistic Inquiry* 12, 155-184.

Gazdar, G. (1982), 'Phrase Structure Grammar', in P. Jacobson and G.K. Pullum (eds.), 131-186.

Gunji, T. (1987), *Japanese Phrase Structure Grammar*, D. Reidel Publishing Co., Dordrecht.

Haegeman, L. (1994), *Introduction to Government & Binding theory*, Blackwell, Oxford.

Haig, J. (1976), 'Shadow Pronoun Deletion in Japanese', *Linguistic Inquiry* 7, 363-371.

Halliday, M. (1967), 'Notes on Transitivity and Theme in English: Part 2', *Journal of Linguistics* 3, 199-244.

Han, J. (1990), *Movement And Empty Categories In Korean Syntax*, Hanshin Publishing Co., Seoul.

Hasegawa, N. (1985), 'On the so-called "Zero Pronoun" in Japanese', *Linguistic Review* 4, 289-341.

Heycock, C. and Y. S. Lee (1990), 'Subjects and Predication in Korean and Japanese', in H. Hoji (ed), *Japanese/Korean Linguistics* I , 239-253.

Hong, M. (1998), 'Treating Multiple-Subject Constructions in a Constraint-Based MT-System', *The proceeding of the KOVENS 98.*

Hong, S. (1985), *A and A' Binding In Korean and English: Government-Binding Parameters*, Hanshin Publishing, Seoul.

Horie, K. (1993), 'Internally Headed Relative Clauses in Korean and Japanese: Where Do the Differences Come From?', in Kuno and Whitman (eds.), *Harvard Studies in Korean Linguistics V*, 449-458.

Hornstein, N. (1995), *Logical Form.* Blackwell, Oxford.

Hudson (1990), *English Word Grammar*, Blackwell, Oxford.

Hukari, T and R.D. Levine (1991a), 'On the disunity of unbounded dependency constructions', *Natural Language and Linguistic Theory* 9, 97-144.

Im, H. B. & I. S. Lee (1983), *Kukemunpuplon*, Hakyeonsa, Seoul.

Jhang, S. (1991). 'Internally-Headed Relative Clauses in Korean', in Kuno and Whitman (eds.), *Harvard Studies in Korean Linguistics IV. 269-280.*

Jo, M. J. (1986), *Fixed Word Order and the Theory of the Pre-Verbal Focus Position in Korea*, Hanshin Publishing, Seoul.

Kang, M-Y. (1988), 'Syntactic Movement in Korean Relativization in Korean', *Linguistics in the morning calm* II, Hanshin Publishing, Seoul.

Kayne, R. S. (1983), 'Connectedness', *Linguistic Inquiry* 14, 223-249.

Kayne, R. S. (1994), *The Asymmetry of Syntax*, MIT Press, Cambridge, MA.

Kathol, A. (2000), 'The morphosyntax of Lai Relative Clauses', in R. Cann, C. Grover and P. Miller (eds), *Grammatical Interfaces in HPSG*, CSLI, Stanford, 137-151.

Keenan, E. L. and Comrie, B. (1977), 'Noun Phrase Accessibility and Universal Grammar', *Linguistic Inquiry* 8, 63-99.

Keenan, E. L. (1985), 'Relative Clauses', in T. Shopen (ed.), *Language typology and Syntactic Description Vol II Complex construction.* Cambridge University Press, 141-170.

Kang, M.Y. (1988), 'Syntactic Movement in Korean Relativization', in *Linguistics in the Morning Calm II*, Hanshin publishing, Seoul.

Kim, I. (1993), 'Topicalization as A-Scrambling', in Kuno and Whitman (eds.), *Harvard Studies in Korean Linguistics V*, 358-367.

Kim, J-B (1999). 'A local treatment of nonlocal relativisation in Korean', *Proceedings of the 25th Berkeley Linguistic Society.*

Kim, J-B. and B-S. Park (2000), 'Grammatical Interfaces in Korean Relatives ', in R. Cann, C. Grover and P. Miller (eds.), *Grammatical Interfaces in HPSG*, CSLI, Stanford, 152-168.

Kim, J. M. (1990), *CoReference Phenomena In Korean: A Functional Analysis*, Hanshin Publishing, Seoul.

Kim, Y. B. (1987), 'A GPSG Approach to Korean Honorifics', in S. Kuno, J. Whitman, I.H. Lee & Y.S. Kang (eds.), *Harvard Studies in Korean Linguistics* II : 229-238.

Kim, W.H. (1994), *Grammatical Relations And Anaphora In Korean*, Hanshin Publishing, Seoul.

Kiss, K.E. (1981), 'On the Japanese 'Double Subject' Construction', *Linguistic Review* 1, 155-170.

Koopman, H. and D. Sportiche (1983), 'Variables and the Bijection Principle', *Linguistic Review* 2, 139-160.

Kuno, S. (1973), *The Structure of the Japanese Language*, MIT press, Cambridge, MA.

Kuroda, S. (1988), 'Whether We Agree or Not : A Comparative Syntax of English and Japanese', *Papers from the Second International Workshop on Japanese Syntax.* CSLI, Stanford, 103-143.

Kwon, J. I. (1985), *Kuku ui bokhapmun kusung yeonku*, Jipmundang, Seoul.

Lambrecht, K. (1994), *Information Structure and Sentence Form*, Cambridge University Press.

Larson, R. K. (1988), 'On the Double Object Construction', *Linguistic Inquiry* 19, 335-391.

Lasnik, H. and M. Saito (1984), 'On the Nature of Proper Government', *Linguistic Inquiry* 15, 235-289.

Lee, I. H. (1987), 'Double Subject Construction in GPSG', in S. Kuno, J. Whitman, I. H. Lee & Y. S. Kang (eds.), *Harvard Studies in Korean Linguistics* II, 287-296.

Lee, I. S. and Im, H. B. (1983), *Kukumunbupron*. Hakyeonsa, Seoul.

Lee, K. (1993), *A Korean Grammar on Semantic-Pragmatic Principle*, Hankuk-munhwasa, Seoul.

Li, C. N. and S. Thompson (1976), 'Subject and Topic: A New Typology of Language', in C. Li (ed), *Subject and topic*, Academic Press, New York, 457-490.

Maling, Joan & S. W Kim (1992), 'Case assignment in the inalienable possession construction in Korean', in S. Kuno, et al. (eds.), *Journal of East Asian Linguistics* 1, 37-68.

Miyagawa, S. (1997), 'Against Optional Scrambling', *Linguistic Inquiry* 28, 1-25.

Nakamura, M, (1986/87), 'Japanese As A *pro* Language', *Linguistic Review* 6, 281-296.

Park, B. S. (1975), 'On the Multiple Subject Construction in Korean', *Linguistics* 100, 63-76.

Park, S. (1994), *A- AND A-Bar Dependencies and Minimalism in Movement Theories: Scrambling and Binding*, Hanshin Publishing, Seoul.

Pollard, C. (1994), 'Towards a unified account of passive in German', in J. Nerbonne, K. Netter and C. Pollard (eds.), *German in Head-Driven Phrase Structure Grammar*, CSLI, Stanford, 273-296.

Pollard, C. and I. Sag (1987), *Information-based Syntax and Semantics, vol1: Fundamentals*, CSLI, Stanford.

Pollard, C and I. Sag (1994), *Head-Phrase Structure Grammar*, Chicago University press.

Portner, Paul and K. Yabushita (1998), 'The semantics and pragmatics of Topic Phrases', *Linguistics and Philosophy* 1, 117-157.

Prince, E. (1981), 'topicalisation, focus movement and Yiddish movement: a pragmatic differntiation', *in Proceedings of the Seventh Annual Meeting of the Berkley Linguistics Society*, Berkley, California, 249-264.

Radford, A. (1988), *Transformational Grammar: a first course*, Cambridge University Press.

Radford, A. (1997), *Syntactic Theory and the Structure of English: a minimalist approach*, Cambridge university press.

Ross, J. R. (1967), *Constraints on Variables in Syntax.* Ph.D Dissertation, MIT.

Ross, J. R. (1986), *Infinite Syntax*, Ablex, Norwood, NJ.

Safir, K. (1986), 'Relative Clause in a Theory of Binding and Levels. *Linguistic Inquiry* 17, 663-689.

Sag, I (1997), 'English Relative clause constructions', *Journal of Linguistics* 33, 431-484.

Sag, I and J. Fodor (1994), 'Extraction without traces', *Proceeding of the thirteen annual meeting of West Coast Conference on Formal Linguistics 13*, 365-84.

Sag, I and T. Wasow (1999), *Syntactic Theory : a formal introduction*, CSLI, Stanford.

Saito, M. (1985), *Some Asymmetries in Japanese and Their Theoretical Consequences*, Ph.D Dissertation, MIT.

Saito, M. (1989), 'Scrambling as Semantically Vacuous A'-Movement', in Baltin, M and A. Kroch (eds.), *Alternative Conceptions of Phrase Structure.* University of Chicago Press.

Saito, M. (1992), 'Long Distance Scrambling in Japanese', *Journal of East Asian Linguistics* 1, 69-118.

Sells, P. (1995), 'Korean and Japanese Morphology from a Lexical Perspective', *Linguistic Inquiry* 26, 277-325.

Siegel, Melanie. (1998) 'Japanese Particle in an HPSG Grammar', *Verbmobil Report 220.*

Sirai, H. and T. Gunji (1998), 'Relative clauses and adnomial clauses', in T. Gunji and K. Hasida (eds.), *Topics in Constraint-based grammar of Japanese,* Kluwer Academic Publishers, 17-37.

Takahashi, D. (1993), 'Movement of Wh-phrase in Japanese', *Natural Language and Linguistic Theory* 11, 655-678.

Warner, A. R. (2000), 'English auxiliaries without lexical rules', in R. D. Borsley (ed.), *the Nature and Function of Syntactic Categories,* Academic Press, New York, 167-220.

Watanabe, A. (1992), 'Wh-in-situ, Subjacency and Formation', *MIT Occasional Papers in Linguistics* 2, 1-124.

Watanabe, A (1993), *Case Absorption,* PhD Dissertation, MIT.

Webelhuth, G. (1995), 'X-bar theory and case theory', (ed) Webelhuth, *Governemnt and Binding Theory and the Minimalist Program,* Blackwell Publishers, Oxford, 15-96.

Wee, H. (1995), 'Meaning and Intonation Associated with the Subject Marker and the Topic Marker in Korean', in Kuno and Whitman(eds.), *Harvard Studies in Korean Linguistics VI,* 443-457.

Yang, D-W. (1989), *The Basis of the Government and Binding theory* (in Korean), Sinasa, Seoul.

Yim, Y. J. (1985), 'Multiple Subject Construction', in S. Kuno, J. Whitman, I.H. Lee & Y.S. Kang (eds.), *Harvard Studies in Korean Linguistics* I, 101-109.

Yoon, James Hye Sook (1985), 'Some Queries Concerning the Syntax of Multiple Subject Constructions in Korean', in S. Kuno, J. Whitman, I. H. Lee & Y.S. Kang (eds.), *Harvard Studies in Korean Linguistics* II, 138-162.

Yoon, Je. (1989), 'ECM and Multiple Subject Constructions in Korean', in Kuno and Whitman (eds.), *Harvard Studies in Korean Linguistics* III, 369-382.

Yoon, Jo. (1989), 'On the Multiple 'ka' and 'lul' Constructions in Korean', in Kuno and Whitman(eds.), *Harvard Studies in Korean Linguistics III*, 383-394.

Yoon, J.Y. (1990), *Korean Syntax And Generalized X-Bar Theory*, Hanshin Publishing, Seoul.