Papers in Syntax

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NULL OBJECTS IN MANDARIN CHINESE

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1. Introduction.

In Mandarin Chinese, as is well known, objects can be omitted, and in this regard, Mandarin has been included in typologies of languages which are best known for exhibiting implicit arguments, like Korean, Thai, Italian, and Portuguese (Cole (1987)), (Rizzi (1986)). Consider (1) as an example.

(1) Xiaomei$_i$ renwei Zhangsan bu xihuan e_i.
     Xiaomei$_i$ think   Zhangsan not like e_i
     'Xiaomei thinks that Zhangsan doesn't like [her].'

While the assessment of neither null subjects nor null objects is final, it has widely been agreed that Mandarin is a pro-drop language in that null subjects, in at least some types on constructions, are pronominal.[1] There is less agreement on null objects. A debate has been going on about the analysis of null objects with respect to GB binding theory, out of which have developed two positions, one represented by C.-T. James Huang and the other by Xu Liejiong, D. Terence Langendoen, and Zhang Shi. Basically, Huang (1984, 87) claims that null objects appear only in topic constructions, where they are interpreted as variables bound by the topic. Xu and Langendoen (1985) and Xu (1986) believe that null objects have a wider distribution, and are always pronouns. Thus, both the distribution and identification of null objects is not yet fully understood. This paper is intended to address these two issues from the perspective of the binding theory for Mandarin Chinese in the Head-driven Phrase Structure Grammar framework. I will take an independent position by suggesting that Mandarin has a "mixed" object system, where null objects are not always identified as having the same reference, but rather are pronominal in certain cases and nonpronominal in others. In doing so, I support Xu's treatment of null objects with respect to their distribution and their identification as pronominal in certain types of constructions, while also supporting Huang's view that null objects are nonpronominals in topic constructions. My position is based on field work done on three kinds of constructions: non-topic constructions (where the object is coindexed with a matrix subject), discourse constructions (where the object is coindexed with an NP contained in a previous utterance in the discourse), and topic constructions (where the object is coindexed with a topic).[2] Typical examples of each are shown below; the non-topic construction is in (1), and the discourse and topic constructions are in (2) and (3), respectively.

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[1] An example is the following:

   Lisi$_i$ yiwei e_i kaoshi bu jige.
   Lisi$_i$ think e_i exam   not pass
   'Lisi thinks that [he] didn't pass the exam.'

[2] My field work consisted of interviews with six informants, who are from the following areas: Guangxi province, Jiangsu province, Xinjiang province, and Taiwan. There was a wide range of native dialects. However, only one of these informants was a true (L1) Mandarin speaker. There are relatively few L1 speakers in the general population of Mandarin speakers.

(2) [Neiben shu]$_i$ hen   gui.   Mai dao e_i de ren   dagai   you qian.
    [that-CL book]$_i$ very expensive. buy ASP e_i DE person probably have money
    'That book is *expensive*. People who have bought [it] must have money.'

(3) [Neiben shu]$_i$,   duguo e_i de ren   hen duo.
    [that-CL book]$_i$ read-ASP e_i DE person very many
    'That book, there are many people who have read [it].'

There are numerous examples that show the acceptability of null objects in all three types of constructions. I will argue that null objects in non-topic and discourse constructions are pronouns, and in topic constructions, traces.

2. HPSG binding theory

2.1. Binding theory for Chinese.

Before considering the data, I review briefly the key concepts of the HPSG general binding theory and the principles of the theory which are particular to Chinese. In contrast to GB binding theory, HPSG binding theory is based on the relative obliqueness of grammatical relations, and is only partially formulated in terms of configuration. The fundamental concept that captures this is the o(bliqueness)-command relation, which is defined in terms of the less-oblique-than relation, an abstract ordering of dependents of the same head which is formally indicated in the order of items in a SUBCAT list (where an item further to the right is less oblique). SUBCAT here includes the subject as in Pollard and Sag (1987, in press).

Local o(bliqueness)-command:
Let Y and Z be *synsem* objects with distinct LOCAL values, and Y be referential.[3] Then Y locally o-commands Z just in case Y is less oblique than Z.

O-command:
Let Y and Z be *synsem* objects with distinct LOCAL values, and Y be referential. Then Y o-commands Z just in case Y locally o-commands X dominating Z.

Notice that local o-command is just a sub-relation of o-command. Since X always dominates itself, a paraphrase of these relations would be as follows: Y locally o-commands all of the less oblique complements of the same head, that is the less oblique NPs on the same SUBCAT list, and it o-commands everything contained in those complements.
    Another key idea of the binding theory is o-binding, which can be defined as follows:

O-binding:
Y (locally) o-binds Z just in case Y and Z are coindexed and Y (locally) o-commands Z. If Z is not (locally) o-bound, then it is said to be (locally) o-free.

A paraphrase of this would be: Y locally o-binds all of the less oblique complements of the same head which it is coindexed with, and it o-binds anything which it is coindexed with and which is contained in one of those complements.
    Another aspect of HPSG which is relevant to the binding theory is the classification of

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[3] In HPSG, "referential" means nonexpletive. Thus, both quantificational and non-quantificational NPs count as referential NPs. Coindexed NPs (i.e. NPs whose INDEX values are token-identical) have the same reference (or covary overt the same domain of quantification).

NPs (sorts of nominal-objects) according to their referential properties. For Chinese, there is a three-way distinction: z-pronouns (zpro), personal pronouns (ppro), and nonpronouns (npro). The binding theory distinguishes these reference types according to their behavior with respect to the concepts above, (local) o-command and o-binding.

Now, for the principles of the binding theory which are particular to Chinese.

Binding theory for Chinese:
Principle A. A z-pronoun with a referential o-commander must be o-bound.
Principle B. A personal pronoun must be locally o-free.
Principle C. A nonpronoun must be o-free.

A paraphrase of Principle B is as follows: a personal pronoun cannot be coindexed with a less oblique dependent of the same head, or in other words, by an item to the left on the same SUBCAT list. A paraphrase of Principle C is as follows: a nonpronoun cannot be coindexed with anything which is on the SUBCAT list of the verb that governs it, or of any superordinate verb. These two principles are conditions in the general binding theory of HPSG, which accounts for other languages such as English.

Principle A, on the other hand, is motivated by Chinese in particular. It is a condition on what Pollard (ms.) calls a z-pronoun, which for Mandarin signifies the long-distance anaphor *ziji*. This condition is identical to the condition on anaphors in the theory, except that it permits both local and nonlocal binding, whereas the condition on anaphors permits only local binding. Due to the nature of z-pronouns, this new reference type fills a gap in the general typology of NPs in HPSG binding theory. Where the binding theory of Pollard and Sag (1992, in press) includes two reference-types which must be o-free (locally or nonlocally), but only one type which must be o-bound (locally), it now includes two reference-types which must be o-bound (both locally and nonlocally).

2.2. NP typology for Chinese.

An HPSG NP typology for Chinese is as of yet inconclusive, due to the unresolved problem of the identification of empty subjects and objects. Since only null objects are the focus here, I will not discuss where null subjects fit into this typology. Instead, I will present a typology for Chinese overt or null object NPs.

HPSG REF-TYPE	ppronoun	nonpronoun	zpronoun
OVERT	ta	Xiaomei	ziji
EMPTY	?	?	--

There is a suitable example for each of the three types of overt objects, but how do null objects fit into this typology? The last two principles of the binding theory laid out in the previous section should determine whether null objects are personal pronouns or nonpronouns.[4] If a null object is a personal pronoun, then it is treated just as an overt pronoun in HPSG except with no phonological content. If a null object is a nonpronoun, then it is treated as a trace whose filler is a nonpronoun. This is because in HPSG, traces appear in filler-gap constructions, where the LOCAL value of a trace is structure-shared with that of the filler, and thus the reference-type of a trace depends on that of a filler. In

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[4] There is no motivation for considering a null object as a z-pronoun, since an o-commanded null object need not be bound by a superordinate argument (it can have a discourse antecedent).

this paper, only fillers which are nonpronouns are considered.

Huang (1984, 87) posits that a null object is bound by a topic or by a null topic operator which is coindexed with it, and is identified, in GB terms, as a variable, which corresponds to a trace in HPSG. Xu, on the other hand, claims all null objects (and subjects) are pronouns.

In considering the three types of constructions at hand, a determination has to be made about which HPSG reference-type a null object is in which constructions.

3. Non-topic constructions.

3.1. Two views.

It is on non-topic constructions that the two opposing views differ most, particularly those where the null object is coindexed with the matrix subject. Huang (1982, 84) claims that the distribution of null objects does not include this type of construction. He says null objects can only be bound by a topic or a relative head, so-called A-bar positions.

Xu (1986), on the other hand, claims that null objects do appear in this kind of construction. Zhang (1988) supports this position.

In an attempt to determine which analysis is more desirable, I will consider examples from each position along with some others.

3.2. Data.

The first two examples are taken from Huang (1984, 87).

(4) Zhangsan$_i$ xiwang Lisi keyi   kanjian e_i.   1984, (22b)
     Zhangsan$_i$ hope   Lisi able-to see e_i
     'Zhangsan hopes Lisi can see [him].'

(5) Zhangsan$_i$ shuo Lisi bu   renshi e_i.   1987, (19)
     Zhangsan$_i$ say   Lisi not   know e_i
     'Zhangsan says Lisi doesn't know [him].'

Huang, as well as my informants, finds these examples grammatical with appropriate contexts, with the indicated readings (even though a more likely interpretation is one where the antecedent of the null object is a discourse referent whose reference is different from *Zhangsan*). Huang claims that even though the null object may be coindexed with the matrix subject in (4) or (5), the antecedent of the null object in both cases is not the subject but, instead, a null topic which has the same reference as both. Consider the structure below.

(6) $[_{Topic} e_i]$, [Zhangsan$_i$ shuo Lisi bu renshi e_i.]

The structure of (6) comes about in the following way: the null object moves into topic position and is coindexed with an NP in the previous sentence by a discourse predication rule, and then the topic is deleted due to discourse redundancy. Huang (1987) argues that the null topic is interpreted from the previous discourse due to the application of discourse and pragmatic conditions (which accounts for the function and interpretation of topics in discourse, among other things), which occurs after the application of the GB binding theory. The ordering of these applications permits the null object to be interpreted as a variable, even though it can only be interpreted as pro by the binding theory (since at the time of applying the binding theory, there is a possible binder in an A-position). The discourse and pragmatic conditions which Huang refers to are crucial to

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his analysis of Chinese, which he claims contributes to the "discourse-oriented" quality of Chinese, as opposed to "sentence-oriented" languages like English.

Huang's analysis, as just illustrated, is motivated by the fact that he finds examples like (4)-(5) ungrammatical if uttered out of the blue, that is, without a previous relevant discourse (i.e. without previous reference to the element referred to by the null object). (Since a null topic is considered to have its reference fixed in a given discourse, positing a null topic assumes a previous discourse, and thus ensures that examples like (4)-(5) are interpreted with contexts.) This observation brings out an asymmetry between null objects and null subjects in this respect, where an example like (7) is considered grammatical (by Huang) when uttered out of the blue, unlike (5) (or (4)).

(7) Zhangsan$_i$ shuo e_i bu renshi Lisi.
    Zhangsan$_i$ say e_i not know Lisi
    'Zhangsan says [he] doesn't know Lisi.'

The judgments of my informants confirm this observation, yet I do not have an explanation for it at this time. However, there is evidence to show that this out-of-the-blue asymmetry is not always the case; there is a symmetry between null object and null subjects in some out-of-the-blue utterances, as illustrated by (7) and the example below, taken from Xu (1986).

(8) [Neige haizi]$_i$ yiwei mama yao zeguai e_i le.
    [that child]$_i$ think mother want reprimand e_i ASP
    'That child thinks that her mother is going to reprimand her.'

(8) is considered by my informants and Xu to be grammatical out of the blue as well as with an appropriate previous discourse, just like (7). Huang does not acknowledge examples like (8).

Furthermore, Huang disregards another type of example (where the null object appears in a relative clause), despite the fact that he (and my informants) finds it grammatical out of the blue as well as with an appropriate previous discourse. An example is shown in (9).[5]

(9) [Neige gu-er]$_i$ zhaobudao yuanyi fuyang e_i de ren.   1984, footnote 10
    [that-CL orphan]$_i$ not-find willing adopt e_i DE person
    'That orphan can't find someone/anyone who is willing to adopt [her].'

For this, he uses the following reasoning: the interpretation given above in (9) can be "pragmatically inferred" in a non-"neutral" context, unlike his "ungrammatical" examples (4)-(5) above (which are interpreted in "neutral contexts"), and thus does not serve as significant data for the analysis of null objects in Mandarin.

I believe there are at least four problems with Huang's analysis. The first is that positing a null topic for examples like (4)-(5) seems unnecessarily complicated. Second, Huang's reasoning for disregarding examples like (9) is unclear. He does not explain in what sense a context in (9) is not neutral, while contexts for the other examples are. Moreover, Huang does not make it clear how neutrality of contexts is related to out-of-the-blue utterances. He seems to suggest that non-neutrality involves an inference taken from a verb in the utterance (namely *fuyang* in (9), which allows (9) to be interpreted out-of-the-blue). Why this non-neutrality qualifies examples like (9) as insignificant is not made

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[5] In order to fully understand the difference in grammaticality between (9) and (4)-(5), as well as between (7)-(8) and (4)-(5), an investigation of the grammaticality of these examples with respect to specific contexts would be necessary.

clear. Huang's arguments do not seem to be based on conventional means of distinguishing what is and is not significant syntactic data. Thus, this line of reasoning does not give a strong case for the set of judgments that Huang gives for these sentences. Third, by not acknowledging examples like (8), Huang fails to acknowledge a symmetry between null subjects and null objects in out-of-the-blue utterances, (as shown between (7) and (8)). Fourth, by interpreting examples like (4)-(5) as topic constructions, while interpreting examples like (7) as non-topic constructions, Huang does not account for the symmetric behavior of null objects and null subjects with respect to acceptance in appropriate contexts, (as shown between (7) and (4)-(5)). By attempting only to account for out-of-the-blue utterances, Huang does not acknowledge this symmetry.

The next examples, from Zhang (1988), are considered grammatical with contexts by both my informants and Zhang. (These are very similar to (4) and (5), respectively.)

(10) Zhangsan$_i$ huaiyi Lisi kanjian le e_i. (4)
Zhangsan$_i$ suspect Lisi see ASP e_i
'Zhangsan suspects that Lisi has seen [him].'

(11) Zhangsan$_i$ shuo Lisi bu xiangxin e_i. (2b)
Zhangsan$_i$ say Lisi not believe e_i
'Zhangsan says that Lisi doesn't believe [him].'

The following three examples are from Pollard (ms.). Of these, the last two correspond closely to examples cited as grammatical by Xu and Langendoen (1986) (their (11) and (12)). All three are considered by my informants to be grammatical with or without appropriate previous discourses.

(12) [Liangge houxuanren]$_i$ dou yiwei yonghu e_i de bi fandui e_i de duo.
[two-CL candidates]$_i$ all think support e_i DE compared-to oppose e_i DE many
'The two candidates both think that there are more people who support [them] than who oppose [them].'

(13) [Fu zongtong]$_i$ yiwei yonghu e_i de bi fandui e_i de duo.
[vice president]$_i$ thinks support e_i DE compared-to oppose e_i DE many
'The vice president thinks that there are more people who support [her] than who oppose [her].'

(14) Zhangsan$_i$ cengjing zhudong yaoqiu bieren piping e_i.
Zhangsan$_i$ formerly initiate demand other-people criticize e_i
'Zhangsan has voluntarily asked other people to criticize [him].'

(10)-(14) give more evidence for the acceptability of null objects which are coindexed with matrix subjects both with or without previous discourses. My informants' judgments are consistent with those of Huang, Xu and Langendoen, and Zhang, as well as Pollard's informants. However, there is a difference in analysis. While Xu and Langendoen, and Zhang all claim that the matrix subject is the binder in each case, Huang believes a null topic is the binder. The reason for this difference in opinion is based on the fact that the first three acknowledge examples like (8)-(9), while Huang does not. It seems as if Huang's sense of what constitutes significant data is different from the others'.

3.3. Analysis.

According to the binding theory given in 2.1., the null object in each example above can only be analyzed as a personal pronoun. Consider, for example, (5), which is shown again here.

(5) Zhangsan$_i$ shuo Lisi$_j$ bu renshi e_i.
    Zhangsan$_i$ says Lisi$_j$ not know e_i
    'Zhangsan says Lisi doesn't know [him].'

The SUBCAT values of the verbs *renshi* and *shuo* are as follows:

renshi: [SUBCAT < NP$_j$, NP$_i$ >]
shuo: [SUBCAT < NP$_i$, S >]

Notice that the null object is locally o-free, since the other NP in *renshi*'s SUBCAT list (*Lisi*) does not bind it. Instead, it is (nonlocally) o-bound by *Zhangsan*, which is not included in that SUBCAT list. Therefore, the null object can be interpreted as a ppro, without violating Principle B of the binding theory. Since the null object is (nonlocally) o-bound by *Zhangsan* (*Zhangsan* o-commands the S which contains the null object), then it cannot be a npro, according to Principle C (nonpronouns must be o-free). Consequently, the null object is identified as a ppro, and is treated in HPSG just like an overt personal pronoun except with no phonology. (This, however, does not entail that overt and null personal pronouns behave the same, as will be seen in section 4.)

The other examples are analyzed in an analogous fashion.

Besides the fact that the binding theory only allows null objects in non-topic constructions to be interpreted as personal pronouns, there is an additional reason for positing null objects as personal pronouns in this case: it brings out the symmetric behavior of null objects and null subjects, (which are also interpreted independently as personal pronouns), with respect to coindexing with a superordinate subject, (as shown in in examples (7) and (4)-(5), (8)-(14)). In contrast, it is difficult for Huang to account for this symmetric behavior by positing that null objects in non-topic constructions are traces. Furthermore, this analysis not only adheres to the binding theory and accounts for a subject-object symmetry, but also accounts for all of the relevant data given in section 3.2. (including sentences interpreted with or without previous discourses).

4. Topic constructions.

4.1. Two views.

There have been thought to be two general types of topic constructions: Chinese-style and English-style, the first illustrated by a Chinese example in (15), and the second by an English example in (16).

(15) Zhongguo, renkou   hen duo.
     China,   population very many
     'China, the population is very great.'

(16) Mary$_i$, I like t_i.

The crucial difference between Chinese-style and English-style topicalization is in the relationship between the topic and the comment S. In Chinese-style topicalization, the comment S is necessarily related (at least pragmatically) to the topic, and may (but is not required to) contain a (possibly empty) NP that is anaphoric to the topic. In English-style topicalization, on the other hand, a (possibly empty) NP in the comment S is syntactically dependent on the topic.

The type of construction that is of interest here is where a null object appears in the comment S, as in (17) below.

(17) [Neiben shu]$_i$, duguo e_i de ren   hen   duo.
    [that-CL book]$_i$ read-ASP e_i DE person very many
    'That book, there are many people who have read [it].'

When null objects appear in languages like English, which lack null pronominals, an analysis of English-style topicalization is presumably the only option. But for Chinese, the interpretation of the null object, and consequently the configuration in which it is interpreted, is not so clear. Specifically, the construction in (17) may be analyzed as either Chinese-style or English-style topicalization, where the relationship between the null object and the topic is either anaphoric (where the null object is a pronoun that is coindexed with the topic), or non-anaphoric (where the null object is a trace coindexed with the topic), respectively.

As with non-topic constructions, there is a dispute over the correct analysis of examples like (17). Huang (1984) believes that an example like (17) is an instance of English-style topicalization, in which the object moves into topic position and leaves a variable which is bound by it. Xu and Langendoen (1985), on the other hand, believe that Chinese only has Chinese-style topicalization, where there is either an anaphoric dependency or no dependency at all.[6]

Let us now translate the two styles of topicalization, on which these two positions are based, into HPSG terms.

Chinese-style topicalization in HPSG can be analyzed in terms of a new constituent-structure type, called <u>topic-head</u>. The following is a characterization of a Topic-Head Schema.

Topic-Head Schema:
    X" -------> Y" , X" [SUBJ < >, COMPS < >]
                TOPIC   HEAD

A special case of Chinese-style topicalization, as mentioned above, is when there is a pronoun, overt or null, in the comment S which is anaphoric with the topic, as shown in the tree a. below.

a.
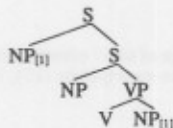
English-style topicalization in HPSG has standardly been analyzed in terms of a filler/gap configuration, in which there is a trace that is coindexed with the extracted topic, and whose reference-type depends on the reference-type of the topic. The Filler-Head Schema and a corresponding tree are shown below.

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[6] They do not, in fact, exclude the possibility of a movement analysis like Huang's, but only under the condition that the object is still considered to be a pronoun.

Filler-Head Schema:

X ------> [LOCAL [1]] , S [fin, INHER/SLASH {[1],...}, TO-BIND/SLASH {[1]}]
    FILLER   HEAD

b.

```
                        S
                 [INHER/SLASH { }]
                  /            \
               NP               S
           [LOCAL [1]]    [INHER/SLASH {[1]}
                          TO-BIND/SLASH {[1]}]
                            /        \
                          NP          VP
                              [INHER/SLASH {[1]}]
                              /          \
                             V            NP
                                      [LOCAL [1]
                                      INHER/SLASH {[1]}]
```
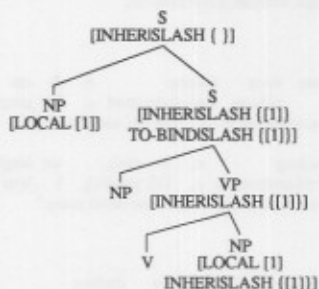
In order to determine which analysis a null object should have, we must consider more data and explore the binding possibilities of the null object.

4.2. Data.

There are many grammatical examples where the null object (which is positioned inside a relative clause) is coindexed with a topic, as in (17). I evaluated both single topic constructions (where there is one topic which is coindexed with a null object) and double topic constructions (where there are two topics, each being coindexed with two distinct null objects), all of which have relative clauses in which the null object is embedded.[7] Furthermore, there are two types of relatives for both single and double topic constructions: what I call subject and object relatives. Subject relatives are cases where the null object is in a relative clause whose subject is the relativized position. Object relatives are cases where the null object is in a relative clause where an object (other than the null object) is the relativized position. In addition, for the single topic constructions, the position of NPs which contain these relative clauses can vary, whether it be the matrix or embedded subject, or the matrix or embedded object. For the double topic constructions, the position of null objects which are coindexed with second topics (the relative clauses) can vary, whether it be the embedded subject, or the matrix or embedded object, (it cannot be a matrix subject). The data is presented below according to subject and object relatives, where the a. examples are single topic constructions and the (b) examples are double topic constructions. Also, the sentential position of both the relative clauses in the a. examples and the second null objects (e_s) in the b. examples is made explicit.

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[7] Besides the fact that null objects often occur in relative clauses in Mandarin, there is no significant theoretical reason for my chosing data that involves relative clauses. I plan to address simpler constructions in the future.

Subject relatives:
Matrix subject:

(18) [Neiben shu]$_i$, neng dudong e_i de ren   bu duo.
     [that-CL book]$_i$ able-to read-understand e_i DE people not many
     'That book, there aren't many people who can understand [it].'

Embedded subject:

(19) a. [Neiben shu]$_i$, wo tingshuo neng dudong e_i de ren   bu duo.
        [that-CL book]$_i$ I hear   able-to read-understand e_i DE people not many
        'That book, I hear that there aren't many people who can understand [it].'

     b. [Neiben shu]$_i$, [neng dudong e_i de ren]$_k$,   wo tingshuo e_k bu duo.
        [that-CL book]$_i$ [able-to read-understand e_i DE people]$_k$ I hear e_k not many
        'That book, people who can understand [it], I hear there aren't many.'

Matrix object:

(20) a. [Neiben shu]$_i$, wo conglai mei jianguo neng dudong e_i de ren.
        [that-CL book]$_i$ I always not   meet   able-to read-understand e_i DE people
        'That book, I've never met a person/anyone who could understand [it].'

     b. [Neiben shu]$_i$, [neng dudong e_i de ren]$_k$,   wo conglai mei jianguo
        [that-CL book]$_i$ [able-to read-understand e_i DE people]$_k$ I always not   meet
        e_k.
        e_k
        'That book, someone/people who could understand [it], I've never met [her/them].'

Embedded object:

(21) a. [Neiben shu]$_i$, wo tingshuo Li Jiaoshou conglai mei jianguo neng   dudong
        [that-CL book]$_i$ I hear   Professor Li always not   meet   able-to read-
        e_i de ren.
        understand e_i DE people
        'That book, I hear Professor Li has never met a person/anyone who could understand [it].'

     b. [Neiben shu]$_i$, [neng dudong e_i de ren]$_k$,   wo tingshuo Li Jiaoshou
        [that-CL book]$_i$ [able-to read-understand e_i DE people]$_k$ I hear   Professor Li
        conglai mei jianguo e_k.
        always not   meet e_k
        'That book, someone/people who could understand [it], I hear Professor Li has never met
        [him/them].'

Object relatives:
Matrix subject:

(22) [Zhei zhong wenti]$_i$, Xiaomei jiejue e_i de banfa zui hao.
     [this kind problem]$_i$ Xiaomei solve e_i DE method best good
     'This kind of problem, a method/methods that Xiaomei used to solve [it] is/are the best.'

Embedded subject:

(23) a. [Zhei zhong wenti]$_i$, Zhangsan shuo Li Jiaoshou jiejue e_i de banfa   zui hao.
    [this kind problem]$_i$ Zhangsan say   Professor Li solve e_i DE method best good
    'This kind of problem, Zhangsan says that a method/methods that Professor Li used to solve
    [it] is/are the best.'

   b. [Zhei zhong wenti]$_i$ [Li Jiaoshou   jiejue e_i de banfa]$_k$, Zhangsan shuo e_k zui
    [this kind problem]$_i$ [Professor Li solve e_i DE method]$_k$ Zhangsan say e_k best
    hao.
    good
    'This kind of problem, a method/methods that Professor Li used to solve [it], Zhangsan says
    [it/they] is/are the best.'

Matrix object:

(24) a. [Zhei zhong wenti]$_i$, wo zao yi   xuehui le   Li Jiaoshou jiejue e_i de banfa.
    [this kind problem]$_i$ I long-ago master ASP Professor Li solve e_i DE method
    'This kind of problem, I've long ago mastered a method/methods that Professor Li used to solve
    [it].'

   b. [Zhei zhong wenti]$_i$, [Li Jiaoshou   jiejue e_i de banfa]$_k$, wo zaoyi   xuehui le
    [this kind problem]$_i$ [Professor Li solve e_i DE method]$_k$ I long-ago master ASP
    e_k.
    e_k
    'This kind of problem, a method/methods that Professor Li used to solve [it], I mastered
    [it/them] a long time ago.'

Embedded object:

(25) a. [Zhei zhong wenti]$_i$, wo tingshuo Xiaomei zao yi   xuehui le   Li Jiaoshou jiejue
    [this kind problem]$_i$ I hear   Xiaomei long-ago master ASP Professor Li solve
    e_i de banfa.
    e_i DE method
    'This kind of problem, I hear that Xiaomei long-ago mastered a method/methods that Professor
    Li used to solve [it].'

   b. [Zhei zhong wenti]$_i$, [Li Jiaoshou   jiejue e_i de banfa]$_k$, wo tingshuo Xiaomei
    [this kind problem]$_i$ [Professor Li solve e_i DE method]$_k$ I hear   Xiaomei
    zao yi   xuehui le e_k.
    long-ago master ASP e_k
    'This kind of problem, a method/methods that Professor Li used to solve [it], I hear that Xiaomei
    mastered [it/them] a long time ago.'

All of these examples, as I mentioned, are grammatical according to my informants. The
double topic constructions, however, aren't as acceptable as the single topic constructions.
(Just as for the non-topic examples, the grammaticality judgments of the particular
binding relationships in these examples do not rule out other binding relationships.)
    Below is an illustration of the configuration of each type of construction: subject
relative (single topic), subject relative (double topic), object relative (single topic), and
object relative (double topic), respectively, where the position of the relative clauses in
the single topic constructions and the position of the second null object in the double
topic constructions is the matrix object (this is done without positing either kind of
topicalization):

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(a) subject relative (single topic), (matrix object), e.g. (20a):

[Neiben shu]ᵢ,   wo conglai mei   jianguo neng   dudong   eᵢ de ren.
[that-CL book]ᵢ I   always not   meet   able-to read-understand eᵢ DE people
'That book, I've never met a person/anyone who could understand [it].'
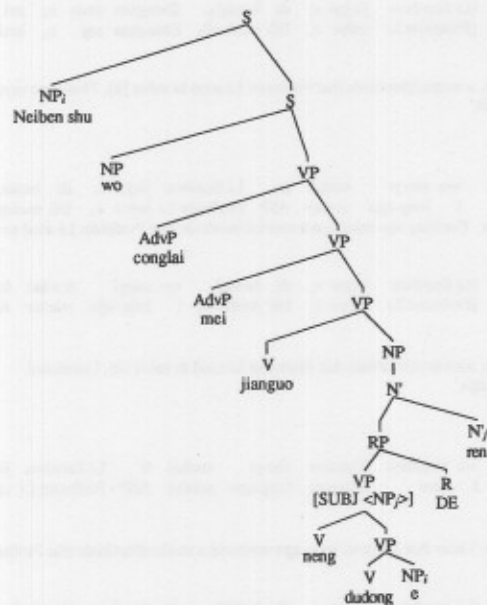
(b) subject relative (double topic), (matrix object), e.g. (20b):

[Neiben shu]$_i$, [neng dudong e_i de ren]$_k$,   wo conglai mei jianguo e_k.
[that-CL book]$_i$ [able-to read-understand e_i DE people]$_k$ I always not meet e_k
'That book, someone/people who could understand [it], I've never met [her/them].'
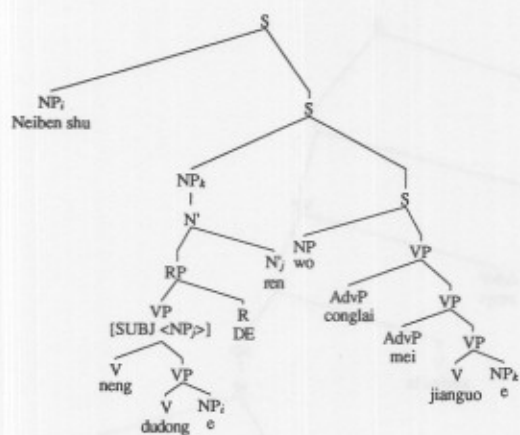
(c) object relative (single topic), (matrix object), e.g. (24a):

[Zhei zhong wenti]$_i$,   wo zao yi   xuehui le   Li Jiaoshou jiejue e_i de banfa.
[this kind problem]$_i$ I   long-ago   master ASP   Professor Li solve e_i DE method
'This kind of problem, I've long ago mastered a method/methods that Professor Li used to solve [it].'
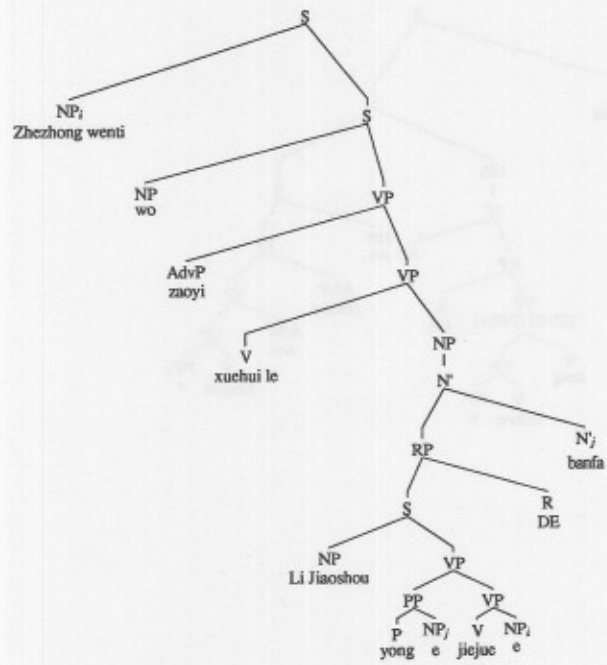
(d) object relative (double topic), (matrix object), e.g. (24b):

[Zhei zhong wenti]$_i$,   [Li Jiaoshou   jiejue e_i de banfa]$_k$,   wo zaoyi   xuehui   le
[this kind problem]-i,   [Professor Li   solve e_i DE method]$_k$ I   long-ago   master   ASP
e_k.
e_k
'This kind of problem, a method/methods that Professor Li used to solve [it], I mastered a long time
ago.'
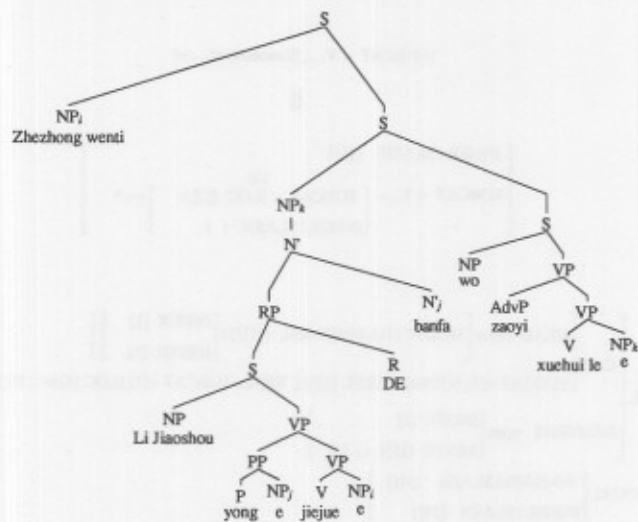
For the subject relatives, the *DE* relativizer is the output of the Subject Extraction Lexical
Rule (SELR) of Pollard and Sag (in press), which accounts for subject extraction from a
relative clause.[8] For the object relatives, I interpret *yong* as a preposition, as proposed by

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[8] Below are the following: 1) the SELR, and 2) the lexical entry for *DE*, (which is the output of the SELR).

Chao (1968)[9], and I assume that *yong* deletes when its complement is relativized, perhaps by some phonological process. (This is mere speculation, and is not crucial to my analysis of null objects.) Furthermore, the *DE* relativizer in the object relatives is different from *DE* in the subject relatives, since it subcategorizes for an S and not a VP, and can serve as input to the SELR.[10]

The general structure of constructions where the position of the relative clauses for the single topic constructions (and of the second null object for the double topic constructions) is not the matrix object should be clear from these illustrations.

---

1)

$$[\text{SUBCAT} < Y, ..., S[\textit{unmarked}], ... >]$$

$$\Downarrow$$

$$\begin{bmatrix} \text{INHER | SLASH} \ \{[1]\} \\ \text{SUBCAT} < Y, ..., \begin{bmatrix} \text{VP} \\ \text{SUBCAT} < [\text{LOC} \ [1]] > \\ \text{INHER | SLASH} \ \{ \ \} \end{bmatrix} , ... > \end{bmatrix}$$

2)

$$\begin{bmatrix} \text{LOCAL} \begin{bmatrix} \text{CAT} \begin{bmatrix} \text{HEAD rltvzr} \begin{bmatrix} \text{MOD N' [TO-BIND | REL} \ \{[1]\}] : \begin{bmatrix} \text{INDEX} \ [1] \\ \text{RESTR} \ [3] \end{bmatrix} \end{bmatrix} \\ \text{SUBCAT} <[7] \ \text{N'[INHER | REL} \ \{[1]\}], \text{VP[fin, SUBCAT} <[7] \ [\text{LOC} \ [4]]>] : [5] > \end{bmatrix} \\ \text{CONTENT npro} \begin{bmatrix} \text{INDEX} \ [1] \\ \text{RESTR} \ \{[5]\} \cup [3] \end{bmatrix} \end{bmatrix} \\ \text{NONLOCAL} \begin{bmatrix} \text{TO-BIND | SLASH} \ \{[4]\} \\ \text{INHER | SLASH} \ \{[4]\} \end{bmatrix} \end{bmatrix}$$

[9] Besides its use as a preposition, *yong* can also be interpreted as a verb, as in: *Wo yong le neige banfa* ('I used that method'). There are also different possible analyses of the PP when *yong* is interpreted as a preposition. For the purposes of my analysis, I assume it is an adjunct.

[10] The following is the lexical entry for the *DE* relativizer (which could be input to the SELR):

$$\begin{bmatrix} \text{LOCAL} \begin{bmatrix} \text{CAT} \begin{bmatrix} \text{HEAD rltvzr} \begin{bmatrix} \text{MOD N' [TO-BIND | REL} \ \{[1]\}] : \begin{bmatrix} \text{INDEX} \ [1] \\ \text{RESTR} \ [3] \end{bmatrix} \end{bmatrix} \\ \text{SUBCAT} <[\text{LOC} \ [4], \text{INHER | REL} \ \{[1]\}], \text{S[fin, INHER | SLASH} \ \{[4]\}] : [5] > \end{bmatrix} \\ \text{CONTENT npro} \begin{bmatrix} \text{INDEX} \ [1] \\ \text{RESTR} \ \{[5]\} \cup [3] \end{bmatrix} \end{bmatrix} \\ \text{NONLOCAL | TO-BIND | SLASH} \ \{[4]\} \end{bmatrix}$$

4.3. Further data.

There are a few points to note about data that is not presented above. All of the data in 4.2. have relativized NPs which are indefinite, but additional data with relativized NPs which are definite were also employed in the informant work. This additional data was somewhat problematic, in that the judgments varied across informants more, and in that a few examples were quite marginal. Below are a few examples, which are less acceptable than their indefinite counterparts, (26) corresponding to (18), (27) to (20a), (28) to (22), and (29) to (24a).

(26) ?[Neiben shu]$_i$,   xie e_i de ren   ceng jianguo   Sun Zhong-san yi mian.
    [that-CL book]$_i$ write e_i DE person once meet-ASP Sun Yat-sen   one-CL
    'That book, the person/the people who wrote [it] met Sun Yat-sen once.'

(27) ?[Neiben shu]$_i$, wo ceng jianguo   xie e_i de ren   yi mian.
    [that-CL book]$_i$ I once meet-ASP write e_i DE person one-CL
    'That book, I met the person/the people who wrote [it] once.'

(28) ?[Zhei zhong wenti]$_i$,   Zhangsan jiejue e_i de neige   banfa   zui   hao.
    [this kind problem]$_i$,   Zhangsan solve e_i DE that-CL method best   good
    'This kind of problem, that method which Zhangsan used to solve [it] is the best.'

(29) ?[Zhei zhong wenti]$_i$, wo zui   xihuan Zhangsan jiejue e_i de neige   banfa.
    [this kind problem]$_i$ I best like   Zhangsan solve e_i DE that-CL method
    'This kind of problem, I like that method which Zhangsan used to solve [it] the best.'

Since the only difference between this set of data and the one shown in 4.2. is definiteness, the marginality of this set of data is assumed to be due to definiteness. This would suggest that relativization of definite NPs in Chinese is somehow marked. Campos (1986) also suggests that there may be a difference in grammaticality between definite and indefinite NPs.

In addition to the data above, examples with null subjects instead of null objects were also employed, such as the following:

(30) *[Li Jiaoshou]$_i$, e_i xie   de shu bu shao.
    [Professor Li]$_i$ e_i write DE book not few
    'Professor Li, [she] has written quite a few books.'

(31) *Zhangsan$_i$, e_i jiejue zheizhong wenti   de banfa hen duo.
    Zhangsan$_i$ e_i solve this kind   problem DE method very many
    'Zhangsan, there are many methods that [he] used to solve this kind of problem.'

(32) *[Li Jiaoshou]$_i$, wo mei duguo e_i xie de shu.
    [Professor Li]$_i$ I not read-ASP e_i write DE book
    'Professor Li, I've never read the book/any books [she] has written.'

(33) *Xiaomei$_i$, wo hen xihuan e_i jiejue zheizhong wenti   de banfa.
    Xiaomei$_i$ I very like e_i solve this kind   problem DE method
    'Xiaomei, I like a method/methods that [she] uses to solve this kind of problem.'

It is beyond the scope of this paper to completely analyze that data. But there was a significant result from the data that should be mentioned: null subjects cannot be coindexed with topics in these constructions; all of the examples in the data were considered ungrammatical when there was enough pause after the topic (to indicate the

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existence of a topic). As we have seen, this is in strong contrast to null objects, which can appear in these constructions.[11] It seems clear that the ungrammaticality of (30)-(33) should be attributed to a failure of coindexing null subjects and topics, for two reasons. First, the ungrammaticality cannot be attributed to a null subject appearing in a relative clause (whose extracted position is an object), since this type of relative extraction without topics is fine, as shown in (34).

(34) Li Jiaoshou xie   de shu   bu shao.
     Professor Li write DE book not few
     'There are many books written by Professor Li.'

This sentence is interpreted without a null subject at all, due to the topic not appearing. (This can be clear to the native speaker through prosody.)

Secondly, there is a difference in grammaticality between null subjects and null objects in topic constructions without relative clauses, as shown in (35) and (36).

(35) *[Li Jiaoshou]$_i$ e_i bu xihuan wo.
     [Professor Li]$_i$ e_i not like   me
     'Professor Li, [he] doesn't like me.'

(36) [Li Jiaoshou]$_i$, wo bu xihuan e_i.
     [Professor Li]$_i$ I not like e_i
     'Professor Li, I don't like [him].'

In conclusion, there is a clear asymmetry between null subjects and null objects with respect to coindexation with a topic.

4.4. Analysis.

Let us reconsider example (20a), repeated below, in order to identify the null object according to the binding theory.

(20) a. [Neiben shu]$_i$,   wo$_l$ conglai mei jianguo [neng   dudong e_i de ren$_j$]$_k$.
        [that-CL book]$_i$ I$_l$ always not meet   [able-to read-understand e_i DE people$_j$]$_k$
        'That book, I've never met a person/anyone who could understand [it].'

The SUBCAT values for *dudong* is as follows:

  dudong: [SUBCAT < NP$_j$, NP$_i$ >]
  jianguo: [SUBCAT < NP$_k$ NP$_l$ >]

Unlike in section 3.3, the binding theory here does not motivate a choice for either npro or ppro. The e_i null object is locally o-free, since the other NP in *dudong*'s SUBCAT list (*ren*) does not bind it. In fact, it is not o-bound at all, since the NP which it is coindexed with is not on any SUBCAT list. Therefore, the null object can be interpreted as a ppro or an npro.

How, then, do we decide between pronoun and trace for identifying null objects in these topic constructions? At first glance, one might assume them to be npros in a filler/gap construction, as in English. On the other hand, the observation that null objects in non-

---

[11] This is contrary to Huang (1984) who says examples like these are grammatical, and thus seems to suggest that there is no asymmetry between null subjects and null objects in topic constructions. The determination of the reason why our judgments differ will have to await future research.

topic constructions are personal pronouns gives support for a (consistent) pronominal analysis. Nevertheless, I want to suggest that null objects are nonpronouns, for the following reason: if null objects in topic constructions were pronouns, then we should expect them to appear as subjects in the same kind of topic constructions, (after all, subjects are thought by (these same) researchers to be pronouns in some cases). But, as I mentioned in 4.3., null subjects cannot appear in these constructions. It would be very difficult to explain the null subject data by treating null objects here as pronouns. On the other hand, if null objects in these topic constructions were analyzed as traces, it would be quite easy to explain the asymmetry between subjects and objects (for example between (20a) and (32)): topic constructions have filler/gap configurations, where, in some cases, objects can be extracted as topics, but subjects cannot. By accounting for the subject-object asymmetry via a trace analysis, I also bring out a contrast in the behavior of null objects and null subjects between non-topic constructions and topic constructions, where they are personal pronouns when they act alike (in non-topic constructions, with respect to examples interpreted with appropriate contexts), and where they are traces when they act differently (in topic constructions). In this sense, I assume that pronouns which have topic antecedents must be overt.[12]

As for the particular analysis of trace in HPSG, it is a sign (a linguistic expression), whose LOCAL value is identical with that of the filler (here the topic), and are passed up the tree as the SLASH value. (The configuration for (20a) should be straight-forward from this information and the general filler/gap tree given in 4.1.)

In conclusion, there is English-style topicalization in Chinese in addition to Chinese-style topicalization, in the sense that empty categories can show up in a comment S. This kind of topicalization should have a filler/gap configuration. This claim supports Huang, who also believes that Chinese has both Chinese-style and English-style topicalization. On the other hand, I disagree with Xu and Langendoen's (1986) pronominal analysis, because such an analysis would be difficult to use to explain the null subject data. They do not mention null subjects in their article, and thus see no problem with the subject-object asymmetry.

5. Discourse reference.

5.1. Two views.

The last type of construction that I will consider is a discourse construction, where the antecedent of the null object, which itself is inside a relative clause, is a referent which is located in a previous utterance of a discourse. The only one of the researchers discussed so far who has data that deals with these constructions is Huang (1982). As discussed above, he claims that the only distribution of null objects is as variables in topic constructions, and in order to account for the grammaticality of discourse reference, he posits a null topic. This works just as his analysis of non-topic constructions.

Xu claims that the null object is a pronoun, and that it is null because of a discourse deletion mechanism (the same kind of thing Huang suggests for the deletion of the topic). Beyond that, he says there is no real syntactic significance to a discourse construction.

I will agree with Xu that the null object here is a pronoun, and not adopt a null-topic analysis such as Huang's, which seems unnecessary: why say there is an existing topic that is nevertheless invisible when you can just say there is no topic at all?

---

[12] This brings up an interesting asymmetry in the behavior of overt and null anaphora in Mandarin. Future investigation of this issue would be interesting.

5.2. Data.

I evaluated the same two kinds of relatives, subject relatives and object relatives, and their paradigm, as used in 4.2.[13] The only difference between the examples in this section and 4.2. is that the NP coindexed with the null object is in a previous sentence of the discourse, instead of being the topic of the same sentence. This kind of data was used instead of examples that had simpler structure in order to make a clearer contrast with the topic constructions.

Similar to the topic constructions, this data is presented below according to subject and oblique relatives, where there is a varying position for the a. examples, (the relative clause in a non-topic construction), and the b. examples, (the second null object in a single topic construction).

Subject relatives:
Matrix subject:

(37) [Neiben shu]$_i$ bu rongyi kan. Neng dudong e_i de ren   bu duo.
     [that-CL book]$_i$ not easy   read. able-to read-understand e_i DE people not many
     'That book is hard to read. There aren't many people who can understand [it].'

Embedded subject:

(38) a. [Neiben shu]$_i$ bu rongyi kan. Wo tingshuo neng   dudong e_i de
         [that-CL book]$_i$ not easy read. I   hear   able-to read-understand e_i DE
         ren   bu duo.
         people not many
         'That book is hard to read. I hear that there aren't many people who can understand [it].'

     b. [Neiben shu]$_i$ bu rongyi kan. [Neng dudong e_i de ren]$_k$,   wo
         [that-CL book]$_i$ not easy   read. [able-to read-understand e_i DE people]$_k$ I
         tingshuo e_k bu duo.
         hear e_k not many
         'That book is hard to read. People who can understand [it], I hear there aren't many.'

Matrix object:

(39) a. [Neiben shu]$_i$ bu rongyi kan. Wo conglai mei jianguo neng   dudong
         [that-CL book]$_i$ not easy   read. I   always not meet   able-to read-understand
         e_i de ren.
         e_i DE people
         'That book is hard to read. I've never met a person/anyone who could understand [it].'

     b. [Neiben shu]$_i$ bu rongyi kan. [Neng dudong e_i de ren]$_k$,   wo
         [that-CL book]$_i$ not easy   read. [able-to read-understand e_i DE people]$_k$ I
         conglai   mei   jianguo e_k.
         always   not   meet e_k
         'That book is hard to read. Someone/anyone who could understand [it], I've never met
         [her/them].'

---

[13] Just as for the data in 4.2., the emphasis on relative clauses here is not essential to my analysis.

Embedded object:

(40) a. [Neiben shu]ᵢ   bu rongyi   kan. Wo tingshuo   Li Jiaoshou conglai mei   jianguo
       [that-CL book]ᵢ not easy   read. I   hear   Professor Li always not   meet
       neng   dudong   eᵢ   de ren.
       able-to read-understand eᵢ   DE people
       'That book is hard to read. I hear Professor Li has never met a person/anyone who could
       understand [it].'

     b. [Neiben shu]ᵢ   bu rongyi   kan. [Neng dudong   eᵢ   de ren]ₖ,   wo
       [that-CL book]ᵢ not easy   read. [able-to read-understand eᵢ   DE people]ₖ I
       tingshuo Li Jiaoshou conglai mei   jianguo eₖ.
       hear   Professor Li always not   meet   eₖ
       'That book is hard to read. Someone/anyone who could understand [it], I hear Professor Li has
       never met [him/them].'

Object relatives:
Matrix subject:

(41) [Zhei zhong wenti]ᵢ   hen   yanzhong. Xiaomei jiejue eᵢ de banfa   zui   hao.
     [this kind problem]ᵢ very   serious.   Xiaomei solve eᵢ DE method best good
     'This kind of problem is very serious. A method/methods that Xiaomei used to solve [it] is/are the
     best.'

Embedded subject:

(42) a. [Zhei zhong wenti]ᵢ   hen   yanzhong. Zhangsan shuo Li Jiaoshou jiejue eᵢ de
       [this kind problem]ᵢ very   serious.   Zhangsan say Professor Li solve eᵢ DE
       banfa   zui hao.
       method best good
       'This kind of problem is very serious. Zhangsan says that a method/methods that Professor Li
       used to solve [it] is/are the best.'

     b. [Zhei zhong wenti]ᵢ   hen   yanzhong. [Li Jiaoshou jiejue eᵢ de banfa]ₖ,   Zhangsan
       [this kind problem]ᵢ very   serious.   [Professor Li solve eᵢ DE method]ₖ Zhangsan
       shuo eₖ zui   hao.
       say eₖ best good
       'This kind of problem is very serious. A method/methods that Professor Li used to solve [it],
       Zhangsan says [it/they] is/are the best.'

Matrix object:

(43) a. [Zhei zhong wenti]ᵢ   hen   yanzhong. Wo zao yi   xuehui le   Li Jiaoshou jiejue
       [this kind problem]ᵢ very   serious.   I   long-ago master ASP Professor Li solve
       eᵢ de banfa.
       eᵢ DE method
       'This kind of method is very serious. A long time ago I mastered a method/methods that
       Professor Li used to solve [it].'

     b. [Zhei zhong wenti]ᵢ   hen   yanzhong. [Li Jiaoshou jiejue eᵢ de banfa]ₖ, wo zaoyi
       [this kind problem]ᵢ very   serious.   [Professor Li solve eᵢ DE method]ₖ I long-
       ago xuehui eₖ le.
           master eₖ ASP
       'This kind of method is very serious. A method/methods that Professor Li used to solve [it], I
       mastered [it/them] a long time ago.'

Embedded object:

(44) a. [Zhei zhong wenti]$_i$ hen   yanzhong.   Wo   tingshuo   Xiaomei   zao yi   xuehui   le
       [this kind problem]$_i$ very   serious.   I   hear   Xiaomei   long-ago   master   ASP
       Li Jiaoshou   jiejue e_i de   banfa.
       Professor Li   solve e_i DE   method
       'This kind of problem is very serious. I hear that Xiaomei long-ago mastered a method/methods
       that Professor Li used to solve [it] .'

     b. [Zhei zhong wenti]$_i$ hen   yanzhong.   [Li Jiaoshou   jiejue e_i de   banfa]$_k$,   wo
        [this kind problem]$_i$ very   serious.   [Professor Li   solve e_i DE   method]$_k$ I
        tingshuo   Xiaomei   zaoyi   xuehui e_k le.
        hear   Xiaomei   long-ago   master e_k ASP
        'This kind of problem is very serious. A method/methods that Professor Li used to solve [it], I
        hear that Xiaomei mastered [it/them] a long time ago.'

These examples were uniformly good across speakers, even more so than the topic constructions were.[14]

5.3. Analysis.

As in the non-topic constructions, the null object here is a personal pronoun. Consider, for example, (39b) (where the second object is the matrix object), which is shown again here.

(39) b. [Neiben shu]$_i$ bu rongyi   kan.   [neng   dudong e_i de   ren$_j$]$_k$,   wo$_l$
        [that-CL book]$_i$ not easy   read.   [able-to   read-understand e_i DE   people$_j$]$_k$ I$_l$
        conglai   mei   jianguo e_k.
        always   not   meet e_k
        'That book is hard to read. Someone/anyone who could understand [it], I've never met
        [her/them].'

The SUBCAT values for *dudong* and *jianguo* are as follows:

   dudong: [SUBCAT < NP$_j$, NP$_i$ >]
   jianguo: [SUBCAT < NP$_l$, NP$_k$ >]

The e_i null object is locally o-free, since the other NP in *dudong*'s SUBCAT list (*ren*) does not bind it. Actually, it is not o-bound at all, since the NP which it is coindexed with is not on any SUBCAT list, and in fact is not even in the same utterance. Therefore, the null object can be interpreted as a ppro. The null object could also be a npro, since it is o-free. Now, for the e_k null object: just like e_k in (20a), it is locally o-free, since the other NP (*wo*) in the SUBCAT of *jianguo* does not bind it. And, like e_i, e_k is not o-bound at all, since NP$_k$ does not show up on any SUBCAT list. So, e_k can be a ppro. But it can also be an npro, since it is o-free.

Even though the e_i null object can be interpreted as an npro according to the HPSG binding theory alone, it nevertheless cannot be interpreted as such in general HPSG theory. This is due to the independent fact that a null non-pronoun is seen as a trace which has its referent in an *intrasentential* filler/gap construction. The nature of filler/gap

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14 For this difference in acceptability, there may be the following explanation: Xu (1986) suggests that there may be a processing difficulty for certain topic constructions, based on the correlation between a nested dependency (all of the examples have cross-referenced anaphora) and pragmatic factors on anaphora.

constructions makes it impossible to determine the binding relationship between a trace and a referential NP in a previous sentence. Therefore the e_i null object here is a ppro (and not an npro). As for the e_k null object, it is an npro, for the same reasoning given for the e_i in (20a) in 4.4.

The null object pronoun (e_i) would be treated in the theory in the same way as in the case of the non-topic constructions, and the null object non-pronoun (e_k) would be treated in the same way as in the case of the topic constructions. The configuration of the first comment sentence in (20a) would look like the topic construction in the second sentence of (39b), except that there is a ppro in the relative clause of (39b), where there is a trace in that of (20a). (See the filler/gap configuration shown in 4.1.)

To cover the range of data, I will look at three more examples, all of which have matrix object position and corresponding tree structures in 4.2. These examples are (39a) and (43a, b), which are shown again here.

(39) a. [Neiben shu]$_i$ bu rongyi kan. Wo$_l$ conglai mei jianguo [neng dudong
         [that-CL book]$_i$ not easy read. I$_l$ always not   meet   [able-to read-understand
         e_i de ren$_j$]$_k$.
         e_i DE people$_j$]$_k$
         'That book is hard to read. I've never met someone/anyone who could understand [it].'

(43) a. [Zhei zhong wenti]$_i$ hen yanzhong. Wo zao yi   xuehui le   [Li Jiaoshou]$_l$
         [this kind problem]$_i$ very serious.   I   long-ago master ASP [Professor Li]$_l$
         jiejue e_i de banfa.
         solve e_i DE method
         'This kind of problem is very serious. A long time ago I mastered a method/methods that Professor Li used to solve [it].'

     b. [Zhei zhong wenti]$_i$ hen yanzhong.   [[Li Jiaoshou]$_l$ jiejue e_i de banfa]$_k$, wo
         [this kind problem]$_i$ very serious.   [[Professor Li]$_l$ solve e_i DE method]$_k$ I
         zaoyi   xuehui e_k le.
         long-ago master e_k ASP
         'This kind of problem is very serious. A method/methods that Professor Li used to solve [it], I mastered [it/them] a long time ago.'

jiejue: [SUBCAT < NP$_l$, NP$_i$ >]

The e_i in each of these three examples is a personal pronoun for the same reasoning given for the e_i of (39b). ((39a) is analyzed with respect to the SUBCAT given in the discussion of (39b), and (43a, b) is analyzed with respect to the *jiejue* SUBCAT just above). The e_k of (43b) is a nonpronoun, for the same reasoning given for the e_k in (39b) and (20a).

Besides the fact that HPSG only allows these constructions to be interpreted as having null-object personal pronouns, there is another reason for positing null objects as personal pronouns in this case: by positing null objects as personal pronouns, I bring out the symmetric behavior of null objects and null subjects, where a null subject is interpreted as a personal pronoun (for the same reasoning as the null objects) in grammatical examples like (45) below.

(45) [Li Jiaoshou]$_i$ you ming. e_i xie de shu bu shao.
     [Professor Li]$_i$ have fame e_i write DE book not few
     'Professor Li is well known. She has written quite a few books.'

This evidence (that both null objects and null subjects are pronouns in discourse constructions) reflects the symmetric behavior between null subjects and null objects, as in the non-topic constructions. It also interestingly contrasts with the asymmetry between

null objects and null subjects when they both are traces in topic constructions.

6. Conclusions.

Now, a revision of the NP typology for Chinese can be made.

HPSG REF-TYPE	ppronoun	nonpronoun	zpronoun
OVERT	ta	Xiaomei	ziji
EMPTY	obj bound by matrix subj or discourse referent	obj bound by topic	--

This new typology indicates that null objects in Mandarin have a wider distribution than has been suggested to date. In coming to this conclusion, I do not reject the whole analysis of either Huang or Xu, but side with both on different issues. Moreover, the typology suggests that null objects do not always have the same reference-type, as has previously been argued. Thus, with respect to non-topic and discourse constructions, Chinese belongs, as suggested by Xu (1986) and Rizzi (1986), in a typology of null-object-drop languages. Furthermore, this analysis, unlike those of Huang and Xu, brings out the relative behavior of null subjects and objects, where their asymmetric behavior is diagnostic for trace-hood and their symmetric behavior for pronoun-hood.

Acknowledgments.

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Toward a Linearization-Based Approach to Word Order Variation in Japanese

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Abstract

Japanese is a strongly head final language, but the order of nonhead elements in a given sentence is relatively free, as the examples in (1) illustrate.

(1) a. Hanako-ga   kono hon-o   yonda (koto)
       Hanako-NOM this book-ACC read   (matter)
       '(That) Hanako read this book.'

    b. kono hon o Hanako ga yonda (koto)

In this paper, I provide a general characterization of word order variation of this type in terms of a linearization model (Dowty, in press; Reape, in press; Pollard, Kasper and Levine, 1992), which allows for the treatment of discontinuous constituency and semi-free word order without appealing to movement transformations or otherwise complicated analyses bound to the notion that word order results from the terminal yield of syntactic trees.

A treatment of this type is motivated in part by the observation that sentential modifiers in Japanese often appear between complements of a given verb.[1] For example, in (2) the linear order of the adjunct *gakko de*, 'at school,' and the complements *Hanako* and *Haruka* appears to be quite free.

(2) a. Hanako-ga   gakko-de Haruka-ni   kisuoshita
       Hanako-NOM school-at Haruka-DAT kissed
       'Hanako kissed Haruka at school.'

    b. gakko-de Hanako-ga Haruka-ni kisuoshita

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[1]Kasper (in press) discusses a similar phenomena in the German *Mittelfeld*, and demonstrates that a solution based on "flat" syntactic structures, with adjuncts and complements as sister constituents, can provide an account for both the syntax and semantics of these constructions, albeit in a complicated way.

c. Hanako-ga Haruka-ni gakko-de kisuoshita

If we adopt ID schemata of the type posited for earlier versions of HPSG (Head-driven Phrase Structure Grammar, Pollard and Sag 1987, 1993) it would be assumed that, in the case of (2), *Hanako ga* and *Haruka ni* would combine (all at once) with the verb *kisuoshita* by way of some head-complement schema (cf. P&S 1993, Schema 3) and that the sentential adverb *gakko de* would combine with the resulting phrase by way of a separate head-adjunct schema (P&S 1993, Schema 5). An analysis such as this, however, does not allow adjuncts to appear interspersed with complements, unless the principles of constituent ordering are reformulated to allow for discontinuous constituents.

Linearization, however, allows us to "have our cake and eat it too." With phrase-structural and linear-precedence relations occupying two distinct levels of description, it is quite easy to formulate an account where elements unrelated on one level are in fact related (that is, ordered together) on another. In the case above, the adjunct *gakko de* is taken to be on a different phrase-structural level than the complements *Hanako* and *Haruka*. However, using a simple operation, these elements can be "unioned" into the same "word order domain," with the predictions in (2) following naturally, by way of LP constraints that allow for free variation of nonhead elements in the same such domain.

1 Preliminaries

In Japanese, complements and other co-dependents of a given head may appear in relatively free linear variation, as the examples in (1) and (2) illustrate.

(1) a. Hanako-ga   sono hon-o   yonda
      Hanako-NOM that book-NOM read
      'Hanako read that book'

   b. sono hon o Hanako ga yonda

(2) a. Hanako-ga   Haruka-ni   gakko-de kisuoshita
      Hanako-NOM Haruka-DAT school-at kissed
      'Hanako kissed Haruka at school.'

   b. Haruka ni Hanako ga gakko de kisuoshita

   c. gakko de Hanako ga Haruka ni kisuoshita

   d. Haruka ni gakko de Hanako ga kisuoshita

   e. Hanako ga gakko de Haruka ni kisuoshita

   f. gakko de Haruka ni Hanako ga kisuoshita

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In addition to cases like these, Japanese also exhibits (to a certain extent) word order variation which would traditionally fall under the rubric of "scrambling." The examples in (3) illustrate that co-dependents of one head, *sase*, intermingle with those of another, *age*.

(3) a. Haruka-wa Hanako-ni hon-o   Ayako-ni age-saseta
       Haruka-TOP Hanako-DAT book-ACC Ayako-DAT give-made
       'Haruka made Hanako give the book to Ayako.'

    b. hon o Haruka wa Hanako ni Ayako ni agesaseta

    c. Hanako ni Haruka wa hon o Ayako ni agesaseta

    d. *Ayako ni Haruka wa Hanako ni hon o agesaseta (out with meaning
       of (2a))

In this paper, I provide an account of the word order variation exemplified in (1), (2) and (3), in a linearization model situated within the framework of HPSG. In addition, I will suggest ways in which this model can be extended to account for well-known examples in which order is subject to certain construction-specific constraints, as in (4).

(4) a. yama   ni ki ga aru
       mountain LOC tree NOM exist
       'Trees are on the mountain.'

    b. ?*ki ga yama ni aru

    c. Hanako-ga   atama-ga warui
       Hanako-NOM head-NOM dull
       'Hanako is not so bright.' (literally, 'Hanako has a dull head.')

    d. *atama ga Hanako ga warui

    e. Haruka-wa Hanako-ni hon-o   Ayako-ni age-saseta
       Haruka-NOM Hanako-DAT book-ACC Ayako-DAT give-made
       'Haruka made Hanako give the book to Ayako.'

    f. *Ayako ni Haruka wa Hanako ni hon o agesaseta
       (out with the same interpretation as (e))

The paper is organized as follows: In §1, I introduce the linearization model, taking the examples in (1) as pedagogical tools. §2 extends the analysis to handle slightly more complicated cases like (2) and (3), while §3 involves a tentative proposal to account for examples like those in (4), as well as a brief discussion of issues for further research and conclusions of the present study.

Before moving on, however, let me point out that Japanese exhibits (at least) one other kind of word order variation, which Saito (1992) treats as "long-distance scrambling." In these cases, a non-subject element of an embedded

finite clause is scrambled to the front of the matrix clause, as the examples in (5) illustrate.

(5) a. Haruka-wa [Hanako-ga Mariko-ni kisuoshita]-to omotteiru
       Har.-TOP Han.-NOM M.-DAT kissed-CMP thinks
       'Haruka thinks that Hanako kissed Mariko.'

   b. Mariko ni Haruka wa Hanako ga kisuoshita to omotteiru

   c. *Hanako ga Haruka wa Mariko ni kisuoshita to omotteiru

I believe, however, that word order variation of this type should be treated by a separate mechanism (namely, as an unbounded dependency) and have left the problem for a future study.

2 Linearization

2.1 An HPSG-based Linearization Model for Japanese

While most current syntactic theories assume (either explicitly or implicitly) that linear ordering arises from or because of phrase structure, and that sentences are in fact characterized by their phrase structure, the linearization model assumes instead that natural language syntax can be characterized in terms of two interrelated, yet distinct, levels of representation: (1) constraints on phrase structure, projected from valence properties of lexical items (also **tectogrammar**), and (2) separate constraints on word order (**phenogrammar**), which may or (crucially) may not depend on tectogrammatical relations such as sisterhood and so forth (Pollard, Kasper and Levine 1992, henceforth PKL). That is, tectogrammatical structure concerns itself with "the steps by which a sentence is built up from its parts, but without regard to the actual form that these combinations take" (Curry 1963) while phenogrammatical structure addresses *how* words and phrases are realized as strings, the final output of the human natural language system.

With these basic assumptions in mind, we posit here an HPSG-based variant of the linearization model based on the work of Reape (1991, in press), in which the phenogrammatical notion of **word order domain** is introduced. And, although we will part with Reape on a number of points throughout the paper, the underlying assumptions will be much the same. Namely, each tectogrammatic combination will have associated with it the formation of a new, more inclusive phenogrammatic (i.e., word order) domain, such that elements in a daughter's order domain may become elements in the mother's order domain. This, among other things, allows tectogrammatically nonadjacent elements to be ordered adjacently in the phenogrammar, and, crucially, even tectogrammatic non-sisters

to be ordered with respect to each other phenogrammatically.[2] We introduce here the details of our model first by a simple, illustrative example, followed by a series of extensions. I'll try to introduce the relevant aspects of HPSG as I go along, but readers desiring a more comprehensive introduction to the framework are referred to P&S 1993.

Consider, then, the sentences in (6) below. It should be noted that the cases presented here exhaust the word order possibilities for Japanese. That is, any word order variation not exemplified here will be taken for our purposes to be ill-formed and is, in reality, extremely marked at best.

(6) a. Hanako-ga   sono hon-o   yonda
       Hanako-NOM that book-NOM read
       'Hanako read that book'

    b. sono hon o Hanako ga yonda

We note first that the difference in meaning between the two sentences presented in (6), if any, is highly pragmatic (Gunji 1987). That is, older information tends to appear earlier in the sentence, but beyond that differences are minimal (see also Kuno 1978). Also, it should be noted that while (I think) most speakers would agree that the examples in (6) are both well within the set of acceptable Japanese utterances, most speakers will not, for example, accept all six permutations of the noun phrase arguments of a ditransitive verb. This variation, however, appears to be highly idiosyncratic. That is, an example which is less acceptable to one speaker may be perfectly acceptable to another who has an easier time imagining the pragmatic conditions that would give rise to that particular ordering. For the purposes of our account, we will assume (as a first approximation) that the noun phrase arguments of a given verb may appear in any order, and that, pragmatic differences aside, sentences such as (6a) and (6b) mean the same thing.[3]

Now, in HPSG, the principle type of linguistic object is taken to be a **sign** – a structured complex of syntactic, semantic and phonological information that corresponds to words, phrases or perhaps even something larger like text. For instance, the sentences in (6a) and (6b) both have signs associated with them, as do noun phrases such as *sono hon o*, and words like *yonda*. These signs (and their internal features) are modelled by typed feature structures, where different types of feature structures permit different sets of appropriate features whose values in turn must be feature structures of an appropriate type. A grammar of HPSG, then, can be thought of as a recursive description of all the types of feature structures permitted in a given language. Signs are taken to

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[2] This represents quite a break, even from earlier systems, such as Generalized Phrase Structure Grammar (Gazdar, Klein, Pullum and Sag, 1982), in which separate Linear Precedence rules were employed to constrain the order of sisters in a given structure.

[3] This assumption is consistent with Ross (1967), N. McCawley (1976) and Chomsky (1976), in which word order variation of this type is treated as "stylistic" or PF movement.

have (at least) the features PHON and SYNSEM, whose values are a bundle of phonological information and a bundle of syntactic and semantic information, respectively. For our purposes, we'll gather this information into objects of type node, encoded in our system by the feature NODE. Phrasal signs also have a DTRS feature whose value is a bundle of phrase-structural information about the daughter signs of the sign in question. We take the DTRS attribute to be the locus for the type of information we presently associate with tectogrammatical structure.

Phenogrammatical information, on the other hand, will be encoded in our system by the feature DOM, certain points about which are summarized below (adapted in part from Reape 1991:126):

i. DOM is taken to encode the phenogrammatical structure of a sign in that it is directly related to that sign's phonological string by way of the Consituent Ordering Principle.[4]

ii. The value of DOM will be a list (i.e., an ordered set) of elements of type node. That is, each element of the DOM list will consist of all the information in the corresponding constituent with the exception of that constitent's DOM and DTRS (and in more advanced versions of HPSG, the QSTORE and RETRIEVED-QUANTS).[5]

iii. DOM is defined on all signs (phrasal and lexical).[6]

iv. The DOM value of a lexical sign will be token identical to that sign's NODE value.

v. Nonlexical domains are composed compositionally from smaller domains, in a manner to be made precise below.

vi. In certain cases (to be made precise below) the elements of a constituent's domain may also belong to the mother's domain.

As an example, consider a sample lexical entry below in (7) corresponding to a typical lexical sign (say, for the verb *yomu*, 'to read') and note that its DOM value is simply a singleton list containing a node which in turn consists of the sign's PHON and SYNSEM values. Note also that since the entry in (7) is a lexical sign, the DTRS attribute is undefined.[7]

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[4]This relation is made explicit shortly.

[5]It is probably desirable to narrow the conception of node as much as possible, in keeping with the spirit of Dowty's "minimalist syntax," i.e., to construe nodes as containing as little information as possible. Kasper (p.c.), however, has suggested that we probably need at least the PHON and SYNSEM values of a sign, and Reape takes "nodes" (he doesn't use the term) to be whole signs. Anyway, this is an interesting area for further study.

[6]This differs from Reape, who defines DOM only for phrases.

[7]This doesn't look much like the real lexical entry for anything in that specific information concerning the PHON and SYNSEM values has been left out for expository purposes. The point of the example is to illustrate how DOM values are defined on lexical signs.

(7) *A lexical instantiation schema:*

$$
\begin{bmatrix}
\text{NODE} & \boxed{1} & \begin{bmatrix} \text{PHON} & \boxed{2} \\ \text{SYNSEM} & \boxed{3} \end{bmatrix} \\
\text{DOM} & (\boxed{1})
\end{bmatrix}
$$

Now, phrases in HPSG are licensed by constraints known as ID (Immediate Dominance) schemata. The schemata are taken to be a set of universal, highly underspecified descriptions on phrasal signs, from which every language makes a selection.[8] A phrasal sign is taken to be well-formed with respect to phrase structural relations if it satisfies exactly one ID schema (cf. the ID Principle of P&S 1993).

It also appears that these schemata can be straightforwardly extended to accommodate the linearization model. That is, I'd like to propose first that ID schemata should be used not only to license tectogrammatical combinations, but also to control phenogrammatical information by way of the DOM attribute.[9]

The extended ID schemata needed for the examples in (6), then, will look something like the ones below.[10] The first schema licenses flat head-complement structures (like Japanese sentences), and the second licenses head-adjunct structures. This version of the head-adjunct schema will allow us to form noun phrases like *sono hon o*, but will not allow adjuncts to appear interspersed among complements. That is, it is not quite what we ultimately want, but will suffice for now.[11]

$$
\begin{bmatrix}
\text{DTRS} & \begin{bmatrix} \text{HEAD DTR} & \begin{bmatrix} \text{NODE} & \boxed{2} & [\text{SYNSEM} \dots [\text{SUBCAT} \langle \boxed{3}, \dots, \boxed{6} \rangle]] \\ \text{DOM} & \langle \boxed{2} \rangle \end{bmatrix} \\ \text{COMP DTRS} & \langle [\text{NODE} \; \boxed{3} [\text{SYNSEM} \; \boxed{3}]], \dots, [\text{NODE} \; \boxed{6} [\text{SYNSEM} \; \boxed{6}]] \rangle \end{bmatrix} \\
\text{DOM} & \text{permute}(\langle \boxed{2}, \dots, \boxed{6} \rangle)
\end{bmatrix}
$$

$$
\begin{bmatrix}
\text{DTRS} & \begin{bmatrix} \text{HEAD DTR} & \begin{bmatrix} \text{NODE} & \boxed{3} & [\text{SYNSEM} \; \boxed{1}] \\ \text{DOM} & \langle \boxed{3} \rangle \end{bmatrix} \\ \text{ADJUNCT DTR} & \begin{bmatrix} \text{NODE} & \boxed{4} & [\text{SYNSEM} [\text{LOC} [\text{CAT} [\text{HEAD} [\text{MOD} \; \boxed{1}]]]]] \\ \text{DOM} & \langle \boxed{4} \rangle \end{bmatrix} \end{bmatrix} \\
\text{DOM} & \text{permute}(\langle \boxed{3}, \boxed{4} \rangle)
\end{bmatrix}
$$

---

[8]That is, of 6 or 7 universally available schemata in the set posited in P&S 1993, a language like Japanese may select 4 or 5.

[9]The claim that each tectogrammatical combination be associated with the formation of a new word order domain follows immediately from this proposal.

[10]An interesting question arises as to whether these schemata are "universal" or "parameterized" for a specific language. This issue will become moot later, as I show it is possible to "factor" some universal relation between tectogrammatical and phenogrammatical processes into an (appropriately) universal principle. I have postponed such a move, however, once more for the sake of expositional clarity.

[11]I've left out some information here to avoid cluttering the picture. For instance, the head in the first schema must be lexical. The key thing to note is how the tectogrammatical processes are related to the formation of the DOM value for the mother's sign.

Note that, for now at least, these schemata do the work of Reape's "Domain Principle" in that they mediate between tectogrammatic notions (like "head" and "daughters") and the phenogrammatic information encoded in the DOM attribute. The generalization here is quite simple: in both cases above (at this preliminary stage!), the DOM value of the mother is some permutation of the the list one of whose elements is the NODE value of the head and the rest of whose elements are the NODE values of the non-head head daughters. It is important to recognize here that these ID schema say nothing about the order in which these elements may or may not permute, nor do they make explicit any relationship between the DOM value and the phonetic/phonological realization of the string associated with any given sign. We will address that issue at this time.

The order of elements in a given DOM value can be determined in two ways, and, usually, the final ordering of these elements will result from a combination of the two. First, we introduce here the notion of LP constraints of the form $\phi_1 \prec \phi_2$. These rules, in our system, are taken to be constraints only on well-formed DOM values (as opposed to, say, sequences of daughter signs, as in the more traditional conception of these rules). Informally, a sequence of nodes, σ satisfies an LP constraint, $\phi_1 \prec \phi_2$ iff every element of σ which satisfies ϕ_1 precedes every other element of σ which satisfies ϕ_2, or, equivalently, if every element of σ which staisfies ϕ_2 follows every other element that satisfies ϕ_1.

In addition to LP constraints, the order of elements in a DOM value can be constrained by more general constraints on signs as a whole (which makes sense since the attribute DOM is defined on all signs).[12] For example, the constraint below could be used as a "head-final constraint."[13]

(8) *A preliminary head-final constraint:*

$$[\text{DTR} [\text{HEAD DTR} [\text{DOM} \,\boxed{1}]]] \Rightarrow [\text{DOM} ([\quad] \prec \boxed{1})]$$

As mentioned earlier, the permissible orders of elements in DOM will usually be determined by an interaction of both types of constraints mentioned here. But how does this ordering correspond to the ordering of elements of the PHON value? Well, if we take PHON also to be a list, the Constituent Ordering Principle, adapted from Reape (1991:134) can be used to mediate between DOM and PHON in a straightforward manner.

$$\text{sign} \Rightarrow \begin{bmatrix} \text{PHON} \,\boxed{1} \circ \cdots \circ \boxed{n} \\ \text{DOM} \,\langle[\text{PHON} \,\boxed{1}], \ldots, [\text{PHON} \,\boxed{n}]\rangle \end{bmatrix}$$

This states simply that the PHON attribute is required to be the concatenation of the values of the PHON attributes of the nodes in the DOM sequence.

---

[12] This is even less surprising when we consider that, formally, LP constraints are just a special case of the general constraints on signs.

[13] This is only an example; our head-final constraint actually looks slightly different.

We now have the necessary formal machinery to posit word order constraints (LP constraints and constraints on signs that refer to the DOM value) that will correctly predict the word order possibilities in (6).[14]

So, turning now to the examples, it appears that one generalization we'd like to capture is that, in Japanese, there is a strong tendency for heads to appear after non-head elements in a given sequence. And, as alluded to before, there appear at first to be two ways to capture this generalization. On the one hand, we could plausibly posit an LP constraint like the one in (9). Recall that this is a constraint on well-formed DOM values.

(9)

$$nonhead \prec head$$

Informally, the equation in (9) states that any nonhead in a given DOM (since any nonhead element will satisfy the left half of the equation) must precede the sequence in DOM that satisfies the right half – namely, the sequence containing the syntactic head. In HPSG, however, information about whether any given element is a head cannot be determined by looking at an object of type node, since NODE contains only the values PHON and SYNSEM, and nothing in these two values encodes this type of information. It appears, then, that the constraint in (9) will not work.

What we need to do, it seems, is to pursue the other alternative and to posit a constraint on signs that will ensure that the last element of any DOM sequence will be the head. One candidate, of course, would be the constraint posited in (8) above. This version of the head final constraint, however, incorrectly rules out examples like (2a), (2b), (2d), (2e), in which the head of the construction is phrasal. That is, in these cases, the adjunct *gakko de* would be required by the constraint in (8) to precede the entire DOM value for the head, which, since it is phrasal, would include not only the NODE value of the verb *kisuoshita*, but also the NODE values for both of its complements, *Hanako ga* and *Haruka ni*.

Alternatively, then, I propose the following, stated first informally, and then expressed in our feature logic:

Head-final constraint: In a (headed) phrasal sign, the final node of that sign's DOM must be the final node of the head daughter's DOM.

$$\left[\text{DTRS} \left[\text{HEAD DTR} \left[\text{DOM} \langle \ldots, \boxed{1} \rangle \right] \right] \right] \Rightarrow \left[\text{DOM} \left(\left[\ \right] \prec \boxed{1} \right) \right]$$

That is, in a sign with final DOM element [1], [1] follows every other element of that sign's DOM value, or, equivalently, if [1] is in the sign's domain, then every other element of that domain precedes it.

---

[14]Throughout this first example, we will ignore the markers *ga* and *o* for the sake of simplicity. A discussion of these is provided in the last section.

To see how this works, consider the phrase (from (6)) *sono hon*, 'this book.' Now, in this case, the noun *hon* is taken to be the head, while *sono* is an adjunct. The phrase as a whole, then, will be licensed by the preliminary version of our head-adjunct schema (above). Now, the DOM value of this phrase, according to head-adjunct schema, will be some permutation of the DOM value of the lexical sign corresponding to *sono* concatenated with the DOM value of the lexical sign *hon*. That is, the head-adjunct schema tells us that the following two DOM values are possible:

$$
\left[\text{DOM} \left\langle \begin{bmatrix} \text{PHON } sono \\ \text{SYNSEM } \alpha \end{bmatrix}, \begin{bmatrix} \text{PHON } hon \\ \text{SYNSEM } \beta \end{bmatrix} \right\rangle \right] \text{ and } \left[\text{DOM} \left\langle \begin{bmatrix} \text{PHON } hon \\ \text{SYNSEM } \beta \end{bmatrix}, \begin{bmatrix} \text{PHON } sono \\ \text{SYNSEM } \alpha \end{bmatrix} \right\rangle \right]
$$

Now, since the last node of the DOM value of the head of the construction (cf. [1] in the equation above) is in the DOM value for the phrase, the head-final constraint tells us that the every other element in this domain must precede it. That is, the lexical sign corresponding to *hon* is the head daughter, and its DOM value (of course) will look like this (cf. the lexical DOM instantiation template in (7)):

$$
\left[\text{DOM} \left\langle \begin{bmatrix} \text{PHON } hon \\ \text{SYNSEM } \beta \end{bmatrix} \right\rangle \right]
$$

So every other element (namely, the node value for the adjunct *sono*) must precede it in the domain for the phrasal sign in question. Thus, the second possibility (where *hon* precedes *sono*) is correctly ruled out.

Consider now the sentence as a whole. Assuming that we have successfully formed phrasal signs corresponding to the complements *Hanako ga* and *sono hon o*, and the head verb *yonda*, the head-complement schema above tells us that the DOM value of the output phrasal sign will be some permutation of the list one of whose members is the NODE value for *yonda*, and the rest of whose elements are the NODE values for *sono hon o* and *Hanako ga*. Six possibilities are therefore licensed by the schema:

$$
\left[\text{DOM} \left\langle \begin{bmatrix} \text{PHON } sono\ hon\ o \\ \text{SYNSEM } \alpha \end{bmatrix}, \begin{bmatrix} \text{PHON } hanako\ ga \\ \text{SYNSEM } \beta \end{bmatrix}, \begin{bmatrix} \text{PHON } yonda \\ \text{SYNSEM } \gamma \end{bmatrix} \right\rangle \right]
$$

$$
\left[\text{DOM} \left\langle \begin{bmatrix} \text{PHON } hanako\ ga \\ \text{SYNSEM } \beta \end{bmatrix}, \begin{bmatrix} \text{PHON } sono\ hon\ o \\ \text{SYNSEM } \alpha \end{bmatrix}, \begin{bmatrix} \text{PHON } yonda \\ \text{SYNSEM } \gamma \end{bmatrix} \right\rangle \right]
$$

$$
\left[\text{DOM} \left\langle \begin{bmatrix} \text{PHON } yonda \\ \text{SYNSEM } \gamma \end{bmatrix}, \begin{bmatrix} \text{PHON } hanako\ ga \\ \text{SYNSEM } \beta \end{bmatrix}, \begin{bmatrix} \text{PHON } sono\ hon\ o \\ \text{SYNSEM } \alpha \end{bmatrix} \right\rangle \right]
$$

$$
\left[\text{DOM} \left\langle \begin{bmatrix} \text{PHON } yonda \\ \text{SYNSEM } \gamma \end{bmatrix}, \begin{bmatrix} \text{PHON } sono\ hon\ o \\ \text{SYNSEM } \alpha \end{bmatrix}, \begin{bmatrix} \text{PHON } hanako\ ga \\ \text{SYNSEM } \beta \end{bmatrix} \right\rangle \right]
$$

$$
\left[\text{DOM} \left\langle \begin{bmatrix} \text{PHON } hanako\ ga \\ \text{SYNSEM } \beta \end{bmatrix}, \begin{bmatrix} \text{PHON } yonda \\ \text{SYNSEM } \gamma \end{bmatrix}, \begin{bmatrix} \text{PHON } sono\ hon\ o \\ \text{SYNSEM } \alpha \end{bmatrix} \right\rangle \right]
$$

$$\left[\text{DOM} \left\langle \begin{bmatrix} \text{PHON } sono\ hon\ o \\ \text{SYNSEM } \alpha \end{bmatrix}, \begin{bmatrix} \text{PHON } yonda \\ \text{SYNSEM } \gamma \end{bmatrix}, \begin{bmatrix} \text{PHON } hanako\ ga \\ \text{SYNSEM } \beta \end{bmatrix} \right\rangle \right]$$

Of these, the head-final constraint will rule out all those where some element of DOM follows that element which is the final domain member of the head daughter (since every other node is required to precede this element). Note that all but the first two fail this condition. Now, considering our previous hypothesis that all non-head elements in a simple Japanese sentence can occur in any order, no further LP rules are needed to predict the word order variation in the examples in (6). That is, the two word order domains remaining after applications of the head-adjunct schema and our head-final constraint, in conjunction with the Constituent Ordering Principle, will predict all and only those examples in (6) to be well-formed. This is a correct prediction.

Note also that this analysis predicts that the interpretation of (6a) and (6b) will be equivalent, since no independent manipulation of the semantics took place at any stage of this derivation.[15] As noted before, this is also a correct prediction.

3 Domain Union

With this lengthy example finally under our belts, we are now in a position to extend the analysis to account for more interesting examples involving the interspersal of adjuncts among complements of a given head (exemplified in (2)), and scrambling (exemplified in (3)).

3.1 Sentential Adverbs

Recall that in (2), we saw that sentential adverbs such as *gakko de* may appear interspersed among the complements of a verb like *kisuoshita*. The examples are repeated here in (10).

(10) a. Hanako-ga   Haruka-ni   gakko-de kisuoshita
      Hanako-NOM Haruka-DAT school-at kissed
      'Hanako kissed Haruka at school.'

   b. Haruka ni Hanako ga gakko de kisuoshita

   c. gakko de Hanako ga Haruka ni kisuoshita

   d. Haruka ni gakko de Hanako ga kisuoshita

   e. Hanako ga gakko de Haruka ni kisuoshita

---

[15] In P&S 1993, NP arguments of a given verb, regardless of their surface order, are associated with a "role" in the verb's argument structure, and, by way of the Semantics Principle, with the semantics of the sentence as a whole.

f. gakko de Haruka ni Hanako ga kisuoshita

Examples like these pose a problem for the linearization model we have presented in the previous section. That is, our model will at present correctly allow the sentences in (10c) and (10f), but will incorrectly rule out the remaining grammatical examples (as well as any ungrammatical ones).

The problem stems from the fact that the complements of the verb *kisuoshita* combine with the verb all at once, creating a phrasal sign whose DOM value is some permutation of the DOM values of the verb and all the complements. The head-adjunct schema then allows the adjunct *gakko de* to combine with this phrase, forming a (larger) phrasal sign whose DOM value is, in our present system, merely some permutation of a list containing the NODE value of the adjunct and the NODE value of the (phrasal) head. This leaves only four possibilites (let γ below represent the disjunction of the (two) allowable permutations of *Hanako-ga Haruka-ni kisuoshita*):

$$\left[\text{DOM} \left\langle \begin{bmatrix} \text{PHON } gakko \ de \\ \text{SYNSEM } \alpha \end{bmatrix}, \begin{bmatrix} \text{PHON } \gamma \\ \text{SYNSEM } \beta \end{bmatrix} \right\rangle \right] \text{ and } \left[\text{DOM} \left\langle \begin{bmatrix} \text{PHON } \gamma \\ \text{SYNSEM } \beta \end{bmatrix}, \begin{bmatrix} \text{PHON } gakko \ de \\ \text{SYNSEM } \alpha \end{bmatrix} \right\rangle \right]$$

Now, the latter of these will be ruled out by the head-final constraint (the node value of the head daughter in this case is taken to be the node whose PHON is γ and whose final element must be the node value corresponding to *kisuoshita*) leaving only one place for *gakko de* to appear in the string – at the beginning.

What we need, it appears, is some mechanism by which sentential adverbs can appear in the same word order domain as the complements of the sentence which the adverb modifies. Reape handles these cases in terms of (word order) domain union, and we will adopt the spirit of his analysis here.[16]

Recall that in the previous section, we noted that two elements that were not sisters in the tectogrammar could in principal be ordered with respect to each other in the phenogrammar. In this case, that is exactly what we need. Our proposal thus far, however, does not give us any means to accomplish this. So we will modify the system at this time in order to allow such a possibility.

To begin, we introduce the **sequence union** relation $\cup_{()} (A, B, C)$, defined as follows:

(11) For three sequences $A = \langle a_1, \ldots, a_m \rangle$, $B = \langle a_{m+1}, \ldots, a_{m+n} \rangle$, and $C = \langle c_1, \ldots, c_{m+n} \rangle$, $\cup_{()}(A, B, C)$ just in case there is a self-bijection π of $\{1, \ldots, m + n\}$ such that:

  i. the restrictions of π to $\{1, \ldots, m\}$ and $\{m + 1, \ldots, m + n\}$ are order-preserving; and

  ii. for each $i = 1, \ldots, m + n, a_i = c_{\pi(i)}$.

---

[16] The implementation will be different.

Informally stated, the sequence C will be the result of sequence-unioning two sequences A and B (also written $A \cup_{()} B$), such that C contains all and only the elements of A and B and any pair of elements from A or B can be found in C in the same order. In formal language theory $\cup_{()}$ is akin to the (perhaps) more familiar shuffle operator.

We take domain union, then, to be just the sequence union of two DOM values, leaving us the task of (1) introducing a means by which we can state positively when domain union must occur, and (2) modifying the schemata to "trigger" domain union in these cases.[17]

In order to accomplish this, we (following Reape again) introduce the attribute UNION, with values ranging over + and −. This feature can be taken to specify which elements must be unioned into some word order domain, and which elements must not. Also, the logical possibility of being unspecified for UNION exists. We will assume here that UNION can be specified lexically, and that certain constructions can require their arguments to be UNION + or −.

We are now in a position to modify the head-adjunct schema to require that elements like *gakko de* be sequence unioned into the word order domain of the head daughter.[18]

Taking $\cup_{()}$ now to be domain union, the revised head-adjunct schema would then look like this:

$$
\begin{bmatrix}
\text{DTRS} & \begin{bmatrix} \text{HEAD DTR} & \begin{bmatrix} \text{NODE} \begin{bmatrix} \text{SYNSEM } \boxed{1} \end{bmatrix} \\ \text{DOM } \boxed{3} \end{bmatrix} \\ \text{ADJUNCT DTR} & \begin{bmatrix} \text{NODE } \boxed{4} \begin{bmatrix} \text{SYNSEM} \begin{bmatrix} \text{LOC} \begin{bmatrix} \text{CAT} \begin{bmatrix} \text{HEAD} \begin{bmatrix} \text{MOD } \boxed{1} \end{bmatrix} \end{bmatrix} \end{bmatrix} \end{bmatrix} \end{bmatrix} \\ \text{UNION } - \end{bmatrix} \end{bmatrix} \\
\text{DOM } \boxed{3} \cup_{()} (\boxed{4})
\end{bmatrix}
$$

And this is the only change we will need to account for all the examples in (10). More explicitly, the head adjunct schema tells us that the DOM value of its output phrasal sign will be the result of domain unioning the singleton sequence of the adjunct's NODE with the DOM of the head daughter. In the case of our example, the DOM value of the head daughter will be one of two possibilities:

$$
\begin{bmatrix} \text{DOM} & \left\langle \begin{bmatrix} \text{PHON } \textit{Haruka ni} \\ \text{SYNSEM } \alpha \end{bmatrix}, \begin{bmatrix} \text{PHON } \textit{Hanako ga} \\ \text{SYNSEM } \beta \end{bmatrix}, \begin{bmatrix} \text{PHON } \textit{kisuoshita} \\ \text{SYNSEM } \gamma \end{bmatrix} \right\rangle \end{bmatrix}
$$

$$
\begin{bmatrix} \text{DOM} & \left\langle \begin{bmatrix} \text{PHON } \textit{Hanako ga} \\ \text{SYNSEM } \beta \end{bmatrix}, \begin{bmatrix} \text{PHON } \textit{Haruka ni} \\ \text{SYNSEM } \alpha \end{bmatrix}, \begin{bmatrix} \text{PHON } \textit{kisuoshita} \\ \text{SYNSEM } \gamma \end{bmatrix} \right\rangle \end{bmatrix}
$$

---

[17] And, ultimately, formulating a Domain Principle which will mediate between tectogrammar and phenogrammar in a universal way.

[18] We take this shuffling operation to be obligatory in Japanese head-adjunct structures. The Domain Principle presented in the next section will allow us to take a more sophisticated view of matters. More importantly, the Domain Principle will allow us to predict what a sign's DOM value will be by appealing to the UNION feature, thereby freeing us from stipulating language-specific phenogrammatic information into the ID schemata (which are taken to be universal).

The NODE value of *gakko de* will be:

$$\begin{bmatrix} \text{PHON } gakko\ de \\ \text{SYNSEM } \delta \end{bmatrix}$$

So the head adjunct schema predicts that one of the two sets of possible DOM values for the whole phrase will be (taking just one of the two possibilities for the DOM value of the head):

$$\left\langle \begin{bmatrix} \text{PHON } gakko\ de \\ \text{SYNSEM } \delta \end{bmatrix} \right\rangle \cup_{\{\}} \left\langle \begin{bmatrix} \text{PHON } Hanako\ ga \\ \text{SYNSEM } \beta \end{bmatrix}, \begin{bmatrix} \text{PHON } Haruka\ ni \\ \text{SYNSEM } \alpha \end{bmatrix}, \begin{bmatrix} \text{PHON } kisuoshita \\ \text{SYNSEM } \gamma \end{bmatrix} \right\rangle$$

And, by the definition of sequence union, any of the following permutations will be allowed as the DOM value for the phrase as a whole:

$$\left\langle \begin{bmatrix} \text{PHON } Hanako\ ga \\ \text{SYNSEM } \beta \end{bmatrix}, \begin{bmatrix} \text{PHON } Haruka\ ni \\ \text{SYNSEM } \alpha \end{bmatrix}, \begin{bmatrix} \text{PHON } kisuoshita \\ \text{SYNSEM } \gamma \end{bmatrix}, \begin{bmatrix} \text{PHON } gakko\ de \\ \text{SYNSEM } \delta \end{bmatrix} \right\rangle$$

$$\left\langle \begin{bmatrix} \text{PHON } gakko\ de \\ \text{SYNSEM } \delta \end{bmatrix}, \begin{bmatrix} \text{PHON } Hanako\ ga \\ \text{SYNSEM } \beta \end{bmatrix}, \begin{bmatrix} \text{PHON } Haruka\ ni \\ \text{SYNSEM } \alpha \end{bmatrix}, \begin{bmatrix} \text{PHON } kisuoshita \\ \text{SYNSEM } \gamma \end{bmatrix} \right\rangle$$

$$\left\langle \begin{bmatrix} \text{PHON } Hanako\ ga \\ \text{SYNSEM } \beta \end{bmatrix}, \begin{bmatrix} \text{PHON } gakko\ de \\ \text{SYNSEM } \delta \end{bmatrix}, \begin{bmatrix} \text{PHON } Haruka\ ni \\ \text{SYNSEM } \alpha \end{bmatrix}, \begin{bmatrix} \text{PHON } kisuoshita \\ \text{SYNSEM } \gamma \end{bmatrix} \right\rangle$$

$$\left\langle \begin{bmatrix} \text{PHON } Hanako\ ga \\ \text{SYNSEM } \beta \end{bmatrix}, \begin{bmatrix} \text{PHON } Haruka\ ni \\ \text{SYNSEM } \alpha \end{bmatrix}, \begin{bmatrix} \text{PHON } gakko\ de \\ \text{SYNSEM } \delta \end{bmatrix}, \begin{bmatrix} \text{PHON } kisuoshita \\ \text{SYNSEM } \gamma \end{bmatrix} \right\rangle$$

However, the first of these will be ruled out by an application of the head-final constraint (with the last element of the head daughter's DOM being the domain element associated with the lexical head *kisuoshita*). A similar set of three permutations would be generated by sequence-unioning the singleton list corresponding to the NODE value of *gakko de* (as above) with the other possible DOM value for the head. The result is six possibilities, corresponding exactly to the sentences in (10a) - (10f).

3.2   Clause Union and Scrambling

A similar analysis can be applied to treat cases where complements of a lower clause intermingle with those of a higher clause, as is the case in the Japanese causative construction. The relevant examples are repeated here in (12).

(12) a. Haruka-wa Hanako-ni   hon-o   Ayako-ni   age-saseta
        Haruka-TOP Hanako-DAT book-ACC Ayako-DAT give-made
        'Haruka made Hanako give the book to Ayako.'

    b. hon o Haruka wa Hanako ni Ayako ni agesaseta

    c. Hanako ni Haruka wa hon o Ayako ni agesaseta

    d. *Ayako ni Haruka wa Hanako ni hon o agesaseta (out with meaning
       of (2a))

In these cases, it appears that what we want is for the elements of the DOM value associated with the lower verb phrase to be sequence unioned into the DOM value of the mother. Setting up our model to allow this, however, raises some interesting technical issues.

Consider first the lexical entry for the causative morpheme *sase*, and note especially that it selects for complements that are both UNION + and UNION − .[19]

$$
\begin{bmatrix}
\text{PHON } sase \\
\text{SYNSEM} \begin{bmatrix}
\text{HEAD } verb \\
\text{SUBCAT } \left\langle \begin{bmatrix} \text{SYNSEM NP-ga} \\ \text{UNION } - \end{bmatrix}, \begin{bmatrix} \text{SYNSEM NP-ni} \\ \text{UNION } - \end{bmatrix}, \begin{bmatrix} \text{SYNSEM VP-inf} \\ \text{UNION } + \end{bmatrix} \right\rangle
\end{bmatrix}
\end{bmatrix}
$$

This has the intended effect of allowing the DOM of the VP complement to be domain-unioned into the DOM of the mother. For this to work, we first need to posit a new schema that will allow us to form verb phrases. Such a schema should look something like this:[20]

$$
\begin{bmatrix}
\text{NODE} \begin{bmatrix} \text{SYNSEM} \begin{bmatrix} \text{LOCAL} \begin{bmatrix} \text{CATEGORY} \begin{bmatrix} \text{SUBCAT } \langle \boxed{1} \rangle \end{bmatrix} \end{bmatrix} \end{bmatrix} \end{bmatrix} \\
\text{DTRS} \begin{bmatrix} \text{HEAD DTR} \begin{bmatrix} \text{NODE} \begin{bmatrix} \text{SYNSEM} \begin{bmatrix} \text{LOCAL} \begin{bmatrix} \text{CATEGORY} \begin{bmatrix} \text{SUBCAT } \langle \boxed{1}, \dots, \boxed{n} \rangle \end{bmatrix} \end{bmatrix} \end{bmatrix} \end{bmatrix} \end{bmatrix} \\ \text{COMP DTRS } \langle \begin{bmatrix} \text{SYNSEM } \boxed{2} \end{bmatrix}, \dots, \begin{bmatrix} \text{SYNSEM } \boxed{n} \end{bmatrix} \rangle \end{bmatrix}
\end{bmatrix}
$$

We are then left with two (reasonable possibilities): (1) we could revise the head-complement schema to concatenate into the output sign's DOM the DOM values on those daughters which are UNION −, while domain unioning the DOM values of the UNION + complements; or (2) take the phenogrammatic information out of the schemata all together, and posit some general principle that will do the same work. Such a constraint, then, would encode the general relationship between tectogrammar and phenogrammar. Quite obviously, we will choose the latter here, as it is more elegant and, in fact, more explanatory. The principle works as follows:

The Domain Principle: In a phrasal sign, let [0] be the head daughter's domain, let $[1], \dots, [m]$ be the domains of the UNION + daughters and $[m+1], \dots, [n]$ the node values of the UNION − daughters. Then the DOM value of the phrase is:

$$
\boxed{0} \cup_{()} \boxed{1} \cup_{()} \dots \cup_{()} \boxed{m} \cup_{()} \text{ permute} (\boxed{m+1}, \dots, \boxed{n})
$$

---

[19]In earlier versions of HPSG, the values on SUBCAT lists were taken to be of type *synsem*. So, in order to allow verbs to select for the UNION attribute, we must either make it part of SYNSEM or allow verbs to select for a *synsem* object and to specify whether its complement in UNION + or UNION −. We will choose the latter here.

[20]Note: I have left the phenogrammatical information out of this schema, for reasons we will see immediately below.

That is, the Domain Principle guarantees that any phrase of the form:

$$
\left[
\begin{array}{l}
\text{DTRS}
\left[
\begin{array}{l}
\text{HEAD DTR}
\left[
\begin{array}{l}
\text{NODE}\left[\text{SYNSEM}\ldots\left[\text{SUBCAT }\langle \boxed{1^n},\ldots,\boxed{m^n}\rangle \cup_{\langle\rangle} \langle \boxed{m+1^n},\ldots,\boxed{n^n}\rangle\right]\right]\\
\text{DOM }\boxed{0}
\end{array}
\right]\\[2mm]
\text{COMP DTRS }\langle\left[
\begin{array}{l}
\text{NODE}\left[\text{SYNSEM }\boxed{1^n}\left[\text{UNION }+\right]\right]\\
\text{DOM }\boxed{1}
\end{array}
\right],\ldots,\\[2mm]
\quad\left[
\begin{array}{l}
\text{NODE}\left[\text{SYNSEM }\boxed{m^n}\left[\text{UNION }+\right]\right]\\
\text{DOM }\boxed{m}
\end{array}
\right]\rangle\cup_{\langle\rangle}\\[2mm]
\langle\left[\text{NODE }\boxed{m+1}\left[\text{SYNSEM }\boxed{m+1^n}\left[\text{UNION }-\right]\right]\right],\ldots,\\[1mm]
\quad\left[\text{NODE }\boxed{n}\left[\text{SYNSEM }\boxed{n^n}\left[\text{UNION }-\right]\right]\right]\rangle
\end{array}
\right]
\end{array}
\right]
$$

will have as its DOM value, the DOM value specified in the statement of the Domain Principle above.

Returning to our example, the net effect of the lexical entry for *sase* above, plus the head complement schema of §2 (with the phenogrammatical information removed) together with our new Domain Principle, will be to create a word order domain like the one below, where Σ abbreviates a description ranging corresponding to the disjunction of the possible word order domains associated with the embedded VP.

$$
\left[\text{DOM permute}\left\langle\left[\begin{array}{l}\text{PHON }\textit{Haruka wa}\\\text{SYNSEM }\alpha\end{array}\right],\left[\begin{array}{l}\text{PHON }\textit{Hanako ni}\\\text{SYNSEM }\beta\end{array}\right],\left[\begin{array}{l}\text{PHON }\textit{sase}\\\text{SYNSEM }\gamma\end{array}\right]\right\rangle\cup_{\langle\rangle}\Sigma\right]
$$

The net effect, then, is a DOM value that includes not only the arguments of the matrix verb *sase* but also the complements of the lower verb *age* (and *sase* and *age* themselves). The head final constraint from the previous subsection requires that *sase* be the last element in this domain, while the rest of the elements can scramble freely, subject to the restriction that the elements from Σ must remain in the same order relative to other elements of Σ (cf. the definition of sequence union). This allows all the sentences in (12) to be generated (including the ungrammatical one).[21]

It will also allow sentences like the following, in which an NP argument of the matrix clause appears between *age* and *sase*. These are definitely ungrammatical, so this constitutes an overgeneration.

(13) *Hanako ni hon o Ayako ni age Haruka wa sase

In this case, the head final constraint did not help us, since *age* is not the head of the phrase that contains the relevant DOM. It is attached to the head, however, by a lexical process, so it is not entirely surprising that this element would also be subject to the head-final constraint. Alternatively, we could posit an LP-constraint for Japanese that would require phrasal elements to precede lexical elements. Then, the phrasal elements *Hanako ni, hon o* and so forth would be required to precede the lexical elements *age* and *sase*, and the example in (13) would be ruled out in terms of this constraint. I leave formalization of this notion for a future study.

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[21] A brief discussion of this particular instance of over-generation is provided in the next section.

4   Suggestions for Further Research

So far, we have seen how our linearization model can be used to account for various word order possibilities, all the while assuming that the order of non-head elements of a given verb may appear in relatively free linear variation. In this first part of this section, I will discuss some cases in which the order of non-head elements is more constrained, and will demonstrate how our model can be (possibly) extended to account for these data. In the latter half of the section, I will make explicit the conclusions of the current work.

4.1   L-S-Exist Constructions: Attachment

In Japanese sentences involving the intransitive verb *aru* ('to exist'), Kuno (1973) notes that a locative NP usually precedes the subject NP, and that in many cases, linear variation among these two elements is impossible. The examples in (14) illustrate.

(14) a. yama   ni   ki ga   aru
          mountain LOC tree NOM exist
          'Trees are on the mountain.'

      b. ?*ki ga yama ni aru

What appears to be going on here is that the subject NP and the verb *aru* must remain adjacent in the phenogrammar. This is evidenced by sentences like (14b) above, and also by the fact that a time adverbial cannot (very easily) appear between the subject and *aru*, as in (15).

(15) a. kyonen   yama   ni   ki   ga   aru
          last year mountain LOC trees NOM exist
          'Trees existed on the mountain last year.

      b. ??yama ni ki ga kyonen aru

This restriction can be formalized in a number of ways, and certainly the way in which "attachment" relations such as this are captured in linearization models in general is a subject for future research. What I envision is for the verb *aru* (since the phenomena seems to be associated with the verb) to simply specify that the NODE of its subject complement must remain strictly adjacent to its own NODE, in any DOM in which they appear together, by way of some feature.

Such a move, along with the head-final constraint, would correctly rule out sentences like (15b) and (14b), since presumably nothing would be allowed to come between *aru* and its *ga*-marked complement, just as nothing is allowed to appear between the causative morpheme *sase* and the verb that attaches to it (in the examples above, *age*).[22]

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[22] Whether *age* attaches to *sase* by the same mechanism as *ki ga* attaches to *aru* is, however, a matter for further research. I suspect not.

4.2 Constraints on Scrambling: A Problem

We have noted already that, while complements of the embedded VP in the causative construction can intermingle with complements of the matrix verb, it is not the case that this intermingling is totally free. For example, in the last section we saw that a *ni-* marked element of the lower clause cannot "cross over" a *ni-*marked element of the matrix clause, with the example repeated here in (16).

(16) *Ayako ni Haruka wa Hanako ni hon o agesaseta.

So far, nothing in the system outlined in this paper can capture this sort of constraint, and the alternatives seem to be few.

One possibility would be to "filter out" the *ni-*marked elements from the DOM of the matrix clause when domain union takes place. That is, domain union would be redefined to allow only "compatible" elements, or, in the case of the example in (16), the Domain Principle (somehow) would specify that *Ayako ni* not be involved in the domain unioning of the complements of *age* with the complements of *sase*.

If we adopt this approach, however, we are left without a way to explain cases like (17) where elements of the higher clause appear after the *ni-*marked element of the lower clause,

(17) Hanako ni hon o Ayako ni Haruka wa agesaseta

This sentence is not entirely perfect, but not entirely out either. Another tactic, of course, would be to explain this phenomena in terms of processing. After all, the sentence in (16) is actually quite grammatical, if *Ayako* is interpreted as the causee. The question, of course, would then be why *Ayako* **must** be interpreted in this way. Again, this issue warrants further study.

4.3 Markers

As one last illustration of the problems that lie ahead, recall that in the account above, I chose to ignore the case markers *ni*, *ga*, *o*, etc. This was not entirely by accident. That is, because markers are not analyzed here as heads, and because they in fact appear **after** the heads that they mark, these particles constitute an entire class of counterexamples to our (very strong) head final constraint. It may be possible, however, to account for these apparent violations by treating case markers like these as clitics, subject to different set of word order constraints; alternatively, we could just make markers the heads, following Gunji (1987). We could also stipulate in our LP constraints that heads follow nonmarkers and precede markers, or, more radically, we could envision a set of "weighted" rules, with markers being most strongly preferred to appear last, followed by heads, and so forth.

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4.4 Concluding Remarks

As is evident, this paper should by no means be taken to provide an exhaustive account of word order variation in Japanese. Certainly, extending the "toy" model I have presented here to more complex examples will involve numerous combinations of new ideas, revisions and retractions. That is, there is a lot of linguistics left to be done, and this paper is only meant to serve as a starting point.

In sum, we have accomplished the following: (1) proposed a basic means by which word order variation in Japanese (and hopefully all languages) can be handled in terms of a linearization model, in which tectogrammatic and phenogrammatic information occupy two distinct, yet related, levels of description; (2) accounted for the previously problematic interspersal of adjuncts among complements in terms of this model; (3) posited a general principle to capture the relationship between tectogrammar and phenogrammar by appealing to the feature UNION; (4) moved towards an account of "scrambling" (in the traditional sense), in which co-dependents of one head intermingle with those of a (lower) head; and (5) identified areas of future research and suggested (albeit briefly) some avenues that this research might take.

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A Lexical Approach to
Inalienable Possession Constructions in Korean

Chan Chung

0. Introduction

The Inalienable Possession construction (IAP hereafter), shown in
(1) and (2) below, is one of the most controversial topics in
Korean syntax. This construction owes its name to the fact that
there is an inalienable body-part relationship between the two
accusative NPs: e.g. *John-lul* is the Possessor NP (PS NP hereafter)
and *son-lul* is the Body Part NP (BP NP hereafter) in (1). One of
the special characteristics of Korean IAP which distinguishes it
from similar constructions in other languages such as French
(Gueron 1985), Chinese (Li 1990), or English (Massam 1989) is that
in Korean, an arbitrary number of BP NPs can appear in a clause as
illustrated in (2), as long as certain semantic constraints are
observed. (See section 3.1 for a detailed discussion of these
semantic constraints.)

(1) Mary-ka John-lul son-lul   capassta.
    M-nom   J-acc   hand-acc held
    'Mary held John's hand.'

(2) Mary-ka ku namwu-lul kaci-lul   kkut-lul callassta.
    M-nom   the tree-acc branch-acc end-acc cut
    'Lit. Mary cut the end of the branch of the tree.'

    Various analyses attempting to explain IAP have been
suggested: e.g. Chun (1986), Kang (1987), Yoon (1989), Y. Kim
(1991), Lee (1992), and O'Grady (1991), among others. All of these
analyses either use a certain configuration to allow a recursion of
the BP NP, or assume more than one level of syntactic
representation to explain various properties of the construction,
but none of these analyses capture all of its properties. The

purpose of this paper is to show how the previous analyses are
problematic and to propose a totally different and more promising
analysis in the framework of Head-driven Phrase Structure Grammar
(Pollard & Sag (in press), HPSG hereafter). The organization of
this paper is as follows. In section 1, various properties of IAP
are discussed; in section 2, three different types of current views
about IAP are reviewed, and it is shown how all of them are
problematic; in section 3, a lexical analysis is suggested in the
HPSG framework, and it is shown how all the properties mentioned in
section 1 are explained by this approach; section 4 is the summary
of this paper.

1. The Properties of IAP

1.1. Relation of inalienable possession

As mentioned above, the PS NP and BP NP stand in a relation of
inalienable possession. Sentence (3) is bad because *chayk* ('book')
is not an inalienable body part of *John*.

(3) #Mary-ka John-lul chayk-lul ccicessta.
      M-nom   J-acc   book-acc tore
    'Mary tore John's book.'

On my analysis, this inalienable possession relation is considered
to be a presupposition. Thus, (3) is infelicitous rather than
ungrammatical, since the relevant convention is not observed. See
section 3.1 for more discussion on this.

1.2. Complementhood of the BP NP

Y.S. Kang (1986) argues that only the PS NP is subcategorized by
the verb since the PS NP alone can be passivized, while the BP NP
cannot. However, I will show that the BP NP can also be passivized
when the PS NP is passivized (See property 1.6, and section 2.1

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below for passivization in IAP.), which strongly suggests that a BP NP is a complement too.

Maling & Kim (1992) also argue that the BP NP is subcategorized for by the verb since the existence of a BP NP is crucial for the well-formedness of a sentence in some cases, such as (4).

(4) a. #Mary-ka talk-lul ppopassta.
       M-nom hen-acc pulled-out
       'Mary pulled out a hen'

    b. Mary-ka talk-lul thel-lul   ppopassta.
       M-nom hen-acc feather-acc pulled-out
       'Mary pulled out the hen's feathers.
       (Mary plucked the hen.)'

However, this is not compelling evidence for the complementhood of the BP NP because the awkwardness of a sentence like (4a) can be accounted for on the basis of pragmatic considerations. For example, in a context in which half of a hen's body is buried in the ground, the sentence like (4a) is perfectly grammatical.

1.3. Linear precedence between the PS NP and BP NP

It is widely believed that a PS NP always precedes a BP NP. (Yoon (1989), O'Grady (1991)) However, the BP NP can precede the PS NP when the PS NP is focussed: (Here the capital letters represent that the word has a pitch accent.)

(5) a. A: Mary-ka nwuku-lul son-lul capass-ni?
          M-nom   who-acc   hand-acc held-Q
          'Whose hand did Mary hold?'

    b. B: Mary-ka son-lul   JOHN-lul capassta.
          M-nom   hand-acc John-acc held
          'Mary held John's hand.'

This shows that the canonical word order in IAP (i.e. the whole precedes the part) is a sort of default word order in Korean, and

this word order can be overridden by other factors such as a focus on the PS NP.[1]

1.4. Modification of the BP NP

A BP NP cannot always be modified by an adjective or quantifier. (Yoon (1989), O'Grady (1991), etc.) However, the BP NP can be modified when the adjective or quantifier restricts or narrows down the choice of the body parts as illustrated in (6) and (7):[2]

(6) ?? Mary-ka mwune-lul   kin/motun tali-lul callassta.
       M-nom   octopus-acc long/every leg-acc cut
       'Mary cut the long/every leg of the octopus.'

(7) Mary-ka Kim-lul olun/ tachin/ ku son-lul capassta.
    M-nom   K-nom   right/injured/the hand-acc held
    'Lit. Mary held Kim's right/injured/the hand.'

In (6), the adjective *kin* ('long') does not restrict the choice of leg since all of the octopus legs are long, and the determiner *motun* ('all'), because of its meaning, cannot restrict the choice either. In contrast, the adjectives and determiner in (7) restrict the choice of hand, and (7) is grammatical.

---

[1]This LP statement seems to have countexamples: when the PS NP and BP NP are subjects bearing nominative case, the order can be reversed as illustrated in (ib):

(i) a. Khokkili-ka kho-ka   kilta.
       elephant-nom nose-nom be-long
       'As for the elephant, its nose is long.'

    b. Kho-ka   khokkili-ka kilta.
       nose-nom elephant-nom be-long
       'As for the nose, elephant has a long one.'

I do not have a good account for this. However, if we assume *kho-ka* in (ib) to be a topic with nominative case, then (ib) is no longer a counterexample.

[2]Y. Kim (1991) also points out that the difference depends on the nature of the modifiers: a BP NP takes only restrictive modifiers, but no appositive modifiers.

1.5. Physical affectedness

Verbs which describe a physical effect on the PS NP are preferable
to verbs which do not (Yoon (1989), Cho (1992)) as shown in (8). In
(8b), the fact that the action of the verb *poassta* ('saw') does not
physically affect the PS NP *John* is given responsibility for its
awkwardness.

(8) a. Mary-ka John-lul ppyam-lul ttaylyessta.
     M-nom   J-acc   cheek-acc hit
     'Mary hit John's cheek.'

  b. #Mary-ka John-lul son-lul poassta.
     M-nom   J-acc   hand-acc saw
     'Mary saw John's hand.'

However, physical affectedness is not an absolute condition on IAP
in Korean since, even though a sentence like (8b) is awkward for
many speakers, (9) is much better, notwithstanding the fact that
the action of seeing does not physically affect *John*.

(9) Mary-ka John-lul elkul-lul poassta.
    M-nom   J-acc   face-acc saw
    'Mary saw John's face.'

I will suggest that the difference in acceptability between
(8b) and (9) is related to the semantic entailments associated with
the lexical semantics of the verb with respect to the "involvement"
of both the BP and PS NPs, rather than physical affectedness. For
example, in (8a), we can say that every situation that makes "Mary
hit John's cheek" true makes "Mary hit John" true (i.e. "Mary hit
John's cheek" entails "Mary hit John"), and this satisfaction of
the entailment relationship may make (8a) good. In contrast, in
(8b), "Mary saw John's hand" does not entail "Mary saw John" since
we can see only a person's hand without noticing whose hand it is,
and this is the reason why (8b) is bad. According to this line of

reasoning, (9) is better than (8b): the entailment holds in (9) because seeing a person's face usually qualifies as seeing the person. (See section 3.1 for more detailed discussion.)

1.6. Passivization

The BP NP alone cannot be passivized (Kang (1987), Yoon (1989), O'Grady (1991)), as shown in (10):

(10) a. *Son-i   John-lul caphiessta.
        hand-nom J-acc   be-caught
        'John's hand is caught.'

     b. *John-lul son-i   caphiessta.
        J-acc   hand-nom be-caught
        'John's hand is caught.'

However, the BP NP can be passivized when the PS NP is passivized as illustrated in (11).

(11) a. John-i son-lul cap-hi-essta.
        J-nom hand-acc be-caught
        'John's hand is caught.'

     b. John-i son-i   cap-hi-essta.
        J-nom hand-nom be-caught
        'John's hand is caught.'

     c. Ce namwu-ka   kaci-ka/lul   kkut-i/lul cal-i-essta.
        that tree-nom   branch-nom/acc end-nom/acc be-cut
        'Lit. The end of the branch of that tree was cut.'

(11c) shows that when more than one BP NP appear, any one of them can be passivized as long as its PS NP is passivized. Four different case combinations of the two BP NPs are possible in (11c): even a sentence like Ce *namwu-ka kaci-lul kkut-i cal-i-essta* is acceptable, where nominative ("passivized") NPs do not have to form a continuous string. In section 3.2, I show how this strange-looking passivization can be explained in a simple fashion by my

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analysis of IAP.

If, as Y.S. Kang (1986) assumes, only a complement can be passivized, the fact that the BP NP undergoes passivization argues strongly that it is a complement too. In contrast, a "real" adjunct-like accusative NP (e.g. a durative or locative NP) cannot be passivized as shown in section 2.1 below.

1.7. Lack of topicalizability of the BP NP

The BP NP cannot be topicalized without a contrastive reading. (Yoon (1989), O'Grady (1991), G, Kim (1986), Chun (1986))

(12) a. ??kaci-nun   Mary-ka ku namwu-lul calassta.
         branch-top M-nom   the tree-acc cut
         'As for branches, Mary cut the one belonging to the
          tree.'

     b. Ku namwu-nun Mary-ka kaci-lul   calassta.
        the tree-top M-nom   branch-acc cut
        'As for the tree, Mary cut its branch.'

(12a) is good in the following contrastive situation: Mary cut a branch of an apple tree, and Sam cut a root of an orange tree. However, it is almost impossible to get an ordinary topic reading. That is, it is bad in the following situation: Mary cut a branch of an apple tree and Sam pulled out weeds around the tree. This lack of topicalizability of the BP NP without a contrastive reading is explained in section 3.2 by the same mechanism responsible for the ungrammaticality of (10).

1.8. Lack of relativizability of the BP NP

The BP NP cannot be relativized. (Yoon (1989), O'Grady (1991))

(13) a. *Mary-ka John-lul capun   son
         M-nom   J-acc   hold-MOD hand
         'John's hand that Mary is holding.'

b. Mary-ka son-lul capun   John
   M-nom hand-acc hold-MOD J
   'Lit. John, who Mary holds his, hand=John whose hand is
   being held by Mary'

On my analysis, this lack of relativizabilty of the BP NP
correlates with the lack of topicalizabilty mentioned above, and
the ungrammaticality of (13a) immediately falls out from the
explanation of the ungrammaticality of (12a).

1.9. Scrambling

Other arguments of the verb such as the subject, an adverbial
expression, or the causee of a causative construction can intervene
between a PS NP and its BP NP.

(14) John-lul Mary-ka son-lul capassta.
     J-acc   M-nom   hand-acc held
     'Mary held John's hand.'

(15) a. Mary-ka John-eykey ku namwu-lul kaci-lul
        M-nom   J-dat   the tree-acc branch-acc

        chikey-haeyssta.
        cut-caused

        'Mary made John cut the branch of the tree.'

     b. Mary-ka ku namwu-lul John-eykey kaci-lul
        M-nom   the tree-acc J-dat   branch-acc

        chikey-haeyssta.
        cut-caused

        'Mary made John cut the branch of the tree.'

(16) Mary-ka John-lul kapccaki ppyam-lul ttaylyessta.
     M-nom   J-acc   suddenly cheek-lul hit
     'Mary hit John's cheek all of a sudden.'

On my analysis, this scrambling phenomenon will be explained
without the movement posited in GB since I assume that subject,

causee and complements are sisters to the head verb: a sentence in Korean has a flat structure, and IAP is no exception.[3] (See Chung (1993) for arguments for the flat structure analysis of Korean sentences.) Therefore, the word orders shown above are instances of general scrambling among sisters.

2. Current Views and Their Problems

In this section, three different types of analyses of IAP are reviewed critically: the adjunct analysis of O'Grady (1991), the V' analysis of Yoon (1989), and the incorporation analysis of M. Y. Kang (1987).

2.1. O'Grady (1991)

O'Grady (1991) suggests that a BP NP is an adjunct modifying any kind of verbal expression: e.g. a transitive verb, transitive VP, intransitive verb, or intransitive VP. He uses NP** to represent this category.

(17) a. Mary-ka namwu-lul kaci-lul   kkut-lul callassta.
        M-nom   tree-acc branch-acc end-acc cut
        'Lit. Mary cut the end of the branch of the tree.'

    b.
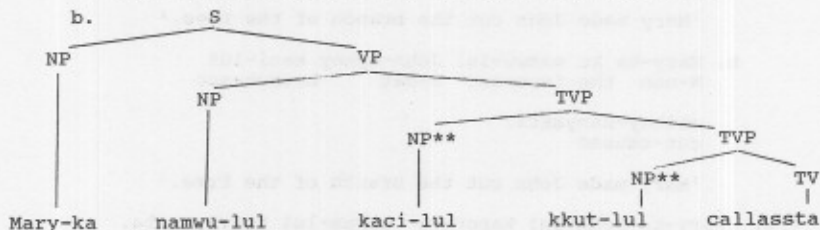
He argues that the the adjuncthood of the BP NP is supported by the

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[3]In this approach, an adverbial as in (16) is also a sister of V. See footnote 10 in section 3.1 for more discussion on this.

fact that a BP NP cannot be topicalized or relativized.

Even though O'Grady's analysis might explain the lack of topicalizability and relativizability of the BP NP, given the assumption that only arguments can be topicalized or relativized, his analysis has some drawbacks. According to his account, (11a) is analyzed as shown in (18):

(18)
```
                    S
         _____|_____
       NP                       IVP
        |              _____|_____
        |            NP**                  IV_PAS
        |             |              _____|_____
        |             |            TV                   |
        |             |             |                   |
     John-i         son-i          cap               -hi-essta
```

Here the BP NP *son-i* has undergone passivization. It is just an adjunct which modifies an IVP containing the passive morpheme and gets nominative case from the IVP. One problem with this analysis is that if the BP NP is an adjunct, it is hard to explain the difference between BP NPs and real adjuncts such as locative NPs or durative NPs. As illustrated in (19), a locative or durative NP (*piskil* in (19b) or *hansikan* in (19d)) cannot be passivized (and cannot modify an IVP containing a passive morpheme in O'Grady's terms), while a BP NP can, as shown above. This difference suggests that the grammatical status of a BP NP is different from that of a real adjunct NP. If we regard a BP NP as a complement, however, this problem does not arise, since it is generally assumed that only complements can be passivized.

(19) a. Mary-ka piskil-lul   cha-lul kwasok-ulo
        M-nom   rainy-road-acc car-acc over-the-speed-limit

        molassta.
        drove   (Y.S. Kang (1992))

     'Mary drove a car over the speed limit on the rainy road.'

b. *Piskil-i   cha-ka kwasok-ulo
   rainy-road-nom car-nom over-the-speed-limit

   mola-ci-essta
   was-driven

   'A car was driven over the speed limit on the rainy road.'

c. Mary-ka ku kkoma-lul hansikan-lul tolpoacuessta.
   M-nom   the kid-acc   one-hour-acc took-care-of
   'Mary took care of the kid for an hour.'

d. ??*Ku kkoma-ka hansikan-i   tolpoa-ci-essta.
      the kid-nom one-hour-nom was-taken-care-of
      'The kid was taken care of for one hour.'

Another piece of evidence that the BP NP is not a real adjunct
is as follows. In Korean, when the auxiliary emotional verb -*sip*
('want to') is attached to a transitive verb which takes an
accusative NP as its complement, the case of the complement can be
changed to nominative. The accusative BP NP in IAP can also be
changed to nominative when the verb occurs with -*sip* as shown in
(20a), while changing the case of a durative adjunct in the same
environment yields only marginal grammaticality as shown in (20b).[4]
This difference also suggests that BP NPs are not real adjuncts.

(20) a. Mary-ka ku namwu-lul kaci-lul/ka   caluko-sip-essta.
        M-nom   the tree-acc branch-acc/-nom want-to-cut
        'Mary wanted to cut the branch of the tree.'

     b. Mary-ka ku chayk-lul   ilcuil-lul/??-i
        M-nom   the book-acc   one-week-acc/-nom

        piliko-sip-essta.
        wanted-to-borrow

        'Mary wanted to borrow the book for one week.'

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[4](20b) with the nominative may be allowed only when the durative NP has a
contrastive reading.

Also note that if the BP NP is not a real adjunct, then O'Grady's assumption that the lack of topicalizabilty or relativizabilty of the BP NP comes from the adjuncthood of the BP NP is untenable, and we would need a different explanation for these properties of the BP NP.

2.2. Yoon (1989)

Yoon (1989) gives another analysis of Korean IAP based on Government and Binding Theory. As shown in (21), the BP NP, which he analyzes as an N', is a sister of V'. This allows the iterative occurrence of BP NPs.[5] (21) is Yoon's analysis of the sentence in (17).

(21)

```
                        CP
              _____|_____
           SPEC                     C'
                             _____|_____
                            C                IP
                                      _____|_____
                                   SPEC              I'
                                             _____|_____
                                            I                  VP
                                                       _____|_____
                                                      NP               V'
                                                      |         _____|_____
                                                      N'               V'
                                                      |         _____|_____
                                                                N'            V
                                                                |             |
       Mary-ka        namwu-lul      kaci-lul      kkut-lul      calassta
```
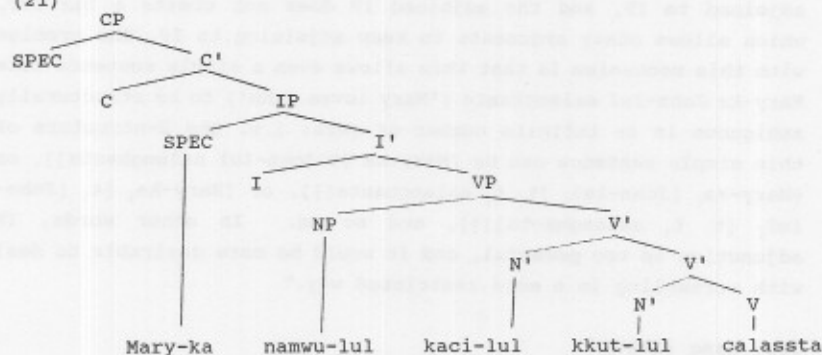
The reason why he assumes that BP NPs are N's in Korean is to explain their lack of modifiability and their immobility (lack of topicalizability and relativizability). However, as (7) in section 1.4 shows, a BP NP actually can be modified by adjectives or

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[5]In (21), it seems odd that only one BP NP (*kkut-lul*) is sister to V, while the other is sister to V' (Carl Pollard (p.c.)). Yoon does not give any explanation for this asymmetry.

determiners if they narrow down the choice of body part. Also the
immobility of the BP NP cannot be explained on the grounds that the
BP NP is an N', since then there would be no way to move the N' at
all, and no way to explain the passivization and scrambling
phenomena illustrated in (11), (14) and (15) in section 1.6 and
1.9. This is because passivization and scrambling result from
movement of a lexical or maximal category in GB; but since an N' is
neither, there is no straightforward way of deriving passivized
sentences or scrambled word orders.

Even if we assume that the BP N' can somehow move in the case
of scrambling (but not in other cases), the scrambling mechanism
itself is problematic. In GB, an IP adunction rule (Saito 1985) is
usually assumed to explain scrambling: roughly, an argument can be
adjoined to IP, and the adjoined IP does not create a barrier,
which allows other arguments to keep adjoining to IP. The problem
with this mechanism is that this allows even a simple sentence like
Mary-ka John-lul salanghanta ('Mary loves John') to be structurally
ambiguous in an infinite number of ways: i.e. the S-structure of
this simple sentence can be [Mary-ka [t John-lul salanghanta]], or
[Mary-ka$_i$ [John-lul$_i$ [t$_i$ t$_j$ salanghanta]]], or [Mary-ka$_i$ [t$_i$ [John-
lul$_j$ [t$_i$ t$_j$ salanghanta]]]], and so on. In other words, IP
adjunction is too powerful, and it would be more desirable to deal
with scrambling in a more restricted way.[6]

2.3. Kang (1987)

The last analysis that I want to review is that of M.Y.Kang (1987).
One of the special characteristics of his analysis is that he
treats BP NPs as lexical categories which are incorporated into the
head verb by head-to-head movement in LF (the BP N is adjoined to
a head verb). Thus a BP N becomes a part of a complex verb in LF on

---

[6]Peter Culicover (p.c.) points out that this kind of consecutive movements
can be ruled out by the Minimalist Program in Chomsky (1992) via the Economy
Principle.

his analysis, as illustrated in (22) (=(1)):

(22)

```
                          S
        _____/ _____
      NP                                    VP
       |                       _____/ _____
       |                     NP                           V
       |              _____/ _____               _____/ \_____
       |            NP               N'            N               V
       |             |               |             |               |
       |             |               N             |               |
       |             |               |             |               |
    Mary-ka       John-lul          t_i         son-lul_i       capassta
```
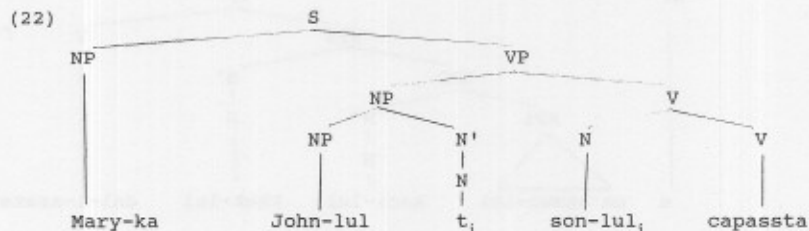
One problem here is that the BP N can be modified by certain adjectives and determiners as mentioned earlier. In this case the BP N must be an NP. Thus this analysis allows an NP modified by restrictive adjectives or determiners to be a part of a complex verb. But on standard GB assumptions, a lexical category moves only to a lexical category even in LF. If we follow Kang's analysis, we seem obliged to say that a BP NP, which is phrasal, is incorporated into a verb which is lexical, thereby violating the principle of structure preservation or "lexical integrity."

Another problem is passivization. Kang assumes that a BP NP cannot be passivized, but as mentioned in (11) in section 1.6, a BP NP can be passivized when its PS NP is passivized. The problematic case is a sentence like (23a), whose D-structure is (23b) on his analysis.[7]

(23) a. Ce namwu-ka kaci-lul   kkut-i cal-i-essta.
          that tree-nom branch-acc end-nom be-cut
          'Lit. The end of the branch of that tree was cut.'

---

[7]Kang does not specifically discuss a structure of an IAP sentence with more than one BP NP such as (23a), but we can confidently infer the structure.

b.

```
                              S
          ┌───────────────────┴──────────┐
         NP                               VP
          │                        ┌──────┴──────┐
          │                       NP3            V
          │                ┌───────┴─────┐        │
          │               NP2           N'        │
          │          ┌─────┴────┐        │         │
          │         NP1        N'        N         │
          │          │          │         │         │
          │         /\          N         │         │
          │        /  \         │         │         │
          e   ce namwu-lul   kaci-lul  kkut-lul  cal-i-assta
```
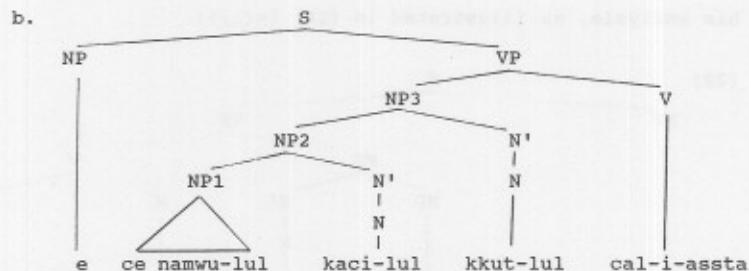
On this analysis, NP1, NP2, or NP3 can be passivized, but Ns cannot because Ns are heads. Thus the problem is that it is not clear how only *ce namwu* and *kkut* are passivized into the subject position to get nominative case, leaving *kaci* in the object position.

3. A Lexical Approach to IAP

The problematic approaches to IAP discussed above can be regarded as configurational inasmuch as they depend on some sort of hierachical structure to capture the iterative occurrence of the BP NP and other properties of IAP. In this section, I claim that all the BP NPs are complements and appear as sisters of the head verb, rather than as sisters of VP or V'.

My approach is similar to that of Lee (1992) in that both the PS NP and BP NP are analyzed as complements of the verb. Yet it is different from his in that I do not posit VP or V' constituents, and all the PS NP and BP NP appear as sisters of the verb in a flat structure. As mentioned in section 2, some problems in Yoon's approach arise from the assumption of such VP or V' constituents in connection with scrambling phenomena. Moreover, as far as I know, there is no theory-external evidence for a VP constituent which is not subcategorized for by a verb in Korean (See Chung (1993)). Thus our analysis will not make use of such a constituent. Also note

that the category of the body part expression is NP (not N' or N)
in our analysis, since a determiner or adjective that narrows down
the choice of the body parts can actually modify the body part
expression.

3.1. A Lexical Rule for IAP

I suggest the following HPSG-style lexical rule to describe the
fact that the BP NP can be iterated an arbitrary number of times so
long as the semantics is compatible with each PS-BP relation
involved. (Here the tag after :: represents an NP's index, and x is
a variable over the value of RELATION)

(24) Lexical Rule for IAP

```
+-            -+           +-                        -+
| HEAD verb    |           | HEAD verb                |
|    +-      -+|           |    +-                  -+ |
| VAL |SUBJ <NP::[1]> ||   | VAL |SUBJ <NP::[1]>     | |
|     |COMPS <NP::[2]>|| --->  |     |COMPS <NP::[2]>,...,NP::[n]>| |
|    +-      -+|           |    +-                  -+ |
|       +-      -+|        |       +-              -+ |
| CONTENT | RELN x  | |    | CONTENT |RELN x         | |
|         | ARG [1] | |    |         |ARG [1]        | |
|         | ARG [2] | |    |         |ARG [n]        | |
+-       +-      -+-+|     |       +-              -+ |
                          |          +-          -+  |
                          | BKG ( ..., |RELN body-part |,... } |
                          |     )      |ARG1 [i]       |      |
                          |     )      |ARG2 [i-1]     |      |
                          |            |ARG3 x         |      |
                          +-          +-          -+   -+
```

(where i = 3,...,n)
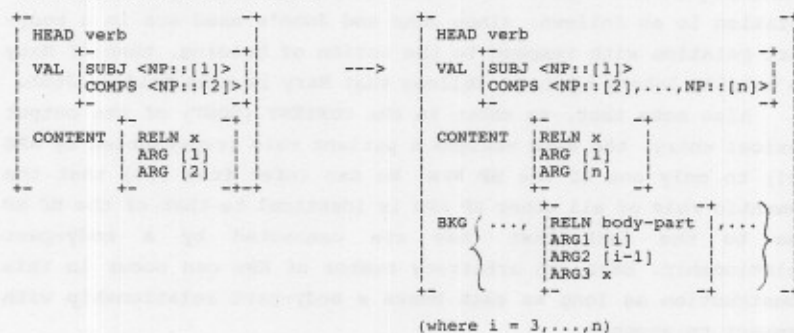
As shown in the BACKGROUND (BKG) of the output lexical entry, the
body-part relation is a three place predicate, and its arguments
correspond to the PS NP, the BP NP, and the involved action: ARG1
and ARG2 are in an inalienable body-part relation with respect to
the involved action ARG3, so that the inalienable possession
relation is parameterized according to the verb's meaning. I also
assume that the body-part relation is such that for all x, y, z, w,

the following entailment holds[8]:

```
     +-            -+   +-        -+         +-        -+
(25) |RELN body-part|   |RELN  x  |         |RELN  x  |
     |ARG1  y       |/\ |ARG1  w  |  ==>    |ARG1  w  |
     |ARG2  z       |   |ARG2  y  |         |ARG2  z  |
     |ARG3  x       |   +-        -+         +-        -+
     +-            -+
```

Roughly speaking, (24) and (25) say that a transitive verb which takes one NP complement can also take an arbitrary number of additional complements as long as all the background conditions are satisfied. The semantic entailment relationship mentioned in section 1.5 is embodied in (25).[9] For example, in a sentence like (1) (*Mary-ka John-lul son-lul capassta.* 'Mary held John's hand.'), x=hold, y=John's hand, z=John, and w=Mary. And the entailment relation is as follows: since John and John's hand are in a body-part relation with respect to the action of holding, then if Mary is holding John's hand, it follows that Mary is also holding John.

Also note that, as shown in the CONTENT (CONT) of the output lexical entry, the verb assigns a patient role (represented by ARG [n]) to only one of the BP NPs. We can infer from (25) that the semantic role of all other BP NPs is identical to that of the BP NP due to the fact that they are connected by a body-part relationship. Here, an arbitrary number of NPs can occur in this construction as long as each bears a body-part relationship with respect to another.

Now let's consider one example of the output lexical entry (26b) which is responsible for licensing (26a):

---

[8]In general the BACKGROUND value corresponds to presuppositions or conventional implicatures associated with an expression. The formulation of BACKGROUND in (24) and (25) is due to Carl Pollard (p.c.).

[9](25) is not part of a lexical entry: it is just a nonlinguistic fact about the body-part relation.

(26) a. Mary-ka namwu-lul kaci-lul   kkut-lul callassta.
        M-nom   tree-acc branch-acc end-acc cut
        'Lit. Mary cut the end of the branch of a tree.'

b.
```
+-                                                    -+
| HEAD verb                                            |
|   +-                                          -+     |
| VAL | SUBJ < NP::[1] >                          |     |
|     | COMPS < NP::[2], NP::[3], NP::[4] >       |     |
|   +-                                          -+     |
|      +-             -+                               |
| CONT | RELN cut     |                               |
|      | CUTTER [1]   |                               |
|      | CUT     [4]  |                               |
|      +-             -+                               |
|      +-             -+ +-             -+  )          |
| BKG {  | RELN body-part| | RELN body-part|  }          |
|      {  | ARG1 [4]      | | ARG1 [3]      |  }          |
|      {  | ARG2 [3]      | | ARG2 [2]      |  }          |
|      (  | ARG3 cut      |,| ARG3 cut      |  )          |
+-    +-             -+ +-             -+             -+
```
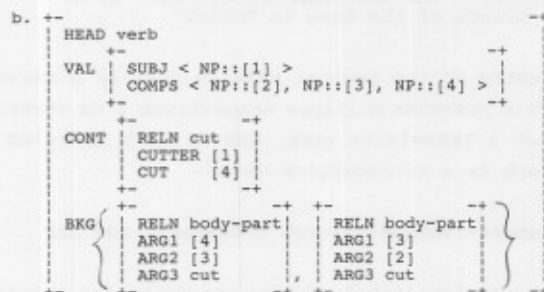
(26b) says that the verb *callassta* takes three NP objects: NP::[2]
namwu-lul, NP::[3] *kaci-lul*, and NP::[4] *kkut-lul*; and that the
NP::[4] bears the patient role of CUT, while the other objects are
related to this index through the successive body-part
relationships specified in the value of the BACKGROUND (BKG)
attribute.

With the lexical rule in (24), and the Subject-Complements-
Head Schema, which says that the subject and all the complements
are the sisters of the head verb, we can give a flat structure
analysis of the IAP, and this provides a more restricted way of
explaining the scrambling phenomena illustrated in (5b), (14),
(15), and (16). To capture scrambling, all we need to say is that
an unfocussed PS NP precedes its BP NP, which allows the subject
NP, the causee NP, or an adverbial to intervene between the PS NP
and BP NP ((14), (15), and (16)),[10] and allows the focussed PS NP
to appear after the BP NP ((5)).

---

[10]In this framework, an adverbial selects a verb as a "modifyee" via the MOD
feature, and is a sister to the verb. If it selects the verb, there may be scope
problems if more than one adverbial is present in a clause. See Kasper (1993) for
a treatment of scrambling of adverbials among complements in a flat structure.

Also note that a sentence like (27) is ruled out in two ways.

(27) *Mary-ka Robin-eykey ku namwu-lul kaci-lul   cuessta.
      M-nom   R-to(dat)   the tree-acc   branch-acc gave
      'Mary gave a branch of the tree to Robin.'

The input lexical entry of the lexical rule in (24) is a strictly transitive verb. This prevents multiple accusatives from occurring when the verb is not a transitive verb, and so (27) is ruled out because the head verb is a ditransitive verb[11].

3.2. 'Local obliqueness-command' (local o-command) and IAP

The lexical rule in (24) immediately raises the following question. It is generally assumed that a constituent which is a complement of a lexical head can be topicalized or relativized (i.e. can be an antecedent of a relative clause gap). If the BP NP is a real complement, how can we explain the fact that the BP NP cannot be topicalized[12] or relativized as illustrated in (12) and (13), repeated as (28) and (29):

(28) a. ??kaci-nun Mary-ka ku namwu-lul calassta.
         branch-top M-nom   the tree-acc   cut
         'As for branches, Mary cut the one belonging to the
          tree.'

     b. Ku namwu-nun Mary-ka kaci-lul   calassta.
        the tree-top M-nom   branch-acc cut
        'As for the tree, Mary cut its branch.'

---

[11]Carl Pollard (p.c) points out that it is also ruled out on semantic grounds, since giving Robin a branch does not entail giving Robin the tree, and therefore, by (25) the branch cannot be a body part of the tree relative to the giving relation.

[12]Sentence (28a) is acceptable only when it has a contrastive reading: e.g. Mary cut only the branch of the tree, (but not the root).

(29) a. *Mary-ka John-lul capun   son
         M-nom   J-acc   hold-MOD hand
        'John's hand that Mary is holding'

    b. Mary-ka son-lul capun   John
       M-nom   hand-acc hold-MOD J
       'Lit. John₁ who Mary holds his₁ hand=John whose hand is
        being held by Mary'

My answer to this question is based on the *local o-command*
relation defined as follows:

(30) Let Y and Z be *synsem* objects with distinct LOCAL values, Y
     referential. Then Y *locally o-commands* Z just in case Y is
     less oblique than Z. (Pollard & Sag (in press):291)

Before explaining the ungrammaticality of (28a), the Korean
topicalization construction using the topic marker *(n)un* (the so-
called Chinese style topicalization, cf.(28)) needs to be briefly
discussed. It has been argued that in languages which do not have
syntactic wh-movement, such as Chinese,[13] Korean and Japanese,
topicalization has several distinctive properties and needs to be
treated differently than in English. (See Xu & Langendoen (1985)
for Chinese, Kuno (1973) for Japanese.) Following this line of
argument, I assume that Korean also needs an independent node for
a topic constituent in which the topic marker *(n)un* is realized.
This idea can be incorporated into HPSG by using another list-
valued VALENCE feature, called "TOPIC", whose value (if present) is
taken as less oblique than the value of the COMPS attribute.
(Whether the value of the TOPIC feature is less oblique than that
of the SUBJ feature is discussed later on.) For this, I propose
the lexical rules shown in (31), which take as input a lexical
entry with a certain COMPS or SUBJ list, and return as output a
lexical entry which is the same except that one element has been

---

[13]Carl Pollard (p.c.) points out that for Chinese, it is controversial
whether (at least some cases of) topicalization involve wh-movement.

65

removed from the COMPS or SUBJ list and placed in the TOPIC list. These rules eliminate the need for empty categories such as traces or *pro*.[14]

(31)

```
     +-                      -+      +-                   -+
a.   | TOPIC < >             |      | TOPIC < [1] >       |
     | SUBJ <...,[1],...>    | -->  | SUBJ <... ...>      |
     | COMPS [3]             |      | COMPS [3]           |
     +-                      -+      +-                   -+
     +-                      -+      +-                   -+
b.   | TOPIC < >             |      | TOPIC < [2] >       |
     | SUBJ [1]             |  -->  | SUBJ  [1]           |
     | COMPS <...,[2],...>  |      | COMPS <... ...>     |
     +-                      -+      +-                   -+
```

Also I suggest a separate Topic-Head Schema (33) for introducing a topic, in addition to the Subjects-Complements-Head Schema (32):

(32) Subjects-Complements-Head Schema

$$X''[SUBJ< >, COMPS< >] \longrightarrow [1]Y'', [2]Z'', X^0[SUBJ [1], COMPS [2]]$$
$$\text{SUBJ} \quad \text{COMPS} \quad \text{HEAD}$$

(33) Topic-Head Schema

$$X''[TOPIC< >] \longrightarrow Y''[1], X''[TOPIC<[1]>, SUBJ< >, COMPS< >]$$
$$\text{TOPIC} \quad \text{HEAD}$$

Schema (32) differs from the original Subject-Complements-Head Schema in current HPSG which allows only one subject per clause. I assume that more than one subject can occur in a clause in Korean (e.g. (40a)); thus we need (32) to license this multiple subject construction. According to these schemata, the structure of (28b) is (34):

---

[14]I do not follow Xu & Langendoen's (1985) idea that a topic and *pro* in subject or complement position are coindexed, because the existence of the coindexed *pro* violates the HPSG Binding Principles. This problem is pointed out by Andreas Kathol (p.c.).

(34)

```
                              S
              TOPIC                      HEAD
                                         +-              -+
        [1]NP[top]                       |TOPIC <[1]>     |
            /\                           |SUBJ  < >       |
           /  \                          |COMPS < >       |
          /____\                         +-              -+
       ku namwu-nun                       |
                                          |
          SUBJ              COMP              HEAD
                                             +-              -+
     [2]NP[nom]         [3]NP[acc]        V |TOPIC<[1]>      |
          |                  |              |SUBJ<[2]>       |
          |                  |              |COMPS<[3]>      |
          |                  |             +-              -+
       Mary-ka            kaci-lul              calassta
```
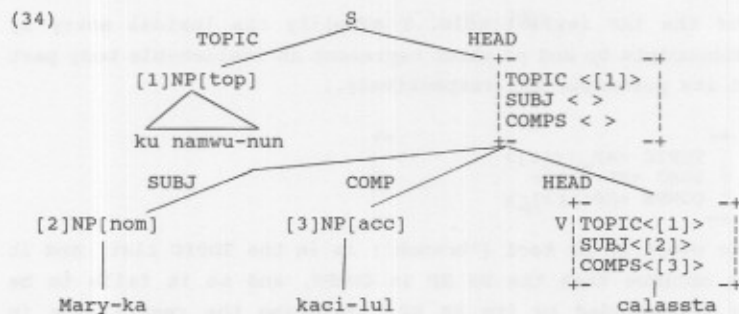
        Now let's go back to the ungrammaticality of (28a). As argued
by Guéron (1985), the referent of a BP NP depends on its PS NP
within a local domain: roughly speaking, in order to identify a BP
NP, we need to identify its PS NP first.   And this referential
dependency of the BP NP makes it similar to anaphora even though it
differs from real anaphors such as English reflexives: in the case
of real anaphora, there is a coindexing relation between the
dependent NP and its antecedent, whereas in the case of the body-
part relationship, there is no such relation between the BP NP and
the PS NP. In spite of this difference, the BP NP has a referential
dependency on its PS NP, and I suggest a syntactic restriction on
this type of dependency based on the notion of *local o-command*
relation as follows:

(35)   A BP NP must be locally o-commanded by its PS NP.

Here, which NP is the PS NP of which BP NP is specified in the
output lexical entry of the lexical rule in (24): for each body-
part *psoa* in the background, the NP corresponding to ARG1 is the
body part of the NP corresponding to ARG2.
        According to my theory, the valence of the head verb of (28a)
is as given in (36). (In this approach, the body-part relations
among the NPs are specified in the BACKGROUND value of the output

entry of the IAP lexical rule. I simplify the lexical entry by using subscripts *bp* and *ps* which represent an inalienable body part NP, and its possessor NP, respectively.)

$$(36) \quad \begin{bmatrix} \text{TOPIC} \ \langle NP_{bp}::[1]\rangle \\ \text{SUBJ} \ \langle NP::[2]\rangle \\ \text{COMPS} \ \langle NP::[3]_{ps}\rangle \end{bmatrix}$$

Here the overt BP NP *kaci* ('branch') is in the TOPIC list, and it is less oblique than the PS NP in COMPS, and so it fails to be locally o-commanded by its PS NP, violating the restriction in (35). In contrast, the VAL feature of the verb in (28b) is (37):

$$(37) \quad \begin{bmatrix} \text{TOPIC} \ \langle \ NP_{ps}::[1] \ \rangle \\ \text{SUBJ} \ \langle \ NP::[2] \ \rangle \\ \text{COMPS} \ \langle \ NP_{bp}::[3] \ \rangle \end{bmatrix}$$

Here the overt BP NP *kaci* is locally o-commanded by the less oblique PS NP *John* in the TOPIC, and (35) is observed.

The restriction in (35) also explains why the BP NP cannot be passivized without concomitant passivization of the PS NP, as illustrated in (10) and (11) in section 1.6. On my approach, the passive rule simply says that when the verb has passive morphology, any NPs in COMPS can become elements of SUBJ, and the original subject NP is deleted or realized as a PP[PFORM *uyhayse*] in COMPS. (38) is a repetition of (10) and (11a). The VAL features of the verbs in (38a,b) and (38c) are given in (39a) and (39b), respectively.

(38) a. *Son-i   John-lul caphiessta.
        hand-nom J-acc   be-caught
        'John's hand is caught.'

    b. *John-lul son-i   caphiessta.
        J-acc   hand-nom be-caught
        'John's hand is caught.'

c. John-i son-lul cap-hi-essta.
   J-nom hand-acc be-caught
   'John's hand is caught.'

(39) a.
```
+-                    -+
| TOPIC < >            |
| SUBJ < NP_bp::[1] >  |
| COMPS < NP_ps::[2] > |
+-                    -+
```

b.
```
+-                    -+
| TOPIC < >            |
| SUBJ < NP_ps::[2] >  |
| COPMS < NP_bp::[1] > |
+-                    -+
```

In (39a), the BP NP in the SUBJ is not locally o-commanded by its
PS NP in COMPS since the NP in SUBJ is less oblique than the NP in
COMPS, and (35) is violated. In (39b), by contrast, the BP NP in
COMPS is locally o-commanded by a less oblique PS NP in SUBJ, and
(35) is observed.

The restriction on the distribution of BP NPs (35) cannot
explain the following topicalization data (40b,c) yet, which are
produced from (40a). ((40a) is called a "double" or "multiple"
subject construction.[15])

(40) a. Mary-ka elkul-i   yepputa.
        M-nom   face-nom pretty
        'As for Mary, her face is pretty.'

     b. Mary-nun elkul-i   yepputa.
        M-top   face-nom be-pretty
        'As for Mary, her face pretty.'

---

[15]We apparently need another lexical rule (similar to the one for IAP) in
order to license this kind of multiple nominative construction, which says that
an NP in SUBJ of an intransitive verb can be repeated an arbitrary number of
times as long as certain semantic constraints are met. See Park (1988) or B.Kang
(1988) for a discussion of the relevant constraints.

c. Elkul-un Mary-ka yepputa.
       face-top M-nom   be-pretty
       'As for the face, Mary's face is pretty.'

(40c) is as good as (40b) in a non-contrastive topic reading. The
problem is that the restriction in (35) cannot explain the
discrepancy in acceptability between a sentence like (40c) in which
the topic BP NP is a nominative, and a sentence like (28) in which
the topic BP NP is an accusative. My account of this asymmetry is
couched in terms of the obliqueness ordering between topic
(realized with the topic marker -nun) and subject (realized by
nominative case). Specifically, I hypothesize that a topic and a
subject are equally oblique in Korean, since subjects seem to be
inherently topic-like in the respect that they set up background
information (topic) of a sentence when they occur sentence
initially[16]. Moreover, in multiple nominative constructions such
as (40a), the first nominative (Mary) apparently exhibits topichood
because it is what the sentence is about. This intuition of native
speakers is reflected in the English translation given in (40a).
From these observations, we assume that the subject takes the same
place in the obliqueness hierarchy as a topic: the subject and
topic are equally oblique. The asymmetry in sentences such as (28)
and (40c) can be explained if we slightly revise the definition of
local o-command in the following manner, with the obliqueness
hierarchy as described above:

(41) Local O-command (weak version)
     Let Y and Z be *synsem* objects with distinct LOCAL values, Y
     referential. Then Y *locally o-commands* Z just in case Y is at
     least as oblique as Z. (i.e. just in case Y is less oblique
     than Z or as oblique as Z.)

In our theory of IAP, (40b,c) are all grammatical because the BP NP *elkul* ('face') and the PS NP *Mary* are equally oblique, *elkul* is locally o-commanded by *Mary*, and restriction (35) is observed.

As just proposed, the obliqueness hierarchy in Korean is as follows: an NP in TOPIC (a topic) or SUBJ (a subject) is less oblique than an NP in COMPS (an object). The next question that may be raised is what the obliqueness hierarchy is among the NPs on the same valence list: e.g. the accusative NPs in COMPS in (26a), or the nominative NPs in SUBJ in (40a). The answer seems to depend on the definition of local o-command. If we used the original definition in (30), there would have to be some way to represent the relative obliqueness among the NPs in the same valence list in order for constraint (35) to work (i.e. not to be violated) in (26a) and (40a). That is, we would have to say that the obliqueness hierarchy among the elements in the same valence list is represented by the relative order of the elements in the list: e.g. a less oblique argument in SUBJ or COMPS must appear to the left of a more oblique one on the COMPS or SUBJ list, respectively. However, when we use the weak version of local o-command definition in (41) instead, it is not necessary to establish a relative obliqueness ordering among the NPs in the same valence list. We can just assume that all the NPs in the same valence list are equally oblique: according to (41), a PS NP can locally o-command an equally oblique BP NP, and (35) is not violated in (26a) and (40a).[17]

---

[17]The PP[*eykey*] which is usually called "indirect object" or "dative NP" needs to be treated as a PP (O'Grady (1987)). The obliqueness ordering between this PP and an (accusative) NP complement is not clear. However, there is evidence the PP seems to be more oblique than the NP for some speakers because the locally bound reflexive *cakicasin* in the PP[*eykey*] can be bound by the NP complement as shown in (i):

(i) Mary-ka (kewul-lo)   John-lul$_j$ cakicasin-eykey$_j$ piche-cwuessta.
     M-nom   mirror-with J-acc ^{j} self-to   mirror-gave
     'Lit. Mary mirrored John$_j$ to himself$_j$ (with a mirror).'

However, for some speakers, (i) is not acceptable. For them, the PP seems to be as oblique as the complement NP.

Restriction (35) can also account for all other possibilities
of passivization illustrated in (11c), repeated in (42), since the
body-part relationship is transitive: if x is a body part of y, and
if y is a body part of z, then x is also a body part of z (all
relative to a given relation).

(42) a. Ce namwu-ka   kaci-ka   kkut-i   cal-i-essta.
        that tree-nom branch-nom end-nom be-cut
        'Lit. The end of the branch of that tree was cut.'

     b. Ce namwu-ka   kaci-lul   kkut-lul cal-i-essta.
        that tree-nom branch-acc end-acc
        'Lit. The end of the branch of that tree was cut.'

     c. Ce namwu-ka   kaci-ka   kkut-lul cal-i-essta.
        that tree-nom branch-nom end-acc
        'Lit. The end of the branch of that tree was cut.'

     d. Ce namwu-ka   kaci-lul   kkut-i   cal-i-essta.
        that tree-nom branch-acc end-nom
        'Lit. The end of the branch of that tree was cut.'

The relevant parts of the lexical entries for verbs in (42a,b,c,d)
are (43a,b,c,d) respectively. Here, NP::[1], NP::[2], and NP::[3]
correspond to ce namwu ('that tree'), kaci ('branch'), and kkut
('end'), respectively. Note that NP::[2] is a body part of NP::[1],
and NP::[3] is a body part of NP::[2], and so NP::[3] is also a
body part of NP::[1].

```
         +-                               -+
(43) a.  | TOPIC < >                       |
         | SUBJ <NP::[1], NP::[2], NP::[3]> |
         | COMPS < >                       |
         +-                               -+

         +-                        -+
     b.  | TOPIC < >                |
         | SUBJ <NP::[1]>           |
         | COMPS <NP::[2], NP::[3]> |
         +-                        -+
```

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```
       +-                      -+
   c.  |  TOPIC < >             |
       |  SUBJ <NP::[1], NP::[2] > |
       |  COMPS <NP::[3]>       |
       +-                      -+

       +-                      -+
   d.  |  TOPIC < >             |
       |  SUBJ <NP::[1], NP::[3]> |
       |  COMPS <NP::[2]>       |
       +-                      -+
```

(43a) shows that all the NPs in COMPS are passivized "into" SUBJ.
Here NP::[3] is locally o-commanded by its PS NP::[1] and NP::[2];
and NP::[2] too is locally o-commanded by its PS NP::[1]. (43b)
shows that only NP::[1] is passivized into SUBJ. Here, NP::[2] and
NP::[3] are locally o-commanded by their PS NP::[1]; and NP::[3] is
also locally o-commanded by its PS NP::[2]. (43c) shows the case in
which only NP::[1] and NP::[2] are passivized into SUBJ. Here,
NP::[3] is locally o-commanded by its PS NP::[1] and NP::[2]; and
NP::[2] is also o-commanded by its PS NP::[1]. (43d) finally
illustrates the case in which only NP::[1] and NP::[3] are
passivized into SUBJ. Here, NP::[3] is o-commanded by its PS NP
NP::[1]; and NP::[2] is also o-commanded by its PS NP::[1].
Therefore, all the lexical entries in (43) observe the restriction
in (35), and the grammaticality of (42) is naturally explained.

   My analysis also predicts that we should be able to topicalize
out of the SUBJ list in a sentence like (42a), which has multiple
subjects through passivization, and this prediction is borne out
considering (44a,b):

(44) a. Kaci-nun   ce   namwu-ka kkut-i cal-i-essta.
        branch-top that tree-nom end-nom be-cut
        'Lit. The end of the branch-[topic] of that tree was cut.'

     b. Kaci-nun   ce   namwu-ka kkut-lul cal-i-essta.
        branch-top that tree-nom end-acc   be-cut
        'Lit. The end of the branch-[topic] of that tree was cut.'

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```

c. #Kkut-un    ce    namwu-ka    kaci-ka      cal-i-essta.
   end-top   that tree-nom    branch-nom
   'Lit. The end-[topic] of the branch of that tree was cut.'

d. #Kkut-un    ce    namwu-ka    kaci-lul     cal-i-essta.
   end-top   that tree-nom    branch-acc
   'Lit. The end-[topic] of the branch of that tree was cut.'


Sentences (44c,d) are not counterexamples to my analysis because
their awkwardness seems to be due to the fact that it is very hard
to use *kkut* ('end') as a topic: it is very hard to think any
situation in which BP NPs such as *kkut* is used as a noncontrastive
topic.

The grammaticality of a sentence like (5b) in which the
reversed linear order of the BP NP and its PS NP is licensed by
focus falls out naturally from my analysis. A.H. Kim (1985) argues
that a focused category tends to immediately precede a verb in a
clause in Korean. However, we can assume that focusing does not
change the grammatical status of the focussed category. Restriction
(35) is not violated in (5b) since the restriction makes reference
to the obliqueness hierarchy of the arguments, rather than
configurational notions, or linear order. That is, in (5b), even
though the PS NP *John* follows the BP NP *son* ('hand') on the
surface, the BP NP is still as oblique as its PS NP in the
representation of the verb's valence. This is different from the
cases of topicalization or passivization mentioned above where we
find a change in the obliqueness of the arguments.  The lexical
entry of the verb of (5b) is (45), which is also the lexical entry
for the verb of the corresponding sentence displaying canonical
word order.

```
      +-                              -+
(45)  | TOPIC < >                     |
      | SUBJ < NP::[1] >              |
      | COMPS < NP_{ps}::[2], NP_{bp}::[3] >  |
      +-                              -+
```

Here, the BP NP is locally o-commanded by an equally oblique PS NP, and restriction (35) is observed.

Note that (28a) is grammatical if it is interpreted as having a contrastive reading. The contrastive topic or focus is different from the ordinary topic in that it results from attaching the marker -*nun* on any expression without changing its grammatical relation, and thus without changing its obliqueness. So, in this reading, the grammatical relation of the BP NP in (28a) is a simple complement suffixed with -*nun*, which is scrambled into the first position of a sentence. In this case, the lexical entry of the head verb is basically the same as (45), and the restriction in (35) is observed.

Now let us consider the lack of relativizability of the BP NP as illustrated in (29a). On my analysis, this fact is also related to restriction (35). According to Kuno (1973), Chinese-style topicalization (thematization in Kuno's terms) and relativization are correlated, and share certain syntactic properties: e.g. deletability of case-particles; permission of resumptive (reflexive) pronouns; and extractability out of adverbial clauses, complex NPs, and sentential subjects.[18]

If we accept the premise that this correlation really holds, the reason for the lack of relativizability of the BP NP may be the same as that for the lack of topicalizability of the BP NP. In Korean, the relativizer -*(n)un* is an inflectional morpheme, and it attaches to a verb. Andreas Kathol (p.c.) suggests that a straightforward way to handle this construction in the HPSG framework may be to assume a lexical rule which changes the valence feature and verb form. Following his suggestion, I propose the lexical rule in (46) to obtain verbs in their modifier form with suffix -*(n)un* (i.e. VFORM *mod*).

---

[18]J.H. Yoon (1993) provides some counterexamples for this assertion which I cannot discuss in this paper in detail. If the account of relativization sketched below turns out to be untenable, we will need a different account of the lack of relativization of the BP NP.

(46) Lexical Rule for a Verbal Modifier

```
        +-  +-                              -+ -+
        |CAT | HEAD verb [VFORM base]       |  |
        |    | +-                      -+   |  |
        |    | VAL | TOPIC <NP::[1]>    |   |  |
        |    |     | SUBJ [2]           |   |  |  --->
        |    |     | COMPS [3]          |   |  |
        |    | +-  +-                -+ -+ -+
        |    |
        | CONTENT [4]                        -+
 word +-                                     -+
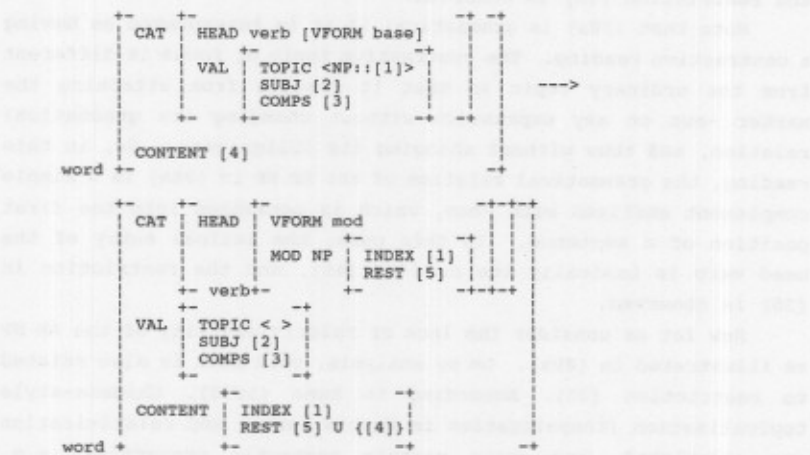
 +-  +-    +-                         -+-+-+
 |CAT | HEAD | VFORM mod              | | | |
 |    |      |          +-         -+ | | | |
 |    |      | MOD NP | INDEX [1] | | | | |
 |    |      |        | REST [5]  | | | | | |
 |    | +- verb+-     +-        -+ -+-+-+ |
 |    | +-           -+
 |    | VAL | TOPIC < >         |
 |    |     | SUBJ [2]          |
 |    |     | COMPS [3]         |
 |    |     +-               -+
 |    |       +-              -+
 |    | CONTENT | INDEX [1]     |
 |    |         | REST [5] U {[4]}|
 word +         +-            -+        -+
```

Lexical rule (46) takes as input a verb of a base form which has an
NP in the TOPIC list, and returns as output a verb of a modifier
form which selects as a "modifyee" (represented by MOD) an NP
sharing the index of the topic NP in the input verb.

The structure of (29b) is (47) in our analysis.

(47)
```
                                              NP
                            +-            -+      NP::[1]
                            V| MOD NP::[1] |        |
                            |   +-      -+ |      John
                            | VAL|TOPIC < >| |
                            |    |SUBJ < > | |
                            |    |COMPS < >| |
                   phrase+- +-            -+-+
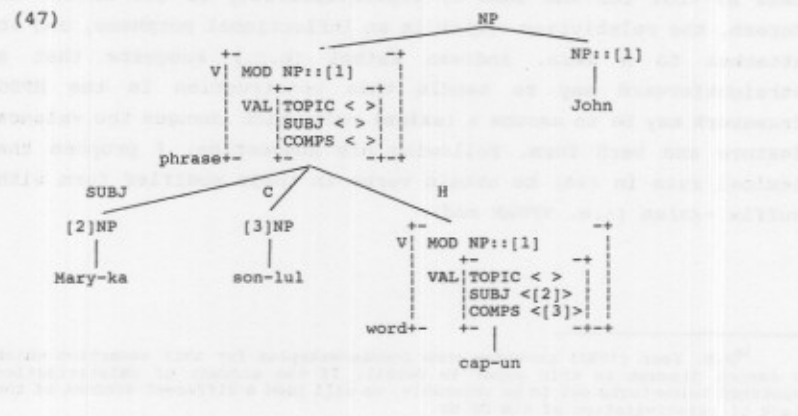
          SUBJ                C              H
                                          +-              -+
         [2]NP             [3]NP          V| MOD NP::[1]   |
           |                 |            |   +-        -+ |
        Mary-ka           son-lul        | VAL|TOPIC < > | |
                                         |    |SUBJ <[2]>| |
                                         |    |COMPS <[3]>| |
                                  word+- +-              -+-+
                                             |
                                           cap-un
```

In the lexical entry for the head verb *capun*, [3] is a BP NP, but its PS NP (NP::[1]) does not exist within the same valence (VAL) attribute. In this case, the sentence is grammatical because the BP NP is exempted from constraint (35).

In the present analysis of relative constructions, the sentence in (29a), which is ungrammatical, is not licensed because the input lexical entry in (48a) violates restriction (35): the BP NP *son* ('hand') in TOPIC cannot be locally o-commanded by the PS NP *John* in COMPS. In contrast, (29b) is grammatical since the BP NP *son* in COMPS is locally o-commanded by the PS NP *John* in TOPIC in input lexical entry (48b).

(48) a.
```
+-                        -+
|  TOPIC < NP_bp::[1] >   |
|  SUBJ  < NP::[2] >      |
|  COMPS < NP_ps::[3]     |
+-                        -+
```

b.
```
+-                        -+
|  TOPIC < NP_ps::[1] >   |
|  SUBJ  < NP::[2] >      |
|  COMPS < NP_bp::[3] >   |
+-                        -+
```

My theory predicts that relativization of a BP NP out of a multiple subject construction is possible because the argument that can be topicalized can also be relativized (cf. (40)). As illustrated in (49c), however, the relativization of a BP NP in a multiple subject construction results in an awkward sentence.

(49) a. Mary-ka elkul-i yepputa.
        M-nom   face-nom be-pretty
        'As for Mary, her face is pretty.'

     b. elkul-i yeppu-n   Mary
        face-nom be-pretty-MOD M
        'Mary whose hace is pretty'

     c. #Mary-ka yeppu-n   elkul
         M-nom   be-pretty-MOD face
         'Lit. the pretty face which Mary has'

According to Kuno (1973), the awkwardness of sentences such as (49c) is due to another independently motivated restriction on relativization of a generic NP: one rarely characterizes something generic by some specific event or state. For example, in (49c), one does not characterize faces in general as something such that a certain person is pretty. However, in certain contexts, this sentence becomes better: in a context in which Mary and John are a couple, and Mary is pregnant, the acceptability of sentence (49c) is improved if appropriate focal stress is given to the BP NPs.

(50) ?Mary-ka yeppu-n   ELKUL-kwa John-i thunthunha-n
     M-nom   be-pretty-MOD FACE-and J-nom be-healthy-MOD

     MOM-lul talmnunta-myen, mescin aki-ka   thayenalkesita.
     body-acc resemble-if   nice   baby-nom will-be-born

     'If (the baby) resembles Mary's pretty face and John's
     healthy body, a nice baby will be born.'

This kind of improvement of acceptibility is not observed in a sentence in which the relativized BP NP is a complement. (51a) is one such example. In (51b), the PS NP is relativized, and it is a little awkward for the semantic reason mentioned above. In (51c), the BP NP is relativized, and it is bad.

(51) a. Mary-ka America-lul California-lul pangmwunhaessta.
        M-nom   America-acc California-acc visited
        'Mary visited California in America.'

     b. #Mary-ka California-lul pangmwunha-n America
        M-nom   California-acc visited-MOD   America
        'America one of whose parts is California which Mary
         visited'

     c. *Mary-ka America-lul pangmwunha-n California
        M-nom   America-acc visited-MOD California
        'California which belongs to America which Mary visited'

Note that the acceptibility of (51b) improves a lot in certain contexts, as illustrated in (52a). However, this improvement is not

allowed in the case of (51c), as illustrated in (52b):

(52) a. Mary-ka California-lul pangmwunha-n AMERICA-wa
       M-nom   California-acc visited-MOD America-and

       Paris-lul pangmwunha-n FRANCE-nun
       Paris-acc visited-MOD France-top

       na-to kapoko-siph-un kos-ita.
       I-also go-want-to-MOD place-be

       'As for America- Mary visited California- and France- she
        visited Paris, they are places that I also want to go to.'

    b. *Mary-ka America-lul pangmwunha-n CALIFORNIA-wa
        M-nom   America-acc visited-MOD California-and

       France-lul pangmwunha-n PARIS-nun
       France-acc visited-MOD Paris-top

       na-to kapoko-siph-un kos-ita.
       I-also go-want-to-MOD place-be

       'As for California which belongs to America
        that Mary visited and Paris which belongs to France that
        Mary visited, they are the places that I also want to
        visit.'

The lack of improvement of (51c) can be explained by constraint
(35). On our analysis, (51c) cannot be licensed because the input
entry of the lexical rule for a verbal modifier violates syntactic
constraint (35). Therefore even a specific context cannot improve
its acceptibilty, as illustrated in (52b). In contrast, (51b) is
licensed because the input entry does not violate constraint (35).
Here, the awkwardness is semantic or pragmatic, rather than
syntactic. Therefore an appropriate context improves its
acceptibility, as illustrated in (52a).

3.3. "Long Distance Scrambling" and IAP

In this section, I consider the case where the topic in an
embedded clause is topicalized into the main clause, which may

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prove problematic for my lexical approach. I give examples in (53):

(53) a. ??Kaci-nun   [Mary-ka [John-i ku namwu-lul
         branch-top M-nom   J-nom the tree-acc

         ___ calasstako] mitessta]
             cut   believed

      'As for the branch, Mary believed John cut the one of the
       tree.'
    b. Ku namwu-nun [Mary-ka [John-i ___ kaci-lul
       the tree-top M-nom   J-nom   branch-acc

       calasstako] mitessta]
       cut   believed

      'As for the tree, Mary believed that John cut its branch.'

Several different approaches to scrambling are suggested in
different theories: e.g. Mahajan (1990), Reape (1990), Saito (1985,
1992), among others. I cannot discuss all of the main issues in
scrambling in detail here since it is far beyond the scope of this
paper. I just want to consider two possible approaches to "long
distance scrambling": roughly, an unbounded dependency approach
which is analoguous to the A'-movement approach in Mahajan (1990)
and Saito (1985); and a word order variation approach based on word
order domain theory in Reape (1990).

    First, I want to consider an unbounded dependency approach
which uses the SLASH feature. This approach assumes that there are
at least two types of topicalization in Korean and Japanese: the
Chinese-style topicalization mentioned already in section 3.2 and
the English-style topicalization in which a filler-gap relationship
exists between a topic (or filler) and its empty category.
Following the current HPSG framework (Ch.9 in Pollard & Sag (in
press)), we may assume that any element of a valence feature
(TOPIC, SUBJ, or COMPS) can be an element of the nonlocal feature
SLASH by the same lexical rule mechanism used in the analysis of
English topic constructions, and that this SLASH element is

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identical to (the LOCAL value of) the filler licensed by the Filler-Head Schema. To explain (53) in this framework, I also need to assume that the element in SLASH is less oblique than those in any of the valence features TOPIC, SUBJ, and COMPS. In this approach, the verb's lexical entries occurring in the embedded clause in (53a) and (53b) are (54a) and (54b), respectively. Here, NP::[1], NP::[2], and NP::[3] correspond to *John-i, ku namwu-lul,* and *kaci-lul,* respectively:

```
         +-       +-      +-                -+-+-+
(54) a.  | LOCAL | VAL  | TOPIC < >         | | | |
         |       |      | SUBJ <NP::[1]>    | | | |
         |       |      | COMPS <NPps::[2]> | | | |
         |       +-     +-                -+-+ |
         |                                     |
         | NONLOCAL | SLASH {NPbp::[3]}        |
         +-                                  -+

         +-       +-      +-                -+-+-+
     b.  | LOCAL | VAL  | TOPIC < >         | | | |
         |       |      | SUBJ <NP::[1]>    | | | |
         |       |      | COMPS <NPbp::[3]> | | | |
         |       +-     +-                -+-+ |
         |                                     |
         | NONLOCAL | SLASH {NPps::[2]}        |
         +-                                  -+
```

In (54a), restriction (35) is violated since the BP NP *kaci-lul* is less oblique than the PS NP *ku namwu-lul*, and cannot be locally o-commanded by the PS NP. In contrast, in (54b), restriction (35) is observed since the BP NP *kaci-lul* is more oblique than PS NP *ku namwu-lul*, and is locally o-commanded by the PS NP.

This approach leads to a problem of spurious ambiguity[19]. While a mechanism such as SLASH percolation is meant to account for unbounded dependencies, there is nothing prima facie that would prevent it from being used in a strictly local way, i.e. within a single clause. Therefore, the position of the object NP in a

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[19]This difficulty was pointed to me by Carl Pollard (p.c.).

simplex sentence such as (55) could be analyzed either in terms of
a filler-gap relationship or simply as one permissible word order
(scrambling).[20]

(55) Sakwa-lul Mary-ka mekassta.
     apple-acc M-nom   ate
     'Mary ate an apple.'

The second problem for this approach is its stipulativeness:
it needs to assume that SLASH participates in the obliqueness
hierarchy in spite of the fact that nonlocal features are usually
assumed to have nothing to do with the obliqueness hierarchy.

A totally different approach which avoids the above-mentioned
problems is possible if we adopt the word order domain theory
suggested by Reape (1990) or the minimalist theory in Dowty (1990):
"long distance scrambling" in Korean and Japanese is due to general
word order variation among the "word order domain elements"
associated with a matrix clause and embedded clause, rather than
due to an unbounded dependency mechanism. Reape's (1990) main idea
is roughly as follows. Each combination of a head daughter and non-
head daughter(s) which have their own word order domain yields a
bigger word order domain which includes the word order domains of
the head and non-head daughter(s). That is, the element(s) in the
word order domains of a head and non-head daughters become the
elements in the mother's order domain. One universal condition on
the merging of word order domains is as follows: if elements x and
y in a daughter's word order domain have a certain ordering
relation, then the ordering relation holds on all domains to which

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[20]We need to assume that topicalization via SLASH allows accusative case
(-lul) or nominative case (-ka) as well as topic case (-nun) because the NP
extracted out of an embedded clause can be accusative or nominative:

(i) Sakwa-lul Sue-ka [S Mary-ka ___ mekesstako] malhayssta.
     apple-acc S-nom   M-nom   ate   said
     'Sue said that Mary ate an apple.'

x and y belong. (I.e. the domains that x and y originally belong to are sequence-unioned.)

In this approach, the lexical entries of the verbs in the embedded clause in (53a,b) are the same as those of the verbs in (28a,b), repectively, which are (36) and (37). Therefore, the (un)grammaticality of (53) is explained by restriction (35) which is used to explain the (un)grammaticality of (28). The only difference between the sentences in (28) and (53) is that, in the case of (53), the subject of the matrix clause occurs between the topic and the subject of the embedded clause in the word order domain of the matrix clause.

One of the problems of this approach is that it is hard to prevent overgeneration. It includes a mechanism which says that any constituents in an embedded clause can be mixed with any constituents in a main clause as long as word orders in each word order domain is maintained. However, this kind of scrambling produces ill-formed sentences such as (56b) (cf.(56a)):

(56) a. Mary-nun Kim-eykey [$_s$ Sue-ka ku namwu-lul
       M-top   K-to   S-nom the tree-acc

      callasstako] malhayssta.
      cut   said

      'Mary said to Kim that Sue cut the tree.'

   b. *Mary-nun Sue-ka Kim-eykey ku namwu-lul
       M-top   S-nom K-to   the tree-acc

      callasstako malayssta.
      cut   said

To salvage this idea of long distance scrambling, we may need some constraint which eliminates ill-formed sentences like (56b), but allows well-formed sentences like (53b). This constraint seems to be a very complicated matter, and presently I do not know how it should be formulated without ad hoc stipulations.

For the time being, I leave as a problem for further studies

the question of which approach is better for dealing with extraction out of embedded clauses.

3.4 Case Assignment

So far I have not mentioned any case assignment mechanism for PS NP and BP NP. The case assignment in IAP is not different from that in any other Korean construction. From the HPSG point of view, case theory in Korean needs to be treated differently from that of English inasmuch as the case of an NP in Korean is not always assigned lexically. (See Yoo 1992.) I do not want to discuss the case assignment mechanism in detail here, but the rough idea is as follows. The default cases of the topic daughter, subject daughter, and complement daughter are topic (realized as *nun*), nominative (realized as *ka* or *i*), and accusative (realized as *lul*), respectively, unless the verb specifies them differently as in the case of emotional verbs: an emotional verb assigns nominative case to its complement. If we assume this case assignment mechanism in Korean, then multiple accusatives as in (1) and (2), or multiple nominatives in a passive of IAP as in (11), or the topic case like (28) are straightforwardly explained.

4. Conclusion

In this paper, I have suggested a new treatment of Korean IAP. The first section is concerned with the properties of Korean IAP. Here, I provided some new data, and pointed out some flaws in the interpretation of the data in current analyses. The important points that I have made are: (i) the linear order between a PS NP and BP NP can be reversed when the PS NP is focussed; (ii) the notion of physical affectedness needs to be replaced by a constraint based on semantic entailment given in (25); and (iii) passivization of the BP NP is possible as long as the PS NP is passivized.

In section 2, I reviewed three different types of approaches to Korean IAP, and showed how all of them are problematic. The main points that I made here are: (i) the BP NP cannot be considered an adjunct; (ii) the lack of topicalizability or relativizability of the BP NP does not allow us to conclude that it is an N'; and (iii) the BP NP cannot be considered to be incorporated into the head verb even at LF.

In section 3, I suggested a lexical approach to IAP. One of the main suggestions here is a lexical rule for IAP which can license any number of the BP NP complements as long as the semantics is compatible with them. Through this lexical rule, I can assume a flat structure analysis of IAP, and explain scrambling in a restricted way. I also have suggested a restriction on the distribution of BP NPs based on the notion of local o-command, and shown how this can account for the facts about passivizability, and the lack of topicalizability/relativizability of the BP NP.

Acknowledgements

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Chinese NP Structure[*]

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1. Introduction

It has generally been believed that an argument position in a sentence is usually filled, if not by an S, with an NP, which is the maximal projection of a head noun. However, this assumption is challenged by Abney 1987, who, in his MIT dissertation, argues extensively that a determiner phrase (DP) should be required in place of an NP so that some similarities between sentences and noun phrases can be captured. According to this proposal, a traditional NP should be analyzed as a DP that has the following configuration:

(1)

```
              DP
           /      \
        Spec       D'
                 /    \
               D       NP
```

At first blush some Chinese facts may seem to support this analysis. For instance, the following sentences in (2) and (3) can be treated as examples[1] of topicalization (Xu and Langendoen 1985).

(2) Píngguǒ$_i$, tā chī-le sān gè t_i
    apples   he eat -LE three CL
    'He ate three apples.'

(3) Níqiu$_i$, tā zhuā-le wǔshi tiáo t_i.
    loach he catch-LE fifty CL
    'He caught fifty loaches.'

If we maintain, as in standard GB Theory, that topicalization involves a movement to sentence initial position, we face some potentially serious problems with examples like (2) and (3). Note first that it is generally assumed that only a lexical head or a maximal projection can move. When a lexical head moves, it is joined to the next (lexical) head, as exemplified by English INFL-to-C

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[1] In the gloss of Chinese examples, DE can be a possessive marker, complement-of-noun marker, or relativizer that heads a relative clause. LE is the (perfective) aspect marker. CL refers to classifier.

movement to form questions. When a maximal projection moves, it is adjoined to a maximal projection or moves to a Spec position. However, *píngguǒ* 'apple' in (2) and *níqiu* 'loach' in (3) are not maximal projections if we assume with the generally accepted point of view that the argument in the object position of *chī-le* 'ate' in (2) and *zhuā-le* 'caught' in (3) are NPs; it follows that such examples cannot be topicalization since topicalization always involves maximal projections. But such examples cannot be a kind of head movement either, since the topic is not a lexical head position.

However, things are quite different if we assume the DP Hypothesis and analyse Chinese noun phrases as having the structure in (1) where *píngguǒ* 'apple' or *níqiū* 'loach' is the NP while the phrase *sān gè píngguǒ* 'three apples' or *wǔshi tiáo níqiū* 'fifty loaches' is a DP. Thus when *píngguǒ* 'apple' in (2) is in the topic position, we can say that this is an instance of topicalization where the maximal projection NP has moved out of the object DP to the sentence initial position, just like any instance of topicalization in English.

So far, it seems that the DP Hypothesis has offered a nice solution to the problem that Chinese topicalization had raised. However, things are not so simple. The following examples show why.

(4) Wǔ gè píngguǒ, tā chī-le sān gè.
    five CL apple   he eat LE three CL
    'Of the five apples, he ate three of them.'

(5) Shí běn xīn shū, tā mǎizǒu-le jiǔ běn.
    ten CL new book he buy-go-LE nine CL
    'He bought nine of the ten new books.'

In (4) and (5) the topicalized elements are full DPs while the gaps in the remaining sentences are merely NPs. This raises the question whether topicalization is the right analysis for structures like those in (2) - (5).

Although the Chinese data mentioned above do not turn out to be supporting evidence for the DP Hypothesis, they are not evidence against it either. In this article, I will examine one analysis which not only is a direct application of the DP Hypothesis but also extends it to exactly parallel the sentential structure assumed in standard GB Theory. I will point out some difficulties that this analysis faces with its own data. In Section 3 I will propose a new analysis, which does not follow the DP Hypothesis, but assumes the NP structure. A large body of data will be provided to show that the new analysis is theoretically sound and empirically correct. In Section 4 I will examine an alternative analysis and show that the alternative may seem to be able to explain the same data. In Section 5 more data are introduced and the two analyses are compared. It is suggested that the analysis proposed in Section 4 may be preferred.

2. The DP Hypothesis in Chinese

2.1 The KP Extension

Although the DP Hypothesis has not been assumed in the main trends of syntactic analysis of noun phrases, its resemblance to the sentential structure has led to some very interesting analyses. One example is the application and extension of the DP Hypothesis in the analysis of Chinese NP structure in Tang 1990.

As Tang 1990 and other Chinese grammarians have pointed out, one of the major differences between Chinese and English is the use of classifiers in Chinese noun phrase structures. In Chinese, demonstratives and numerals cannot modify the head noun unless they cooccur with a classifier and their relative position must be that the demonstrative precedes the numeral, which is then followed by the classifier. The following examples show this.

(6)a. *zhè shū
　　　this book

　 b. *sān shū
　　　three book

　 c. *běn shū
　　　CL   book

(7)a. zhè běn shū
　　　this CL book
　　　'this book'

　 b. *běn zhè shū
　　　CL   this book

(8)a. sān běn shū
　　　three CL book
　　　'three books'

　 b. *běn sān shū
　　　CL   three book

(9)a. zhè sān běn shū
　　　this three CL book
　　　'these three books'

　 b. *zhè běn sān shū
　　　this CL three book

　 c. *sān zhè běn shū
　　　three this CL book

These facts lead Tang 1990 to assume that a classifier phrase (KP) should be included in a DP. Thus she proposes that a Chinese noun phrase has the structure in (10).

(10)

```
                    DP
                 /      \
              Spec       D'
                       /    \
                      D      KP
                           /    \
                        Spec     K'
                               /    \
                              K      NP
                            /   \
                          Num    CL
```

Tang calls particular attention to the resemblance of the Chinese noun phrase structure in (10) to the sentential structure adopted in GB Theory, which is illustrated in (11).

(11)

```
                    CP
                 /      \
              Spec       C'
                       /    \
                      C      IP
                           /    \
                        Spec     I'
                               /    \
                              I      VP
                            /   \
                       (Modal)   Agr
```

This resemblance of the sentential CP-IP-VP with the proposed Chinese noun phrase structure DP-KP-NP is crucial in Tang's analysis[2] because some of the principles applicable to sentences are applied directly to Chinese noun phrases without further motivation. But there are some differences between the CP-IP-VP structure and the proposed DP-KP-NP structure which Tang fails to point out. One of these differences is the agreement facts. In an English sentence, for instance, the agreement is always seen to be between the Spec of IP and the head I. In a Chinese noun phrase, however, the agreement is between the head K and its complement NP. This difference is shown in the following examples.

(12)a. [CP [IP John [I does not] [VP run very fast]

b. *[CP [IP John [I do not] [VP run very fast]]]

---

2   Tang's analysis is different from Abney's in that Abney takes the parallel to be between DP and IP, not DP and CP. In this sense, Tang's analysis is not an extension, but a revision of the DP hypothesis. See also Grimshaw 1991 for a different approach, where PP is taken to be the extension of DP, which in turn is the extension of NP.

(13)a. [$_{DP}$ [$_{KP}$ [$_K$ yǐ   gè] [$_{NP}$ háizi]]]
　　　　　　　　one CL　　　　child

　　b. *[$_{DP}$ [$_{KP}$ [$_K$ yǐ   gè] [$_{NP}$ háizimen]]]
　　　　　　　　　one CL　　　　children

The data in (12) and (13) show at least that different agreement principles have to be established to account for Chinese noun phrases in Tang's proposal.

　　Now suppose that this agreement difference can be explained in a way consistent with Tang's proposal. Let's look at some similarities that Tang has explored. Tang claims that the following variations of a Chinese noun phrase can be accounted for by general rules analogous to V-to-I movement and I-to-C movement (in English).

(14)a. nà yǐ-běn Zhāngsān de shū
　　　　that one-CL Zhangsan DE book
　　　　'that book of Zhangsan's'

　　b. *nà   Zhāngsān de yǐ-běn shū
　　　　that Zhangsan DE one-CL book

　　c. Zhāngsān de nà yǐ-běn   shū
　　　　Zhangsan DE that one-CL book
　　　　'that book of Zhangsan's'

Tang proposes that (14a) is the base-generated structure, as in (15)

(15)

In order to derive the grammatical (14c), *Zhāngsān de* 'Zhangsan's' has to move first to the Spec of KP. Tang claims that this movement is parallel to (hence licensed by) the V-to-I movement

in the sentence level in English, where if no modals appear, V must move to I.[3] This movement results in (14b). However, since (14b) is not a grammatical structure in Chinese, Tang is forced to to assume an obligatory K-to-D movement parallel to I-to-C movement in English subject-auxiliary inversion. This K-to-D movement will move *Zhāngsān de* 'Zhangsan's' from the Spec of KP to the Spec of DP and the result is the grammatical structure (14c).

We must point out that Tang gives no independent evidence to support her proposed sequence of movements from Spec of NP to Spec of DP except the parallelism she draws between her proposed Chinese noun phrase structure and the generally assumed English sentential structure in GB Theory. However, I-to-C movement at the sentential level is not obligatory, since the existence of declarative sentences shows that V can stay in I. Thus Tang should provide independent theoretical justification for the assumption that the movement from Spec of KP to Spec of DP is obligatory. However, no such justification is provided.

Moreover, there is a major flaw in Tang's analogy between the movements assumed for sentential structure and the ones in her proposed structure. V-to-I and I-to-C movements in the sentential level are head movements. But although Tang repeatedly uses the term K-to-D movement, the movement from Spec of KP to Spec of DP is not a head movement, nor is the movement from Spec of NP to Spec of KP. Hence there actually exists no parallelism between the movements Tang mentions at the sentential level and the proposed movements in Chinese noun phrases.

Suppose that Tang has simply made a mistake in terminology and that what she intends is a movement from Spec to Spec when *Zhāngsān de* 'Zhangsan's' changes position from (14a) to (14c). Then the appropriate analogy in the sentential structure is with the movement of NP from Spec of VP to Spec of IP, assuming with Koopman and Sportiche 1985, Kitagawa 1986, and Speas 1990 that the external argument of a predicate is base-generated at D-Structure under Spec of VP.[4] This argument NP is forced to move to Spec of IP to get Case at S-Structure since Spec of VP is not a Case position. But if this is the true story behind Spec of VP to Spec of IP movement, then we have to ask what the story is behind the optional movement from Spec of NP to Spec of KP. It is also unclear what drives *Zhāngsān de* 'Zhangsan's' to move from Spec of KP to Spec of DP since this is, according to Tang, an obligatory movement. This is a very serious question that Tang provides no answer for.

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[3]   The current standard analysis seems to be I lowering to V in S-structure, and then back to I in LF. See Pollock 1989 and Chomsky 1991 for discussion.

[4]   But see Koopman and Sportiche 1991 and Johnson 1991 for a somewhat different approach, where the external argument is believed to be base-generated adjoined to VP.

Still another question concerns Tang's treatment of genitive phrases. Tang notes that in a Chinese noun phrase, unlike in an English noun phrase, the genitive phrase can be iterated. She gives the following example to support her claim.

(16)　wǒ de　Zhào Yuánrèn de　yǔyánxué de　shū
　　　　I 's　Chao Yuanren 's　linguistics 's　book
　　　　'the book on linguistics that is written by Chao Yuanren and that belongs to me.'

Note that Tang's translation is not the only possible reading of the sentence, though it may be the most obvious one because Chao Yuanren is one of the most famous Chinese linguists. If we replace the possessive phrases in (16) with other names, the pragmatic preference for one reading disappears. This is shown in (17) below.

(17)　Zhāngsān de　Lǐsì de　nà　běn　Wángwǔ de　xiǎoshuō
　　　　Zhangsan DE　Lisi DE　that CL　Wangwu DE　novel
　　　　a) 'the novel about Wangwu that is written by Lisi and that belongs to Zhangsan.'
　　　　b) 'the novel about Wangwu that belongs to Lisi and that is written by Zhangsan.'

There are at least two natural readings available. That is, of the first two genitive phrases, either one could denote the possessor of the book. Since Tang later states that a genitive phrase is base-generated in the Spec of NP position, we are left wondering how two genitive phrases can be squeezed into this position in the D-Structure. And what about the phrase *Wángwǔ de* 'Wangwu's'? Should it also be base-generated in Spec of NP?

At this point we want to mention that, in a Chinese noun phrase, it is also possible to have prenominal relative clauses. The following examples show this.

(18)a.　wǒ rènshi de　nà　wèi jiāo　yǔyánxué de　yīngguó lǎoshī
　　　　 I　know DE that　CL teach　linguistics DE British　teacher
　　　　 'the English teacher that I know who teaches linguistics'

　　 b.　nà　wèi wǒ rènshi de　jiāo　yǔyánxué de　yīngguó lǎoshī
　　　　 that　CL I　know DE teach　linguistics DE British　teacher
　　　　 'the English teacher that I know who teaches linguistics'

　　 c.　wǒ rènshi de　jiāo　yǔyánxué de　nà　wèi　yīngguó lǎoshī
　　　　 I　know DE teach　linguistics DE　that CL　British　teacher
　　　　 'the English teacher that I know who teaches linguistics'

　　 d.　*nà　wǒ rènshi de　wèi jiāo　yǔyánxué de　yīngguó lǎoshī
　　　　 that I　know DE CL　teach linguistics DE British　teacher

　　 e.　*nà　wǒ rènshi de　jiāo　yǔyánxué de　wèi　yīngguó lǎoshī
　　　　 that I　know DE teach linguistics de　CL　British　teacher

　　 f.　*wǒ rènshi de　nà　jiāo　yǔyánxué de　wèi yīngguó lǎoshī
　　　　 I　know DE CL teach linguistics de　CL British　teacher

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Note that the examples in (18) show that the relative clauses have the same syntactic properties as the genitive phrases discussed earlier: they are iterable and can appear in exactly the same positions as genitive phrases do. This suggests that it is appropriate to treat relative clauses as having the same syntactic status as genitive phrases. Since we have already seen that it is very problematic to treat genitive phrases as specifiers, we may anticipate that the same problems will rise if relative clauses are treated as specifiers. Therefore an alternative treatment should be sought for both relative clauses and genitive phrases. In Section 3 I will discuss this alternative analysis.

2.2 An Alternative DP-Style Analysis

I have criticized Tang's treatment of Chinese noun phrase structures. However, another analysis along the lines of the DP Hypothesis is possible, viz. to treat the classifier phrase (ClP) as the analogue of the English DP. A typical ClP then would take the following configuration.

(19)

```
              ClP
           /       \
        DemP        Cl'
                  /     \
                Cl       NP
                       /    \
                      ?      N'
                             |
                             N
```

In (19) demonstratives are in the [Spec, ClP] and NP's are classifier complements. There are some advantages in (19) over Tang's analysis. For instance, relative clauses (RC) can be treated as XP adjuncts. If we assume Grimshaw's 1991 proposal, we may suggest that RC's are base-generated adjoined to XP[+N].[5] Since ClP and NP are nominal projections, this may explain the synonymy of the sentences in (19). Possessive phrases (PossP's) are not treated as specifiers of NP, but XP[+N] adjuncts, just like RC's (see discussion of similarities between PossP and RC in Section 3). However, questions remain. For instance, if PossP's are treated as adjuncts, what is going to fill the [Spec, NP] position?[6] How do we guarantee the presence of DemP when a classifier lacks a numeral morpheme (see Subsection 3.4 for discussion)? If we assume the Spec-Head Agreement Principle proposed in recent studies (Chomsky 1992, Rizzi 1991), how do we get the agreement right between the noun phrases and the classifier phrases? In the face of such difficulties, I will not pursue this line of analysis in this paper.

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[5]   There are still problems with this. For instance, in Grimshaw 1991, PP is suggested to be an F_2 level of the nominal projections. But in Chinese RC's are not found to be PP adjuncts.

[6]   But this question may be avoided if we could assume that certain categories such as N simply don't have a Spec position. See Fukui 1986 for similar suggestions in Japanese.

3. A New Analysis

In this section, I will propose a different analysis based upon the more commonly assumed NP structure for noun phrases. But first I will lay out the syntactic framework I am assuming in this analysis.

3.1. The Syntactic Framework

I will assume the syntactic theory of HPSG as discussed in Pollard and Sag 1987 and in press. In this theory, the syntactic structure for phrases can be stated in the ID schemata below.

(20)a. Head-Subject Schema: XP[SUBJ < >] --> [1] YP,   XP[SUBJ <[1]>]
                                                SUBJ   HEAD

    b. Head-Specifier Schema: XP --> [2] YP[SPEC [1]], [1] X'[SPR <[2]>]
                                          SPR   HEAD

    c. Head-Complement Schema: X' --> [1] , X^0[COMPS [1]]
                                        COMPS   HEAD

    d. Head-Adjunct Schema: X' --> YP[MOD [1]], [1] X'
                                        ADJUNCT   HEAD

In the above schemata, we have made some revisions to those proposed in Pollard and Sag in press.[7] The revised version adopted here is in accordance with the X-Bar Theory in GB, where XP is not ambiguous between X' and X". Instead, it is always equivalent to X". Prenominal adjuncts can only modify X', not XP.[8]

---

[7]   In the ID schemata proposed in Pollard and Sag in press, XP in the Adjunct-Head Schema subsumes both X", which is SPR saturated, and X', which seeks an SPR. A subset of the schemata is given below.

  (i)   Head-Specifier Schema: X" --> [2] Y"[SPEC [1]], [1] X'[SPR <[2]>]
                                              SPR   HEAD

  (ii)   Head-Complement Schema: XP --> [1] , X^0[COMPS [1]]
                                           COMPS   HEAD

  (iii) Head-Adjunct Schema: XP --> YP[MOD [1]], [1] XP
                                          ADJUNCT   HEAD

     In English, the word *cats* can occupy the usual NP position and so can *the cats*. Thus it is assumed that *cats* optionally selects an SPR. The the following problem arises. When *cats* has an SPR such as *the*, it is treated as X' by (i) (an SPR unsaturated phrase). When it doesn't, it is an N" (a phrase that does not need an SPR). However, in order to generate the N" *yellow cats*, *yellow* must be allowed to modify an N". But then nothing stops it from modifying the N" *the cats*. To solve this problem, I suggest that the ID Schemata be revised in accordance with X-Bar Theory in GB, where adjuncts only combine with X' to form another X'. With or without an SPR, X' will then project to X" (=XP).

[8]   I want to restrict my discussion of adjuncts here to only prenominal modifiers, because it has been claimed that postnominal modifiers in English such as relative clauses may be said to modify NP rather than N'. However, in Chinese there are no postnominal modifiers.

3.2. Scrambling

Having laid down the general theoretical frame for my analysis, let's now look at some more facts about Chinese noun phrases.

We have noted that in a Chinese noun phrase the head noun is always the last (rightmost) element. We can also have a (demonstrative)-numeral-classifier sequence. Let's call this sequence a classifier phrase (ClP) for the time being. A possessive phrase (PossP) may appear before ClP or after ClP as is shown in (14) and (21). Within a noun phrase we may also have relative clauses. A relative clause (RC) may also appear either before or after the classifier phrase. This is shown in (18) and (22).

(21)a.   Zhāngsān de nà jǐ   zhǐ qiānbǐ
            Zhangsan DE that several CL pencil
            'those pencils of Zhangsan's'

    b.   nà jǐ   zhǐ Zhāngsān de qiānbǐ
            that several CL Zhangsan DE pencil
            'those pencils of Zhangsan's'

(22)a.   wǒ xǐhuān de nà sān   zhǒng zázhì
            I   like   DE that three CL   magazine
            'the three magazines that I like'

    b.   nà sān   zhǒng wǒ xǐhuān de zázhì
            that three CL I   like   DE magazine
            'the three magazines that I like'

Now let us consider cases where a noun phrase includes all three kinds of phrases at the same time. We find that the positions that each of the three phrases can take are relatively free. This is shown in (23).

(23)a   wǒ xǐhuān de Zhāngsān de nà sān zhǐ qiānbǐ
       I   like   DE Zhangsan DE that three CL pencil
       'those three pencils of Zhangsan's that I like'

    b.   wǒ xǐhuān de nà sān zhǐ Zhāngsān de qiānbǐ
          I   like   DE that three CL Zhangsan DE pencil
          'those three pencils of Zhangsan's that I like'

    c.   nà sān zhǐ wǒ xǐhuān de Zhāngsān de qiānbǐ
          that three CL I   like   DE Zhangsan DE pencil
          'those three pencils of Zhangsan's that I like'

    d.   Zhāngsān de wǒ xǐhuān de nà sān zhǐ qiānbǐ
          Zhangsan DE I   like   DE that three CL pencil
          'those three pencils of Zhangsan's that I like'

e. Zhāngsān de nà sān zhī wǒ xǐhuān de qiānbǐ
Zhangsan DE that three CL I like DE pencil
'those three pencils of Zhangsan's that I like'

f. nà sān zhi Zhāngsān de wǒ xǐhuān de qiānbǐ
that three CL Zhangsan DE I like DE pencil
'those three pencils of Zhangsan's that I like'

The fact that RC, ClP and PossP are freely ordered in prenominal positions suggests that these three kinds of phrases should have the same syntactic status. If we assume with HPSG (or the main trend in GB) that NP is the maximal projection of the lexical head noun, then the position that these phrases can take cannot be the SPR position. In other words, the relation between the head noun and any of these phrases cannot be taken to be the relation between specifier and head, since in each maximal projection only one specifier is allowed. Here we cannot use the Head-Subject Schema either, because the head in a NP is not a full phrase (= a maximal projection). Then can the structure in (23) take the form of a head-complement structure? My answer to this question is negative for the following reasons. First, these phrases do not seem to be subcategorized for by the head noun. Second, a lexical head usually does not tolerate the iteration of the same complements. Note that we have pointed out in Section 2 that a PossP can be iterated and so can an RC. Thirdly, I will show in the next subsection that there are better candidates for the complement position in a noun phrase and they behave differently from ClP's, PossP's, or RC's. Can the structure in (23) be a head-adjunct strucure? The answer seems to be positive, since there is no limit on the number of times that the Head-Adjunct Schema can be iterated.

We have seen in (18) that RC can be iterated within an NP. (24) confirms this observation.

(24) wǒ rènshi de nà jǐ wèi cóng yīngguo lái de zhùzài yǒuyì-bīnguǎn
I know DE that several CL from Britain come DE live-in friendship-hotel
de měi xīngqiwǔ dou dào běi-dà shòukè de yǔyánxue-jiàoshòu
DE every Friday all to Beijing-University teach DE linguistics-professor
'the several linguistics professors that I know who come from UK, live in Friendship Hotel, and teach at Beijing University every Friday'

This shows that the number of RC occurences in an NP is in principle unlimited.

We also note (see (17) above) that PossP can be iterated as well, subject only to semantic/pragmatic conditions. For instance, our common knowledge may tell us that, for a given possession relation, usually an object is owned by one owner. So when more than one PossP appear within an NP, they correspond to different possession relations with the head noun. For example, in (17) the translation given interprets the first possessor Zhangsan as the owner of the (physical) book but the second possessor Lisi as the copyright owner. (Li wrote the book so he owns the copyright.) Similarly in (25), two kinds of possession relation are suggested, one being a

temporary owner (because he is holding the pencil) and another being the permanent owner (because he bought it).

(25) Zhāngsān de Lǐsì de nà zhǐ qiānbǐ
  Zhangsan DE Lisi DE that CL pencil
  a) 'the pencil that Zhangsan has which belongs to Lisi'
  b) 'the pencil that Lisi has which belongs to Zhangsan'

  So far we have seen examples that can have only one classifier in each NP. If iterability is one of the properties of adjuncts, the non-repeatability of ClP's may seem to pose a problem for my analysis. To deal with this, again, I resort to semantic considerations. For instance, I suggest that the limited number of ClP occurrences is due to the agreement between the head noun and the classifier compound. If more than one classifier appears within a single NP, it is very likely to cause agreement feature conflicts, due to the high sensitivity of the head noun towards selection of classifier (See Sections 3.4 and 3.5 for further discussion).

3.3. Complements in NP

Is there any head-complement structure within a Chinese noun phrase? There appears to be. Consider the following examples.

(26)a. yī bù yǔyánxué de zhùzuo
  one CL linguistics DE work
  'a piece of work on linguistics'

  b. *yǔyánxué de yī bù zhùzuo
  linguistics DE one CL work

(27)a. yī zhāng cǎisè de zhàopiàn
  one CL multi-color DE photo
  'a color photo'

  b. *cǎisè de yī zhāng zhàopiàn
  multi-color DE one CL photo

(28)a. yī cì jīngjì de tǎolùnhuì
  one CL economy DE dicussion-meeting
  'a conference on the economy'

  b. *jīngjì de yī cì tǎolùnhuì
  economy DE one CL discussion-meeting

  The fact that the noun phrases after ClP and before the head noun in the (a) expressions in the above examples cannot switch position with the ClP's shows that these phrases do not have the same syntactic status as ClP's. The fact that they can only occur between ClP and the head noun suggests that they are lower in the structure and hence have a closer relation with the head noun. I

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have already argued that ClP is an adjunct which combines with N' to form another N'. Then the noun phrase between ClP and the head noun should be something that combines with the head noun (N^0) to form an N'. This relation in my framework is the head-complement structure licensed by (20c).

Second, the phrases that can combine with the head noun, according to my investigation, turn out to be those that are subcategorized for by the head noun. That is, the relation between the head noun and the noun phrase is very idiosyncratic. For instance, in (26a), the fact that *yŭyánxué* 'linguistics' has an idiosyncratic relation with the head noun *zhùzuo* 'works' is because the entities denoted by the nouns such as *zhùzuo* 'works' are understood to have some content and *yŭyánxué* 'linguistics' can denote this content. This 'about' relation can only exist with nouns like *zhùzuo* 'works', *xiǎoshuō* 'novel', and *gùshi* 'story'. Other nouns such as *qiānbi* 'pencil' and *yĭzi* 'chair' can not have the same kind of complements. This is analogous to English noun phrases such as *story about* NP, where there is a fixed idiosyncratic meaning relationship between the head noun *story* and the NP: the relation of a story and its contents.

Thirdly, unlike an RC or PossP, the noun phrases discussed here are not repeatable within the same NP. Thus the following examples are meaningless.

(26)c. *yī   bù   yŭyánxué de wùlī   de zhùzuo
       one CL linguistics DE physics DE work

(27)c. *yī   zhāng cǎisè   de hóngsè   de zhàopiàn
       one CL   multi-color DE red-color DE photo

(28)c. *yī   cì   jīngjì   de zhèngzhì de tǎolùnhuì
       one CL economy DE politics   DE dicussion-meeting

The non-repeatability of the same kind of noun phrases shows that they behave just like complements.

In his dissertation, Dai 1992 claims that some noun-noun sequences are actually compounds. That is, the noun (phrases) have actually been incorporated into the head nouns. The noun phrases that can be incorporated into the head nouns in his analysis are mostly those that are treated as complements in our analysis. The difference between our complement-head sequence (not a word) and Dai's noun-noun compounds is that our complement noun phrases always bear a compement marker *de* while Dai's compounds do not have this marker. This difference is actually one of Dai's

criteria in distinguishing (compound) words from phrases.[9] The fact that the noun (phrases) in (26)-(28) can have the option of being incorporated into the head nouns (dropping the complement marker *de*) also shows that these noun phrases indeed have closer relation with their head nouns.

(29) yī bù yǔyánxué-zhùzuo
    one CL linguistics-work
    'a piece of work on linguistics'

(30) yī zhāng cǎisè-zhàopiàn
    one CL   multi-color-photo
    'a color photo'

(31) yī cì jīngjì-tǎolùnghuì
    one CL economy-discussion-meeting
    'a conference on economy'

Based on the semantic and syntactic relations dicussed above, I believe that my distinction between adjuncts and complements for prenominal phrases is correct. That is, some noun phrases with the marker *de* are complements, while ClP's, RC's, and PossP's are adjuncts. This distinction will help us solve the following puzzle.

(32) nà běn Zhāngsān de shū
    that CL Zhangsan DE book
    a. 'that book of Zhangsan's'
    b. 'the book about Zhangsan'

(33) Zhāngsān de nà běn shū
    Zhangsan DE that CL book
    a. 'that book of Zhangsan's'
    b. *'that book about Zhangsan'

In (32) the phrase *Zhāngsān de* is between the ClP and the head noun. There are two possible structures that can be assigned to it: one being an adjunct as in (34a)[10] meaning 'that book of Zhangsan's' and another being a complement as in (34b) meaning 'the book about Zhangsan'.

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9   Actually Dai's incorporated nouns cannot be full phrases, while our complement nouns are full phrases. The following examples show this.

(i)   yī-bù nà wū-wèi lièshi de xiǎoshuō
        one-CL that five-CL martyr DE novel
        a. 'a novel about the five martyrs.'
        b. 'a novel that belongs to the five martyrs.'

(ii)   *yī-bù nà-wū-wèi-lièshi-xiǎoshuō
        one-CL that-five-CL-martyr-novel

10   It is not my intension to assume any preference over the flat structure in (34a). A strictly binary tree will serve the same purpose here.

(34)a.

```
              NP
              |
              N'
        ┌─────┼─────┐
      ClP    PossP   N'
       △      △      |
    nà běn  Zhāngsān de  N
                        |
                        shū
```

b.

```
              NP
              |
              N'
        ┌─────┼─────┐
      ClP          N'
       △       ┌────┴────┐
    nà běn   NP[de]      N
              △          |
         Zhāngsān de    shū
```

However, (33) is not ambiguous because the phrase *Zhāngsān de* appears before the ClP and there is only one possible structure to assign to it. This is shown as (35).

(35)

```
              NP
              |
              N'
        ┌─────┼─────┐
     PossP   ClP     N'
       △      △      |
  Zhāngsān de nà běn  N
                     |
                     shū
```

That is, since the ClP is necessarily an adjunct, the PossP to its left must also be an adjunct.

3.4. Classifier Phrase and Agreement

Although Tang's KP Hypothesis has some difficulties, her treatment of the numeral-classifier sequence as being under the same lexical head K is worthy of note. She does not make clear why the numeral and the classifier must be under a single lexical node, nor does she explain how this treatment should be interpreted. In this subsection I will take up this question and give evidence to show that numeral-classifier sequence should be treated as a compound word.

The first piece of evidence comes from the fact that a numeral and a classifier always act as a

single unit. Nothing can be inserted syntactically to separate the two.[11]

(36)a. sān   zhǐ Lìsì de qiānbǐ
        three CL Lisi DE pencil
        'Lisi's three pencils'

   b. *sān   Lìsì de zhǐ qiānbǐ
        three Lisi DE CL pencil

   c. *sān   de zhǐ Lìsì de qiānbǐ
        three DE CL Lisi DE pencil

   d. Lìsì de sān   zhǐ qiānbǐ
        Lisi DE three CL pencil
        'Lisi's three pencils'

The second piece of evidence comes from universal tendency. Rijkhoff 1990 has surveyed
more than a dozen classifier languages and found that all of them, without a single exception, have
inseparable numeral-classifier or classifier-numeral sequences. Thus the closeness of numeral and
classifier in Chinese is not an accident.

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11   There are some apparent counterexamples to this claim, as is shown in the following.

   (ia)   yì   zhuō kèren
           one CL   guest
           'guests that can fulfil a (dinner) table'

   b)   yì   dà zhuō kèren
           one big CL   guest
           'guests that can fulfil a big (dinner) table'

   (iia) yì   wǎn shǔi
           one CL   water
           'a cup of water'

   b)   yì   xiǎo wǎn shǔi
           one small CL water
           'a small cup of water'

   To explain this, we must understand that there are two kinds of classifiers in Chinese. One is the permanent
classifier, which has no other function but denoting the 'shape' (see Footnote 13) of objects, like wèi (denoting a
(respected) person) and pǐ (denoting a horse). The other is the temporary classifier, which is originally used as a
noun, like zhuō (a (dinner) table) and wǎn (a cup). Usually, the permanent classifiers do not allow any modifiers.

   (iii) yì   (*dà/*xiǎo) wèi xuéshēng
           one big/small CL   student

   Since most temporary classifiers were originally used as nouns, I suppose that they are borrowed either from
simple nouns like wǎn and zhuō or from already compounded nouns like dà-zhuō and xiǎo-wǎn. See Section 3.3 and
Dai 1992 for discussion of how Chinese compounds are treated.

A third piece of evidence can be seen from the agreement facts. It is generally true that the head noun in Chinese agrees with the numeral in number[12] and with the classifier in 'shape'[13] or 'kind', as the following examples suggest.

(37)a.   yì gè háizi
      one CL kid
      'a kid'

    b. *yì gè háizimen
        one CL kids
        *'a kids'

    c. *yì běn háizi
        one CL kid

    d. wǔ gè háizi/háizimen
        one CL kid/kids
        'five kids'

However, when the classifier is plural in nature such as *qún* 'flock', then even if the numeral is singular *yì* 'one', the head noun has to denote a plural entity although it does not have to be morphologically marked.

(38) yì qún háizi/háizimen
      one CL kid/kids
      'a group of kids'

This suggests that any attempt to relate number agreement solely to the numeral would run into serious problems. However, this will present no difficulties if we treat numeral and classifier sequence as a compound since then the compound as a single unit will be responsible for both agreement features. I will abbreviate the numeral-classifier compound as Cl. I will treat the demonstratives as the specifier of ClP. Thus a classifier phrase will take the form in (39).

(39) zhè hòuhou   de yì-běn
      this thick-thick DE one-CL
      'this very thick (book)'

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12   Note that in Chinese only personal nouns have the option of using the overt plural marker *men*.

13   I borrow this term from Allen 1977 and Chin 1991. Note that not all agreement between the classifier and the head noun can be denoted by the literary meaning of 'shape'. Especially, the permanent classifiers are chosen arbitrarily. So the term 'shape' should not be taken literally, but understood to refer to a special agreement found in classifier languages.

```
                    CIP
                   /   \
               DemP     Cl'
               /\      /   \
             zhě  XP        Cl'
                  /\         |
              hòuhou de      Cl
                             |
                          yì-běn
```

I have already claimed that CIP is an adjunct to N'. Therefore the agreement between the CIP and the head noun can be captured by the head feature MOD on the classifier, as is shown by the following example of *yì-tiáo*.

(40) $\begin{bmatrix} \text{PHON} <\text{yì-tiáo}> \\ \text{SYNSEM|LOCAL|CAT|HEAD} \ _{Cl}[\text{MOD N'[NUM sing, SHAPE} \quad \text{tiáo }]] \end{bmatrix}$

We must also note here that our CIP analysis has some other advantages over Tang's. Recall that Tang 1990 treats demonstratives as the head of DP, which subcategorizes for a KP. The difficulty in her analysis is how her structure can guarantee the presence of a demonstrative when the numeral is absent in the head K. Note that a classifier cannot modify the head noun by itself, as is shown in (6) and the following.

(41) *Zhāngsān de zhǐ qiānbǐ
       Zhangsan DE CL pencil

In my analysis, demonstratives are treated as specifier of CIP, which means that the presence of demonstratives is dependent on the presence of the head classifier. My treatment of numeral-classifier sequences as compounds makes it possible to specify when the specifier is obligatory. This can be achieved by a compounding rule such as (42), where the classifier head, before it is compounded with a numeral, must look for a specifier in order to project to its maximal projection.

(42) $< \begin{bmatrix} \text{PHON [1]} \\ \text{SYNSEM|LOC|CAT|HEAD numeral} \end{bmatrix} , \begin{bmatrix} \text{PHON [2]} \\ \text{SYNSEM|LOC|CAT} \begin{bmatrix} \text{HEAD classifier} \\ \text{VAL|SPR <DemP>} \end{bmatrix} \end{bmatrix} >$

$\Downarrow$

$< \begin{bmatrix} \text{PHON append([1],[2])} \\ \text{SYNSEM|LOC|CAT} \begin{bmatrix} \text{HEAD classifier} \\ \text{VAL|SPR <(DemP)>} \end{bmatrix} \end{bmatrix} >$

The instantiation of the compounding rule with the lexical entry *yì-tiáo* is illustrated in (42') below.

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(42') $<$ $\begin{bmatrix} \text{PHON} <\text{yī}> \\ \text{SYNSEM|LOC|CAT|HEAD} \quad \text{numeral} \end{bmatrix}$, $\begin{bmatrix} \text{PHON} <\text{tiáo}> \\ \text{SYNSEM|LOC|CAT} \begin{bmatrix} \text{HEAD classifier} \\ \text{VAL|SPR} <\text{DemP}> \end{bmatrix} \end{bmatrix}$ $>$

$\Downarrow$

$<$ $\begin{bmatrix} \text{PHON} <\text{yī-tiáo}> \\ \text{SYNSEM|LOC|CAT} \begin{bmatrix} \text{HEAD classifier} \\ \text{VAL|SPR} <(\text{DemP})> \end{bmatrix} \end{bmatrix}$ $>$

3.5. Other Prenominal Modifiers.

Besides RC's, PossP's, and ClP's, there are other prenominals in Chinese, the properties of which need to be discussed. In this subsection, I will first discuss how adjective phrases (AP's) are treated. Then I will consider the necessity of distinguishing ClP's from measure phrases (MP). Finally, I will show that prenominal MP's can also be treated as RC's.

3.5.1. Adjective Phrases

Adjective phrases (AP's) behave differently from their English counterparts in that they can function as predicates of main clauses, while in English they must cooccur with a linking verb. Thus the English sentences in (a) and the Chinese sentences in (b) are acceptable, while the exact counterparts of (b) in English, shown as (c), are bad.

(43)a. Mary is very pretty.

b. Mǎlì hěn piàoliàng.
Mary very pretty
'Mary is very pretty.'

c. *Mary very pretty.

(44)a. John is extremely brave.

b. Zhāngsān fēicháng yǒnggǎn.
Zhangsan extremely brave
'Zhangsan is extremely brave.'

c. *John extremely brave.

That Chinese AP's can function as main predicates is also suported by the fact that they can be suffixed with aspect morphemes[14] such as the perfective marker -le (Gao 1993a and 1993b) and the experiential marker -guo (Li and Thompson 1981).

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14   But adjective predicates usually do not take the durative marker -zhe. This is because adjectives denotes states, not activities. Stative verbs such as zhīdào 'know' and xǐhuān 'like' do not take -zhe, either.

(45) Fēngyè   hóng-le.
      maple-leaf red-LE
      'The maple leaves have turned red.'

(46) Lìsì gāoxìng-guo.
      Lisi happy-GUO
      'Lisi was once happy.'

Thus the adjectives in the above examples behaves just like intransitive verbs. When adjectives are used as prenominal modifiers, they also behave like verbs: they are marked by the relativizer *de* and may take aspect markers.

(47)a. hěn piàoliàng de yī-wèi gūniang
        very pretty   DE one-CL girl
        'a very pretty girl'

   b.   yī-wèi hěn piàoliàng de gūniang
        one-CL very pretty   DE girl
        'a very pretty girl'

(48)a. hóng-le de jī-piàn   fēngyè
        red-LE DE several-CL maple-leaf
        'several maple leaves that have turned red'

   b.   jī-piàn   hóng-le de fēngyè
        several-CL red-LE DE maple-leaf
        'several maple leaves that have turned red'

On the basis of such facts, I follow Sproat and Shih 1990 in treating the marker *de* as the same relativizer as that heads an RC. That is, prenominal AP's with *de* are taken to be RC's.

3.5.2. Measure Phrases

In the literature of Chinese grammar, classifiers are often conflated with measure words such as *bàng* 'pound' and *jīn* 'jin'[15]. Chao 1968 uses the term "measure phrase" to encompass both. Li and Thompson 1981 assume that measure words are used as classifiers when they are followed by other nouns; on this view, in prenominal positions, ClP's subsume measure phrases (MP's). Tai and Wang 1990 have made an attempt to identify semantic differences between ClP's and MP's. They propose that while a ClP categorizes an object, an MP simply measures an object. Their examples include *yī-bàng* 'one-pound' as an MP and *yī-kuài* 'one-piece' as a ClP. The reason for the distinction is basically that while a ClP is very sensitive to the nouns it can co-occur with, an MP is free in this respect. Thus, we can use *yī-bàng* 'one-pound' to measure *tiě* 'iron', *shāzi*

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15   *Jin* is the most commonly used weight measurement in mainland China. It is equal to 500 grams.

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'sand', *píngguǒ* 'apple', and *miánhuā* 'cotton' as in *yì-bàng tiě* 'a pound of iron', *yì-bàng shāzi* 'a pound of sand', *yì-bàng píngguǒ* 'a pound of apple', and *yì-bàng miánhuā* 'a pound of cotton'. But we have to use different classifiers for these objects as in *yì-kuài tiě* 'a piece of iron', *yì-lì shāzi* 'a grain of sand', *yì-gè píngguǒ* 'an apple' *yì-tuán miánhuā* 'a ball of cotton'. For instance, we cannot say **yì-tuán píngguǒ* 'a ball of apple', nor can we say **yì-lì tiě* 'a grain of iron'.

I will follow Tai and Wang in distinguishing CIP's and MP's. The semantic distinctions, when translated into the HPSG framework, are captured by agreement features. For CIP's, the MOD feature will ensure that the CIP values matches the head noun values. For MP's, on the other hand, the MOD feature is unspecific; thus they are free to modify any head noun as long as the expressions are pragmatically interpretable. In what follows, I will provide more data and discuss in detail the syntactic differences between CIP's and MP's.

It has sometimes been suggested that one of the syntactic properties of MP's is the optional insertion of *de* after the numeral-measure word sequence (e.g., Tai 1993). Thus *sān-tiáo* in (49) is a CIP while *sān-jīn* in (50) is an MP.

(49) sān-tiáo (*de) yú
   three-CL DE fish
   'three fish'

(50) sān-jīn (de) yú
   three-*jīn* DE fish

It should be noted that *sān-jīn yú* and *sān-jīn de yú* have different interpretations: *sān-jīn yú* means three *jīn* of fish, while *sān-jīn de yú* means a fish that weighs three *jīn* (or fish that weigh three *jīn* each). Likewise, Chao 1968 points out that *sān-jiān fángzi* has a different meaning than *sān-jiān de fángzi*. In some dialects of Chinese, *sān-jiān fángzi* denotes three rooms, which are not necessarily in the same house. (They may be in the same house, but that house does not necessarily have only three rooms.) In other dialects, it simply means three (single-room) houses. However, in almost all dialects, *sān-jiān de fángzi* refers only to a house with three rooms (or houses with three rooms each). Therefore I propose that an MP is a numeral-measure word sequence followed by *de*.

Recall that earlier in this subsection I discussed the acceptability of *sān-jīn tiě* 'three *jīn* of iron', *sān-jīn shāzi* 'three *jīn* of sand', *sān-jīn píngguǒ* 'three *jīn* of apple', and *sān-jīn miánhuā* 'three *jīn* of cotton'. But we must also note that expressions like **sān-jīn zhuōzi* 'three *jīn* of table' and **sān-jīn chuáng* 'three *jīn* of bed' are unacceptable. This is simply because *sān-jīn* is a mass (as opposed to a count) CIP. However, if *de* is used with *sān-jīn*, an MP is formed. In accordance with the semantic criteria for MP proposed by Tai and Wang, *sān-jīn de* should be able to freely measure other nouns. This prediction is borne out.

(51)   sān-jīn de zhuōzi
         three-*jin* DE table
         'a table that weighs three *jin* ' (or 'tables that weigh three *jin* each')

(52)   wǔ-jīn de chuáng
         five-*jin* DE bed
         'a bed that weighs five *jin* ' (or 'beds that weigh five *jin* each')

Having delimited the form of MP's, I now turn to other syntactic differences between ClP's and MP's. We have noted that ClP's may take demonstratives.[16] MP's, however, do not. This is shown in the following, where the (a) examples have ClP's while the (b) examples have MP's.

(53)a.   zhè sān-tiáo yú
         this three-CL fish
         'these three fish'

   b.   *zhè sān-bàng   de yú
         this three-pound DE fish

(54)a.   zhè sān-jīn   yú
         this three-CL fish
         'these three *jin* of fish'

   b.   *zhè sān-jīn de yú
         this three-*jin* DE fish

Third, it is always possible to use an adjective before or after an MP that specifies in which respect the head noun is measured by the MP. For instance, *sān-jīn de* measures weight, thus the adjective *zhòng* 'heavy' can be used with *sān-jīn*. *Sì-mǐ de* measures length, thus *cháng* 'long' can be used with it.

(55)a.   *sān-jīn zhòng yú   or   *zhòng sān-jīn yú
          three-CL heavy fish   heavy three-CL fish

   b.   sān-jīn zhòng de yú   or   zhòng sān-jīn de yú
         three-CL heavy DE fish   heavy three-CL DE fish
         'a fish that weighs three *jin* ' ('fish that aweigh three *jin* each')

(56)a.   *sì-mǐ cháng bù   or   *cháng sì-mǐ bù
          four-CL long cloth   long four-CL cloth

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16   During the presentation of this section in a Chinese Syntax Seminar at OSU, some colleagues gave the following example.

(i)   zhè sān-zhuō de kèren
      this three-table DE guest

While I agree this is a well-formed phrase, I must point out that *zhè sān-zhuō de* in (i) does not denote measurement at all. Instead, it is used as a PossP meaning (the guests) that belong to/sit at these three tables.

b. sì-mǐ   cháng de bù   or cháng sì-mǐ   de bù
     four-meter long DE cloth   long four-meter DE cloth
     'a piece of cloth that is four meters long' ('pieces of cloth that are four meters long
     each')

Fourth, a ClP generally does not cooccur with another ClP within the same NP, but it is always possible for an MP to occur side by side with a ClP within a single NP.

(57)a. *zhè tiáo sān-jīn   yú
       this CL   three-CL fish

    b. zhè tiáo sān-jīn de yú
       this CL   three-*jīn* DE fish
       'this fish that weighs three *jīn*'

    c. zhè tiáo zhòng sān-jīn de yú
       this CL heavy three-*jīn* DE fish
       'this fish that weighs three *jīn*'

    d. zhè tiáo sān-jīn zhòng de yú
       this CL   three-*jīn* heavy DE fish
       'this fish that weighs three *jīn*'

(58)a. *zhè kuài sì-mǐ   bù
       this CL   four-CL cloth

    b. zhè kuài sì-mǐ   de bù
       this CL   three-meter DE cloth
       'this piece of cloth that is four meters long'

    c. zhè kuài cháng sì-mǐ   de bù
       this CL long three-meter DE cloth
       'this piece of cloth that is four meters long'

    d. zhè kuài sì-mǐ   cháng de bù
       this CL   three-meter long DE cloth
       'this piece of cloth that is four meters long'

Finally, MP's can serve as predicates[17] while this use is impossible for ClP's. Thus in (57) and (58) where we have ClP's as well as MP's, only the MP's can be put in a post-NP position[18] to serve as predicates. This is shown in the following examples.

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[17] This claim is also supported by the fact that some predicate MP's can be followed by sentence final particle -*le* when change of state is involved. This particle is present even when these MP's are used prenominally.

  (i)   Zhè jǐ-gè   xiǎoháir yǐjīng sān-suì le.
         this several-CL kid   already three-year LE
         'These few kids are already three years old.'

  (ii)   Zhè jǐ-gè   yǐjīng sān-suì le de xiǎoháir.
         this several-CL already three-year LE DE kid
         'These few kids who are already three years old.'

(59)a. *Sān-jīn de yú zhè tiáo.
   three-*jin* DE fish this CL

b. Zhè tiáo yú sān-jīn.
   this CL fish three-*jin*
   'This fish weighs three *jin*.'

c. Zhè tiáo yú sān-jīn zhòng.
   this CL fish three-*jin* heavy
   'This fish weighs three *jin*.'

d. Zhè tiáo yú zhòng sān-jīn.
   this CL fish heavy three-*jin*
   'This fish weighs three *jin*.'

(60)a. *Sì-mǐ de bù zhè kuài.
   four-meter DE cloth this CL

b. Zhè kuài bù sì-mǐ.
   this CL cloth four-meter
   'This piece of cloth is four meters long.'

c. Zhè kuài bù cháng sì-mǐ.
   this CL cloth long four-meter
   'This piece of cloth is four meters long.'

d. Zhè kuài bù sì-mǐ cháng.
   this CL cloth four-meter long
   'This piece of cloth is four meters long.'

The above discussion shows that it is not only necessary to distinguish MP's from ClP's, it is also possible to distinguish them syntactically. It is very interesting to note the use of MP's as predicates. As examples in (57)-(60) show, when MP's are used as predicates, no marker *de* is necessary. But when they appear in prenominal positions, *de* is always used. This shows that MP's behave just like AP's (see Subsection 3.5.1.). Therefore, it is reasonable that the marker *de* after prenominal MP's be treated as a relativizer that heads a RC which contains a predicate MP and a gap in the subject position.

To summarize, I have shown in this section that ClP's can be distinguished from MP's in that in a prenominal position, ClP's do not bear the marker *de* while MP's always do. In addition,

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(iii) Yǐjīng sān-suì le de zhè jǐ-gè xiǎoháir.
   already three-year LE DE this several-CL kid
   'These few kids who are already three years old.'

[18] Only under one circumstance can ClP's appear in post-NP positions. This is when items are read from a list by shop clerks (see Chao 1968 for discussion). However, this post-NP use does not necessarily make the ClP's predicates. For instance, in such cases, no sentence final particles are possible.

MP's behave like AP's in that they both can be used as predicates and need the marker *de* when appear in prenominal positions. Therefore, I will treat prenominal AP's and MP's as RC's with the marker *de* as the relativizer in both cases.

4. An Alternative Analysis

As we have seen in the previous section, the proposed analysis can solve the problems raised by Tang's KP analysis. However, difficulties still remain. Recall that the analysis in Section 3 limits the possible number of ClP's in a single Chinese noun phrase based on semantic considerations. One difficulty with this approach is that sometimes a single noun is compatible with more than one classifier. In cases like this, semantic considerations alone may not be able to rule out the possibility of more than one classifier modifying a single head noun. In most cases, however, these structures turn out to be ungrammatical. For instance, *xiǎoshuō* 'novel' may take either *bù* or *běn* as in *yī-bù xiǎoshuō* 'a novel' or *yī-běn xiǎoshuō* 'a novel'; *xuéshēng* 'student' may be modified by either *wèi*, *míng*, or *gè* as in *zhè-wèi xuéshēng* 'a student', *zhè-míng xuéshēng* 'a student', or *zhè-gè xuéshēng* 'a student'. But as (61) and (62) show, a single noun usually does not take more than one classifier.

(61) *yī-bù   yī-běn   xiǎoshuō
     one-CL one-CL novel

(62) *zhè wèi zhè míng zhè gè xuéshēng
     this CL   this CL   this CL student

The purpose of this section is to explore another alternative to solve the ClP problem.

In the proposal in Section 3.2, I did not make use of the Head-Specifier Schema in a Chinese noun phrase. In the alternative analysis in this section, I am going to treat ClP as the specifier of NP. Since each NP can have at most one specifier, we are guaranteed that no more than one ClP will be found in a single NP. Thus we can avoid the difficulties pointed out above with relying on semantic considerations to restrict the occurrence of ClP's in Chinese noun phrases. In this analysis, agreement can be mediated by the head feature SPEC on the head classifier. The example of *yī-tiáo* in (40) is then revised as (63) below.

(63) $\begin{bmatrix} \text{PHON } <\text{yī-tiáo}> \\ \text{SYNSEM|LOCAL|CAT|HEAD }_{\text{Cl}}[\text{SPEC N'[NUM sing, SHAPE tiáo]]} \end{bmatrix}$

The difference between (41) and (63) is that the former is an agreement between modifier and head and the latter is between specifier and head. Both are commonly found in natural languages.

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For this to work, a second Head-Adjunct Schema must be added to the Schemata in (20) in order to allow adjunction to XP, as shown in (64):

(64)   Head-Adjunct Schema 2:   XP --> YP[MOD [1]], [1] XP
                                        ADJUNCT   HEAD

Correspondingly, adjuncts such as RC's or PossP's must have the option of modifying either an N' or an NP, depending on whether the adjuncts appear after the ClP or before the ClP, as the following examples show.

(65)a.   nà běn Lìsì de yǔyánxue de shū
          that CL Lisi DE linguistics DE book
          'the book on linguistics that belongs to Lisi.'

b.   Lìsì de nà běn yǔyánxue de shū
      Lisi DE that CL linguistics DE book
      'the book on linguistics that belongs to Lisi.'

Although Tang 1990 assumes that (65a) and (65b) have the same meaning, her observation, I believe, is correct only when we consider the truth conditions of the two expressions. As the structures show, the difference between (65a) and (65b) is one of scope: *Lìsì de* 'Lisi's' in (65a) is inside the specifier (=ClP), thus it only has a narrow scope reading, which is equivalent to an English restrictive relative. Following Sproat and Shi 1990, I give the interpretation as (65a').

(65)a'.   [this x | linguistics-book(x) & possess'(lisi, x)]

On the other hand, (65b) shows that *Lĭsì de* 'Lisi's' is outside the ClP and we get the interpretation that is parallel to an English nonrestrictive relative, as is shown in (65b').

(65)b'.　[this x | linguistics-book'(x)] & possess'(lisi, x)

Therefore, (63a) is felicitous if the ClP picks out a book from a set of linguistics books which belong to Lisi; (63b) is felicitous if the ClP picks out a book from a set of linguistics books and that book belongs to Lisi.

From the discussion above, I conclude that the different structures in (65) are motivated because they capture the different felicity conditions associated with the different orders.

Although the alternative analysis, which resorts to syntactic means to limit the number of ClP occurences in a single NP to one, can solve the problem raised at the beginning of this section, the following examples may appear to be problematic:

(66)　Mǎlì mǎi-le wǔ-dǎ liùshi-zhǐ qiānbǐ sònggei tā de xuéshēng.
　　　Mary buy-LE five-CL sixty-CL pencil send-give she DE student
　　　'Mary bought five dozen, that is, sixty pencils to give to her staudents.'

(67)　Tāmen gòng jìngxíng-le sān-lún shíwu-chǎng bǐsài cái fēngchu shèngfù.
　　　they all undergo-LE three-CL fifteen-CL match then find-out win-lose
　　　'The result came only after they had fifteen matches of competition in three rounds.'

(68)　Tāmen jiéhūn de nà tiān zhǐ qǐng-le sān-zhuō èrshisì-wèi　kèren.
　　　they marry DE that day only invite-LE three-CL twenty-four-CL guest
　　　'On the day when they got married, they invited only twenty-four guests who filled three (dinner) tables.'

In these sentences we seem to find two classifier phrases within a single NP. If each of the two classifiers has its own maximal projection, that is, ClP, then this will pose a problem for a specifier ClP analysis, since a specifier position can host only one ClP. Thus the facts in (66)-(68) seems to suggest that the adjunct analysis of ClP's should be preferred.

This is not really a problem, however. In all the examples where two ClP's occur within a single NP, the two ClP's must be adjacent to each other, suggesting that the second ClP may be treated as appositive to the first one. This suggestion is supported by the fact that it is always possible to insert between the two ClP's expressions like *yě jiùshì* 'that is (to say)'. Thus (68) can also be paraphrased as (68').

(68')　Tāmen jiéhūn de nà tiān zhǐ qǐng-le sān-zhuō, yě jiùshì èrshisì-wei　kèren.
　　　they marry DE that day only invite-LE three-CL also that-is twenty-four-CL guest
　　　'On the day when they got married, they invited only twenty-four, that is, three tablefuls of, guests.'

5. Conclusion

We have discussed two possible solutions within the HPSG framework for the Chinese noun phrase structures. The difference between the two approaches is centered on the ways of dealing with ClP's. In Section 3, semantic considerations were utilized to limit the possible ClP occurences within a single NP to one. However, as I later showed, these semantic considerations seem to be too weak. In Section 4, I suggested that ClP's be treated as specifiers. Since each NP only allows one specifier, the occurences of ClP's in a single NP is limited to one through syntactic means. The specifier-ClP analysis has thus avoided the difficulties raised by the adjunct-ClP analysis.

Another advantage of the specifier-ClP analysis is that it simplifies the account of agreement in Chinese NP structures. Recall that Section 3 treats ClP's as adjuncts on a par with RC's and PossP's. Although agreement between adjuncts and the head nouns is not hard to find in the world's languages, it is still not clear why in Chinese only one kind of adjunct must agree with its head noun. On the specifier-ClP analysis, we need simply assure that Chinese has agreement only between specifiers and head nouns. This is clearly shown when we compare ClP's with MP's discussed in Section 3.5.2.

Therefore I conclude that the syntactic approach suggested in Section 4 is to be preferred in dealing with the ClP problem.

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Linearization and Coordination in German[*]

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Abstract

This paper attempts a novel approach to certain coordination constructions in German and other Germanic languages. It will be shown that virtually all previous attempts at describing such constructions involve asymmetric conjuncts, in violation of the general like category constraint on coordination. While independent evidence for the kinds of mechanisms that license such asymmetry is weak, these analyses in addition are incapable of reflecting the close relationship of the constructions in question with another type of coordination. Since the reason for the asymmetry is essentially the insistence on phrase structure as the sole means of describing syntactic structure (i.e. by relating structure and surface representation in terms of the terminal yield of a *tree*), we will develop an alternative analysis that is empirically adequate and respects the like category constraint necessitating a different relation between structure and surface string which we will call "Linearization".

1 Introduction

Consider the sentence in (1):

(1) In den Wald   ging der Jäger   und lief der Junge.
     into the forest went the hunter and ran the boy
     'The hunter went, and the boy ran, into the forest.'

On the commonly held assumption that coordination requires that elements involved constitute likes of some sort, it is easy to see why this sentence should be grammatical. One way in which the likeness manifests itself is by virtue of the fact that both conjuncts can be used to extend the initial string *in den Wald* to yield the well-formed German sentences *in den Wald ging der Jäger* and *in den Wald lief der Junge*. Let us refer to this diagnostic of likeness as the "String Continuation Criterion". Contrast this now with sentences such like (2):

(2) In den Wald   ging der Jäger   und fing   einen Hasen.
     into the forest went the hunter and caught a hare
     'The hunter went into the forest and caught a hare.'

Here, this criterion will not apply because although *in den Wald ging der Jäger* is a well formed sentence, there is no initial substring of the material before the conjunction particle that could be extended by the second conjunct. Thus, *in den Wald fing einen Hasen* is not any kind of constituent in German, let alone phrase. Yet the sentence is perfectly grammatical in that language and corresponding examples can be found in virtually all Germanic languages, including English (cf. Kathol and Levine 1992).

In this paper, we will attempt a novel way of analyzing sentence as in (2). We will refer to constructions like these, following the usage employed by Wunderlich 1988, as "SGF coordination", for "subject gap in finite/fronted clauses". Wunderlich coined his terminology after the one used in the first careful study of the phenomenon, Höhle 1983, who calls them "SLF Koordinationen". It will become clear shortly why the authors chose this term although, as we will see later, the assumption that a gap is involved here will turn out to be questionable.

The present study is organized as follows: first some of the properties of the SGF coordination construction will be outlined, drawing heavily on the exposition found in Höhle 1983. Next, it will be shown how the various formal treatments proposed up to date try to account for this construction type and in what respects they are inadequate. This will prompt another, closer look at the data which reveals a fundamental parallelism with coordination constructions in which regular (="surface") VPs are coordinated. To capture this similarity the alternative analysis proposed here will be cast in terms of "linearization" which represents a novel way of relating syntactic structure with surface representations in the general framework of HPSG.

The implications of the account developed here will lead to a novel look at the relationship between SGF coordination and what we will refer to as "symmetric coordination". It will also cast some critical light on the kinds of devices that have commonly been assumed for deriving verb-second clauses in German. The paper concludes with an appendix exploring some of the implications of an alternative account that does not employ mechanisms of syntactic dislocation of the initial constituent.

2 A first look at the data

What is striking about sentences as in (2) is that they seem to violate the widely held assumption (cf. Williams 1981) that the participants in a coordination construction should be "like categories" of some sort. The above mentioned String Continuation Criterion is one way of making this notion explicit in terms of (possible) surface manifestations of likeness. The sentence in (2) consists of an initial string that is analyzable as a V2 (i.e. verb-second) clause and a subjectless, verb-initial finite second conjunct. In standard terms, this would have to be taken as a conjunction of a sentence and a VP, which are not like categories by anyone's definition.

The presence of an initial topic[1] is not obligatory. As Höhle 1983 points out, SGF constructions are also found with initial V1 (i.e. verb-first) clauses, as in (3): (Höhle 1983:12)

(3) a. [Stehen da   schon wieder welche rum] und verteilen Flugblätter?
         stand   there yet   again some   around and distribute leaflets?
         'Are there again some [people] standing around distributing leaflets?'

     b. [Nimmt man den Deckel ab] und rührt die Füllung um,
         takes one the lid   off and stirrs the filling   around
         steigen übelriechende Dämpfe auf
         rise   nauseating   vapors up
         'If one takes off the lid and stirrs the filling, nauseating vapors will rise.'

     c. [Gehen Sie lieber nach Hause] und bringen Ihre Angelegenheiten in Ordnung!
         go   you rather home   and get   your affairs   in order
         'You had better go home and get your affairs in order.'

The three sentences exemplify the main contexts in which V1 clauses are found in German: (3 a) is a polarity question, (3 b) a conditional, and (3 c) an imperative. Other contexts licensing V1 clauses also allow SGF coordinations, for instance after the subordinating particle *als* ('as'):

(4) Er tut so als [sei sie unaufmerksam gewesen] und habe den Unfall verursacht.
     he acts so as be she unattentive   been   and have the accident caused
     'He is acting as if she had been unattentive and caused the accident.'

It is clear that the topicless cases are just as much a problem for accounts based on a (surface) like-category constraint as V2 clauses: what follows the finite verb crucially contains a subject in the first conjunct yet this argument is obligatorily missing in the second.

A common assumption (cf. Höhle 1990, Wesche 1991) is that SGF coordinations—whether with initial V1 or V2 clauses—belong to a larger class of asymmetric coordination constructions that include sentences such as the one in (5) where where the initial part is a Vfin (verb-final) clause:[2]

(5) [Wenn jemand   nach Hause kommt] und sieht da   den Gerichtsvollzieher, ...
     when someone to home   comes   and sees there the bailiff
     'When someone comes home and sees the bailiff there, ...'

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[1] I will, as is common practice, use the term "topic" and "topicalization" throughout the paper to refer to the initial constituent in V2 clause although, as Arnold Zwicky and David Dowty have pointed out to me, this might invite confusion with other usages such as in the context of information structure in opposition to "comment" or "focus". Occasionally I will use the term "Vorfeldbesetzung" as a less loaded equivalent of "topicalization".

[2] Another kind of asymmetric coordination involves conjunction of a Vfin clause with a V2 clause, which is interpreted as under the scope of the initial conditional complementizer *wenn*:

(i) [Wenn jemand   nach Hause kommt] und da   steht der Gerichtsvollzieher vor der Tür, ...
     when someone to home   comes   and there stands the bailiff   in front of the door
     'When someone comes home and the bailiff is standing in front of the door, ...'

However, as convincingly argued by Wunderlich 1988, there is reason to believe that such instances actually have to be distinguished from the V1/2 cases. We will come back to this in more detail in section 4.

For expository purposes let us assume for now that the way to describe SGF coordination constructions is by reference to a "subject gap" in the second conjunct (hence the name "subject-gap in finite clauses").

The motivation behind such a device is the fact that the subject is contained in the Mittelfeld[3] of the first conjunct. This suggests that the subject and the second conjunct are related to one another in a way that is different from the one involved in sentences like (6). In those examples, which for ease of reference will be referred to from now on as "surface VP coordination" (SVPC), the subject is in the topic position, which is arguably higher that the conjoined VPs, hence construal with both VPs is not problematic.

(6) Der Jäger [[ging in den Wald] und [fing einen Hasen]].
     the hunter went into the forest and caught a hare
     'The hunter went into the forest and caught a hare.'

Thus it seems that in SGF sentences, the subject and the second conjunct seem to be related to one another by means other than the ones at play in SVPC coordination. Yet, they must clearly be linked very closely: as (7) shows, agreement has to hold between the subject and both conjuncts:

(7) a. In den Wald gingen die Jäger und fingen einen Hasen.
         into the forest went[PL] the hunters and caught[PL] a hare
         'The hunters went into the forest and caught a hare.'
     b. *In den Wald gingen die Jäger und fing einen Hasen.
         into the forest went[PL] the hunters and caught[SG] a hare

The assumption of a subject gap allows the statement of certain generslizations that hold with SGF constructions. First, no arguments other than subjects can be "gapped" in the second conjunct, as in the following example containing an accusative object gap which is illicitly linked to a previous object (cf. Höhle 1983:15). In analogy to SGF, let us refer to such a constellation as "OGF", for "object gap in finite clauses":

(8) *Gestern zeigte Hans   die Briefmarken_i dem Onkel
      yesterday showed Hans[nom] the stamps[acc] the uncle[dat]
      und verkaufte Otto   _OBJ-GAP_i der Tante
      and sold   Otto[nom]   the aunt[dat]

Moreover the subject gap cannot cooccur with the trace of a topic that has been extracted out of both conjunct, or, in more common parlance, which has been ATB-extracted (for "Across-the-Board", cf. Williams 1978):

(9) *Die Briefmarken_i zeigte Hans_j   dem Onkel   t_i
      the stamps[acc]   showed Hans[nom] the uncle[dat]
      und verkaufte _SUBJ-GAP_j t_i der Tante
      and sold   the aunt[dat]

However, as one might expect, the sentence becomes perfectly grammatical if the subject gap is replaced by an overt subject, as this gives rise to an ordinary ATB extraction:

(10) Die Briefmarken_i zeigte Hans   dem Onkel t_i
       the stamps[acc]   showed Hans[nom] the uncle[dat]
       und verkaufte Otto   t_i der Tante
       and sold   Otto[nom]   the aunt[dat]
       'Hans showed the stamps to the uncle and Otto sold them to the aunt.'

The sentence in (9) also increases markedly in acceptability if the fronted constituent cannot be construed as an argument of the predicate in the second conjunct, as is the case for instance if the latter is already saturated:

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[3]This is the term commonly used to refer to the string of constituents between the complementizer or the finite verb on the left and the verbal complex on the right.

(11) (?)Die Briefmarken$_i$ zeigte   Hans$_j$ dem Onkel t_i
     the stamps[acc]   showed Hans[nom] the uncle[dat]

     und verkaufte _SUBJ-GAP$_j$ die Bilder   der Tante
     and sold   the pictures[acc] the aunt[dat]

     'Hans showed the stamps to the uncle and sold the pictures to the aunt.'

A similar effect is obtained if the fronted element is the argument of neither predicate, as in the case of temporal adverbials:

(12) Gestern   zeigte   Hans   die Briefmarken dem Onkel
     yesterday showed Hans[nom] the stamps[acc] the uncle[dat]

     und verkaufte _SUBJ-GAP die Bilder   der Tante
     and sold   the pictures[acc] the aunt[dat]

     'Yesterday, Hans showed the stamps to the uncle and sold the pictures to the aunt.'

To summarize, the first two properties that an account of SGF constructions or a general theory of coordination in which an analysis of SGF is couched have to capture are:

1. Impossibility of object-gap constructions
2. Impossibility of SGF cooccurring with ATB extractions

The next section will discuss four approaches to SGF constructions and how the two properties above are captured (if they indeed are).

3 Approaches to SGF

3.1 Approaches in Government-Binding Theory

There are a number of approaches to SGF coordination in the GB framework, in particular Höhle 1990, Heycock 1991, Heycock and Kroch 1993, Fanselow 1991, Zwart , . Since we cannot discuss all of them in detail in this study, we will concentrate on the first two as representatives of the kinds of problems that essentially all of these accounts encounter.

3.1.1 Höhle 1990

The first formal account of SGF constructions to be discussed here is that of Höhle 1990. A detailed discussion of his proposal would require assessment of many theory-internal assumptions which we are not prepared to engage in here. Thus, we only want to focus here on the main thrust of his theory and highlight the most obvious drawbacks.

Höhle adopts an analysis for German sentence structure in which V2 structures are derived by verb movement into INFL and movement of a phrasal category into the sentence-initial SPEC,IP position. This constitutes a deviation from the generally assumed analysis of German V2 where the movement is into head and SPEC of CP respectively.[4] He proposes the following revisions of case and theta theory (p. 231):

(13) 1. A position can only be θ-marked if it is case-marked.
      2. If in a given constituent a θ-role R cannot be assigned, R must be externalized.
      3. A constituent can assign at most one external theta role.
      4. Assignment of structural case is optional

Nominative case assignment by INFL to the subject position to its right is a case of structural case assignment in German. Given optionality, there are then two things that can happen in a configuration as in (14), depending on whether or not INFL assigns case to the subject position, here marked as Δ:

(14)

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[4]But cf. for instance Kathol 1989 and Travis 1991 for related proposals.

If the position is assigned (nominative) case, it will also receive a θ-role, hence there will have to be some lexical NP that can bear that role. This will then allow sentences as in (15) to be analyzed as in (16):

(15) gestern   fing   der Jäger   einen Hasen
     yesterday caught   the hunter   a hare
     'Yesterday, the hunter caught a hare.'

(16)

```
                IP
         _____/_____
      SPEC            I'
       |         _____/\_____
    gestern    INFL         V^max
               |        ____/\____
             fing_k   SPEC        V'
                       |        /\___
                   der Jäger  einen Hasen t_i
```

On the other hand, if no case is assigned, the position will not be able to bear the θ-role assigned to it (presumably by the verb), and according to clause 2 above, this role will then have to be externalized. Externalization of a θ-role has the effect of turning an I' into a predicative category. Because Höhle considers "degree of saturation" as the crucial factor for determining likeness of category (pp. 229-31), this means that V' and (predicative) I' are now eligible categories for coordination. The structure for an SGF sentence is then as given in (17):[5]

(17)

```
                IP
         _____/_____
      SPEC            I'
       /\        _____/\_____
    gestern    INFL         V^max
               |        ____/\____
             ging_k   SPEC        V'
                       /\       __/\___
                 der Jäger_j   V'   und    I'
                              /\        __/\___
                        in den Wald t_k  fing_k   V^max
                                                 ___/\___
                                               SG_j     V'
                                                       /\___
                                                  einen Hasen t_i
```

Because only the first of the two conjuncts is the syntactic head of the conjunction, the second is exempted from the requirement that extraction has to affect all conjuncts. This is how Höhle can account for the fact that initial constituents in V2 SGF clauses cannot be construed as extracted out of the second conjunct. Also, since only subjects can be the recipients of external θ-roles, a situation in which any argument other than the subject is shared among the conjuncts, such as the hypothetical OGF case in (8), cannot arise. Finally, although Höhle does not make this explicit, it seems plausible that this coindexation via externalization of the θ-role ensures that agreement information is shared among the relevant elements.[6]

Unfortunately, Höhle does not tell us much about how this process of externalizing a θ-role is supposed to work. For instance, in a case such as (18), in which an accusative object (*ihn*) is scrambled to the left of

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[5]Höhle uses a different example; however, the one used here is isomorphic in its relevant structural properties. Note also that the example used here is slightly different from the the one in (2) in that the initial position is occupied by an adjunct rather than an argument. This is to avoid any complication that might arise in connection with the initial V' conjunct having all of its constituents (i.e. verb and PP) removed in the case of an initial argument. Nothing hinges on this distinction, though.

[6]Höhle does not relate the status of the empty category in subject position created by externalization to other empty categories assumed in GB theory, so it is not clear whether, given the taxonomy in terms of binding properties, this category will match any of the others proposed in GB.

the subject *der Jäger*, it is not immediately clear what prevents the externalized θ-role from being assigned to the structurally higher accusative NP.[7]

(18) Gestern   sprach ihn   der Jäger an   und zeigte ihm   den Weg.
      yesterday spoke him[acc] the hunter PART and showed him[dat] the way
      'Yesterday, the hunter spoke to him and showed him the way.'

As the following structure for (18) indicates, not only Vorfeldbesetzung, but also scrambling must be assumed to be a process that can only affect head conjuncts:

(19)

```
                 IP
              /      \
          SPEC        I'
           |        /    \
        gestern  INFL    V^max
                  |      /   \
               sprach_i ihm_k  V^max
                         /       \
                      SPEC        V'
                       |         /   \
                  der Jäger_j   V'    und    I'
                              /   \        /    \
                          t_k an t_i    zeigte t_j ihm den Weg
```

Let us now take a closer look at what appear to be two major problems with Höhle's treatment, both independent of the technicalities of his proposal.

The first problem becomes apparent in connection with SVPC constructions. Based on standard assumptions in GB on ATB-extraction (cf. Williams 1978), the following is the analysis one would get for the SVPC version of (8):

(20)

```
                    IP
                 /      \
             SPEC        I'
              |        /   |   \
         der Jäger_j  I'   und   I'
                    /  \        /   \
                 INFL  V^max  INFL   V^max
                  |    /  \    |     /   \
                ging_i t_j V'  fing_k t_j V'
                         \        \
                 in den Wald t_i    einen Hasen t_k
```

However, nothing in an SGF construction would block the subject from moving into the initial position leaving behind a coindexed trace which would give rise to a structure as in (21):

---

[7]Examples such as the following are another potential class of counterexamples to biuniqueness of role-assignment:

(i)   Otto fing   einen Hasen und wurde vom Förster   bestraft
       Otto caught a hare   and was by-the ranger   punished
       'Otto caught a hare and was punished by the ranger.'

Here, the subject appears to receive two roles at once, presumably agent and patient, in analogy to the illicit double role assignment in (18). However, as pointed out to me by Bob Levine (p.c.), this is only the case if one does not assume some version of coordination reduction, so that the two roles can be assigned to two distinct syntactic representatives of the subject, the second of which is inaudible.

(21)

```
                    IP
            _____|_____
          SPEC             I'
           |          _____|_____
       der Jäger_j   INFL        V^max
                      |         ____|____
                    ging_i     t_j     V'
                            _____|_____
                          V'       und      I'
                      _____|_____      _____|_____
                   in den Wald t_i   fing_k        V^max
                                           _____|_____
                                         SG_j             V'
                                                      _____|_____
                                                   einen Hasen t_k
```

If this second analysis is legitimate, one would expect that either it has an interpretation distinct from that associated with (20) or that there is independent syntactic evidence for it. However, as far as we have been able to determine, neither seems to be the case, and as the discussion of alternative accounts will show, the same criticism applies to Wunderlich 1988 and, to a lesser degree, to Heycock and Kroch 1993. We can therefore conclude that the ambiguity is spurious in the sense that the grammar gives rise to an ambiguity which does not seem motivated.[8] Furthermore, there is no immediate way to prevent fronting of the subject in the problematic cases, as it is precisely this kind of dislocation that Höhle assumes to be responsible for subject-initial simplex sentences.

Secondly, note that Höhle never explicitly makes reference to any ordering of the V' and I' conjuncts. We can take that to mean either that any order should be allowed, or, second, that the order is in consonance with the commonly held principles governing the position of heads in German, in which case the head should come last. These two possible assumptions then imply that by virtue of being the head—Höhle makes it clear that he considers only the V' conjunct (p. 233) the head in SGF sentences—the V' conjunct *can* or *must* be ordered last respectively, as in the following variation of the structure in (17):[9]

(22)

```
                    IP
            _____|_____
          SPEC             I'
           |          _____|_____
        gestern      INFL        V^max
                      |         ____|____
                    ging_i     SPEC     V'
                              ___|___  __|__
                          der Jäger_j  I'   und   V'
                                   ____|____   __|__
                                 fing_k   V^max  in den Wald t_i
                                        ___|___
                                      SG_j    V'
                                          ____|____
                                       einen Hasen t_k
```

However, such orders are ungrammatical to the point of being uninterpretable as shown in (23):

---

[8]Of course, it is difficult to assess how damaging multiple analyses really are—after all, it abounds in other frameworks such as Categorial Grammar. However, the fact that in the case at hand, the alternative analysis does not arise due to GENERAL rules of the grammar such as CG's type-raising and functional composition which are motivated by a multiplicity of constructions (cf. for example Dowty 1988), but because of exactly the assumptions in (13) for which Höhle gives no motivation other than to account for SGF constructions, appears to be quite disturbing.

[9]For expository reasons, the sentence below is slightly different from the example in (17. Nothing hinges on this difference.

(23) *gestern ging der Jäger fing einen Hasen und in den Wald
     yesterday went the hunter caught a hare and into the forest

This suggests that not only will some amount of asymmetry with respect to the order of the conjuncts have to be provided for, but also, as the problem with Höhle's analysis shows, it is questionable whether this asymmetry should be linked to a difference in head status among the conjuncts.

3.1.2 Heycock & Kroch 1993

A second GB-based approach to SGF coordination is offered in Heycock and Kroch 1993.[10] Adopting the more standard approach to German clause structure in terms of final INFL, the authors pursue the idea—originally suggested in Heycock 1991—that categories can sometimes "conflate", in particular, COMP and INFL to C/I. This, so the authors claim, is a consequence of their general **Licensing Principle**: (p. 5)

(24) A licensing relation that can be satisfied by the head of a chain is necessarily so satisfied.

amended with the assumption that "each licensing relation is uniquely instantiated". This means that in the case of verb movement from I to C, and movement of the subject into SPEC,CP the SPEC-head relation between I and SPEC,IP will be "duplicated" at the C level. Because the licensing relation is satisfied by the head in C already, the trace in I can, so to speak, do no more licensing work. As a result, this trace is deleted together with the category it is dominated by and the properties of the deleted category are inherited by the mother category. As a result, C' inherits all the properties of I', and similarly for the CP projection, indicated by C'/I' and CP/IP respectively. A subject-initial V2 clause will then be analyzed as follows:

(25)

```
          CP/IP
         /     \
      SPEC     C'/I'
       |       /   \
       er    C/I    VP
             |     /  \
           fing_k einen Hasen t_k
```

Because I' and C' are now nondistinct categories, they can be coordinated with a structurally higher subject shared among them. This will give rise to an analysis of SGF sentences along the lines illustrated in (26):

(26)

```
              CP
             /   \
          SPEC    C'
           |      /  \
        gestern  C    IP
                 |   /  \
               ging SPEC   I'
                    /\    /    \
              der Jäger  I'      C'/I'
                        / \      /   \
                      VP   I   C/I    VP
                     /  \  |   |     /  \
            in den Wald t_i t'_i fing_k einen Hasen t_k
```

Heycock and Kroch's analysis represents an improvement over earlier approaches in the GB framework. Specifically, there is no longer any need for dubious empty categories such as Heycock's C-category or Höhle's subject gap. However, again there seems to be an alternative analysis for SVPC sentences, apart from ATB extraction, as shown in (27). Here, however, it is not clear what effect the fronting of the subject has on the conflation of C and I. In particular it is not obvious whether it is possible to delete t'_i inside the initial I' conjunct and subsequently delete the dominating I' node as well. If so, this would seem to lead to the conjunction of VP with C'/I', and all bets are off what the result of that coordination should be.

---

[10]Because this analysis is in essence a refinement of the one proposed in Heycock 1991, we will not discuss the latter here.

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(27)

```
                    CP/IP
            _____|_____
         SPEC              C'/I'
          |          _____|_____
      der Jäger_j   C/I              ??
                     |        _____|_____
                   ging_k    VP    und      C'/I'
                           __|__        _____|_____
                      in den Wald t_i  C/I          VP
                                        |        ____|____
                                      fing_k   einen Hasen t_k
```

Moreover, however, Heycock and Kroch implicitly admit that their theory does not explain why extraction in SGF contexts can (and in fact, must) be out of the initial conjunct alone. While they note that superficially similar ATB violations are possible with topicalizations in English too, cf. (28), it is not clear that the two phenomena are as closely related as they suggest.

(28)   This advice the committee decided to follow and proceeded to set up a new subcommittee.

Note that in the SGF case, ATB violations are not restricted to topicalization, but, on their analysis, also come about via verb movement from the first conjunct alone.[11] Assuming, as is common, movement of a maximal category for the former and head movement for the latter, we have two prima facie independent instances of Move-α, yet there is no obvious logical connection to the effect that in BOTH cases, only the first conjunct may be affected. Furthermore, the analogy with the English CSC violations does not seem to hold up in light of examples such as the following, based on data in Lakoff 1986, where the extraction crucially only affects NONINITIAL conjuncts:[12]

(29)   Sam, you can't just sit there, listen to and not want to punch in the nose.

Of course, no such thing is ever possible in SGF contexts, which shows that the latter is a fundamentally different phenomenon from asymmetric topicalization (and relativization) constructions in English.

It seems then that the prohibition of extraction from noninitial conjuncts can only be stipulated, but does not follow from more general principles. If no such stipulation is made, not only would it then be possible to extract from noninitial conjuncts in general, but the necessary ordering between I' and C'/I' would no longer be predicted. As a consequence, the same problems with illicit order variation as noted before in connection with Höhle's analysis would arise. We conclude that with one of the hallmarks of the SGF construction, namely the severely restricted extraction possibilities, unaccounted for, Heycock and Kroch's solution falls short of a satisfactory account.

3.2   An Approach in Generalized Phrase Structure Grammar: Wunderlich 1988

Another attempt to come to terms with SGF construction, in the framework of GPSG, is undertaken by Wunderlich 1988. His main idea is that SGF constructions have to be analyzed in terms of a metarule that provides additional rules introducing exactly the kind of categories needed for the SGF cases. In particular, he assumes the following set of rules to describe clausal structures in German, which owe much to the analysis developed in Uszkoreit 1987:

(30)   Immediate Dominance rules:
   a. $VP \rightarrow H^0$ [i], ...
   b. $V^n \rightarrow XP$[+TOP], H^n/XP[-SC]
      Metarule (1st version):
   c. $VP \rightarrow W \Rightarrow V^n$[-SC] $\rightarrow$ NP[NOM], W

What is noteworthy about the ID rules in (30) is that in simplex finite clauses, VP is in effect a phantom category, for it is only as the output of the metarule in (30)) that a subject is supplied, but then, concomitantly,

---

[11] We will see later that scrambling too gives rise to similar discontinuity effects.

[12] One objection that may be raised against this argument is that the conjuncts in (29) contain nonfinite verb forms, whereas in the typical SGF examples, the conjuncts are finite. However, as will be shown in section 7, nonfinite constructions in German show the same kinds of violations of the String Continuation Criterion as do normal SGF sentences, which we will take as evidence that both cases are instances of the same syntactic phenomenon.

the VP node is "liberated" (cf. Zwicky 1986), so that it does not end up being part of the syntactic structure of such a clause. The rule in (30 b) is based on the assumption that Vorfeldbesetzung in German should essentially be taken to be an instance of syntactic dislocation. While, as we saw earlier, in transformational theories, this involves an instance of move-α, the corresponding mechanism in GPSG is slash cancellation. The dislocated constituent is then also assigned the feature +TOP (for "topic, cf. Uszkoreit 1987) to ensure proper placement via linear precedence (LP) statements as in (31), while "-SC" (for "subordinated clause") is Wunderlich's equivalent to Uszkoreit's +MC or Pollard's +INV (cf. Pollard in press). Together with the feature cooccurrence restriction (FCR) in (31 d), they account for the right ordering of the finite verb.

(31)   Feature Cooccurrence Restriction:
        d. -SC $\Rightarrow$ +FIN
           Linear Precedence statements:
        e. +TOP $\prec$ X
        f. X $\prec$ V[+SC]
        g. V[-SC] $\prec$ X
        h. X $\prec$ [CONJ α_2] $\alpha_2 \in$ { und, oder, ... }

Wunderlich is able to account for SGF constructions by modifying the metarule in (30) in the following fashion:

(32)   i. VP $\to$ W $\Rightarrow$ V^n[-SC] $\to$ NP[NOM], W, (HP [CONJ α_2])

What (32) in effect does is allow an optional verb phrase marked as containing an element of a certain class of conjunction particles to occur as the sister of the original daughters of VP (including the verb itself) and the newly introduced subject. This then gives rise to structures like (33) for the sentence in (2):

(33)

While getting the surface word order right, this analysis is able to account for three of the properties of SGF constructions in a fairly straightforward manner. First, since both the lexical verb as well as the coordinated VP are sisters of the subject, the Control Agreement Principle (CAP, cf. Gazdar et al. 1985:89) should ensure that agreement holds in both cases.[13] Second, no objects can be shared across conjuncts—either in an OGF construction or as an ATB-extracted topic—because the only constituents that VPs lack are subjects and only VPs are licensed by the output of the metarule in (32).

Note that Wunderlich is also able to capture the asymmetry between the two conjuncts; i.e. unlike Höhle, he does not predict the alternative permutation of the conjuncts to be grammatical because that would lead to a violation of the LP statement in (31).

Yet, one has to be skeptical whether the use of ID rules in Wunderlich's analysis conforms with the way such rules are generally interpreted. As Wunderlich himself admits, it is not obvious in which sense the metarule in (32) outputs rules that conform to the general conjunction schema in GKPS (Gazdar et al. 1985:171).[14]

---

[13] However, as Bob Levine (p.c.) has pointed out to me, given the definition of control in Gazdar et al. 1985:88, the subject actually does not control V^0 here because of a type mismatch, which would be a prerequisite for the CAP to apply. Thus, we have another instance of a problem first noted in Hukari and Levine 1986 in connection with English inversion constructions where, according to GKPS's analysis, we also find the subject as the sister of a lexical verb.
[14] He proposes to rewrite the output of the metarule in (32) as:
(i)   V^n $\to$ V^0[CONJ α_1] ... VP[CONJ α_2]

Moreover, in the original system of Gazdar et al. 1985, phrasal sisters to a lexical head in a local tree are commonly understood as this head's arguments.[15] But only by a long stretch of imagination can the conjunctive VP be conceptualized in that way. Note, for example, that VPs with the feature CONJ α_2 are never selected directly as arguments of lexical verbs in rules of the type in (30 a). On the other hand, if instead these VPs are conceived of as adjuncts, this would still be at odds with the assumed two-headedness of the output rules in (32). In short, the output rules of this rule do not fit into any of the general patterns in the grammar of German for the distribution of heads, arguments, or adjuncts. It can be argued then that if the sole purpose of such an idiosyncratic rule is to account for SGF constructions, it would seem more likely that there is something quite wrong with the whole analysis than to conclude that we should reconsider our understanding of such notions as head and complement in order to find a more comfortable place in the grammar for the rule in (32).

Comparing SGF and SVPC cases, it turns out that—perhaps surprisingly—Wunderlich's system as it is outlined above is incapable of providing the obvious analysis in the latter case, viz. to conjoin the two VPs as in (34) and to combine the result with the subject.

(34)

```
                    VP
             ┌──────┴──────┐
            VP             VP
        ╱───┴───╲      ╱────┴────╲
    ging in den Wald   und fing einen Hasen
```

Since the subject is only provided by applying the metarule in (32) to rules expanding SINGLE VPs, the rule that produced the conjoined VP in (34) simply fails to meet the input requirements. This means that the only way to supply a subject is to conjoin not the original VPs, but the outputs of the metarule in (32) and treat the subject as slashed out of both conjuncts:

(35)

```
                  VP/NP[NOM]
             ┌────────┴────────┐
         VP/NP[NOM]        VP/NP[NOM]
        ╱────┴────╲       ╱────┴────╲
    ging in den Wald      und fing einen Hasen
```

But this means that the syntactic structure of *fing einen Hasen* depends on whether it occurs in SGF or SVPC: while in the former case, there is a VP node, there is no such constituent in the latter. While there is no prima facie reason to exclude this possibility, it would seem incumbent upon Wunderlich to motivate this difference in structure, expecially since, as we will see below, there is essentially no difference in behavior between noninitial VPs in SGF vs. SVPC constructions.

Moreover, Wunderlich's analysis shares one of the defects of Höhle's, namely the emergence of spurious ambiguities. Since the ID rule in (30 b) accounts for the fronting of any constituents including subjects, there does not seem to be any reason why in (33), the subject is fronted instead of the PP. But this gives rise to an alternative analysis of the SVPC sentence in (6) which looks as follows:

However, it is far from obvious in which way this formulation makes the rule conform any more closely to the conjunction schema because the is still a mismatch in Head features, in particular, with respect to the value of BAR.

[15]In particular this view suggests itself if the metarule in (32) is conceived of as one that changes the subcategorization frame of a lexical class, cf. Pollard 1985.

(36)

```
                            V″
              ┌─────────────┴──────────────┐
        NP[NOM,+TOP]            V″/NP[NOM], -SC, +FIN
            │            ┌───────┬──────────┬──────────┐
        der Jäger       V⁰      PP     NP[NULL]/NP  VP[CONJ und]
                         │      ╱╲         │          │
                       ging  in den Wald   e     ┌────┴────┐
                                                und       VP
                                                      ┌────┴────┐
                                                     V⁰      NP[ACC]
                                                      │          │
                                                    fing     einen Hasen
```

This structure owes its existence to nothing other than the mechanisms that were introduced into the grammar to account for SGF constructions because Wunderlich does little in the way of independently motivating his crucial metarule, either by syntactic or semantic evidence. Such unwanted byproducts cast some doubt on the correctness of the analysis of the latter which motivated the additions in the first place.

Finally, Wunderlich's suggestion that the lexical verb and the VP[CONJ] are both heads does not yield the desired effect on closer inspection either. He claims that the biheadedness explains why the initial constituent in V2 SGF sentences cannot be construed as ATB-extracted out of both conjuncts because that would lead to a violation of GPSG's Head Feature Convention (HFC). His reasoning is that given a phrasal as well as a lexical head, an ATB-extracted element would have to be missing not only from the phrasal head but also from the lexical one, because as a head feature, SLASH would have to be shared by all heads. But then, Wunderlich concludes, since there is no sense in which a lexical verb could be lacking a constituent, the second, phrasal, head must not contain a gap either. However, the problem with this analysis is that Wunderlich does not appear to notice that the HFC as conceived of in Gazdar et al. 1985 is only a DEFAULT principle.[16] This means that the HFC requires features to be shared among heads only if they **can** be shared. But of course, because SLASH is inappropriate for lexical categories, the relevant feature cooccurrence restriction overrides the HFC. However, so long as head features are shared among the mother and the phrasal head, the HFC does not disallow free instantiation of SLASH on the phrasal conjunct. As a result, Wunderlich cannot exclude ungrammatical examples such as (9) above, in which the initial constituent corresponds to a gap in the second conjunct.

3.3 An Approach in Categorial Grammar: Steedman 1990

Among all the approaches to be discussed here, Steedman devotes the least effort to an elaborate analysis, as his solution for SGF constructions is essentially a byproduct of his treatment of gapping in Categorial Grammar.[17]

The central feature of Steedman's approach to gapping is his introduction of a new rule into the categorial calculus which he calls "Left Conjunct Revealing Rule" (notated as "< decompose"):

(37)   X ⇒ Y X\Y
       where X = S
       (and Y = given(X))

The effect of this rule is that a sentence S that has been obtained by the combination of other categories (in the usual ways, i.e. via Functional Application) can be decomposed into two categories, different from the original parts of S as long as these categories are possible elsewhere in the grammar and, if combined, yield a sentence again. In addition, the condition that the category Y in (37) be "given" captures the requirement that this revealed category be contextually supported or accommodated, hence comply with certain pragmatic constraints which, however, will not concern us here further. For a sentence containing a verbal gap we then get an analysis of the following sort:

---

[16]Thanks to Bob Levine for pointing this out to me.

[17]Although he demonstrates his proposal with a Dutch sentence, the general idea carries over unchanged to the case of German.

(38)

```
Harry [will buy] bread,        and Barry, potatoes
---------------------------    ---------------------
         S                     [S\((S\NP)/NP)]&
==========================<decompose
(S\NP)/NP  S\((S\NP)/NP)
           ---------------------------------------<&
                   S\((S\NP)/NP)
           ------------------------------------<
                   S
```

The Left Conjunct Revealing Rule makes it possible to "extract" categories (such as the transitive verb, *will buy*) which were originally embedded in the sentence and let the other part of the sentence conjoin with the remnants on the right before the whole is put together to form a sentence again. This rule then in effect permits combinations of categories that before were not possible because of the relative positions of the original categories in the surface string. It should also be noted as a minor point about (38) that Steedman assumes a syncategorematic treatment of the conjunction particle *and*. This is done via the introduction of two new rules:

(39) a. Forward Coordination Rule: (> &)
         conj X ⇒ [X]&

     b. Backward Coordination Rule: (< &)
         X [X']& ⇒ X"

Now, for cases of SGF coordination, Steedman proposes to treat the subject as the gapped element, instead of the verb as in (38). The sentence in (2) will then be given the following categorial analysis:

(40)

```
in den Wald ging der Jaeger       und fing einen Hasen
-----------------------------     ----------------------
            S                         [(S\NP)]&
===========<decompose
NP     S\NP
       --------------------------------------<&
                   S\NP
       ------------------------------<
                   S
```

It is easy to see that Steedman's proposal straightforwardly ensures that the subject agrees with the verbs in both conjuncts. The backward coordination rule in (39 b) requires that both conjoined categories be identical, hence they must require the same agreement features of the (subject) NP they select. Next, Steedman's system correctly predicts the impossibility of SGF coordination cooccurring with ATB extraction. Intuitively, what would have to be allowed in order for this to be possible is that a category missing an object be decomposed with the subject being "extracted" out of the Mittelfeld of the first conjunct and that the object then be combined to yield a sentence. However, the constraint in (37) to the effect that only sentences qualify as decomposable categories rules this possibility out. What is not ruled out is that categories other than subjects could be extracted by the rule in (37) giving rise to OGF constructions which, as we saw in (8) are ungrammatical. To see this, assume that something like the following derivation (using type-raising on the subject and a special category assignment for fronted constituents) is needed to yield an object-initial sentence:

(41)

```
                              fing          der Jaeger(nom)
                              -----         ----------------
                              VP/NPa            NPn
                                            ----------------TR
          einen Hasen(acc)                  S/NPa\(VP/NPa)
          -----------------     -----------------------------<
           S/(S/NPa)                    S/NPa
           ---------------------------------------<
                            S
```

Then, crucially, the category for fronted objects will be one that "the grammar itself makes available" (p. 246), hence a sentence can be legitimately decomposed into any such fronted constituent and something else, regardless of the initial placement of the derived fronted element. But this means that objects in the Mittelfeld too can be extracted via (37) and following derivation of an ungrammatical sentence is allowed:

(42)

```
     *dann zeigte Otto die Bilder      und verkaufte Hans
     ----------------------------      --------------------
                 S                         [(S/NP[acc])]&
     ========================<decomp.
     S/(S/NP[acc])  S/NP[acc]
                    -------------------------------------<&
                         S/NP[acc]
     -------------------------------------<
                      S
```

One way to rule out this type of overgeneration is to add a restriction to the rule in (37) restricting gapped NPs to subjects, that is, bearing nominative case:

(43) $X \Rightarrow Y\ X\backslash Y$
      where $X = S$,
      and Y ..., such that if cat(Y) = NP, then Y = NP[nom]

This will get the facts right; however, it does have the flavor of mixing fairly unrestricted apples (verbal gapping) with very specific oranges ("missing" nominative arguments), in other words, it is not clear that the elements effected by the rule in (43) really form a natural class of some sort. Along those lines it should be noted that Gapping is generally considered to be a phenomenon of higher registers and requires a specific intonation in the gapped sentence. This contrasts sharply with SGF sentences which neither are restricted in occurrence (at least in German) nor exhibit special intonational properties.

Yet, it should be noted that there a some desirable features of Steedman's approach. In particular, he does not face the problem of spurious ambiguity in the case of SVPC sentences. The reason for this is that the only way that we could have more than one analysis would be to have (37) apply in such a way that the revealed categories are the same as in the original categorial assignment. In the case of SVPC, this means that the only way to try to give an additional analysis for the sentence would be to split the initial sentence into the same kinds of categories that the derivation starts out with, as in (44):

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(44)

```
    der Jaeger ging in den Wald
    ---------- ----------------
       NP           S\NP              und fing einen Hasen
    -------------------              ----------------------
              S                           [(S\NP)]&
    ==========<decompose
       NP      S\NP
              --------------------------------------<&
                                S\NP
              --------------------------------<
                          S
```

However, according to Steedman, such cyclic derivations are ruled out by general principle, hence there will be only one analysis for SVPC. Moreover, Steedman's account makes explicit a fundamental similarity between surface VP coordination and SGF constructions: both are instances of the general coordination schema manifested as conjunction of two constituents of category S\NP, i.e. two VPs. We will see shortly that there is strong empirical evidence in favor of this view.

4 A second look at the data

Let us now take a closer look at the facts about SGF constructions with particular focus on the properties that they share with surface VP coordination constructions.[18] Besides the parallelism already mentioned above about subject-verb agreement, both constructions also allow quantificational subjects. Examples are given in (45)) and (46):

(45) a. Gestern   gingen wenige Jäger in den Wald   und fingen   einen Hasen.
        yesterday went   few hunters into the forest and caught a hare
     b. wenige Jäger gingen gestern   in den Wald   und fingen   einen Hasen.
        few hunters went   yesterday into the forest and caught a hare
        'Yesterday, few hunters went into the forest and caught a hare (= caught hares)'

(46) a. Gestern   ging niemand in den Wald   und fing   einen Hasen.
        yesterday went nobody into the forest and caught a hare
     b. Niemand ging gestern   in den Wald   und fing   einen Hasen.
        nobody went yesterday into the forest and caught a hare
        'Yesterday, nobody went into the forest and caught a hare.'

Thus, in the context of an SGF construction, a quantified subject is interpreted as if it were in a position such as the initial topic position where it can be construed as the binder for bound variables in the two conjuncts. Clearly, this situation differs greatly from one in which we try to bind a variable expressed as an overt pronoun across sentence boundaries, as in (47), which gives rise to uncompromising ungrammaticality, no matter where the pronoun is placed in the second conjunct:

(47) *Gestern   gingen wenige Jäger$_i$ in den Wald   und (sie$_i$) fingen (sie$_i$) einen Hasen.
       yesterday went   few hunters   into the forest and they   caught they   a hare

(48) *Gestern   ging niemand$_i$ in den Wald   und fing   er$_i$ einen Hasen.
       yesterday went nobody   into the forest and caught he   a hare

These facts constitute clear evidence against any account that tries to treat SGF in terms of the second conjunct containing an empty pronominal of the sort familiar from languages like Italian. As is well-known, in those languages, quantificational NPs cannot function as the antecedents for *pro* either.

Quantificational subjects also provide evidence that examples like (5), repeated here as (49), should not count as instances of SGF-coordination:

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[18]Again, I will draw heavily on Höhle 1983. Although he suggests the similarity between SGF and SVPC, the discussion his later work shows that he obviously did not think that the parallelism would yield a worthwhile point of departure toward a satisfactory account.

(49) [Wenn jemand nach Hause kommt] und sieht da den Gerichtsvollzieher, ...
     when someone to home comes and sees there the bailiff
     'When someone comes home and sees the bailiff there, ...'

Wunderlich (p. 313) observes that this kind of "asymmetric" coordination is impossible with "true" quantificational subjects (i.e. which do not allow accommodation of a discourse referent):

(50) *[Wenn uns keiner willkommen heißt] und schließt uns in die Arme, ...
     when us nobody welcome calls and takes us in the arms
     'When nobody welcomes us and embraces us, ...

On the other hand, SGF-coordination is perfectly legitimate in this case:

(51) Uns hieß keiner willkommen und schließ uns in die Arme.
     us called nobody welcome and took us in the arms
     'Nobody welcomeed us and embraced us.'

Moreover, the pattern in (49) is limited to only a few subordinating conjunctions, hence *daß*, which does not belong to this set, yields an ungrammatical sentence:

(52) *Ich weiß daß er nach Hause kam und sah dort den Gerichtsvollzieher
     I know that he home came and saw there the bailiff

We have nothing to say about how to actually account for sentences like (49), but the prohibition against quantificational subjects and the lack of productivity across different verb-final contexts presents strong enough evidence for excluding them from the domain that a theory of SGF coordination would have to be able to cover.

The next piece of evidence for a fundamental parallelism in structure between SGF and surface VP coordination comes from the scopal behavior of adverbials. As Höhle notes, temporal adverbials, for instance, tend to take wide scope if they are in the first SGF conjunct. However, they don't have to and it is possible to have another temporal adverbial in the second conjunct (cf. (53 a)). The interpretation is precisely the same as if the subject were initial and both adverbials were placed in the Mittelfeld of each conjunct, as in (53 b):

(53) a. Gestern haben alle ihre Sachen gepackt und wollen heute ausziehen.
        yesterday have all their things packed and want today to-move-out
     b. Alle haben ihre Sachen gestern gepackt und wollen heute ausziehen.
        all have yesterday their things packed and want today to-move-out
        'All packed their belongings yesterday and want to move out today.'

Contrast this now with the example in (54) where two V1 sentences have been conjoined that share the fronted element which can only be construed in terms of an ATB-extracted topic:

(54) *Gestern [hat Otto seine Sachen gepackt] und [will Karl heute ausziehen]
     yesterday has Otto his things packed and want Karl today to-move-out

Here, the occurrence of another adverbial in the second conjunct is perceived to give rise to a contradictory statement, viz. that Karl wants to move out both today and yesterday.

Höhle points out the ability to take scope over both conjuncts can be observed with other kinds of adverbials and negation too. This is illustrated below in (55) with the negation particle *nicht* ('not'). Again, the position of the subject does not make any difference.

(55) a. Deshalb hörten viele Teilnehmer nicht zu und schrieben mit
        therefore listened many participants not PART and wrote along
        (sondern bohrten in der Nase).
        (but were picking their noses)
     b. Viele Teilnehmer hörten deshalb nicht zu und schrieben mit
        many participants listened therefore not PART and wrote along
        (sondern bohrten in der Nase).
        (but were picking their noses)
        'Therefore, many participants didn't listen and take notes, but ...'

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Furthermore, as shown in (56), contrastive contexts, as for instance induced by *stattdessen* ('instead') come with a preferred narrow scope reading; that is, only the first conjunct is understood as negated. Here, too, there is no significant difference correlated with the placement of the subject.

(56) a. Deshalb   hörten   viele Teilnehmer   nicht zu
     therefore listened many participants not   PART

     und malten   stattdessen in ihren Heften   herum.
     and doodled   instead   in their notebooks PART

   b. Viele Teilnehmer   hörten   deshalb   nicht zu
     many participants listened therefore not   PART

     und malten   stattdessen in ihren Heften   herum.
     and doodled   instead   in their notebooks PART

     'Therefore, many participants didn't listen and instead were doodling in their notebooks.'

SGF and SVPC also show similar behavior with respect to extraposition from subjects. The data in (57) show that certain restrictive relative clauses can be extraposed from subjects to the right periphery of the sentence:[19]

(57) a. All diejenigen, die   Hans eingeladen hatte, kamen zur Feier.
     all those   whom Hans invited   had   came   to-the party
     'All those whom Hans had invited came to the party.'

   b. All diejenigen kamen zur Feier   die   Hans eingeladen hatte.
     all those   came   to-the party whom Hans invited   had
     'All those came to the party whom Hans had invited.'

Moreover, the following examples show that this extraposition can cross a VP conjunct regardless of the position of that subject that the relative clause depends on:

(58) a. All diejenigen kamen und amüsierten sich   königlich,
     all those   came   and amused themselves royally

     die   Hans eingeladen hatte.
     whom Hans invited   had

     'All those came and had a good time whom Hans had invited.'

   b. Dann kamen all diejenigen und amüsierten sich   königlich,
     then   came   all those   and amused themselves royally

     die   Hans eingeladen hatte.
     whom Hans invited   had

     'Then all those whom Hans had invited came and had a good time.'

Contrast this now with the extraposition from nonsubjects in medial position across conjuncts, which is markedly worse in grammaticality:[20]

(59) *Dann warf   mein Freund ein Spielzeug weg   und verließ den Raum,
     then   threw my friend   a toy   away and left   the room

     welches kaputt war.
     which   broken was

     Intended reading: 'Then my friend threw away a toy that was broken and left the room.'

The next piece of evidence has to do with the placement of certain conjunction particles. Here, the argumentation is actually less for a symmetry of the first conjuncts in SGF and surface VP coordination, but rather for the second ones. Wunderlich's theory is one where the noninitial conjuncts do not receive identical structural descriptions, hence it is not immediately obvious whether in such a system the parallelism can be made to follow.

As Höhle 1983 observes, the conjunction particle *aber* ('however') is odd at the beginning (as opposed to second position) of the second conjunct in SGF sentences, cf. (60 a–b):

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[19] A similar point is made in Höhle 1983:16.
[20] This fact is pointed out with an example from Dutch in Heycock and Kroch 1993.

(60) a. Da   standen ein paar Leute rum,   rührten aber   keinen Finger.
        there stood   a few people around, moved however no finger
        'A few people were standing around there, but didn't move a finger.'
    b. *Da   standen ein paar Leute rum,   aber   rührten keinen Finger.
        there stood   a few people around, however moved   no finger

Precisely the same thing happens if the subject is initial:

(61) a. Ein paar Leute standen da   rum,   rührten aber   keinen Finger.
        there   stood a few people around however no finger
        'A few people were standing around there, but didn't move a finger.'
    b. *Ein paar Leute standen da   rum,   aber   rührten keinen Finger.
        a few people   stood there around, however moved   no finger

Finally, Höhle notes that certain bipartite conjunctions such as *weder ... noch* ('neither ... nor') and *sowohl ... als auch* ('both ... and') are ungrammatical in SGF contexts:

(62) *Gestern   tränkte Karl weder   den Ochsen noch fütterte den Hund.
      yesterday watered Karl neither the ox   nor fed   the dog
      'Yesterday, Karl neither watered the ox nor fed the dog.

But the same holds true for surface VP coordination:

(63) *Karl tränkte gestern   weder   den Ochsen noch fütterte den Hund.
      Karl watered yesterday neither the ox   nor fed   the dog

The badness of (62) and (63) might be due to a requirement to the effect that the strings following *weder* and *noch* be analyzable in terms of the same category labels.[21] Thus, in order to match the VP *noch fütterte den Hund* in the second conjunct in (62), one would have to place *weder* before a finite VP in the first parts of (62) and (63). But crucially, in (62) there is no string that could be assigned the category label "VP" because of the subject occurring in the Mittelfeld, whereas in (63), placement of *weder* at the beginning of the finite VP is incompatible with the occurrence of the subject in the initial position which can only hold one constituent. By contrast, the strings preceded by *weder* and *noch* in the following examples can be assigned matching category labels: sentences in (64) and VPs in (65):

(64) Weder   tränkte Karl gestern   den Ochsen noch fütterte Otto den Hund.
     neither watered Karl yesterday the ox   nor fed   Otto the dog
     'Yesterday, Karl neither watered the ox nor did Otto feed the dog.

(65) daß Karl gestern   weder   den Ochsen tränkte noch den Hund fütterte.
     that Karl yesterday neither the ox   watered nor the dog fed
     'that Karl neither watered the ox nor fed the dog yesterday.'

Thus, it turns out that both SGF and SVPC sentences—albeit for somewhat different reasons—fail to meet the conditions on parallelism imposed by the conjunctions particles *weder ...noch*. Notice, incidentally, that the explanation given here accounts for the ungrammaticality of the examples in (62–63) in a more principled way than the solution given by Wunderlich, who simply stipulates that the value for the feature CONJ on V^0 in the output rules of (32) be set to NIL.

Having looked at the evidence for the fundamental parallelism between SGF and surface VP coordination, let us now turn to asymmetries in behavior between the two constructions. "Left deletion" is the term Höhle uses to describe cases of coordination in which the right string of the left conjunct is left out, somewhat similar to, but more general than, Right Node Raising in English. As noted by Höhle, left deletion is only possible with surface VP coordination, but not with SGF constructions. Hence, in (66 b), the direct object *den Lautsprecher* is missing in the left conjunct, but if the same constituent is left out as in (66 a), the result sounds fairly bad:

(66) a. ??Morgen   überprüft sie _ und repariert den Lautsprecher.
          tomorrow checks   she   and repairs   the loudspeaker
     b. Morgen   überprüft sie _ und repariert sie den Lautsprecher.
        tomorrow checks   she   and repairs   she the loudspeaker
        'She'll check and repair the loudspeaker tomorrow.'

---

[21] This was suggested to me by Hee-Rahk Chae (p.c.).

There is reason to believe, though, that this contrast does not indicate a fundamental difference in structure, but rather is due to some surface constraint on parallelism that is at work in left deletion.[22] Höhle himself points out that the following surface VP coordination example is ungrammatical, where the two conjuncts differ in the number of arguments:

(67) *Karl erblickte _ und Heinz zeigte der Tante etwas ganz besonderes.
     Karl saw   and Heinz showed the aunt[dat] something very special
     'Karl saw, and Heinz showed to the aunt, something very special.'

Left deletion seems to be contrained in such a way that not only the material missing in the first conjunct must have a match in the second (such as *der Lautsprecher* above), but there also has to be a correspondence between the conjuncts with regard to other elements preceding the shared material. Thus, for instance in (68), *überprüft/repariert*, *sie/sie*, and *kleine/große* form matching pairs, while the N constituent *Lautsprecher* is missing from the first conjunct:

(68) Morgen   überprüft sie kleine _ und repariert sie große Lautsprecher
     tomorrow checks   she small   and repairs   she large loudspeakers
     'Tomorrow she'll check small loudspeakers and repair large ones.'

Already the intrusion of an adverb such as *danach* ('thereafter') in the sequence of adjacent matched constituents severely decreases acceptability:

(69) *?Morgen überprüft sie kleine _ und repariert sie danach   große Lautsprecher
      tomorrow checks   she small   and repairs   she thereafter large loudspeakers
      'Tomorrow she'll check small loudspeakers and afterwards repair large ones.'

It then becomes obvious why left deletion should always be worse with SGF coordination than with surface VP coordination. In the former, the conjoined sequences will always differ at least in the number of arguments: whereas the string corresponding to the first conjunct contains that subject, the second conjunct crucially does not. It is also important to note that the subject cannot be "skipped" (i.e. if the sequence of matched constituents were to include only material following the subject in the first conjunct) because finite main verbs appear to obligatorily be part of the matching sequences.[23]

5   An Alternative Approach to Syntactic Structure and SGF Coordination

There have recently been two interesting proposals that challenge the dominant paradigm in current syntactic theory which essentially treats word order variation as a derivative notion. These are David Dowty's proposal for a theory of "Minimalist Syntax"[24] (Dowty in press) and Mike Reape's introduction of the notion of "word order domain" into Head-driven Phrase Structure Grammar[25] (Reape in press, Reape 1993).

Instead of deriving the string representation from the yield of the tree encoding the syntactic structure of that sentence (as, for instance in GPSG, LFG, and—as far as the relationship between S-structure and PF, discounting operations at PF, is concerned—GB), Dowty and Reape propose to derive the sentential string via a recursive process that operates directly on encodings of the word order of the subconstituents of the sentence. These representations are what Dowty, adopting a term originally proposed by Haskell Curry (Curry 1963), calls the "phenogrammatics" of a sentence while the equivalent information in Reape's proposal is called "word order domain". As a convenient cover term we will refer to the family of frameworks that share this basic philosophy as "Linearization Grammar", as suggested in Kathol and Levine 1992.

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[22]Wunderlich comes to a similar conclusion.

[23]Auxiliaries behave differently in this regard, as the following example shows:

(i)   vielleicht hat sie gestern kleine _ _ und heute große Lautsprecher repariert
        maybe   has she yesterday small   and today large loudspeakers repaired
        'Maybe yesterday she repaired small loudspeakers and today, large ones.'

But sentences like these do not constitute counterexamples to the claims above because here, the nonfinite main verb is part of the deleted material, hence we are not dealing with an instance of an SGF sentence here.

[24]Although Dowty's notion of minimalism could hardly be more different from the one developed independently in Chomsky's recent work (cf. Chomsky 1992), it may be interesting to note that—beyond the similarity in terminology—there are, after all, some striking resemblances in the goals that each is striving toward. Thus, by relying on constraints associated with the interfaces to the conceptual and the phonetic component to rule out ungrammatical derivations, Chomsky's abandoning of distinct S- and D-structures is reminiscent of Dowty's distrust of phrase structure in favor of the two elements of linguistic information we know best, i.e. what a sentence's surface form is and what it means. Of course, though potentially of great value, an in-depth comparison of the two approaches is well beyond the scope of this paper.

[25]See Pollard and Sag 1987 and Pollard and Sag 1993.

In the version adopted here, word order is represented in terms of ordered lists—the details of which will be discussed below.

The derivation of the surface string itself, i.e. the categories that have contributed to the ultimate string and the functor-argument relations holding among them is what Dowty calls a sentence's "tectogrammatical" structure, again borrowing from Curry. For the sake of concreteness let us now look at how a V1 sentence, i.e. a question or conditional clause, is derived in such a system.

(70) Ging der Jäger in den Wald
      went the hunter into the forest
      E.g.: 'Did the hunter go into the forest?'

(71)
$$\begin{bmatrix} \text{S} = \text{V[SUBCAT } \textit{nil}] \\ \text{DOM} \left\langle \begin{bmatrix} \text{V[+INV]} \\ \textit{ging} \end{bmatrix}, \begin{bmatrix} \text{NP[NOM]} \\ \textit{der Jäger} \end{bmatrix}, \begin{bmatrix} \text{PP} \\ \textit{in den Wald} \end{bmatrix} \right\rangle \end{bmatrix}$$

$$\begin{bmatrix} \text{NP[NOM]} \\ [\text{der}], [\text{Jäger}] \end{bmatrix} \qquad \begin{bmatrix} \text{VP} = \text{V[SUBCAT (NP)]} \\ \text{DOM} \left\langle \begin{bmatrix} \text{V[+INV]} \\ \textit{ging} \end{bmatrix}, \begin{bmatrix} \text{PP} \\ \textit{in den Wald} \end{bmatrix} \right\rangle \end{bmatrix}$$

$$\begin{bmatrix} \text{PP} \\ [\text{in}], [\text{den}], [\text{Wald}] \end{bmatrix} \qquad \begin{bmatrix} \text{V[+INV], SUBCAT (NP, PP)} \\ [\text{ging}] \end{bmatrix}$$

Details of the informational structure involved in derivations will be discussed below. However, let us at this point make a few remarks how such a representation is to be interpreted.

Ignoring the internal structure of NPs and PPs for now, we can see how the derivation involves a number of word order domains along the head projection of the clause. Each time two categories are combined, a new domain is formed from the domains of the daughters of that node. Word order domains associated with a node in a derivation are given in angled brackets as the value of the new feature "DOM". While the nodes themselves—modulo some changes in the featural architecture, including new features such as DOM—correspond to *signs* in the HPSG sort hierarchy, the elements in the word order domain contain a part of that information. As we will see below, they do contain information relevant for ordering constraints as well as a representation of the phonological properties of that domain element. For reasons that will become apparent shortly, we will assume that the derivation will at least involve one level of projection in which all arguments save the subject have been cancelled from the valence list(s). While there are a number of ways to ensure this, the simplest one, and the one we will adopt for the purposes of this study, is by by assuming that all selector-argument combinations are binary. Note, however, that the VP will lose its phenogrammatic integrity once its domain is "merged" into that of the resulting clause. This effect has been likened by Reape to "bracket erasure". Now, linear order within word order domains is treated by LP statements of the sort employed in GPSG and HPSG. In this way, it is possible to express ordering relations that hold among elements that are not tectogrammatical sisters. Thus, word order domains constitute an elegant way of implementing the idea of "liberation", which in its earlier formulations used metarules produced from ID rules (Pullum 1982, Zwicky 1986).[26] Crucially, in our system, there are no reordering operations such as move-α. Once an element is combined with an existing order domain, the constituents can be placed anywhere in the new domain, subject to the requirement that the resulting domain comply with the LP statements and that the order that held in the originally smaller domains be preserved. This latter constraint can be enforced by means of a "persistence condition" of the following sort: (cf. Pollard et al. 1993)

(72) *All ≺ relations between two domain elements in a* DOM *list must obtain in all* DOM *lists in which both domain elements appear.*

Another way of forming phenogrammatical structure is in terms of what Dowty calls "bounding domains", which means that the word order domain of some sign is treated as a single domain element in the domain of its mother category and in any subsequent derivation. This has the effect that the phonological string corresponding to the original domain becomes impenetrable for interleaving of outside constituents. We will shortly see how this intuition can be built directly into the modified feature architecture of HPSG that

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[26]Note, also, that in the system proposed here, it is not necessary to make reference to ID rules and hence one will not have to worry about producing a possibly infinite number of ID rules as the output of recursively applying liberation metarules.

we will assume in this study. As can be seen in (72), NPs—modulo extraposition which will be discussed below—give rise to bounding domains, but VPs do not, hence the appearance of flat structure of the S level.

We will follow the treatment of Pollard in press for the placement of finite verbs in the different clause types of German in terms of a feature named "INV" for 'inverted'. In V1 and V2 clauses, the verb is specified as [+INV], while it bears the feature [-INV] in verb final clauses. Thus, unlike in current GB-based analyses, V1 and V2 clauses are not derived via head movement. The LP statements that will determine the right placement of the verb with respect to the other constituents is given in (73):

(73)   V[+INV] ≺ X
       X ≺ V[-INV]

One brief comment is also in order about the informational structure underlying the representation in (72). Dowty's original idea behind his "Minimalist Syntax" is that word order should be derivable with reference to little more than the "pure" string representation at each node of the derivation. But it can easily be seen that at the very least, information about the syntactic valence of a given node must also be accessible; otherwise, a derivation along the lines of the combinatorics given in the syntactic types would not be possible. On the other hand, Reape assumes that the elements in his word order domain are full-fledged HPSG-style "signs" (cf. Pollard and Sag 1993), i.e. informational structures containing a vast array of linguistic knowledge including syntax, semantics, phonology, and internal phrase structure. However, this seems like more information than should be available for expressing constraints on ordering within word order domains; in particular, it is not desirable to be able to make reference to the internal phrase structure (in HPSG, encoded in the "DTRS" attribute of a sign) of a domain element. We will therefore adopt a somewhat different informational architecture than that used by Reape in his system, in which only the kind of information relevant for ordering constraints is associated with domain elements; in particular, the information that a given sign will be able to contribute to a word order domain is packaged into a new feature, "DOM-OBJ" (for "domain object"). Word order domains will then consist of a list of elements of sort *domobj*, each of which in turn contain information about its phonology—which is then mapped into the phonological representation for the whole sign it is part of—as well as information about its syntax and semantics, in HPSG conveniently bundled in the value of the feature "SYNSEM".[27]

$$
(74) \quad
\begin{bmatrix}
sign \\
\text{DOM-OBJ}
\begin{bmatrix}
domobj \\
\text{PHON (phonological information)} \\
\text{SYNSEM (morphosyntactic, valence, and semantic content information)}
\end{bmatrix} \\
\text{DOM (a list of domain objects)} \\
\text{DTRS (tectogrammatical information about daughter signs)}
\end{bmatrix}
$$

The notation chosen in (72) is then to be understood as a convenient shorthand in which only the relevant parts of the informational structure above are made explicit. Thus, if a sign ends up as a single domain element, as for instance the NPs and PPs in the example in (72), the domain elements of that sign—which play no role in the subsequent derivation, except to contribute to the mother category's phonology—are indicated by square brackets. Yet, because all internal structure is lost when the sign's DOM-OBJ value is projected into the mother's word order domain (i.e. when the DOM-OBJ value becomes part of the of the mother's DOM value), only the phonological string is left, represented by italics. The phonology of the whole sign (i.e. it's PHON value) is just the concatenation of the PHON values of its domain elements, strung together isomorphically to the order in which the domain elements appear in the order domain. Only the phonology of the domain elements is represented here in the interest of succinctness. Note that DTRS, the feature that encodes the tectogrammatical structure of a sign in terms of its daughter constituents, does not form part of the information gathered in DOM-OBJ. As a result, the value of DTRS is no longer available once that sign's DOM-OBJ value becomes part of a larger order domain. Note that from such an architecture the boundedness condition, i.e. the prohibition against interleaving material into domain elements falls out automatically: since only its phonology, not its internal structure, is represented in a domain element, such interleaving would have to break up what only exists as a phonological string with no reference to internal constituency left. But any such operation could only be defined in violation of (a sufficiently precise formulation of) the principle of phonology-free syntax (cf. for instance Pullum 1988).

This said, it is now possible to attempt a new approach to SGF constructions. From the previous

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[27] This particular architecture was suggested to me by C. Pollard; see also Pollard et al. 1993.

discussion of its properties, it should have become clear that there are at least three intuitions that should be captured more or less directly by the analysis:

1. What are conjoined in SGF sentences are in fact VPs.
2. We have to acknowledge—in whatever way—a certain asymmetry to avoid the kind of criticism that applied to Höhle's analysis.
3. The initial string that gives the appearance of a sentence should be derived on the basis of the same principles that apply in the case of simplex clauses.

In addition, we of course want an analysis with as few stipulations and additions to the general theory of grammar as possible. The way we want to meet these desiderata is by assuming that something special happens when the word order domains of VPs combine in coordination. All other things being equal, one would probably expect that in coordination, the resulting order domain consists simply of the conjuncts ordered by some LP statement. However, it seems that that is not the case in SGF coordination. Instead, we want to argue that only noninitial VPs are mapped into a single element of the resulting conjunctive domain. The initial VP, on the other hand, simply passes on its domain elements to the mother unchanged. In other words, the domain of the whole coordinated VP will consist of all the domain elements of the initial VP with one domain element containing the value of DOM-OBJ of the noninitial VP added:[28]

(75)
$$
\begin{bmatrix}
\text{VP} = \text{V[SUBCAT}\langle\text{NP}\rangle] \\
\text{DOM} \left\langle \begin{bmatrix} \text{V[+INV]} \\ \textit{ging} \end{bmatrix}, \begin{bmatrix} \text{PP} \\ \textit{in den Wald} \end{bmatrix}, \begin{bmatrix} \text{VP[CONJ]} \\ \textit{und fing einen Hasen} \end{bmatrix} \right\rangle
\end{bmatrix}
$$

$$
\begin{bmatrix}
\text{VP} \\
\text{DOM} \left\langle \begin{bmatrix} \text{V[+INV]} \\ \textit{ging} \end{bmatrix}, \begin{bmatrix} \text{PP} \\ \textit{in den Wald} \end{bmatrix} \right\rangle
\end{bmatrix}
\qquad
\begin{bmatrix}
\text{VP[CONJ]} \\
\text{DOM} \left\langle \begin{bmatrix} \text{CONJ} \\ \textit{und} \end{bmatrix}, \begin{bmatrix} \text{V[+INV]} \\ \textit{fing} \end{bmatrix}, \begin{bmatrix} \text{NP} \\ \textit{einen Hasen} \end{bmatrix} \right\rangle
\end{bmatrix}
$$

We will refer to this particular way of projecting a word order domain from coordinated constituents as "Asymmetric Conjunctive Domain Formation" (ACDF). As we will see later, there might be reason to believe that something very similar is actually also going on in the case of coordination that would normally be thought of as "symmetric". The crucial effect of ACDF in our example is that if now a subject combines with the coordinated VP, its placement will depend only on the elements of the originally initial VP domain. To put in another way, for the purposes of word order, the subject is treated as though it only were a subject of the original initial VP domain, although in terms of tectogrammatics and semantics, it is the subject of BOTH VP conjuncts; the resulting word order domain in a V1 environment can be seen in (76)—a somewhat different implementation, yet in the same spirit, will be offered in section 7:

(76)
$$
\begin{bmatrix}
\text{S} = \text{V[SUBCAT } nil] \\
\text{DOM} \left\langle \begin{bmatrix} \text{V[+INV]} \\ \textit{ging} \end{bmatrix}, \begin{bmatrix} \text{NP[NOM]} \\ \textit{der Jäger} \end{bmatrix}, \begin{bmatrix} \text{PP} \\ \textit{in den Wald} \end{bmatrix}, \begin{bmatrix} \text{VP[CONJ]} \\ \textit{und fing einen Hasen} \end{bmatrix} \right\rangle
\end{bmatrix}
$$

$$
\begin{bmatrix} \text{NP[NOM]} \\ \text{[der] [Jäger]} \end{bmatrix}
\qquad
\begin{bmatrix}
\text{VP} = \text{V[SUBCAT}\langle\text{NP}\rangle] \\
\text{DOM} \left\langle \begin{bmatrix} \text{V[+INV]} \\ \textit{ging} \end{bmatrix}, \begin{bmatrix} \text{PP} \\ \textit{in den Wald} \end{bmatrix}, \begin{bmatrix} \text{VP[CONJ]} \\ \textit{und fing einen Hasen} \end{bmatrix} \right\rangle
\end{bmatrix}
$$

$$
\begin{bmatrix}
\text{VP} \\
\text{DOM} \left\langle \begin{bmatrix} \text{V[+INV]} \\ \textit{ging} \end{bmatrix}, \begin{bmatrix} \text{PP} \\ \textit{in den Wald} \end{bmatrix} \right\rangle
\end{bmatrix}
\begin{bmatrix}
\text{VP[CONJ]} \\
\text{DOM} \left\langle \begin{bmatrix} \text{CONJ} \\ \textit{und} \end{bmatrix}, \begin{bmatrix} \text{V[+INV]} \\ \textit{fing} \end{bmatrix}, \begin{bmatrix} \text{NP} \\ \textit{einen Hasen} \end{bmatrix} \right\rangle
\end{bmatrix}
$$

The resulting phenogrammatical representation bears some resemblance to the output of Wunderlich's metarule—yet without the kinds of technical and conceptual problems that riddle his solution. Linearization Grammar thus provides us with exactly the right kind of "division of labor" that we need to account for SGF coordination: while on a par semantically and tectogrammatically, the two VPs display an asymmetry in the way they relate to each other in the phenogrammatics.

At this point, let us briefly consider a possible alternative to the ACDF analysis of (75). Rather than creating an asymmetric word order domain at the level at which the two VPs are conjoined, we could assume

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[28] As Peter Culicover points out to me (p.c.), a similar idea is suggested in Wexler and Culicover 1980 for the analysis of English Right-node-raising constructions; yet there it is the right-peripheral constituent whose integrity is left undisturbed by the presence of the other conjunct.

that the VP domains are in fact intact when they combine. However it is the placement of the subject which is asymmetric: the latter only becomes an element of the first VP domain:[29]

(77)
$$\begin{bmatrix} S = V[\text{SUBCAT } nil] \\ \text{DOM} \left\langle \begin{bmatrix} S \\ \text{ging der Jäger in den Wald} \end{bmatrix}, \begin{bmatrix} VP[\text{CONJ}] \\ \text{und fing einen Hasen} \end{bmatrix} \right\rangle \end{bmatrix}$$

$$\begin{bmatrix} NP[\text{NOM}] \\ [\text{der}], [\text{Jäger}] \end{bmatrix} \qquad \begin{bmatrix} VP \\ \text{DOM} \left\langle \begin{bmatrix} VP \\ \text{ging in den Wald} \end{bmatrix}, \begin{bmatrix} VP[\text{CONJ}] \\ \text{und fing einen Hasen} \end{bmatrix} \right\rangle \end{bmatrix}$$

$$\begin{bmatrix} VP \\ \text{DOM} \left\langle \begin{bmatrix} V[+\text{INV}] \\ \text{ging} \end{bmatrix}, \begin{bmatrix} PP \\ \text{in den Wald} \end{bmatrix} \right\rangle \end{bmatrix} \qquad \begin{bmatrix} VP[\text{CONJ}] \\ \text{DOM} \left\langle \begin{bmatrix} CONJ \\ \text{und} \end{bmatrix}, \begin{bmatrix} V[+\text{INV}] \\ \text{fing} \end{bmatrix}, \begin{bmatrix} NP \\ \text{einen Hasen} \end{bmatrix} \right\rangle \end{bmatrix}$$

Although this version embodies essentially the same intuitive idea and meets the desiderata above equally well, there are a number of reasons to reject it. First, it is not clear how this kind of analysis can be made compatible with the boundedness constraint that (with Dowty and Reape) we want to impose on domain construction. That is, if the VP domains are put together in the way suggested in (77), they in effect are treated as two distinct domain elements in the domain of the conjoined VP. But as mentioned before, one of the crucial constraints on domain formation is that one cannot go "back inside" a domain element in the course of the derivation.

Aside from this technical issue, there actually seems to be empirical evidence that argues against the solution in (77) and supports the analysis presented in (76). As we saw earlier, German permits certain relative clauses to be extraposed from subjects to the right periphery of the sentence. However, it is not possible to extrapose a relative clause across a sentential boundary, hence if two sentences are coordinated, one cannot place the extraposed constituent to the very right periphery of the conjoined sentence:

(78) *All diejenigen kamen zur Feier,
       all those   came   to-the party
       und es kam schnell Stimmung auf, die   Hans eingeladen hatte.
       and there was soon a good mood whom Hans invited   had

Yet, as we saw earlier in (58 b), repeated as (79), extraposition from subject in SGF contexts is indeed possible, as shown in (78):

(79) Dann kamen all diejenigen
       then came   all those
       und amüsierten sich   königlich, die   Hans eingeladen hatte.
       and amused themselves royally   whom Hans invited   had

       'Then all those whom Hans had invited came and had a good time.'

If in the phenogrammatical representation, this sentence indeed consisted of an initial sentential domain (as indicated in (77)), this would come as a puzzle because this sentence then would essentially be identical to the example in (78) with respect to the kinds of domain elements that intervene between the subject and its dependent relative clause. [30] On the other hand, on the analysis proposed here, no such problem arises because given that extraposition can be analyzed simply as placement to the extreme right periphery WITHIN a sentential domain (as in Reape in press) the extraposed relative clause will never have to "leave" its original clausal domain. Thus the different parts of the subject will then end up wrapped around the second VP conjunct, as outlined in (80):

(80)
$$\begin{bmatrix} S \\ \text{DOM} \left\langle \begin{bmatrix} ADV \\ \text{dann} \end{bmatrix}, \begin{bmatrix} V \\ \text{kamen} \end{bmatrix}, \begin{bmatrix} \bar{N}[\text{NOM}] \\ \text{all diejenigen} \end{bmatrix}, \begin{bmatrix} VP[\text{CONJ}] \\ \text{und amüsierten sich königlich} \end{bmatrix}, \begin{bmatrix} \text{REL-S} \\ \text{die Hans eingeladen hatte} \end{bmatrix} \right\rangle \end{bmatrix}$$

---

[29]This particular implementation was indeed suggested in Kathol 1992. Thanks to Bob Levine for bringing the alternative analysis pursued here to my attention.

[30]Actually, an alternative solution is conceivable in which the left element in the domain of the mother node does not change its categorial status from VP to S when the subject is placed into that domain. On such a scenario, no sentential domain boundary would intervene between the subject and the material extraposed from it. However, not only would we be faced with the quite unusual situation that a sentence is built up from two conjoined VPs. Crucially, as we will see later, the placement of the initial element in V2 clauses involves reference to SENTENTIAL domains. This would mean that the identical behavior of initial VPs in SGF sentences and simplex V2 sentences could only be derived on the basis of mere stipulation.

Notice, incidentally, that the above facts about extraposition constitute additional evidence against configurational analyses in which the SGF sentences are analyzed as coordinations of two sentential categories (i.e. IP or CP) with an empty subject in the second conjunct.

There are a number of facts that immediately fall out from the asymmetric domain formation outlined in (76). First, note that the category VP is understood strictly in terms of the combinatorial properties of a verbal projection; i.e. by "VP" we mean those projections that need one and only one NP[nom] to yield a sentence.[31] This predicts that impersonal predicates in German, such as *schlecht werden* ('become sick to the stomach') or the passive of *helfen* ('help'), which arguably do not contain a subject cannot be construed in an SGF fashion. This prediction is in fact borne out:

(81) *Daher   war dem Mann   schlecht und mußte sofort   geholfen werden.
       therefore was the man[dat] sick   and had-to immediately helped   be
       'Therefore, the man was sick to the stomach and had to be helped immediately.'

There is a certain amount of evidence for equating the notions of "subject" with NP[NOM] in German, as for instance argued in Reis 1982. Assuming this we are forced to the conclusion that there is no subject present in the example above—pace Chomsky's Extended Projection Principle. On the other hand, in any theory in which grammatical relations are identified in terms of the (semantically-motivated) order in which the verb combines with its arguments (cf. Dowty 1982), "true" (nominative) subjects are indistinguishable from nonnominative arguments that accidentally end up as least oblique. In such theories, the dative NP above, in virtue of it being the highest argument, would falsely be predicted to allow SGF coordination. We can therefore take the behavior of lexical impersonals as evidence that the domain formation in (81) crucially has to make reference to SYNTACTIC combinatorial properties that for instance includes reference to case and cannot be correctly described on the basis of semantic functor-argument structure alone.

Let us now turn to the question of domain formation with verbfinal VPs. None of the proposals we saw earlier makes reference to such constructions. In fact, Höhle's original terminology (subject gaps in finite/FRONTED (i.e. V1 or V2 clauses)) makes it clear that he did not think there was any connection between the conjunction of verb-initial and verb-final VPs. As the following example shows, however, we get a discontinuity effect in connection with verb-final VPs as well. Here, it is not verb placement that is responsible for a violation of the String Continuation Criterion, but instead the effect comes about via "scrambling" of, for instance, a pronominal object past the subject:

(82) daß sie   niemand anspricht   und ihr   den Weg zeigt
      that her[acc] no one   approaches and her[dat] the way shows
      'that no one approaches her and shows her the way'

The fact that we have a quantificational subject NP again shows that there cannot be a phonologically empty subject for the second conjunct. It seems clear that such examples raise immediate problems for any account that analyzes scrambling in terms of movement: one possibility is that the two conjuncts combine only after scrambling has occurred, so that the resulting phrase marker combines with the second conjunct, as in:

(83)

```
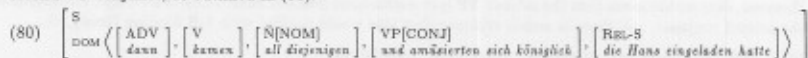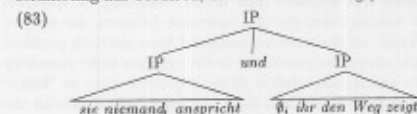                        IP
             _____|_____
            IP         und          IP
        ____|____              _____|_____
   sie niemandᵢ anspricht   Øᵢ ihr den Weg zeigt
```

However, that would mean that the subject NP is in a structural position from which it no longer c-commands the second conjunct, yet there is ample evidence that this would conflict with GB binding theory, cf.:

(84) daß sie niemandᵢ anspricht   und sichᵢ entschuldigt
      that her no one   approaches and self apologizes
      'that no one approaches her and apologizes.'

Alternatively, we could assume that scrambling occurs after the two conjuncts have combined, as outlined in:

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[31] Hence, with the notion of VP assumed here, there cannot be such things as "VP-internal" subjects; cf. also Wunderlich 1988:311-2 on this issue.

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(85)

$$
\begin{array}{c}
\text{IP} \\
\swarrow \quad \searrow \\
\textit{sie} \quad \text{IP} \\
\swarrow \quad \searrow \\
\text{SPEC} \quad \text{VP} \\
| \qquad \swarrow \quad \searrow \\
\textit{niemand} \quad \text{VP} \quad \textit{und} \quad \text{VP} \\
\triangle \qquad\qquad \triangle \\
\textit{anspricht} \qquad \textit{ihr den Weg zeigt}
\end{array}
$$

However, it would be somewhat of a mystery why this movement can only affect the first conjunct.[32]

On the treatment proposed here, however, nothing further needs to be said about the placement of the subject. Since in a linearization framework, "scrambling" will arise from underdetermination of linear precedence, a pronominal object will not only be permitted to be placed before the subject, but with LP statements of the sort proposed in Uszkoreit 1987, this will end up as the preferred order. Again, the second conjunct will itself be one domain element, hence it will not interfere with the placement of the subject with respect to the material originating from the first conjunct:

(86) $\left[\begin{array}{l} \text{S} \\ \text{DOM} \left\langle \left[\begin{array}{c} \text{NP[ACC]} \\ \textit{sie} \end{array} \right], \left[\begin{array}{c} \text{NP[NOM]} \\ \textit{niemand} \end{array} \right], \left[\begin{array}{c} \text{V[-INV]} \\ \textit{anspricht} \end{array} \right], \left[\begin{array}{c} \text{VP[-INV,CONJ]} \\ \textit{und ihr den Weg zeigt} \end{array} \right] \right\rangle \end{array} \right]$

There is reason, however, to believe that in the verbfinal case, asymmetric domain formation is possible with more than just VPs. Consider the following example:

(87) daß   ihr   das   Hans   gezeigt hat   und   später   an Otto   verkauft hat
     that her[dat] that[acc] Hans   shown has   and   later   to Otto sold has
     'that Hans showed it to her and later sold it to Otto.'

Here, the dative pronominal object *ihr* is scrambled past the subject as well as the accusative object *das*, which has to be understood as shared among BOTH conjuncts. This sentence can be derived in a straightforward way if we assume that with [-INV] conjuncts, any level of saturation can be conjoined asymmetrically, including transitive projections as in (87). The corresponding derivation is sketched in (88):

(88) $\left[\begin{array}{l} \text{S} \\ \text{DOM} \left\langle \left[\begin{array}{c} \text{NP} \\ \textit{ihr} \end{array} \right], \left[\begin{array}{c} \text{NP} \\ \textit{das} \end{array} \right], \left[\begin{array}{c} \text{NP} \\ \textit{Hans} \end{array} \right], \left[\begin{array}{c} \text{V} \\ \textit{gezeigt hat} \end{array} \right], \left[\begin{array}{c} \text{V[SBCT }\langle\text{NP, NP}\rangle] \\ \textit{und später an Otto verkauft hat} \end{array} \right] \right\rangle \end{array} \right]$

$$
\begin{array}{c}
\left[\begin{array}{c} \text{NP[NOM]} \\ \text{[Hans]} \end{array} \right] \qquad \left[\begin{array}{c} \text{VP} \\ \text{DOM} \ldots \end{array} \right] \\
\left[\begin{array}{c} \text{NP[ACC]} \\ \text{[das]} \end{array} \right] \qquad \left[\begin{array}{c} \text{V[SBCT }\langle\text{NP, NP}\rangle] \\ \text{DOM} \ldots \end{array} \right] \\
\left[\begin{array}{l} \text{V[SBCT }\langle\text{NP, NP}\rangle], \text{-INV} \\ \text{DOM} \left\langle \left[\begin{array}{c} \text{NP} \\ \textit{ihr} \end{array} \right], \left[\begin{array}{c} \text{V} \\ \textit{gezeigt hat} \end{array} \right] \right\rangle \end{array} \right] \quad \left[\begin{array}{l} \text{V[SBCT }\langle\text{NP, NP}\rangle], \text{-INV} \\ \text{DOM} \left\langle \left[\begin{array}{c} \text{ADV} \\ \textit{später} \end{array} \right], \ldots, \left[\begin{array}{c} \text{V} \\ \textit{verkauft hat} \end{array} \right] \right\rangle \end{array} \right]
\end{array}
$$

There might be reason to believe that the kind of verbal projections that can be coordinated asymmetrically in Vfinal context does not even have to correpond to those that arise from iteratively cancelling arguments off the SUBCAT list, starting from more to less oblique. Instead, it appears as if the verb can combine with any subset of its arguments, independent of the obliqueness ordering among them. Thus, while the conjuncts in (89) lack a dative argument in addition to the subject, the conjuncts in (90) share an accusative object:

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[32] As we will see shortly, this is a problem quite similar to that raised by V2 SGF constructions. Since for V2 we will not completely rule out the case that a certain amount of valence asymmetry between the two VP conjuncts is permitted, one could argue that we are dealing with a similar situation here. However, note that it is anything but clear why both the movement involved in Voofeldbesetzung and the one in scrambling should converge in that they are both permitted to violate the CNC here, and moreover, that this violation is confined to the first conjunct, for it is absolutely impossible to topicalize or scramble out of a noninitial conjunct.

(89) ... daß ihm   Hans   die Bilder   zeigte
          that him[dat] Hans[nom] the pictures showed
      und die Briefmarken verkaufte.
      and the stamps   sold
      'that Hans showed him the picture and sold him the stamps.'

(90) ... daß sie   Hans   dem Onkel   zeigte
          that them[acc] Hans[nom] the uncle[dat] showed
      und der Tante   verkaufte.
      and the aunt[dat] sold
      'that Hans showed them to the uncle and sold them to the aunt.'

While we have nothing of great insight to say about this, it would seem though that this might be an-
other example where coordination does not exploit preexisting constituency, but rather "forces" it upon the
elements put into conjuncts. While it is not immediately obvious how to integrate this intuition—if it is
indeed the right way of looking at the phenomena—into an HPSG based approach, the kind of flexibility
attained in Categorial Grammar by using Type Raising and Functional Composition seems to be well-suited
to accommodate such data. We'll leave this problem to further research.

6 SGF and V2

Let us now turn to the question of how in the approach offered here, SGF sentences in which the initial
string is a verb-second clause can be analyzed. Verb-second is commonly thought to derive from some kind
of syntactic dislocation process, either via move-α, usually into SPEC,CP, as in transformational theories, or
by means of an (unbounded) filler-gap dependency mediated by a SLASH feature, as in nontransformational
approaches. Applied to the SGF case, this means that we would have to allow a certain amount of asymmetry
in terms of the categories that are coordinated. In particular, we would have to allow a VP/XP category
to be conjoined with a VP containing no slash. There may exist evidence that this occurs in English, when
wh-movement or topicalization only affects one of multiple coordinated VPs, as in the following examples
from Goldsmith 1985, Lakoff 1986, and Heycock and Kroch 1992, respectively:[33]

(91) a. How many counterexamples can the Coordinate Structure Constraint sustain and still be considered
          empirically correct?
      b. Sam is not the sort of guy you can just sit there, listen to and not want to punch in the nose.
      c. This advice the committee decided to follow and proceeded to set up a new subcommittee.

However, if we are to base our treatment of V2 SGF sentences on a similar kind of asymmetry arising via
Vorfeldbesetzung, we end up in the somewhat embarrassing situation that our account will fare no better
with respect to spurious ambiguities than Höhle's and Wunderlich's. This is so because we will then have
no principled way of ruling out ATB analyses for SVPC sentences, hence we are stuck—again—with two
analyses.[34] Moreover, even if we were to bite the bullet and accept the fact that linearization might not
be superior to the other accounts proposed in terms of the ambiguity issue, there are even more unsettling
questions associated with the coordination of asymmetric conjuncts. First of all, it is not clear from what it
would follow that the slash can NEVER go into the second conjunct. Thus it would be only by stipulation, as
seen before with Heycock and Kroch 1993, that we could prevent illicit linkages between a nonsubject and a
gap in a noninitial conjunct. On the other hand, as we observed earlier, examples such as (91b) suggest that
in English, extractions from noninitial conjuncts are indeed possible to the exclusion of the initial conjunct,
which is strong evidence that SGF coordination and asymmetric wh-frontings in English are really very
distinct phenomena.

   Second, we would have to provide for an exception to the general coordination scheme that not only allows
for the conjunction of dissimilar categories, but also makes sure that the result is of the right category, i.e.
VP/XP rather than VP. Note that this would be a statement about combinatorial properties of categories,

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[33]It is well known (see for instance Goldsmith 1985) that such violations are in general only permitted if certain semantic
factors are involved. As was pointed out to me by David Dowty (p.c.), the kind of relationship between the conjoined predicates
required bears a striking resemblance to the one observed in serial verb constructions.
[34]Alternatively, we could try to mark VP domains that have arisen through asymmetric domain formation and bar Vorfeldbe-
setzung of the subject from ever applying to a thus marked domain. But this appears as much ad hoc as any way of avoiding
spurious ambiguities in Höhle's and Wunderlich's analyses.

that is, tectogrammar. This, however, seems logically independent from the special kind of domain formation that we have proposed for SGF sentences. It is not clear whether this "conspiracy" across different aspects of linguistic structure can be motivated in any more principled way, and hence would seem suspicious.

In the following section we will therefore begin to explore an alternative treatment of V2 (and, V2 SGF) which does not rely on syntactic dislocation of the initial constituent. It should be clear that the proposal is somewhat speculative.

6.1 V2 Without Dislocation

The treatment of verb second word order in German adopted here is somewhat of a refinement of the one proposed in Kathol 1992 and the one proposed for English main verb inversion in Kathol and Levine 1992. The central idea is to treat the placement of the initial element in terms of a special feature, there called "FIRST" which gives rise to a perfectly flat sentential domain. For reasons that will become apparent later, the feature responsible for Vorfeldbesetzung will be called "CI" (for "clause initial"). Extending the informational architecture presented above somewhat, it will reside inside a new feature, appropriate for domain elements, named "TOPOLOGY":

$$(92) \quad \begin{bmatrix} sign \\ \text{DOM-OBJ} & \begin{bmatrix} domobj \\ \text{TOPOLOGY} \\ \text{PHON} \\ \text{SYNSEM} \end{bmatrix} \\ \text{DOM} \\ \text{DTRS} \end{bmatrix}$$

The name "topology" is supposed to reflect the tradition amongst grammarians of German to think of the word order constraints in that language in terms of topological "fields" (cf. Höhle 1986 and references therein). Another candidate for a topology feature is Reape's "EXTRA" which he uses for the placement of right-extraposed constituents. In a way, we can think of such topological features as an attempt to take the topological theory at face value, rather than trying to derive it from, say, movement into specific "slots" such as HEAD or SPECIFIER of different categories supposedly provided by Universal Grammar as in current GB theory.[35] For the different clausal word order patterns of German, we will then assume here that verb-second word order simply comes about via interaction of two features, one for the placement of the verb (INV) and one the placement of the initial element. Leaving aside for the purposes of this study how a domain element is to be specified with a positive value—or negative, for that matter—of CI,[36] V2 word order is then a consequence of the ordering imposed by the following LP statements:

(93) X[+CI] ≺ V[+INV]
     V[+INV] ≺ X[-CI]

As a result of treating V2 in terms of a topological feature, it is now possible to treat both subject-initial as well as nonsubject-initial V2 sentences in terms of the same tectogrammatical structure, which is incidentally the same as in (71):

$$(94) \quad \begin{bmatrix} \text{S = V[SUBCAT } nil\text{]} \\ \text{DOM} \left\langle \begin{bmatrix} \text{NP[NOM]} \\ +\text{CI} \\ der\ J\ddot{a}ger \end{bmatrix}, \begin{bmatrix} \text{V[+INV]} \\ ging \end{bmatrix}, \begin{bmatrix} \text{PP} \\ in\ den\ Wald \end{bmatrix} \right\rangle \end{bmatrix}$$

$$\begin{bmatrix} \text{NP[NOM]} \\ +\text{CI} \\ \text{[der], [Jäger]} \end{bmatrix} \qquad \begin{bmatrix} \text{VP = V[SUBCAT (NP)]} \\ \text{DOM} \left\langle \begin{bmatrix} \text{V[+INV]} \\ ging \end{bmatrix}, \begin{bmatrix} \text{PP} \\ in\ den\ Wald \end{bmatrix} \right\rangle \end{bmatrix}$$

$$\begin{bmatrix} \text{PP} \\ \text{[in], [den], [Wald]} \end{bmatrix} \qquad \begin{bmatrix} \text{V[+INV], SUBCAT (NP, PP)} \\ [ging] \end{bmatrix}$$

---

[35] It should be clear, however, that nothing prevents the adoption of such "slots" to fix certain aspects of word order in a linearization-based framework—provided that the filling of such slots is not subject to the same constraints as movements in transformational grammar, that is, does not have to proceed in an ATB fashion in the presence of coordinated constituents.

[36] This question is interrelated with that of what kinds of constituents, in particular, what kinds of *partial* constituents can occur in the Vorfeld.

(95)
$$
\begin{bmatrix}
\text{S} = \text{V[SUBCAT } nil] \\
\text{DOM} \left\langle \begin{bmatrix} \text{PP} \\ +\text{CI} \\ in\ den\ Wald \end{bmatrix} \begin{bmatrix} \text{V[+INV]} \\ ging \end{bmatrix}, \begin{bmatrix} \text{NP[NOM]} \\ der\ Jäger \end{bmatrix}, \right\rangle
\end{bmatrix}
$$

$$
\begin{bmatrix} \text{NP[NOM]} \\ [\text{der}], [\text{Jäger}] \end{bmatrix}
\qquad
\begin{bmatrix}
\text{VP} = \text{V[SUBCAT (NP)]} \\
\text{DOM} \left\langle \begin{bmatrix} \text{PP} \\ +\text{CI} \\ in\ den\ Wald \end{bmatrix} \begin{bmatrix} \text{V[+INV]} \\ ging \end{bmatrix}, \right\rangle
\end{bmatrix}
$$

$$
\begin{bmatrix} \text{PP} \\ [\text{in}], [\text{den}], [\text{Wald}] \end{bmatrix}
\qquad
\begin{bmatrix} \text{V[+INV], SUBCAT } \langle \text{NP, PP} \rangle \\ [ging] \end{bmatrix}
$$

On the other hand, if one counts SLASH as affecting the valence of a syntactic category, dislocation-based accounts will inevitably involve different syntactic categories—in particular, there is nothing in the subject-initial case that would correspond to the valence of an S/PP category. Moreover, in theories such as CG where the operations corresponding to SLASH also affect the semantic type of the involved constituent, a dislocation-based treatment would have to assume that the derivation in both cases involves different semantic constituents. (But intuitively, it is not clear that in (95) above, we really have to form the property of being such that the hunter went in that direction.)

What, now does this heretic account of verb-second word order in German buy us? Primarily, it now allows us to treat SGF coordination entirely in terms of an asymmetry at the phenogrammatical level. Because Vorfeldbesetzung is no longer derived from the combinatorial properties of a clausal constituent, all we need to say is that a sentence such as (2), is derived in terms of the coordination of two VPs, i.e. two V[SUBCAT ⟨ NP ⟩] projections and the rest follows. In particular it follows that the placement of the initial element will happen without reference to any element in the second conjunct—and this situation is in fact quite similar to scrambling-induced discontinuities in V[-INV] coordinations. So, the derivation of (2) is as given in:

(96)
$$
\begin{bmatrix}
\text{S} = \text{V[SUBCAT } nil] \\
\text{DOM} \left\langle \begin{bmatrix} \text{PP} \\ +\text{CI} \\ in\ den\ Wald \end{bmatrix}, \begin{bmatrix} \text{V[+INV]} \\ ging \end{bmatrix}, \begin{bmatrix} \text{NP[NOM]} \\ der\ Jäger \end{bmatrix}, \begin{bmatrix} \text{VP[CONJ]} \\ und\ fing\ einen\ Hasen \end{bmatrix} \right\rangle
\end{bmatrix}
$$

$$
\begin{bmatrix} \text{NP[NOM]} \\ [\text{der}], [\text{Jäger}] \end{bmatrix}
\qquad
\begin{bmatrix}
\text{VP} = \text{V[SUBCAT(NP)]} \\
\text{DOM} \left\langle \begin{bmatrix} \text{PP} \\ +\text{CI} \\ in\ den\ Wald \end{bmatrix}, \begin{bmatrix} \text{V[+INV]} \\ ging \end{bmatrix}, \begin{bmatrix} \text{VP[CONJ]} \\ und\ fing\ einen\ Hasen \end{bmatrix} \right\rangle
\end{bmatrix}
$$

$$
\begin{bmatrix}
\text{VP} \\
\text{DOM} \left\langle \begin{bmatrix} \text{PP} \\ +\text{CI} \\ in\ den\ Wald \end{bmatrix} \begin{bmatrix} \text{V[+INV]} \\ ging \end{bmatrix} \right\rangle
\end{bmatrix}
\begin{bmatrix}
\text{VP[CONJ]} \\
\text{DOM} \left\langle \begin{bmatrix} \text{CONJ} \\ und \end{bmatrix}, \begin{bmatrix} \text{V[+INV]} \\ fing \end{bmatrix}, \begin{bmatrix} \text{NP} \\ einen\ Hasen \end{bmatrix} \right\rangle
\end{bmatrix}
$$

Note also that with the treatment of V2 advocated here, the corresponding SVPC sentence is analyzed in terms of precisely the same tectogrammatics, while the linearization is induced by a different assignment of the CI feature.

(97)
$$
\begin{bmatrix}
\text{S} = \text{V[SUBCAT } nil] \\
\text{DOM} \left\langle \begin{bmatrix} \text{NP[NOM]} \\ +\text{CI} \\ der\ Jäger \end{bmatrix}, \begin{bmatrix} \text{V[+INV]} \\ ging \end{bmatrix}, \begin{bmatrix} \text{PP} \\ in\ den\ Wald \end{bmatrix}, \begin{bmatrix} \text{VP[CONJ]} \\ und\ fing\ einen\ Hasen \end{bmatrix} \right\rangle
\end{bmatrix}
$$

$$
\begin{bmatrix} \text{NP[NOM]} \\ +\text{CI} \\ [\text{der}], [\text{Jäger}] \end{bmatrix}
\qquad
\begin{bmatrix}
\text{VP} = \text{V[SUBCAT(NP)]} \\
\text{DOM} \left\langle \begin{bmatrix} \text{V[+INV]} \\ ging \end{bmatrix}, \begin{bmatrix} \text{PP} \\ in\ den\ Wald \end{bmatrix}, \begin{bmatrix} \text{VP[CONJ]} \\ und\ fing\ einen\ Hasen \end{bmatrix} \right\rangle
\end{bmatrix}
$$

$$
\begin{bmatrix}
\text{VP} \\
\text{DOM} \left\langle \begin{bmatrix} \text{V[+INV]} \\ ging \end{bmatrix}, \begin{bmatrix} \text{PP} \\ in\ den\ Wald \end{bmatrix} \right\rangle
\end{bmatrix}
\begin{bmatrix}
\text{VP[CONJ]} \\
\text{DOM} \left\langle \begin{bmatrix} \text{CONJ} \\ und \end{bmatrix}, \begin{bmatrix} \text{V[+INV]} \\ fing \end{bmatrix}, \begin{bmatrix} \text{NP} \\ einen\ Hasen \end{bmatrix} \right\rangle
\end{bmatrix}
$$

Another consequence of this treatment is that there cannot be anything missing from the second conjunct. As we will show shortly, if the second conjunct contained, say a SLASH, it would no longer meet the conditions on when asymmetric conjunctive domain formation can happen, hence the only way left is to construe the conjunction in terms of symmetric domain formation which requires the object to be construed in an ATB fashion with both conjuncts (see below.) However, what our treatment does not automatically rule out (given that we have essentially put no constraints on the occurrence of +CI) is that there could be an element in the second conjunct that bears the feature specification +CI. Yet, a sentence like:[37]

(98) in den Wald   ist der Jäger   gegangen und einen Hasen hat gefangen.
      into the forest is the hunter gone   and a hare   has caught

is utterly ungrammatical: there must not be any +CI constituent in the noninitial VP. Now while at this point, we cannot claim to have an elegant solution to this problem, so we will simply assume for the time being that it can built into the constraint on ACDF. Ultimately, though, the impossibility of a +CI domain element here should be derivable from the fact that CI by virtue of referring to word order in CLAUSES can only be appropriate for CLAUSAL domains. But since the noninitial VP conjunct essentially gets "closed off" once it enters into the larger domain as one domain element, any +CI elements inside would have missed their chance of occurring in a clausal domain.[38]

7 Symmetric and Asymmetric Coordination

One issue we have been avoiding so far is a comparison of the derivation of asymmetric word order domains with that of symmetric ones, such as in the derivation of sentences like (1) in which the initial PP is related to both conjuncts in an ATB fashion. The basic intuition has been that symmetric coordination, unlike its asymmetric counterpart, conforms to the String Continuation Criterion. Given this, let us assume then that in order for a symmetric coordination to be legitimate, the shared constituent, i.e. the "factor" must be linearizable with each conjunct in the same fashion. Schematically, in (99), such a factor F with domain X must "in principle" be linearizable with the domain $Y_{i_1}, \ldots, Y_{i_n}$ of the each of the conjuncts C_i.

(99)
$$\begin{bmatrix} R \\ \langle X, [Y_{1_1}, \ldots, Y_{1_n}], [Y_{2_1}, \ldots, Y_{2_m}] \rangle \end{bmatrix}$$

$$\begin{bmatrix} F \\ X \end{bmatrix} \qquad \begin{bmatrix} C \\ \langle [Y_{1_1}, \ldots, Y_{1_n}], [Y_{2_1}, \ldots, Y_{2_m}] \rangle \end{bmatrix}$$

$$\begin{bmatrix} C_1 \\ Y_{1_1}, \ldots, Y_{1_n} \end{bmatrix} \qquad \begin{bmatrix} C_2 \\ Y_{2_1}, \ldots, Y_{2_m} \end{bmatrix}$$

However, it is immediately apparent this implementation would violate the boundedness condition imposed by the particular feature architecture assumed here. To see this, remember that everything enclosed in square brackets in (99) is a single domain object; hence there is no longer a word order domain with respect to which the factor domain could be linearized, only a phonological string.[39] For this reason, it seems that the assumption that there is an intermediate conjunct category with a word order domain associated with it might have to be given up. Instead we want to propose yet another departure from widely-held beliefs; this time with regard to the structure of coordination.[40] Let us assume that shared-constituent coordination is handled by a ternary (or n-ary, in the case of more than two conjuncts) operation, involving the factor

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[37] Here, I use perfect tense to make sure that the second conjunct cannot be mistaken for a V[-INV] projection, as in *einen Hasen fing, which would be bad for independent reasons (INV is a head feature, so both conjuncts must agree in their values).

[38] To express formally the intuition that +CI elements must end up in a clausal domain without having access to the whole derivation is a nontrivial matter.

[39] This particular problem could be circumvented if the domain corresponding to the conjunct category is built up from its daughter's domains via "distributive attachment", i.e. by linking all elements of a domain by means of Dowty's "attachment operation" (cf. Dowty in press). This would then yield a domain for the mother category which looks like $Y_{1_1} + \ldots + Y_{1_n}, Y_{2_1} + \ldots + Y_{2_m}$. While this implementation would have the advantage of preserving "transparency" for linearization purposes, it also comes with a number of severe problems, chief among them the fact that LP statements would have to allow for multiple occurrences of categories with the same feature specification (e.g. [+INV]) in a SINGLE domain, viz. one corresponding to each conjunct.

[40] The ideas developed in this section have been greatly inspired by conversations with Carl Pollard.

and each conjunct simultaneously.[41] The general schema for coordination, be it symmetric or asymmetric, is given in (100):

(100)
$$\begin{bmatrix} R \\ (Y_{1_1}, \ldots, X, \ldots, Y_{1_n}, [Y_{2_1}, \ldots, Y_{2_m}]) \end{bmatrix}$$

$$\begin{bmatrix} F \\ X \end{bmatrix} \qquad \begin{bmatrix} C_1 \\ Y_{1_1}, \ldots, Y_{1_n} \end{bmatrix} \qquad \begin{bmatrix} C_2 \\ Y_{2_1}, \ldots, Y_{2_m} \end{bmatrix}$$

The constraints associated with this scheme are as follows:

1. The combination of F with each C_i yields R
2. All C_i are "like catgories"
3. X and Y_{1_j} are linearized to $Y_{1_1}, \ldots, X, \ldots, Y_{1_n}$ (such that X *can* be initial, but does not have to).

The first two conditions can be seen as capturing precisely the constraints ordinarily assumed for coordination. Where we get a difference is in the way that word order domains are projected from the combination of a factor with the conjuncts. Thus, the third condition essentially states that all coordinations involving a factor constituent are asymmetric in that only the elements of the initial conjunct[42] are projected into the mother's domain, while the domains of the noninitial conjuncts (or nonfinal for that matter) are "frozen" into domain objects and cannot further be manipulated in the subsequent course of the derivation.

Interestingly, one consequence of this view of coordination is that now it is symmetric, rather than asymmetric coordination, that has to be regarded as a special case of the general coordination scheme in (100). Because no constraint is placed on where the factor domain object occurs in the domain of the resulting category R, both intitial and noninitial occurrences are allowed, as long as they conform to the other linearization constraints. On the other hand, in symmetric coordination, peripheral placement in the resulting word order domain is obligatory, enforced by the following additional constraint:

4. X bears the same relationship to Y_{1_j} and Y_{2_k}
   (i.e., X is peripheral in $Y_{1_1}, \ldots, X, \ldots, Y_{1_n}, [Y_{2_1}, \ldots, Y_{2_m}]$)

The intuition behind the requirement on peripheral placement is that if the factor were to occur amongst the domain elements of the intitial domain, it could not at the same time bear the same relationship (i.e. medial occurrence) to the other conjuncts. Only the (left/right) periphery allows a factor to precede/follow all conjuncts at the same time. The effect of this additional constraint is that for symmetric coordination, the schema in (100) ends up being instantiated as indicated in (101):

(101)
$$\begin{bmatrix} R \\ (X, Y_{1_1}, \ldots, Y_{1_n}, [Y_{2_1}, \ldots, Y_{2_m}]) \end{bmatrix}$$

$$\begin{bmatrix} F \\ X \end{bmatrix} \qquad \begin{bmatrix} C_1 \\ Y_{1_1}, \ldots, Y_{1_n} \end{bmatrix} \qquad \begin{bmatrix} C_2 \\ Y_{2_1}, \ldots, Y_{2_m} \end{bmatrix}$$

Turning now to the conditions under which shared-constituent coordination instantiates either the less restrictive (i.e. only conditions (1-3) above) or more restrictive (i.e. with the addition of condition (4)) schema, we propose that the latter option be in effect unless the conjuncts match one of the following two specifications:

(102) a.
$$\begin{bmatrix} V, \text{SUBCAT} \langle \text{NP[NOM]} \rangle \\ \text{INV} + \\ \text{SLASH}\, \emptyset \end{bmatrix}$$

b.
$$\begin{bmatrix} V, \text{SUBCAT} \langle \text{NP[NOM]}, \ldots \rangle \\ \text{INV} - \end{bmatrix}$$

Thus, if the verb is "inverted" (i.e. either initial or in second position), only the subject may be missing. On the other hand if the verb occurs phrase-finally, other levels of saturation are permitted with the more liberal schema too.

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[41] There is no claim that this scheme of combination is involved when there is no constituent shared by the conjuncts, thus there does not seem to be a need to depart from the traditional analysis in the case of conjunction of simple sentences or group-forming coordination of NP's.

[42] Cases where the factor combines at the right periphery, such as in Right Node Raising, represent the exact mirror image to the left-peripheral factors investigated here.

Another way of interpreting the schema in (100) together with the constraints in (1-3) is that every instance of conjunction either satisfies the additional restriction (4) or one of the constraints in (102). This automatically makes the right predictions with respect to the linearization of ATB constructions. Suppose, for instance, we were to treat ATB topicalization of a PP out of two conjuncts in terms of SLASH.[43] Then the coordinated categories are [+INV] sentences, i.e. of category V[SUBCAT *nil*], which crucially do not match either of the two descriptions in (102). But then to be a valid conjunction, the restriction in (4) must be obeyed, which has the result that the corresponding linearization can only proceed as outlined in (103):

(103)
$$\left[\begin{array}{l} \text{S} \\ \langle [\textit{in den Wald}], [\textit{ging}], [\textit{der Jäger}], [\textit{und lief der Junge}] \rangle \end{array} \right]$$

$$\left[\begin{array}{l} \text{PP} \\ [\text{in}], [\text{den}], [\text{Wald}] \end{array} \right] \qquad \left[\begin{array}{l} \text{"S/PP"} \\ [\text{ging}], [\text{der Jäger}] \end{array} \right] \qquad \left[\begin{array}{l} \text{"S/PP"} \\ [\text{und}], [\text{lief}], [\text{der Junge}] \end{array} \right]$$

Another welcome consequence of the set of constraints proposed here follows from the fact that the fourth restriction and the category specification in (102) do not form an exclusive disjunction. Thus, when the latter constraints are met, it does not follow that the structure must disobey restriction 4, i.e. result in a violation of the String Continuation Criterion. Instead, it is perfectly legitimate for conjuncts to meet the description in (102) while ordering the factor peripherally. As a consequence, the analysis proposed here circumvents the spurious ambiguity problem arising in connection with SVPC constructions noted with Höhle's, Heycock & Kroch's, and Wunderlich's solutions. Consider the derivation of such an example, given in (104), which can be seen as a revision of (97) above.

(104)
$$\left[\begin{array}{l} \text{S} \\ \langle [\textit{der Jäger}], [\textit{ging}], [\textit{in den Wald}], [\textit{und fing einen Hasen}] \rangle \end{array} \right]$$

$$\left[\begin{array}{l} \text{NP} \\ [\text{der}], [\text{Jäger}] \end{array} \right] \qquad \left[\begin{array}{l} \text{VP} \\ \langle [\textit{ging}], [\textit{in den Wald}] \rangle \end{array} \right] \qquad \left[\begin{array}{l} \text{VP} \\ \langle [\textit{und}], [\textit{fing}], [\textit{einen Hasen}] \rangle \end{array} \right]$$

The categories involved here (VP) match the description in (102 a) and at the same time the linearization is in accordance with the restriction in (4). But clearly, while this linearization is, so to speak, "doubly licensed", there is no alternative analysis that would emerge on the basis of what licenses SGF coordination in our system.

Not only does limiting exceptions to the fourth condition on conjunctive domain formation to the cases listed in (102) handle the linearization of ATB extraction and SVPC constructions quite nicely, it also makes the right prediction in the case of interaction of phrasal coordination with SGF. It is well-known that in German, not only the subject, but essentially the whole initial string including a governing verb can be shared across conjuncts. Thus in the following example, both *die Kommission* and *will* have to be construed with both conjuncts.

(105) Die Kommission will   diesem Vorschlag folgen und eine neue Unterkommission einsetzen.
      the commission wants-to this suggestion follow and a new subcommission set-up
      'The commission wants to follow this suggestion and set up a new subcommission.'

Note, however, that the verbal projections conjoining with the factor auxiliary *will* instantiate [-INV], albeit with a nonfinite verb form, but no reference to morphology is made in (102). This predicts that we should be able to get SGF-like discontinuity effects. As the following example (from Heycock and Kroch 1993) shows, this is fact the case, as it is possible to prepose an object belonging to the initial conjunct, thus violating the String Continuation Criterion once again:

(106) Diesem Vorschlag will   die Kommission folgen und eine neue Unterkommission einsetzen.
      this suggestion   wants-to the commission follow and a new subcommission set-up
      'The commission wants to follow this suggestion and set up a new subcommission.'

The following outlines a derivation of this sentence:[44]

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[43]No claim is made here that this is to be thought of as the right analysis. In particular, we will not get into the problem here of how to properly restrict the occurrence of SLASH so as to prevent an alternative analysis of topicalization. One way to achieve this may be by restricting SLASH in German to occur only in coordinated contexts (long-distance dependencies in simplex clauses notwithstanding, cf. Appendix.)

[44]For the sake of simplicity, we assume here that all the arguments of the nonfinite verb safe its subject have been cancelled before it combines with the auxiliary verb. Alternatively, one could assume with Hinrichs and Nakazawa 1990 and Kiss 1992

(107) $\left[\text{S}\langle\,[\textit{diesem V.}],\,[\textit{will}],\,[\textit{die Kommission}],\,[\textit{folgen}],\,[\textit{und eine ... einsetzen}]\,\rangle\,\right]$

$\begin{bmatrix}\text{NP}\\ [\text{die}],\,[\text{Kommission}]\end{bmatrix}$ $\begin{bmatrix}\text{VP}\\ \langle[\textit{diesem V.}],\,[\textit{will}],\,[\textit{folgen}],\,[\textit{und eine ... einsetzen}]\rangle\end{bmatrix}$

$\begin{bmatrix}\text{V}\\ [\text{will}]\end{bmatrix}$ $\begin{bmatrix}\text{VP}\\ \langle[\textit{diesem Vorschlag}],\,[\textit{folgen}]\rangle\end{bmatrix}$ $\begin{bmatrix}\text{VP}\\ \langle[\text{und}],\,[\textit{eine n. U.}],\,[\textit{einsetzen}]\rangle\end{bmatrix}$

Before closing this section, let me briefly discuss a phenomenon that Höhle points out in his original paper but which, to the best of my knowledge, has not been addressed in any subsequent formal account of SGF constructions. He notices that while it is possible to topicalize an argument in an SGF construction, Wh fronting leads to significantly decreased grammaticality:

(108) a. (?)Die Tasche ließ er fallen und rannte zum Hinterausgang.
     the bag   let he drop and ran   to-the back exit
     'He dropped the bag and ran for the back exit.'

   b. ??Was ließ er fallen und rannte zum Hinterausgang?
      what let he drop and ran   to-the back exit
      'What did he drop and run for the back exit?'

Contrast this now to the case of Wh fronting with nonargument Wh phrases such as *wann* ('when'), which appear to be markedly better:

(109) Wann hat jemand einen Einfall und sagt uns die Lösung?
     when has someone an inspiration and tells us the solution
     'When will someone have an inspriration and tell us the solution?'

It is not entirely clear how to correctly assess the significance of the data here; after all, at least to the author, SGF sentences with topicalized arguments (as in (108 a) above tend in general to be somewhat more marginal than if some adjunct fills the initial position, as in:

(110) Dann ließ er die Tasche fallen und rannte zum Hinterausgang.
     then let he the bag   drop and ran   to-the back exit
     'Then he dropped the bag and ran for the back exit.'

Thus, the marginality of (108 b) might be subsumed under whatever accounts for a reluctance to topicalize arguments in general. Evidence for this assumption can be seen in the fact that, as pointed out in Heycock and Kroch 1993, the Dutch example corresponding to (108 a) is judged to be quite marginal:[45]

(111) ??De baggage liet hij vallen en   rennde naar de achteruitgang.
     the bag   let he   drop and ran   to-the back exit
     'He dropped the baggage and ran for the back exit.'

Note also that, as the example of an ATB violation from Lakoff 1986, repeated below, shows, asymmetric Wh fronting of arguments is not universally bad.

(112) How many counterexamples can the Coordinate Structure Constraint sustain and still be considered empirically correct?

At this point, we have nothing insightful to offer to account for the different grammaticality patterns involving violations of the String Continuation Criterion induced by Wh fronting. However, it seems plausible that the difference between (108 b) and (109) above is related to the phenomenon, noted earlier, that adverbials can take wide scope over all conjuncts even if they are not syntactically related to the second. On the other hand, a tighter connection, i.e. a syntactic linkage appears to be needed in the case of arguments. If we now assume that argument Wh phrases are, for whatever reason, necessarily construed with the more restrictive coordination scheme, i.e. in a "symmetric" way, it would follow that initial argument Wh phrases are obligatorily construed in an ATB fashion, hence the marginality of (108 b) is predicted.

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that the auxiliary "attracts" all the the arguments of the embedded verb. Nothing seems to hinge on this difference with respect to the linearization effects we are interested here.

[45]Unfortunately, no information is given on what the status of the Dutch equivalent to (108 a) is. Presumably it is judged as equally bad, if not worse, than the German sentence.

A Appendix: V2 as Linearization and Long Extraction

While the idea that V2 is essentially a (local) linearization effect has obvious advantages for an elegant treatment of SGF constructions, there is nevertheless a price to pay in that certain phenomena which have previously been thought to be accountable in structural terms need to be reevaluated in light of the present assumptions. For instance, to account for the fact that preposing of Wh phrases normally[46] triggers interrogative interpretation one would have to refer to word order properties rather than structural conditions (such as occurrence of a +WH element in the SPEC,CP). While this is not the place to go into details of such a word order based account, it is worthwhile pointing out that since Wh phrases do get an interrogative interpretation in situ when they occur in multiple Wh constructions (with initial Wh), it is clear that interrogative interpretation cannot always be tied to occurrence in certain structural positions anyway. It is therefore conceivable that an account based on word order will lead to an overall simpler theory of how syntax and interpretation are related in the case of Wh questions.

Another price that the analysis of SGF sentences proposed here has to pay is that it necessitates an alternative treatment of long-distance movements out of embedded V2 clauses. As is well-known, if the matrix sentence contains a bridge verb, i.e. allows embedding of a V2 clause in addition to a *daß*-clause, the topic (including WH elements)—and only the topic—of the embedded clause can be moved into the topic position of the matrix clause. This would seem to follow more or less naturally on a theory such as the one proposed in Grewendorf 1988 where V2 is analyzed in terms of movement into SPEC,CP so that long-distance extraction could be seen as an instance of extending that movement in a COMP-to-COMP fashion. If we were forced to accept that analysis, we would be faced with the dilemma that while rejecting syntactic dislocation for nonembedded clauses, we nevertheless have to admit it for long-distance topicalization. But then it is not clear how to rule out dislocation from verb-initial domains in the nonembedded cases. In other words, simplex V2 clauses would then receive an alternative analysis in which the topicalized element has been placed there via local dislocation, rather than by means of linearization, as suggested here. However, we believe that there might be a different way of looking at extraction from embedded V2 clauses that avoids the above-mentioned dilemma.

It has been observed that there is a certain similarity between long-distance topicalization as in (113 a) and a sentence as in (113 b) containing a parenthetical: (cf. Mrotzek 1991 and references therein):

(113) a. Gestern   meint Karl, sei Lisa nach Hamburg gefahren
       yesterday says Karl is Lisa to Hamburg   driven
   b. Gestern,   so hat mir Karl erzählt, sei Lisa nach Hamburg gefahren
       yesterday so has Karl me   told   is Lisa to Hamburg driven

While there is little doubt that there is a syntactic relationship in (113 a) between what for the sake of exposition we want to refer to here as the "quasi"-parenthetical *meint Karl* and the rest of the sentence—namely that the first subordinates the latter—it is not clear that there is any syntactic linkage between the parenthetical and the rest of the sentence in (113 b); not only is the parenthetical itself a full V2 sentence, it also can occur in places other than right after the initial constituent:

(114) Gestern   sei, so hat mir Karl erzählt, Lisa nach Hamburg gefahren
      yesterday is so has Karl me   told   Lisa to Hamburg   driven

No such thing is possible in long-distance topicalizations: a V2 matrix clause (such as *Karl meint* in (115) a) is completely impossible, and V1 matrix clauses are marginally acceptable if there is a noticeable intonation break around it, indicated as"#", in which case it is probably to be classified as a parenthetical:

(115) a. *Gestern Karl meint, sei Lisa nach Hamburg gefahren
       yesterday Karl says   is Lisa to Hamburg   driven
   b. Gestern   sei *(#) meint Karl, *(#) Lisa nach Hamburg gefahren
       yesterday is   says Karl   Lisa to Hamburg   driven

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[46]This, however, is not necessarily so as pointed out by Brandt et al. 1992:30 (cf. also Reis and Rosengren 1991) citing examples such as:

(i)   Wieviel   schätz   mal,   daß das Kleid gekostet hat.
       how much estimate PART   that the dress cost has
       'Estimate how much the dress cost me.'

Here, with imperative morphology on the verb, no interrogative interpretations arises despite the initial occurrence of the Wh phrase.

Nevertheless the two construction types share an important feature of their intonational properties: there has to be an intonational break after the (quasi)parenthetical. In the case of real subordination, this break precedes the embedded sentence, while for true parentheticals it seems to indicate that the material following belongs to the main sentence again. What we want to propose here is that the similarity in intonation might have to do with a similiarity in the phenogrammatical structure in both instances, namely that in both, elements of a word order domain are "split up" by the (quasi)parenthetical. This means that for the case of long-distance topicalization, the embedding under the matrix verb results in the topic of the embedded clause becoming part of the matrix domain. As a consequence, this topic, due to its +CI specification, will have an impact on the ordering of the matrix domain, i.e. it forces the [+INV] verb to be placed second and the subject after that verb. The derivation of the matrix VP, i.e. before the subject joins the domain, is outlined below:

$$(116) \quad \begin{bmatrix} \text{VP} = \text{V[SUBCAT NP]} \\ \text{DOM} \left\langle \begin{bmatrix} \text{ADV} \\ +\text{CI} \\ gestern \end{bmatrix} \cdot \begin{bmatrix} \text{V[+INV]} \\ meint \end{bmatrix} \cdot \begin{bmatrix} \text{S} \\ sei\ Lisa\ nach\ H.\ gefahren \end{bmatrix} \right\rangle \end{bmatrix}$$

$$\begin{bmatrix} \text{V[+INV]} \\ [meint] \end{bmatrix} \qquad \begin{bmatrix} \text{S} \\ \text{DOM} \left\langle \begin{bmatrix} \text{ADV} \\ +\text{CI} \\ gestern \end{bmatrix} \cdot \begin{bmatrix} \text{V[+INV]} \\ sei \end{bmatrix} \cdot \begin{bmatrix} \text{NP} \\ Lisa \end{bmatrix} \cdots \right\rangle \end{bmatrix}$$

Thus, the intuition is that the topic of the embedded clauses is "passed up" into the matrix clause, without actually involving a change in the combinatorial properties of the embedded clause (i.e. a syntactically missing constituent). Prima facie, this may appear to be an operation which is incompatible with our persistence and boundedness conditions on domain formation. However, remember that we have to make a strict distinction between *signs* containing order domains, that is, nodes in a tectogrammatical derivation, and domain *elements*. Because the embedded clause in (116) is not itself a domain element, it is then possible to split that domain into a head and a tail as long as the order among the elements in the tail remains undisturbed. In the case of true parentheticals, on the other hand, no such interaction takes place because such a parenthetical never actually becomes part of the domain it is inserted into.

Assuming that the above represents a reasonable alternative to treating long-distance topicalization out of V2 clauses in terms of a phenogrammatical operation such as the domain split suggested above, our treatment would predict that long-distance topicalization should be able to occur in SGF contexts as well. This seems to indeed be borne out by the facts, as the following examples show:

(117) a. Gestern   meint Karl, sei Lisa nach Hamburg gefahren und habe sich eine Mikrowelle gekauft.
yesterday says Karl is Lisa to Hamburg   driven   and has self a microwave   bought
'Karl says that Lisa drove to Hamburg yesterday and bought herself a microwave'

b. ?Ihrer Tante behauptet Otto, habe Lisa das Familienbuch gezeigt
her aunt[dat] claims   Otto has Lisa the family book shown

und wolle   es jetzt ihrem Onkel geben
and wants-to it now her uncle   geben

'Otto claims that Lisa has shown the family book to her aunt and now wants to give it to her uncle.'

The argument extraction in (117) appears to be a little worse, but that is to be expected as there is a slight difference in the non-SGF cases as well. Note, incidentally, that there seems to be a marked difference in the behavior of topic extractions out of V2 clauses as above and Vfinal clauses. For speakers that can get the latter kind of construction (the author is not one of them), it is possible to construe the initial topic with a gap in the noninitial conjunct:[47]

(118) Ihrer Tante$_i$ meint Otto, daß Lisa t_i das Familienbuch gezeigt habe
her aunt   says Otto that Lisa   the family book shown has

und t_i es jetzt schenken wolle
and   it now give wants

'Otto says that Lisa showed the family book to her aunt and now wants to give it to her

This is what one would expect given that extraction out of a Vfinal clause—if possible at all—cannot be

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[47]Thanks to Susanne Riehemann for conducting a little survey among speakers of various German dialects.

thought of as a phenogrammatical operation on a par with domain split in the V2 case. On the assumption that it instead involves some genuine syntactic dislocation of the type usually captured by UDC mechanisms like SLASH, such sentences could then be analyzed as extraction applied in an ATB fashion. This assumption also implies that in the case of verb-final environments, if long distance topicalization is possible at all, it MUST affect both conjuncts: if only the first one contains a gap, the result should be less acceptable. Again, the relevant group of speakers appears to confirm this prediction:

(119) *?Ihrer Tante$_i$ meint Otto, daß Lisa t_i das Familienbuch gezeigt habe
     her aunt   says Otto that Lisa   the family book shown has

     und es jetzt ihrem Onkel schenken wolle
     and it now her uncle   give wants

On the other hand, the situation is different in the V2 case as the majority of the speakers that accept extraction from Vfinal clauses in general and the example in (118) in particular, find its V2 equivalent bad (traces are to indicate where the extraction site *would* presumably be if topicalization were to be analyzed as a filler-gap dependency here):

(120) *?Ihrer Tante$_i$ meint Otto, habe Lisa t_i das Familienbuch gezeigt
     her aunt   says Otto has Lisa   the family book shown

     und wolle t_i es jetzt geben
     and wants-to   it now give

The sentence is in clear contrast to the one in (117 b) above in which the dative object in the second conjunct has been provided overtly (*dem Onkel*), hence the preposed *der Tante* CANNOT be syntactically linked to the second conjunct.

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Revisiting the Genitive Relative Construction in Korean:
Real GRC?*
Ki-Suk Lee

1. Introduction

"Genitive Relative Construction"(GRC) is the traditional term for
relative constructions, such as the (b) examples below, which
appear to contain a genitive subject instead of the usual
nominative subject.

(1) a. [ku sinsa-ka   ip-un] os-i   telepta
        the gentleman-NOM wear-REL clothes-NOM be dirty
        'the clothes that the gentleman is wearing are dirty.'

    b. ku sinsa-uy   ip-un   os-i   telepta
           GEN

(2) a. [nay-ka sal-ten]   kohyang
        I-NOM live (ASP) REL native village
        'the native village in which I was living'

    b. na-uy sal-ten   kohyang
           GEN

    The term GRC implies that there is an exact correlation
between the (a) and (b) examples in (1) and (2), in the sense that
(b) is semantically equivalent to (a), or perhaps even derived from
(a).[1]   This phenomenon may have been noticed by many Korean

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        [1] In brief, GRCs are assumed to result from a sort of *ka-uy*
conversion, as mentioned by Yoon (1991).

scholars implicitly, but seems to have been first explicitly introduced by authors such as Yang (1987), Kang (1988) and Yoon (1991).[2]   This reluctance of authors to discuss GRCs might be thought to be due to the very subtle grammaticality judgments associated with this construction as mentioned by Yoon (1991: note 3), but I believe the real reason for this reluctance to be that GRCs do not exist.   Instead, I will argue that a genitive NP followed by a relative clause can be coindexed with an empty pronominal ("pro") in the relative clause relatively freely depending on the context.

In this paper, I will discuss some problems with the aforementioned approaches, and try to solve them by providing an alternative analysis of GRCs within the HPSG framework.

2.   The Background of the Introduction of GRC

Yang (1987) and Kang (1988) introduced GRCs as an "escape hatch" for certain cases of movement out of double relative clauses in Korean. Double relative clauses, which have two relative heads, as illustrated in (3), have usually been considered to violate island constraints.

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[2] Yoon (1991) differs from the other two authors in that, to avoid the problem of case marking, he proposes that the genitive NP in GRCs is base-generated instead of arising from movement. However, all three share the fundamental assumption that GRCs exist.

(3) *[[[[t₁ t₃ po-n]   os₃-i]   tele-un]   ku sinsa₁]
           see-PAST-REL clothes-NOM be dirty-REL the gentleman
      'Lit. the gentleman₁ that the clothes₃ that t₁ saw t₃ are dirty'

On standard transformational analyses, (3) has the following structure:

(4)   [[[..t₁..]ᵢₚ₁]cₚ₁..]ₙₚ ....]ᵢₚ₂ O₁]cₚ₂ NP₁]

In (4), the trace in the inner relative clause is related to the coindexed empty operator and so it violates subjacency.

However, there are many double relative constructions which are often judged to be grammatical, such as the following.

(5)   [[[[t₁ t₃ ip-un]   os₃-i]   tele-un]   ku sinsa₁]
                 wear-REL clothes-NOM be dirty-REL the gentleman
      'Lit.the gentleman₁ [that the clothes₃ [that t₁ wear t₃] are dirty]'

Example (5) would appear to have exactly the same structure as (3), namely (4). Thus it too must violate subjacency. But it is still grammatical.[3]

To solve this problem, Yang (1987) and Kang (1988) suggest that (5) is derived from (1b), which in turn is derived from (1a). That is, they use the construction (1b) as an "escape hatch" to make the movement possible in (5). More specifically, Yang (1987) proposes that *ku sinsa* is CP adjoined as illustrated in (6a), so

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[3] For this reason, linguists like Choe (1985), following the claims of Kuno (1973) and Saito (1985) that Japanese relativization does not involve Move alpha, concludes that Korean relativization does not observe the island constraints. Instead she suggests, following Huang (1982)'s analysis of Chinese, that Korean relativization involves Move alpha at LF, a level in which island constraints are not observed in general.

the later movement of *ku sinsa* out of the embedding NP in the double relative construction is possible without violating subjacency. Kang (1988), as illustrated in (6b), proposes that *ku sinsa* is NP adjoined, with the other arguments being the same.[4]

(6) a. D.W. Yang (1987) -- CP adjoined

$[_{CP}$ ku sinsa$_1$-uy $[_{CP}$ $[_{IP}$ t$_i$ $[_{VP}$ t$_j$ ip$]_{VP}$ $]_{IP}$ un O$_j$$]_{CP}$ $]_{CP}$ os$_j$

b. M.Y. Kang (1988) -- NP adjoined

$[_{NP}$ ku sinsa$_1$-uy $[_{NP}$ $[_{CP}$ $[$t$_i$ $[$t$_j$ ip$]$ $]$ un$]_{CP}$ $[$os$_j$$]]_{NP}$ $]_{NP}$

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[4] In this respect, Kang differs from Chomsky (1986), who prohibits NP adjunction to an NP. In addition to the difference of the position of adjunction, there is another diffence between Yang's and Kang's approaches. That is, whereas Yang (1987) proposes movement of an empty operator in Korean relativization, Kang (1988) suggests movement of the head noun, following Vergnaud (1974). Yang's approach is much more in line with mainstream transformational analyses since Chomsky's "On Wh-Movement"(1977).

In contrast to (5), according to their view, (3) is ill-formed, because the construction (7b) from which (3) would have to be derived is itself ungrammatical. In other words, the derivation of (7b) from (7a) is impossible. Thus (3), which is derived from (7b), is ungrammatical.

(7) a. [ku   sinsa-ka   po-n]   os-i   telepta
       the gentleman-NOM see-PAST-REL clothes-NOM be dirty
       'the clothes that the gentleman saw are dirty.'
    b. *ku   sinsa-uy   po-n   os-i   telepta
            GEN

In this fashion, Yang and Kang seem to succeed in explaining the Korean double relative constructions, which are apparently exceptional in the standard GB framework. However, this account is not without problems, as will be seen later in this paper.[5]

3. Arguments against GRCs

In this section, I will provide some arguments against the view that GRCs exist in Korean.

3.1. Problems with Double Relative Constructions
First, there are counterexamples to Yang (1987) and Kang (1988)'s

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[5] This paper focuses on GRCs, i.e., the constructions which have a genitive NP plus a relative clause plus a head NP. Therefore, we will leave the study of these double relative constructions for future study.

explanation for double relative constructions.   Consider the
following datum, which is from Kang (1988) himself.

(8) *[[$_{CP}$ [[$_{CP}$ t$_i$ t$_j$ ip-un]$_{CP}$ os$_j$-i]   saenghwalcengdo-lul
                      wear-REL clothes-NOM living-standard-ACC
              cwawuha-nun]$_{CP}$ sinsa$_i$]
              determine-REL   gentleman
    'Lit. the gentleman$_i$ [that the clothes$_j$ [that t$_i$ wear t$_j$]
    determines the living standard]'

The GRC hypothesis wrongly predicts that (8) should be grammatical.
To solve this problem, comparing (8) with (5), Kang employs the
notion of "event" from Higginbotham (1985), together with the
assumption that if the matrix clause contains an independent event,
then the movement out of the inner relative clause is impossible.
In addition, he assumes that most predicates have independent
events, whereas adjectives (stative verbs in my terminology) do
not.   Based on these assumptions, Kang concludes that (8) is
ungrammatical, since the predicate *saenghwalcengdo-lul cwawuha-*
'determine the living standard' constitutes an independent event
and so the higher CP functions as a bounding node blocking movement
out of the lower CP. On the other hand, (5) is grammatical, since
the simple adjective (again stative verb in my terminology) *tele-*
'be dirty' does not constitute an independent event.

     If this is so, then what about the following GRC sentence?

(9) [[[[t$_i$ t$_j$ ip-un]   os$_j$-i]   salamtul-uy nwun-ul
                      wear-REL clothes-NOM people-GEN   eye-ACC
              kkul-nun]   sinsa$_i$]
              attract-REL   gentleman
    'Lit. the gentleman$_i$ [that the clothes$_j$ [that t$_i$ wear t$_j$]
    attract people's eyes']

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Here the predicate *salamtul-uy nwun-ul kkul-* is not an adjective
and therefore presumably constitutes an independent event as in
(8). Nevertheless, (9) is grammatical. Such examples suggest that
the GRC hypothesis, even augmented with event-based explanation, is
wrong.

   More crucial and direct evidence against the GRC hypothesis
are examples such as the following.

(10) a. [[[[t_i t_j po-n]   os$_j$-i]   pissa-ass-ten]
                   see-PAST-REL clothes-NOM be expensive-PAST-REL
             John$_i$-un] (kukes-ul) sa-ciankhilo kyelcengha-ess-ta
                   TOP (it-ACC)   buy-not   determine-PAST-DEC
        'Lit. John$_i$ [who the clothes$_j$ [that t_i saw t_j] were expensive]
           determined not to buy (it)'

     b.*[[John-uy po-n]   os-i]   pissa-ass-ta]
             GEN   DEC

The double relative sentence (10a) is judged to be grammatical by
most Koreans, but the GRC construction from which it is presumably
derived is impossible as shown in (10b). This fact alone seems to
be reason enough to reject the GRC hypothesis.

   3.2. Problems with Constraining GRCs
Second, there are problems having to do with semantic or pragmatic
constraints on the acceptability of GRCs. Yang (1987) posits the
constraint that "the subject of a relative clause may be
genitivized if the relative clause describes a characteristic
property of its head NP in Korean", and Yoon (1991) proposes that
"the genitive noun phrases in GRCs are licensed by the

inalienability of the relative heads".[6] Both of these constraints are used to explain the grammaticality of the constructions in (11).

(11) a.   John-uy ip-un   os
           GEN wear-REL clothes
      'the clothes that John wears'

     a'.*John-uy po-n   os
                see-PAST-REL

     b.   John-uy pwuleci-n   son
           GEN be broken-REL hand
        'Lit. the hand that John is broken'

     b'.*John-uy pwuleci-n chayksangtali
                           leg of the desk

According to Yang (1987) and Yoon (1991), (11a') is ungrammatical because the verb *po-* 'see', unlike the verb *ip-* 'wear' in (11a), does not describe the characteristic property of its head NP *os* 'clothes'.   In other words, the characteristic property of *os* 'clothes' is not to be seen but to be worn. And, on the relevant reading, (11b') is ungrammatical because the head NP *chayksangtali* 'leg of the desk' is not an inalienable part of the genitive NP 'John' (in this repect, they seem to regard *os* 'clothes' as an

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[6] In addition, Yoon (1991) posits the following constraints:
(i)   The relative head nouns in GRCs cannot have specifiers.
(ii) The genitive noun phrase in GRCs must be either generic or definite.
(iii) The acceptability of a GRC is dependent on properties of the predicate of the relative construction.
(iv) The legitimacy of the genitive noun phrases in GRCs is dependent on the thematic role of the noun phrase.
    All of these constraints can be derived from one or two constraints I will give later in this paper, if we reject the GRC hypothesis that a genitive NP followed by a relative clause is the subject of the relative clause.

inalienable part of humans).[7] If this is so, then what about the
following examples?

(12) a. John-uy peli-n   yenphil
              throw away-REL pencil
      'the pencil which John threw away'

     b. John-uy cwup-un   ton
              pick up-REL money
      'money which John picked up (or found)'

    In (12), the verb *peli-* 'throw away' does not describe the
characteristic property of the head NP *yenphil* 'pencil', nor does
the verb *cwup-* 'pick up (or find)' describe the characteristic
property of *ton* 'money'; rather, the characteristic property of
yenphil 'pencil' is to be used in writing and that of *ton* 'money'
is to be spent or earned. In addition, neither *yenphil* 'pencil'
nor *ton* 'money' is usually considered to be an inalienable part of
'John'. The grammaticality of such examples is not explained by
the GRC hypothesis.

3.3. The Arbitrariness of the Relation of the Genitive NP to the Relative Clause

The third argument against the GRC hypothesis is that the genitive
noun phrase can correspond to an object as well as a subject of the
relative clause, and may even be grammatically unrelated to the
relative clause. Consider the following data.

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[7] However, if we are not forced to have a reading in which
John is the subject of *pwuleci* 'be broken', (12b') is perfectly
grammatical. It may mean either "John's desk leg that is broken
(by someone)" or "John's desk leg that is broken (by John)".

(13) a. ku ai-uy   khiwu-n   pwumo
        the child-GEN raise-REL parent
        'the parent who raised the child'

    b. na-uy mossalkekwu-nun chinkwutul
        I-GEN tease-REL   friends
        'the friends who are teasing me'

    c. na-uy panhangha-nun atul
        I-GEN defy-REL   son
        'the son who defies me(NP[dat] in Korean)'

    d. na-uy salangha-nun hananim
        I-GEN love-REL   God
        'God whom I love' or 'God who loves me'

    e. na-uy mescikey ci-un   cip
        I-GEN nicely   build-REL house
        'my house which somebody built nicely'
        or 'the house which I built nicely'

In fact Kang (1988) and Yoon (1991) recognize that genitive NPs can correspond to objects in relative clauses, though they treat such cases as exceptional. But the exceptional cases are much more widespread than they recognize. In (13c), the genitive NP is related to the indirect object; and (13d) and (13e) are ambiguous about where the genitive NPs "come from". Furthermore, in (13e), the genitive NP bears no grammatical relation to the relative clause in the preferred reading. And it is possible for all of the constructions in (13) to have corresponding double relative clauses as shown (14).

(14)
 a.[[t$_i$ t$_j$ khiwu-n]   pwumo$_i$-ka cwuk-un] ku ai$_j$
        raise-REL   parent-NOM die-REL   the child
   'Lit. the child$_j$ [that the parent$_i$ [that t$_i$ raised t$_j$] died]'

 b.[[t$_i$ t$_j$ mossalkekwu-nun] chinkwutul$_i$-i motwu isahaypeli-n] na$_j$
        tease-REL   friends-NOM   all   move-REL   I
   'Lit. I$_j$ [that the friends$_i$ [that t$_i$ teased t$_j$] all moved away]'

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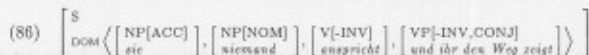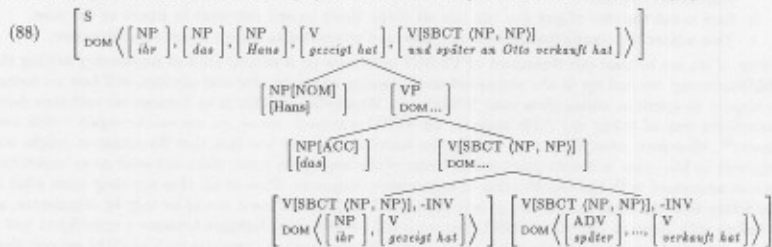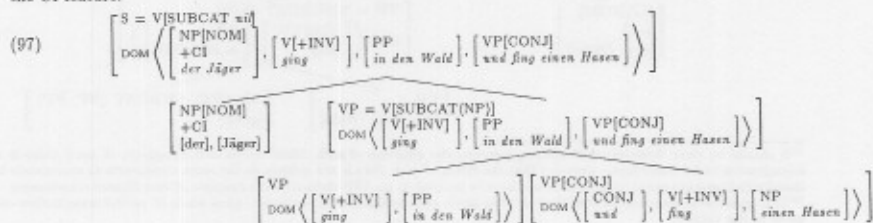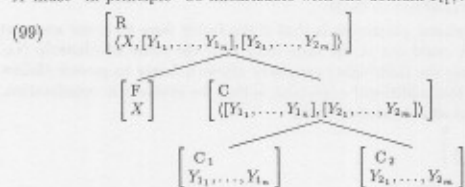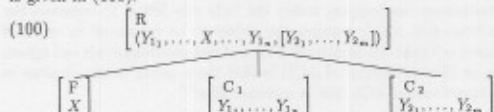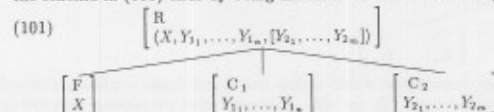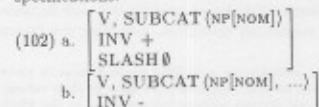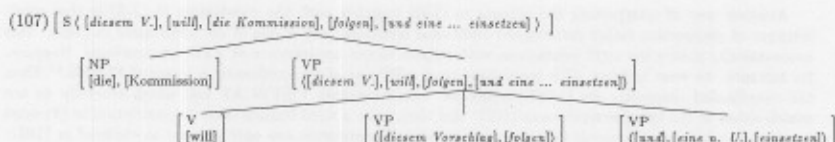c.[[t₁ t₁ panhangha-nun] atul₁-i cip-ul    nakapeli-n] na₁
        defy-REL      son-NOM home-ACC leave-REL   I
  'Lit. I₁ [that the son₁ [that t₁ defied t₁] left home]'

d.[[t₁ t₁ salangha-nun] hananim₁-i teisang concayha-cian-un] na₁
        love-REL       God-NOM    any more exist-not-REL     I
 'Lit. I₁ [that God₁ [that t₁ love t₁] does not exist any more]'or

  [[t₁ t₁ salangha-nun] hananim₁-i teisang concayha-cian-un] na₁
        love-REL       God-NOM    any more exist-not-REL      I
 'Lit. I₁ [that God₁ [that t₁ love t₁] does not exist any more]'

e.[[[(someone) t₁ mescikey ci-un] cip₁-i    pwulthapeli-n]   na
              nicely build-REL house-NOM be burnt down-REL I
  'Lit. I [that the house₁ [that someone built t₁ nicely] is burnt
   down]' or
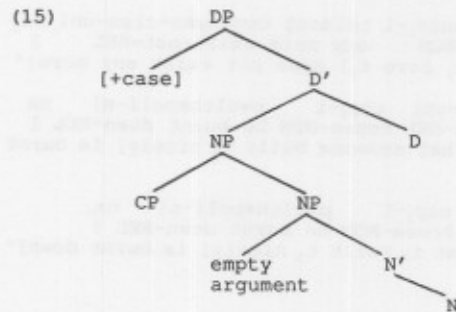
  [[t₁ t₁ mescikey ci-un]    cip₁-i    pwulthapeli-n]   na₁
        nicely  build-REL house-NOM be burnt down-REL I
 'Lit. I₁ [that the house₁ [that t₁ built t₁ nicely] is burnt down]'
```

3.4. Theoretical Problems with GRC Analyses

The adjunction approaches of Yang (1987) and Kang (1988) also have some theory-internal problems.   First, there is no relevant genitive case assigner, since in the standard NP analysis only the specifier and complement positions of N are assigned genitive case. Second, there is a violation of case theory, since the chain containing the genitive noun phrase and its trace has two cases, [+NOM] and [+GEN].

Pointing out these problems, another advocate of the GRC hypothesis, Yoon (1991), suggests the base generation approach illustrated in (15).

Following Abney (1987), Yoon (1991) proposes that the genitive NP in GRCs is base-generated in the SPEC of D where [+GEN] is assigned by AGR in D. He further assumes that the genitive NP and

the empty argument of the head noun form a chain.[8] The genitive
NP getting case in the D-structure position inherits (or shares)
its theta role from the empty argument.

(15)
```
                        DP
             _____
          [+case]                    D'
                            _____
                           NP                 D
                     _____
                    CP          NP
                            _____
                         empty        N'
                         argument       \
                                         N
```

    This approach also has a couple of problems. First, it is not
clear where the empty argument, which like the genitive NP is base-
generated, gets its theta role. The inference from the position of
the empty argument (i.e., it is in the internal argument position)
leads us to conclude that it gets its theta role from the head N.
But it is more appropriate for the empty argument to get its theta
role from the CP which is the relative clause (or more strictly
speaking, from the V in the CP).

    The second problem is that with this approach, we cannot
explain the scrambling between a genitive NP and a relative clause

---

    [8] Traditionally a chain consists of an argument and its
traces.   That is, chains arise from movement.   So it is
questionable whether the genitive NP, which is base-generated, and
the empty argument of the head noun, which is also base-generated,
can form a chain.

as in (16).[9]

(16) a. [John-i yenphil-lo ssu-n]   pyenci
            NOM pencil-with write-REL letter
         'the letter which John wrote with a pencil'
     a'. *[yenphil-lo ssu-n] John-i pyenci

     b.   John-uy [yenphil-lo ssu-n]   pyenci
            GEN pencil-with write-REL letter
         'the letter which John wrote with a pencil'
     b'. [yenphil-lo ssu-n] John-uy pyenci

     c.   na-uy [salangha-nun] cokwuk
          I-GEN love-REL   native contury
         'the native contury which I love'
     c'. [salangha-nun] na-uy cokwuk

As we can see in (16a'), when the NP is nominative, the scrambling
is impossible; but it is genitive, the scrambling is possible.

     However, if we read Yoon's (1990) dissertation carefully, we
can infer that the scrambling in the example constructions like
(16b' and c') can be explained. He posits a Del(imiter) Phrase
above DP in (15) as illustrated in (17). And the SPEC of this DelP
functions as a landing site for scrambling. Thus the scrambling in
the example construction (16c') can be explained in his structure,
since the scrambling occurs between just two constituents.

     However, what about a more general structure like (18), where
the scrambling occurs between three constituents, i.e., the
scrambling occurs in six different grammatical ways as shown in
(19)?

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[9] The adjunction approaches of Yang (1987) and Kang (1988) do
not explain this scrambling phenomenon either. According to Gil
(1987), this scrambling phenomenon is also observed in Japanese
NPs.

(17)

```
          DelP
         /    \
        /      Del'
       /      /    \
      ↑      DP      Del
      |     /  \
      |  na-uy   D'
      |        /    \
      |      NP       D
      |     /   \
      |   CP     NP
      |  /  \    /  \
      | salangha-nun  N'
      |  /              \
       ‾                  N
        ‾ ‾ ‾ ‾ ‾ ‾ ‾ ‾   |
                         cokwuk
```

(18)   John-uy [salangha-nun] ku yeca
          GEN   love-REL   the woman
        'the woman whom John loves'

(19) a. John-uy [salangha-nun] ku yeca
     b. John-uy ku [salangha-nun] yeca
     c. [salangha-nun] John-uy ku yeca
     d. [salangha-nun] ku John-uy yeca
     e. ku John-uy [salangha-nun] yeca
     f. ku [salangha-nun] John-uy yeca[10]

Yoon cannot solve this problem unless he posits another unmotivated
phrase above DelP.

On the basis of the array of arguments presented in this
section, it would appear that we have no choice but to reject the
GRC hypothesis. In the next section, I develop an alternative
analysis which addresses all the problems with the GRC analyses
discussed above.

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[10] In (d), (e) and (f), in addition to the given reading, there
may be another reading which means 'the woman whom that John (not
this John) loves'.

4. A New Analysis and its Implementation in HPSG

I propose that there is in fact no distinct GRC construction. In other words, a genitive NP before a relative clause has no grammatical relation to the subject position or any other position of the relative clause. What I assume instead is that a genitive NP followed by a relative clause may happen to be coindexed with a pro (phonetically empty pronominal argument) in the relative clause, depending on the context. To make my explanation explicit, let us assume the following general structure for so-called GRCs.

(20)   NP[gen] $[...e_i...e_j...Vt]_{RC}$ N'

If we suppose for example that the verb within the relative clause is transitive, there may be two empty categories (the subject and the object). And, here, the head noun will typically be coindexed with one of the empty categories in the relative clause. Then, the genitive NP will be coindexed with the other empty category, which is a pro. So if the head noun is coindexed with e_j (the object in the relative clause), the genitive NP will be coindexed with e_i (the subject), and on the other hand, if the head noun is coindexed with e_i (the subject), then the genitive NP will be coindexed with e_j (the object). Thus so-called GRCs correspond to the former case. My point is that GRCs are just a special case of the general structure in (20), with the specific (if any) coindexing determined

by context.[11] That is why it is so difficult to capture general constraints on the acceptability of GRCs.

One more thing we must not fail to notice is that every genitive NP followed by a relative clause plus a head NP has the possessive reading with respect to the head NP.[12] In this respect, I assume that the structure under discussion is one in which a relative clause is inserted between a genitive NP and a head NP. This in turn leads us to predict that scrambling between the genitive NP and the relative clause is possible, as was shown in (16).

If we reject the GRC hypothesis and follow the approach just suggested, we can characterize the construction under discussion in terms of just two constraints.

One is Kuno (1976)'s functional constraint (21):

(21) A relative clause must be a statement about its head noun.

This is a constraint not only on the structure under discussion but also on relative clauses in general. With this constraint, we can explain the unacceptability of (8) on the ground that the relative

---

[11] Thus there may be cases in which the genitive NP is not coindexed with any empty category in the relative clause, as shown (13e).

[12] Here, the term "possessive reading" is used in a broad sense, not in a narrow sense in which something "belongs to" something or something is an "inalienable part" of something. My term "possessive reading" includes all the possible readings available when a genitive NP is followed by an NP without an intervening relative clause.

clause in (8) *ip-un os-i saenghwalcengdo-lul cwawuha-nun* 'the clothes that are worn determines the living standard' is not a statement about the gentleman but about persons in general.

The second constraint is related to a processing effect.

(22) In a structure which has a genitive NP followed by a relative clause, the relative clause must be heavy enough (at least two syllables, and the longer it is, the more acceptable it is).

If a relative clause is short (here, one syllable), it may sound incomplete as a clause. So language users are likely to think that the relative clause (strictly speaking, the verb in the relative clause) should have overt arguments such as a subject NP or an object NP instead of the genitive NP. Thus the structure with a genitive NP followed by a relative clause which consists of one syllable sounds odd to many people. With this constraint, we can explain the ill-formedness of (11a'). If the relative clause becomes longer by adding some adverbs, the construction is grammatical as in (23).

(11a') *John-uy po-n   os
        GEN see-PAST-REL clothes

(23)   John-uy ecey   po-n   os
              yesterday see-PAST-REL

And interestingly enough, as discussed in footnote 9, (11b') is grammatical, contrary to the prediction of the GRC hypothesis. This is because we need not interpret *John* as the subject of

pwuleci– 'be broken', although it does have a possessive reading to the head NP *chayksangtali* 'leg of the desk'.

From the arguments we have developed so far, we may summarize our observations and assumptions as follows.

(24)

  a. GRCs do not exist.

  b. A genitive NP always has the possessive reading with respect to the head NP.

  c. A genitive NP followed by a relative clause can be coindexed with a pro in the relative clause.[13]

  d. There are two constraints on the construction of a genitive NP plus a relative clause plus a head NP.

  (i) A relative clause must be a statement about its head noun.

  (ii) The relative clause must be heavy enough (at least two syllables, and the longer it is, the more acceptable it is).

  e. Scrambling between a genitive NP and the following RC is possible.

This new approach to the facts under discussion can be formalized within the HPSG framework (Pollard and Sag, in press), in at least two ways.

---

[13] This assumption is not without problems. That is, the problem arises whether a pro coindexed with the genitive NP can be replaced by its corresponding explicit pronoun. This substitution in the constructions under discussion is bad in most cases. To solve this problem, I assume following J. Yoon (this volume) that pro and overt pronouns do not have exactly the same distribution.

One analysis involves a flat structure as in (25).[14]

(25)
```
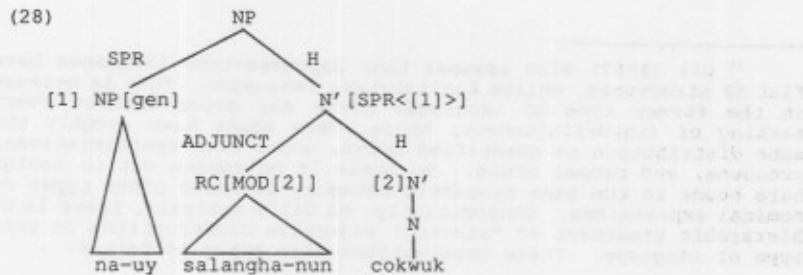              N'
         ┌────┼────┐
    NP[gen]   RC    N'
                     │
                     N
```

(26) LP Statement: X < head

Here we assume that NPs in Korean have flat structure, analogous to the flat (VP-less) structure for sentences proposed by Chung (1993). And the LP statement in (26) accounts for scrambling automatically, since there is no precedence relation between NP[gen] and RC. The most probable HPSG schema for licensing the structure in (25) seems to be a modified Head-Adjunct Schema as in (27).

(27) Head-Adjunct Schema: XP ---> YP*,   XP

                                       ADJUNCT HEAD

---

[14] Gil (1987) also assumes that Japanese-type languages have flat NP structures, unlike English-type languages. This is because in the former type of languages nouns may occur without overt marking of (in)definiteness; hence, bare nouns have roughly the same distribution as quantified nouns, nouns with demonstratives, pronouns, and proper nouns. So there is no reason not to assign bare nouns to the same syntactic category as these other types of nominal expressions. Concomitantly, on Gil's analysis, there is no hierarchic treatment of "stacked" adjective constructions in this type of language. These observations also apply to Korean.

An alternative HPSG analysis would adopt the word order domain approach suggested by Reape (1990). This approach rejects phrase structure as the basis of word order. Instead, it projects word order domains, allowing them to consist of elements which are -- in terms of the syntactic derivation -- not sisters and therefore couldn't be ordered with regard to each other in a strictly phrase-structure based approach, so that "sequence union" of domains may operate. The sequence union operation is a linear ordering operation informally defined as follows: When a nonhead expression and a head expression combine, parts of each expression can be intercalated as long as the precedence relations in both nonhead and head expression remain the same, i.e., as long as the LP statement holds. If we apply this sequence union operation to the example syntax tree shown in (28), we will have the domain tree of (29) which shows how scrambling occurs, i.e., the sequence union of the NP[gen] and N' word order domain allows us to have both *na-uy salangha-nun cokwuk* and *salangh-nun na-uy cokwuk* as outputs. We can apply this approach to the construction discussed, since the lexical head is in the final position and the LP statement applies to every domain.

(28)

```
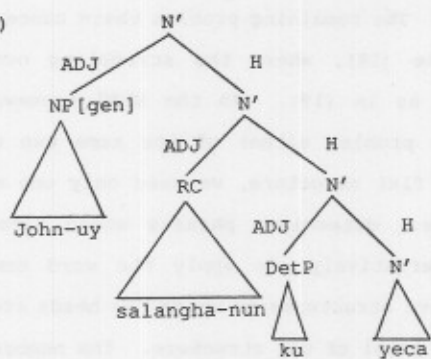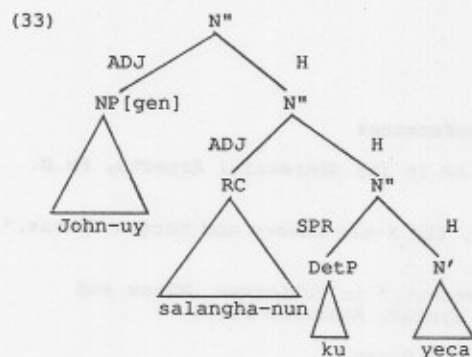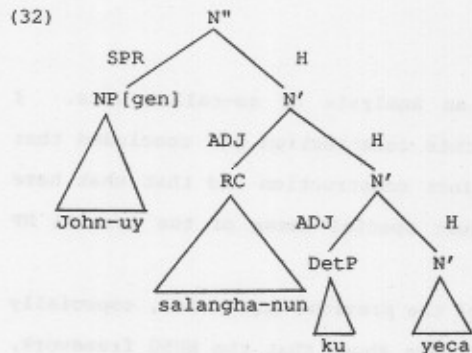                        NP
           SPR        /    \        H
        [1] NP[gen]            N' [SPR<[1]>]
          /   \          ADJUNCT    /        H
         /     \      RC[MOD[2]]   [2]N'
        /       \       /  \          |
       /         \     /    \         N
                                      |
      na-uy    salangha-nun        cokwuk
```

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(29)   [NP [NP na-uy] [RC salangha-nun] [N cokwuk]]
                         or
        [NP [RC salangha-nun] [NP na-uy] [N cokwuk]]

        [NP na-uy]   [N' [RC salangha-nun] [N cokwuk]]

                        [RC salangh-nun]   [N cokwuk]

    LP statement: X < lexical head

    We have seen so far how the problem of scrambling, which is
solved in none of Yoon (1991)'s, Yang (1987)'s, or Kang (1988)'s
approaches, can be solved within the HPSG framework.   In (17),
however, it was shown that the problem of scrambling in the example
construction could be solved by positing a Del(limiter) Phrase
above DP, as in Yoon (1990). The remaining problem there concerned
more general structure like (18), where the scrambling occurs
between three constituents as in (19).   In the HPSG framework,
however, we can solve this problem either of the same two ways
described above. To get a flat structure, we need only one more
daughter node in (25), i.e., determiner phrases would also be
treated as adjuncts. Alternatively, to apply the word domain
approach, we need only to have structures in which the heads are in
the final positions at each level of the structure. The number of
possible structures seems to be four as follows, depending on
whether the possessive NP and the determiner phrase are treated as
an adjunct or an specifier respectively.

(30)　X" ---> Y"*,　X'
　　　　　　　　SPR　HEAD

(31)

(32)

```
                        N"
             SPR              H
        NP[gen]                N'
                         ADJ       H
                         RC         N'
      John-uy                  ADJ     H
                              DetP     N'
              salangha-nun
                             ku      yeca
```

(33)

```
                        N"
             ADJ              H
        NP[gen]                N"
                         ADJ       H
                         RC         N"
      John-uy                  SPR     H
                              DetP     N'
              salangha-nun
                             ku      yeca
```

For the present, it seems difficult to determine which one of these four structures is to be preferred. To answer this question, it will be necessary to investigate more general NP structures. I leave this question for future study.

5. Conclusion

In this paper, I provided an analysis of so-called GRCs. I examined the approaches to this construction and concluded that GRCs do not exist as a distinct construction and that what have been analyzed as GRCs are just special cases of the general NP structure I developed.

And given the problems of the previous approaches, especially the problem of scrambling, I have shown that the HPSG framework, with or without the word domain approach, offers promising alternatives.

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Subcategorization and Case Marking in Korean

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1. Introduction

The case marking of the so-called small clause construction and raising construction in Korean has been paid much attention to in the literature. Especially the mechanism of Exceptional Case Marking (ECM) has been popularly assumed in order to account for these constructions. Kim (1989) and Lee (1991), respectively, explains the case marking of the so-called small clause construction and raising construction in terms of ECM. In this paper, after some problems with Kim (1989) and Lee (1991) are discussed, it will be examined how these constructions can be dealt with within the framework of HPSG.

If we assume a flat structure for both constructions following Pollard & Sag (1993), the case assignment can be accounted for without an ECM mechanism. However, in this case, the case marking in the raising construction in Korean cannot be explained by a lexical specification of case which is the standard case assignment mechanism in HPSG. To remedy this, the notion of structural case will be adopted and a principle will be proposed to resolve the structural case.

On the other hand, the idea of lexical specification of case will still be maintained for the case marking of the so-called emotion verbs. Therefore, it is assumed that there are two sorts of case, structural and lexical. In the later section of this paper, the present analysis will be extended to the case marking of the complex predicate construction which consists of auxiliary verb(s) and a governed verb.

2. So-Called Small Clause Constructions

2.1. Previous Analysis

The following sentences are analyzed as small clause analogs of ECM structures by Kim (1989):[1]

(1) a. John-i [pp Mary-lul   papo-lo]   yeki-n-ta.
       John-nom   Mary-acc   fool-as(prep.) consider-pres-dec
       'John considers Mary a fool.'

---

[1]The abbreviation 'dec' is used for a declarative marker.

b. John-i [$_{AP}$ Mary-lul   yeppukey] yeki-n-ta.
   John-nom Mary-acc pretty   consider-pres-dec
   'John considers Mary pretty.'
c. John-i [$_{VP}$ Mary-lul kakey] mantul-ess-ta.
   John-nom Mary-acc go   make-past-dec
   'John made Mary leave.'
d. John-i [$_{NP}$ Mary-lul papo-lul] mantul-ess-ta.
   John-nom Mary-acc fool-acc make-past-dec
   'John made Mary a fool.'
e. John-i [$_{PP}$ Mary-lul papo-lo]   mantul-ess-ta.
   John-nom Mary-acc fool-as(prep.) make-past-dec
   'John made Mary a fool.'

Kim assumes that all categories have subjects and that small clause subjects are in the Spec positions of X°, which in turn are projections of small clause predicates, following Stowell (1983). According to her, a small clause subject is assigned an Exceptional Case by a matrix verb since small clauses lack internal case assigners. She also agrees with Stowell (1988) in the respect that small clause subjects have dual characteristics as subjects of small clauses and objects of matrix sentences, and that the objecthood of small clause subjects follows from the fact that small clause subjects are governed by matrix verbs.[2] However, the evidence from binding in Stowell (1988), which is claimed to support the subjecthood of small clause subjects in English, does not apply in Korean, because long distance binding is also possible for reflexive anaphors like *caki*.[3]

   A major problem of her analysis is that we can generate ungrammatical sentences like the following, since there is no category difference between a normal XP and a small clause XP:

(2) *Mary-ka [$_{PP}$ John-eykeyse] yeki-n-ta.
    Mary-nom   John-from   consider-pres-dec

   Moreover, her `restructuring' analysis of a sentence like (1d), which is shown in the following, is also problematic:

(3)

---
[2] Kim (1989) says small clause subjects behave like direct objects in matrix sentences in case marking, pronoun reflexivization, NP-movement and scrambling.
[3] The following examples are given in Stowell (1988):
  i) Mary considers Bill kind to himself / *herself.
  ii) Mary considers Bill too kind to her / *him.

In (3), the nominal predicate *papo* is argued to be head-to-head adjoined to the matrix verb *mantulta* and to be assigned accusative case from the matrix verb. However, the following sentence cannot be explained by restructuring since the nominal predicate is a phrase and cannot be head-to-head adjoined:

(4) Mary-ka John-ul cangan-eyse uttumka-nun uysa-lul mantul-ess-ta.
     Mary-nom John-acc city-in   best   doctor-acc make-past-dec
     'Mary made John the best doctor in the city.'

   Another problem with her analysis is that she cannot account for the following sentence in which the small clause verb appears with a nominative NP:

(5) John-i [Mary-ka ttenakey] mantul-ess-ta.
     John-nom Mary-nom leave   make-past-dec
     'John made Mary leave.'

As she assumes that the small clause verb *kakey* in (1c) is not a case assigner and that this fact triggers ECM from the matrix verb, she cannot explain how the NP *Mary* is assigned a nominative case in (5).

2.2. No Small Clauses

A more direct way of explaining the object-like properties of the second NP's in (1) is to say that they are subcategorized for by the matrix verbs and there are no phrasal categories of small clauses. Following Pollard & Sag's (1993) analysis of small clauses in English, we can assume the following structure for (1a):[4]

(6)   S
        ┌────┬────┬────┐
       NP   NP   VP   V
       △   △   △ |
    John-i Mary-lul yeppukey yekinta

In (6), both the NP *Mary-lul* and the VP *yeppukey* are complements of the matrix verb, and the accusative case of *Mary* is assigned in the lexical entry of the verb *yeki-*. Thus we don't need the Exceptional Case Marking mechanism any more. The lexical entry for the verb *yeki-* is described as follows:[5]

(7) yeki- [SUBJ <NP[nom]>
            COMPS <[2]NP[acc], { VP[+STATIVE, VFORM -key, SUBJ<[2]>] } >
                               { PP[PFORM -lo, SUBJ<[2]>] }   ]

---

[4] Whether *Mary-lul yeppukey yekin-ta* forms a VP is a separate issue. I am assuming a flat structure for Korean sentences, following Chung (to appear).

[5] The PP complement in this entry is for the sentence (1a).

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A similar lexical entry can be given for the verb *mantul-* in (1c) - (1e) as in (8):[6]

(8) mantul- ⎡ SUBJ <NP[nom]>
          ⎢ COMP <[2]NP[acc], ⎧ VP[VFORM -key, SUBJ<[2]>] ⎫ >
          ⎢   ⎨ PP[PFORM -lo, SUBJ<[2]>]   ⎬
          ⎣   ⎩ NP[Case[acc], SUBJ<[2]>]   ⎭

The above account is based on the general assumption in HPSG that only finite forms of a verb assign a case to their subject. As the VP in (6) is always nonfinite, it does not specify a case for the NP *Mary* which is in the SUBJ list of the head of the VP. Therefore, the only source from which *Mary* is assigned a case is the matrix verb. Though this general assumption appears to be tenable for the account of the above examples, there is, however, a problematic case where we need to assume that even nonfinite verbs assign a case to their subjects. Consider the following:

(9) a. Mary-ka   John-i   hakkyo-ey ka-key mantul-ess-ta.
        Mary-nom John-nom   school-to go   make-past-dec
        `Mary made John go to school.'
     b. Mary-ka   John-ul   hakkyo-ey ka-key mantul-ess-ta.
        Mary-nom John-acc   school-to go   make-past-dec
        `Mary made John go to school.'

The case for *John* freely alternates in (9). The only apparent ways that *John* in (9a) can get nominative case are either from the verb *ka-* or from the verb *mantul-*. If we assume that *John* is subcategorized for by the matrix verb in (9a) and that *kakey* does not assign case, then we should say the verb *mantul-* assigns either nominative or accusative to its complement NP. On the other hand, if we assume that *mantul-* in (9a) takes the sentential complement *John-i hakkyo-ey ka-key*, then the NP *John* should get nominative case from the nonfinite verb *ka-key*. At this point, I suggest the latter analysis as the preferred one, since there are some other examples where a nominative NP is the subject of a nonfinite verb. Consider the following:

(10) a. Ku-nun [ecey   tongsayng-i cwuk-ese] sulphu-ta.
        he-top   yesterday brother-nom die-because sad-dec
        `He is sad because his brother died yesterday.'
     b. Ku-nun [ecey   tongsayng-i cwuk-ess-umulo] sulphu-ta.
        he-top   yesterday brother-nom die-past-because sad-dec
        `He is sad because his brother died yesterday.'

(11) a. Nay-ka chwumchwu-(ess)-ko tongsayng-i noray-lul pwulu-ess-ta.
        I-nom   dance-(past)-and   sister-nom   song-acc sing-past-dec
        `I danced, and my sister sang a song.'
     b. Na-nun   chwumchwu-ess-una tongsayng-un   chwumchwuci anh-ass-ta.
        I-contrastive dance-past-but   sister-contrastive dance   don't-past-dec
        `I danced, but my sister didn't dance.'

---

[6]The idea of raising-to-object is represented in (7) and (8) by structure sharing between small clause subjects and matrix objects.

In a subordinate clause with -*ese* in (10a), a finite form of verb is not allowed, but the subject is nominative. (On the other hand, in a subordinate clause with a synonymous conjunction -*umulo* in (10b), only a finite verb is used.) Moreover, a nonfinite verb can be (and usually is) used in a coordinate clause in (11a) with a nominative subject. One might want to explain such facts on the basis that the nonfinite forms in (10a) and (11a) are given by a lexical rule which changes finite verbs into nonfinite verbs when they are used with certain conjunctions. However, in that case, it would be very difficult to generalize as to when this lexical rule is applied, since even synonymous conjunctions take different forms of verbs as in (10).

If we assume that nonfinite verbs also assign nominative cases and that each conjunction selects either finite or nonfinite verbs, (10) and (11) can be accounted for in a much simpler way. Therefore, I will assume that nonfinite verbs as well as finite verbs assign nominative case in Korean. More detailed discussion of (9) will be provided in section 3.3.

When we assume (6) as the structure for (1b), a potential problem is that the order between a complement NP and a complement VP is not free as we usually observe in other sentences in Korean where the arguments of a verb are freely scrambled. Consider the following examples:

(12)a. John-i   Mary-lul   yeppukey   yeki-n-ta.
       John-nom Mary-acc pretty   consider-pres-dec
       'John considers Mary pretty.'
    b. Mary-lul John-i yeppukey yekin-ta.
    c. ?*John-i yeppukey Mary-lul yekin-ta.

Another interesting fact is that the object NP in a VP complement of a small clause verb can be scrambled out of the VP. (13) and (14) exemplifies this:

(13)a. John-i   [NP Mary-lul] [VP sakwa-lul   mekkey] mantul-ess-ta.
       John-nom   Mary-acc   apple-acc   eat   make-past-dec
       'John made Mary eat an apple.'
    b. (?) John-i sakwa-lul Mary-lul mekkey mantul-ess-ta.
    c. ?* John-i sakwa-lul mekkey Mary-lul mantul-ess-ta.

(14)a. John-i   [NP Mary-lul] [VP hakkyo-ey kakey] mantul-ess-ta.
       John-nom   Mary-acc   school-to   go   make-past-dec
       'John made Mary go to school.'
    b. (?) John-i hakkyo-ey Mary-lul kakey mantul-ess-ta.
    c. ?* John-i hakkyo-ey kakey Mary-lul mantul-ess-ta.

To explain the above scrambling facts, I will adopt the linearization approach of Reape (in press). Moreover, to block scrambling between two complements of a small clause verb, the following LP rule is proposed:

(15)   [1]   <   [SUBJ <[1]>]

Let us see how this works. Reape claims that word order is determined within *word order*

domains and that the word order domain of a daughter may be the same as a subpart of the domain of its mother. Formally this idea is described by the sequence union relation, $\cup_{()}$ (A, B, C), where C contains all and only the elements of A and B and any pair of elements from A or B can be found in the same relative order. (cf. Reape (in press)) On Reape's analysis, it is assumed that phrasal signs bear a DOM feature, and it is further assumed in Pollard, Kasper & Levine (1992) that DOM elements are of type *node* whose only appropriate features are PHON and SYNSEM.[7]

If we follow these assumptions, the feature geometry of the head verb and the VP complement in (13a) can roughly be represented as follows:

(16)
$$
\begin{bmatrix}
\text{NODE} & node\begin{bmatrix}\text{PHON} & \text{permute (<sakwa-lul, mekkey>)}\\ \text{SYNSEM}\end{bmatrix}\\[2em]
\text{DTRS}\begin{bmatrix}\text{HEAD-DTR} & word\begin{bmatrix}\text{NODE [4]} & \begin{bmatrix}\text{PHON <mekkey>}\\ \text{SYNSEM V}\end{bmatrix}\\ \text{DOM <[4]>}\end{bmatrix}\\[2em]
\text{COMP-DTRS} < phrase\begin{bmatrix}\text{NODE [3]} & \begin{bmatrix}\text{PHON <sakwa-lul>}\\ \text{SYNSEM NP}\end{bmatrix}\\ \text{DTRS}\\ \text{DOM <[3]>}\end{bmatrix} >\end{bmatrix}\\[2em]
phrase\quad \text{DOM} \quad \text{permute (<[3], [4]>)}
\end{bmatrix}
$$

(17)
$$
\begin{bmatrix}
\text{NODE [5]}\begin{bmatrix}\text{PHON <mantulta>}\\ \text{SYNSEM}\begin{bmatrix}\text{HEAD} & \text{verb}\\ \text{VAL}\begin{bmatrix}\text{SUBJ} < \begin{bmatrix}\text{NP}\\ \text{UNIONED-}\end{bmatrix} >\\ \text{COMPS} < \begin{bmatrix}\text{NP}\\ \text{UNIONED-}\end{bmatrix}, \begin{bmatrix}\text{VP}\\ \text{UNIONED+}\end{bmatrix} >\end{bmatrix}\end{bmatrix}\end{bmatrix}\\[2em]
word\quad \text{DOM <[5]>}
\end{bmatrix}
$$

In (16), though the head and the complement daughter are permutable in principle,[8] a phrase such as *mekkey sakwa-lul* will be blocked by the following LP rule, which is needed to explain the head-final property of Korean (cf. Chung , to appear):

(18)   X   <   head

The use of the feature UNIONED in (17) is adopted from Reape, and verbs are assumed to select complements that are either UNIONED +, -, or unspecified.[9] As the complement VP of

---

[7]They explain that DTRS or DOM features are not appropriate for the type *node*, since elements of order domains do not refer to internal tectogrammatical (DTRS) structure, or to more deeply embedded levels of phonogrammatical (DOM) structure. (cf. Pollard, Kasper & Levine 1992:14)

[8]Actually, this assumption is necessary for the case where there are more than one complement daughter in a phrase.

[9]The way that I use this feature follows Calcagno (1993) as well.

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the verb *mantulta* is specified as UNIONED +, the elements of the word order domain of VP will become elements of the higher word order domain, i.e., domain of the matrix S. Therefore, the word order domain of S consist of five elements:[10]

(19)   S : { [1],[2],[3],[4],[5] }

NP[NODE[1]]: {[1]}   NP[NODE[2]]: {[2]}   VP[NODE[6]]: { [3],[4] }   V[NODE [5]]: {[5]}

                                                NP: {[3]}   V: {[4]}

        John-i   Mary-lul   sakwa-lul   mekkey   mantul-ess-ta

The five elements in the DOM of S are permutable with each other, so long as the head [5] is final and [3] precedes [4].[11]

     Now the account of (13b) is straightforward. As the NP *sakwa-lul* and the NP *Mary-lul* are in the same word order domain and there is no violation of LP rules, *sakwa-lul* can precede *Mary-lul*. On the other hand, (13c) is blocked by the LP rule in (15).

     The LP rule in (15) will limit the freedom of order between complements of a small clause verb to some degree. However it will still allow scrambling in equi verb constructions such as (20):

(20)a John-i   Mary-lul   hakkyo-ey ka-ra-ko seltukha-ess-ta.
        John-nom Mary-acc school-to   go   persuade-past-dec
        'John persuaded Mary to go to school.'
    b. John-i hakkyo-ey ka-ra-ko Mary-lul seltukha-ess-ta.

According to Pollard & Sag (1993), one of the differences between equi verbs and raising verbs is that for equi verbs, the VP complement's unexpressed subject is only coindexed with a NP complement, not structure-shared with it. Therefore, the LP rule (15) does not block the scrambling between *Mary-lul* and *hakkyo-ey ka-ra-ko* in (20).

3. Raising Verbs

3.1. Raising Verb Construction

An interesting case alternation is observed in a construction with a raising verb in the following:[12]

---

[10]For convenience, the notation { } is used to represent the word order domain of each sign.
[11][3] precedes [4] here, since [3] should precede [4] by (18) in the DOM of the complement VP, and this order is kept when the elements of the VP are sequence unioned into a higher DOM.
[12]Actually, the term `raising verbs' is not appropriate here, since both the small clause verbs and the *believe*-type verbs are treated as raising verbs in HPSG. However, I will often use this term to refer only the *believe*-type raising verbs to distinguish them from small clause verbs. Unlike in English, Korean *believe*-type raising verbs

(21) Mary-ka   John-i   ttokttokha-ta-ko mit-nun-ta.
     Mary-nom John-nom   smart-dec-comp   believe-pres-dec
     'Mary believes that John is smart.'
(22) Mary-ka   John-ul   ttokttokha-ta-ko mit-nun-ta.
     Mary-nom John-acc   smart-dec-comp   believe-pres-dec
     'Mary believes that John is smart.'

Some verbs which belong to this category are listed in the following:

(23) mit- `believe'              nukki- `feel'
      sayngkakha- `think'         phyengha- `criticize'
      kancuha- `consider'         incengha- `admit'
      chakkakha- `mistake'   carangha- 'take pride in'
      pwunsekha- `analyze'

3.2. Previous Analysis

Lee (1991) proposes the following structure for the VP in (22):

(24)

In his analysis he argues that the NP *John* which was in the Spec of IP in (21) is raised to Spec of CP by `focalization' in (22). Thus *John* gets case from the matrix verb *mit-* via ECM. He assumes that the A' chain (John-ul$_i$, e$_i$) is not subject to the Chain Condition and can bear dual case (nominative from I, and accusative from *mit-*) following Massam (1985).

However, there is a problem in his analysis. The trace left behind in the SPEC of IP must be properly governed, but it cannot be governed by its antecedent *John-ul*, since C' forms a barrier according to Chomsky's (1986) Minimality Condition. Lee proposes the Case Minimality Condition in (25) to avoid this problem and to explain the contrast in (26):

(25) Case Minimality Condition:
     In the configuration ...α...[$_\gamma$ ...δ...β]..., α does not govern β if γ is a minimal Case domain, the
     (immediate) projection of δ, a Case-assigner, containing a maximal projection that is governed
     by δ.

---

take finite VP complements.

(26) a. John-i [$_{CP}$ Mary-lul$_i$ t$_i$ yeppu-ess-ta-ko]   mit-nun-ta.
    John-nom Mary-acc   pretty-past-dec-comp believe-pres-dec
    'John believes that Mary was pretty.'
   b.*John-i [$_{CP}$ Mary-lul$_i$ t$_i$ Tom-ul po-ass-ta-ko]   mit-nun-ta.
    John-nom   Mary-acc   Tom-acc see-past-dec-comp believe-pres-dec
    'John believes that Mary saw Tom.'

In (25), the basic idea is that the case-assigning property of the embedded predicate is relevant to the barrierhood of the embedded IP. According to Lee, the embedded I' is a minimal case domain in (26a), whereas both the embedded VP and the embedded IP are minimal case domains in (26b). Therefore, he says that the trace in (26a) is properly governed, whereas the trace in (26b) is not.

However, contrary to Lee's generalization that ECM is possible in *believe* type constructions only when the embedded predicate is a non-case-assigner, the following sentences are judged to be acceptable by some speakers:[13]

(27) a.(?) John-i   Mary-lul   sakwa-lul mek-ess-ta-ko   mit-nun-ta.
      John-nom Mary-acc apple-acc eat-past-dec-comp believe-pres-dec
      'John believes that Mary ate an apple.'
   b.(?) John-i   Mary-lul sicang-ul   ka-ss-ta-ko   mit-nun-ta.
      John-nom Mary-acc market-acc go-past-dec-comp believe-pres-dec
      'John believes that Mary went shopping.'

Moreover, when two accusative NPs are separated by other material, acceptability seems to improve:

(28) John-i   Mary-lul haru-ey hanpen-ssik cinthongcey-lul   pokyongha-n-ta-ko
    John-nom Mary-acc day-on   once-per   pain-reliever-acc take
    mit-nun-ta.
    believe-pres-dec
    'John believes that Mary takes a pain reliever once a day.'

Therefore, it can be assumed that *believe* type raising constructions are possible even with non-stative embedded predicates.[14]

Even if we assume Lee's grammaticality judgment on (26b) and his Case Minimality Condition, there is a serious problem in his analysis. Because an embedded IP is a barrier when it contains a verb which assigns a case to its complement as in (26b), the following relative clause and passive sentences cannot be accounted for:

(29) [$_{NP}$[$_{CP}$ saramtul-i [$_{CP}$[$_{IP}$ t$_i$ tok-ul   cinyess-ta]-ko] mit-nun]   paym$_i$]
       people-nom   poison-acc have-dec-comp believe-pres snake
    'a snake that people believe to have poison'

---

[13]Moreover, for some speakers, (26b) is acceptable, too. For those speakers for whom (26b) is worse than (27), it seems that two consecutive proper names with the same accusative case make processing harder.
[14]If there are speakers for whom (27) and (28) are also bad, we can assume that in their lexicon, *mit*-subcategorizes for a VP whose head is [+stative].

(30) Ku paym-i_i   saramtul-eyuyhay [_{CP}[_{IP} t_i tok-ul   cinyess-ta]-ko] mit-e ci-n-ta.
   the snake-nom people-by   poison-acc have-dec-comp believe passive-pres-dec
   `The snake is believed to have poison (by people).'

In both the above examples, the embedded IP is a minimal case domain according to Lee, so the subject traces cannot be properly governed. Therefore, his Case Minimality approach is problematic. If we come back and assume Chomsky's Minimality Condition, (26a) cannot be accounted for in Lee's raising-to-CP analysis, as it was mentioned before.

   In addition, we can provide a piece of evidence that *John* in (22) is a matrix sentence argument rather than an element of the embedded sentence, borrowing Postal's classical argument for raising to subject. In Korean, a matrix adverbial cannot scramble into an embedded S despite its free position within a matrix S. The following exemplifies this:

(31) a. Elisekkeydo, John-i   [Mary-ka   pwuca-la-ko] mit-nun-ta.
       stupidly   John-nom Mary-nom rich-comp   believe-pres-dec
     `Stupidly, John believes that Mary is rich.'
   b. *John-i [Mary-ka elisekkeydo pwuca-la-ko] mit-nun-ta.

However, it is possible in raising situations as in (32):

(32) a. Elisekkeydo, John-i   Mary-lul   pwuca-la-ko   mit-nun-ta.
       stupidly   John-nom Mary-acc rich-comp   believe-pres-dec
     `Stupidly, John believes that Mary is rich.'
   b. John-i   Mary-lul   elisekkeydo pwuca-la-ko   mit-nun-ta.
     John-nom Mary-acc stupidly   rich-comp   believe-pres-dec
     `John believes stupidly that Mary is rich.'

(32) is explained straightforwardly if we assume that *Mary-lul* is a matrix argument.

3.3. A Flat Structure for Raising Verbs and its Consequences

Now, what I want to propose is that the case alternation in (21) and (22) arises from different structures due to dual subcategorization of raising verbs. In (21), *mit-* subcategorizes for a sentence as a complement, whereas in (22) it subcategorizes for the two complements NP *John-ul* and VP *ttokttokha-ta-ko*. This is shown in the following:

(33) a.

b.

```
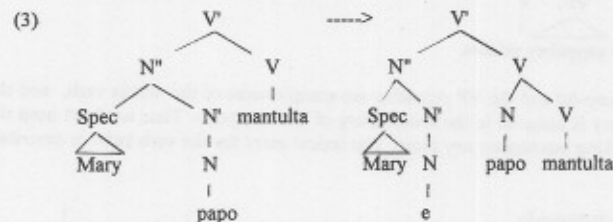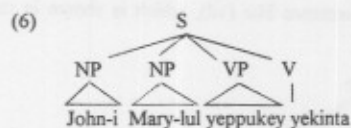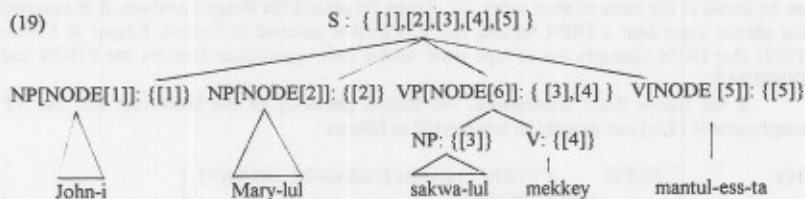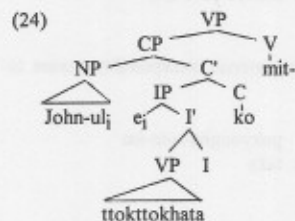                          S
        ┌─────────┬────────┬──────────┐
     NP[nom]   NP[acc]   VP[ko]      V
        │         │         │         |
     Mary-ka   John-ul  ttokttokha-ta-ko  mit-nun-ta
```

Accordingly, I assume the following lexical entries (34a) and (34b) for (33a) and (33b), repectively:

(34) a. mit- $\begin{bmatrix} \text{SUBJ <NP[nom]>} \\ \text{COMP <S[MARKING -\underline{ko}]>} \end{bmatrix}$

   b. mit- $\begin{bmatrix} \text{SUBJ <NP[nom]>} \\ \text{COMPS <[2]NP[acc], VP[SUBJ[2], MARKING -\underline{ko}]>} \end{bmatrix}$

   (34b) shows that the morpheme -*ko* is not treated as a complementizer attached to an S. Instead, it is analyzed as a marker attached to VP. As both S and VP (which is looking for a subject) are represented as projections of V in HPSG, there is no reason why we cannot consider -*ko* a marker which selects a projection of V via its SPEC feature. Then, a lexical entry for -*ko* is given as follows:

(35) ko- $\begin{bmatrix} \text{HEAD marker[SPEC phrase[HEAD V}\begin{bmatrix}\text{VFORM -\underline{ta}, unmarked}\\\text{COMPS < >}\end{bmatrix}\text{]]} \\ \text{MARKING \underline{ko}} \end{bmatrix}$

   However, in fact, the lexical entry in (34b) is problematic, since the complement VP is finite, as (36) clearly shows:

(36) John-i   Mary-lul   ttokttokhay-ss-ta-ko   mit-nun-ta.
     John-nom   Mary-acc   smart-past-dec-comp   believe-pres-dec
     `John believes Mary to have been smart.'

   As the finite verb *ttokttokha-* has a lexical entry in which the SUBJ value is NP[nom], we have a case conflict in (34b). The SUBJ value of the complement VP is NP[acc] on the one hand, because it is structure-shared with the complement NP[acc]. On the other hand, it should be NP[nom], since the VP has the same SUBJ feature as its head *ttokttokha-* by the Valence Principle.
   This suggests that the case marking in (22) and other raising verb constructions cannot be accounted for lexically, which is generally assumed to be the case assignment mechanism in HPSG. Instead, what we can see in (33b) is that the accusative case of the NP complement is connected to the fact that it is realized as a complement of the verb *mit-* but is not realized as a subject of the VP *ttokttokha-ta-ko*.
   To solve this problem, I want to borrow the notion of structural case which is introduced into HPSG by Pollard (1993) for the account of German passives. His basic idea is that the case of some NPs is not lexically assigned, but just specified as [structural] in the lexicon and surfaces

as either nominative or accusative depending on the syntactic context.

     Assuming this, we can treat *Mary* in (22) as a structural NP. Since most verbs in Korean can appear in the complement VP of a raising verb, we need to extend the notion of structural case to almost every verb in Korean. Therefore, most verbs in Korean can be specified in the lexicon in such a way that they subcategorize for structural NPs for both subjects and complements. Accordingly, the lexical entries of *ttokttokha-* and *mit-* should be changed as follows:

(37) a. mit- $\begin{bmatrix} \text{SUBJ} <\text{NP[str]}> \\ \text{COMPS} <\text{S}> \end{bmatrix}$

    b. mit- $\begin{bmatrix} \text{SUBJ} <\text{NP[str]}> \\ \text{COPMS} <\text{[2]NP[str], VP[SUBJ[2], MARKING -ko]}> \end{bmatrix}$

(38) ttokttokha- $\begin{bmatrix} \text{SUBJ} <\text{NP[str]}> \end{bmatrix}$

Now, we need a principle to resolve a structural case to either nominative or accusative in a surface structure. I propose the following principle for this:

(39) Case Principle (for Korean)

    A unresolved structural NP which is a daughter of a phrase α is [nom] if it is a SUBJ-DTR of α , and [acc] if it is a COMP-DTR of α .

    Let us consider (22) in terms of the lexical entry in (37b) and the above principle. In (37b) both structural NPs are realized as a daughter of a phrase S as follows:

(40)
```
                        S
          ┌──────┬───────┴───────┐
     NP[str]   NP[str]   VP[ko]     V
        ⇓         ⇓
      [nom]     [acc]
```

In (40) the first structural NP is specified as [nom] and the second NP is specified as [acc] by (39). However, the structural NP in the SUBJ list of *ttokttokha-* in (38) will not surface as nominative, since it is not realized as a daughter in any phrasal projection of *ttokttokha-*. Thus we can account for (22) without case conflict.

    In 2.2, I provided an example in which we needed to assume that nonfinite verbs are also responsible for nominative case assignment. It is repeated in the following for convenience:

(41) a. Mary-ka   John-i   hakkyo-ey ka-key   mantul-ess-ta.
       Mary-nom John-nom school-to go   make-past-dec
       'Mary made John go to school.'
    b. Mary-ka   John-ul   hakkyo-ey ka-key   mantul-ess-ta.
       Mary-nom John-acc school-to go   make-past-dec
       'Mary made John go to school.'

To account for the case alternation in (41), I will assume that the verb *mantul-* has two lexical entries as follows:

(42) a. mantul- $\begin{bmatrix} \text{SUBJ <NP[str]>} \\ \text{COMPS <S[VFORM -\underline{key}]>} \end{bmatrix}$

b. mantul- $\begin{bmatrix} \text{SUBJ <NP[str]>} \\ \text{COPMS <[2]NP[str], VP[SUBJ[2], VFORM -\underline{key}]>} \end{bmatrix}$

Then, I will eliminate the distinction between finite and nonfinite verbs with respect to case assignment capacity in Korean. Thus the nonfinite form *ka-key* has the following lexical entry:

(43) ka- $\begin{bmatrix} \text{SUBJ <NP[str]>} \end{bmatrix}$

The structural NP which is in the SUBJ list of *ka-* will be specified as nominative in (42a) since it is realized as a subject daughter of the embedded S, whereas it will surface as [acc] in (42b) since it is realized as a complement daughter of the matrix S. It follows from this that the nonfinite verb *yeppukey* in (1b) also subcategorizes for a structural NP for its subject, but as this structural NP is not realized in a phrase it does not cause any case conflict.

  Though a large part of case assignment can be covered by the notion of structural NP and the Case Principle, it does not seem that the idea of lexical specification of case should be given up. In the following section, it will be argued that lexical specification of case is necessary for the so-called emotion verbs in Korean.

4. Case Marking of Emotion Verbs

4.1. Emotion Verbs

Korean has a set of verbs called emotion verbs or psych-verbs. Their general characteristics are described as follows in No (1991):[15]

(44) a. They do not occur in a Realis Declarative inflection when the expressed experiencer is any entity other than the speaker.
 b. They do not occur in a Realis Interrogative inflection when the expressed experiencer is any entity other than the hearer(s).
 c. The restrictions above can lifted in presumptive registers.
 d. They denote the property of being in an emotional or sensory state.

He provides a list of emotion verbs in Korean, a few of which are given in (45):

---

[15] The term 'emotion verb' is adopted from No (1991).

(45) kulip- `miss'        mwusep- `be afraid'
      pwulep- `envy'       mip- `loath'
      yalmip- `hate'       silh- `dislike'

These verbs act idiosyncratically with respect to case marking on their complements: the complements have nominative case. (46) exemplifies this:

(46) a. Nay-ka pata-ka   kulip-ta.
        I-nom   sea-nom   miss-dec
        `I miss the sea.'
     b. *Nay-ka pata-lul kulip-ta.
        I-nom   sea-acc   miss-dec
        `I miss the sea.'

For this group of verbs, lexical specification of case is still needed, and I will assume the following lexical entry for emotion verbs:

(47) $\begin{bmatrix} \text{SUBJ <NP[str]>} \\ \text{COMPS <NP[nom]>} \end{bmatrix}$
     emotion verb

Therefore, the complements of emotion verbs are treated as non-structural NPs in my analysis and the Case Principle in (39) is not applicable to them.

Now, as it is assumed that there are two kinds of case, structural and lexical, clarification of our case system is in order. In the sort hierarchy of case, I assume that we have two subsorts, lexical and structural, both of which, in turn, have two subsorts, nominative and accusative. As a result, we have four different kinds of case as in the following (48), though morphologically there is no difference between structural case and lexical case:

(48) nom_1 acc_1 nom_2 acc_2

          nom   acc   lex   str

          MORPH   LEX/STR

                  CASE

4.2. De-emotionization

It has been observed that the morpheme *-ha-* can be attached to all the emotion verbs. Specifically, No (1989) suggests that attachability of *-e-haysse*, which is a past equal intimate form of *-e-ha*, is a sufficient condition for the membership of emotion verbs. This morpheme is treated as an auxiliary verb in some literature (cf. No (1991)), while it is treated as an affix in some Korean dictionaries.

The morpheme *ha* is peculiar in the respect that it is attached to only and all emotion verbs. This is a crucial difference from the other auxiliary verbs. Moreover, whenever it is attached to emotion verbs, it changes emotion verbs to non-emotion verbs.

Due to the above characteristics of this morpheme as a derivational affix, I want to distinguish *ha* from other auxiliary verbs, and assume that non-emotion forms of emotion verbs are derived by a lexical rule. As non-emotion verbs differ from emotion verbs in case marking, this should be specified in the lexical rule, too. The following is the de-emotionization lexical rule:[16]

(49)   emotion verb [COMPS <NP[nom$_1$]>]

$$\Downarrow$$

non-emotion verb [COMPS <NP[acc$_1$]>]

The PHON value is not given in (49), but we can assume a morphological function which takes the emotion verb as input and gives us a non-emotion verb form with *-e-ha-* as output.[17] (cf. Pollard & Sag (1987:210))

Given this lexical rule, the different case markers in the following examples are accounted for:

(50)a. Nay-ka   pata-ka   kulip-ta.
        I-nom   sea-nom   miss-dec
        'I miss the sea.'
    b. Nay-ka   pata-lul   kuli-e-ha-n-ta.
        I-nom   sea-acc   miss-deemotionizer-pres-dec
        'I miss the sea.'

5. Case Marking of Complex Predicates

5.1. Analysis of Complex Predicates

Korean has so-called complex predicates which consist of a verb and one or more auxiliary verbs. Some examples are given in the following:

(51)a. Nay-ka   sakwa-lul   mek-key   toy-ess-ta.
        I-nom   apple-acc   eat   become-past-dec
        'I came to eat an apple.'
    b. Nay-ka   sakwa-lul   mek-ci   anh-ass-ta.
        I-nom   apple-acc   eat   don't-past-dec
        'I didn't eat an apple.'

---

[16] The output case in (49) is lexical accusative ([acc$_1$]) instead of [str], since lexical case cannot be changed into structural case, given the distinction in (48).

[17] As a result of de-emotionization, non-emotion verbs affixed with *-ha* lose the characteristics in (44).

    c. Nay-ka sakwa-lul mek-e   po-ass-ta.
       I-nom apple-acc eat   try-past-dec
       `I tasted an apple.'

(52)a. Nay-ka pata-ka   kuliw-e ci-ess-ta.
      I-nom sea-nom miss   become-past-dec
      `I came to miss the sea.'
   b. Nay-ka pata-ka   kulip-ci anh-ta.
      I-nom sea-nom miss   don't-dec
      `I don't miss the sea.'

    There have been various analyses of the structure of the above sentences. Among them I will adopt the lexical view presented in Cho (1988), Chan (to appear) and Sells (1991), in which a verb and an auxiliary verb form a compound verb (or complex verb). The basic structure is represented as follows:[18]

(53)

    Another assumption that I will make for complex predicate constructions is based on the notion of argument attraction proposed by Hinrichs & Nakazawa (in press, 1993). They claim that auxiliary verbs in German attract all the dependents of the governed verb. This idea is represented in the following lexical entry of the German auxiliary verb *wird* `will':

(54) <u>wird</u> $\left[$ SUBCAT append ([1], < V[SUBCAT [1]]>) $\right]$

In Chung (to appear), the notion of argument attraction is adopted in an account of Korean complex predicate construction in such a way that an auxiliary verb attracts the complements of its governed verb. The following lexical entry of the auxiliary verb *anh*- shows this:[19]

(55) <u>anh</u>- $\left[\begin{array}{l} \text{SUBJ} \ <NP_{[1]}> \\ \text{COMPS} \ [2] \\ \text{GOV} \ \ \ \text{V[SUBJ} <NP_{[1]}>, \text{COMPS} \ [2] \ ] \end{array}\right]$

    Then, consider the complex verb *mek-ci anh*- in (51b), which has the structure in (53). As the auxiliary verb *anh*- is the head, the Valence Principle requires that the COMPS value of the head matches that of the mother, i.e. the complex verb. As a result the complex verb *mek-ci anh* will have the complement of the governed verb as its complement:

---

[18]Cho's (1988) structure actually differs from (53), since she analyzes the suffixed verb forms with *-e*, *-key*, *-ci* or *-ko* as gerundive nominals and treats them as nouns. However, her analysis is basically the same as those of the others in the respect that the suffixed verb and another verb form a compound verb.

[19]The feature GOVERNEE is employed following Chung (to appear) to represent the relationship between head and governed verb in a compound verb. We also need to assume that (56) is licensed by Chung's HEAD-GOV Compounding Schema.

(56)
```
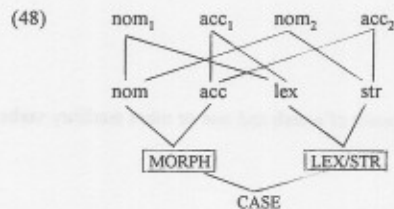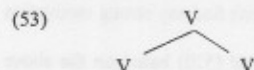                        V [ COMPS [2]]
              ┌──────────┴──────────┐
    [3] V[ COMPS [2] ]        V⌈COMPS  [2] ⌉
           │                   ⌊ GOV   [3]  ⌋
           │                         │
         mek-ci                    anh-
```

Before moving on, I would like to mention one more thing. In the section 2.2, I accounted for scrambling out of small clauses by a Reape-style linearization approach, and in this section I assumed Hinrichs-Nakazawa-style attraction for complex predicates. As these two assumptions are useful in formalizing a similar class of linguistic phenomena, our system might appear to be too powerful by assuming both. However, Reape-style linearization is necessary in explaining scrambling in small clause constructions, since in the examples such as (14) in which an adjunct scrambles out of the complement VP, the idea of "argument" attraction is not applicable. On the other hand, it is questionable how a Reape-style approach can account for the constituency in (53) and the inheritance of subcategorization information which comes from non-heads. (See Chan (to appear) and Sells (1991) for the arguments in favor of (53).) As I don't find any strong motivation for choosing just one of them, I assume in this paper.

Now we are in a position to examine the examples (51b) and (52b) based on the above assumptions and the discussions on case marking in previous sections. In (51b), the complex verb *mek-ci anh-* attracts the complement of the verb *mek-*, which is specified as [str] :

(57) a. mek- ⌈ SUBJ <NP[str]> ⌉
               ⌊ COMPS <NP[str]> ⌋

     b. mek-ci anh-⌈ SUBJ <NP[str]> ⌉
                   ⌊ COMPS <NP[str]> ⌋

As both structural NPs are realized as daughters in a phrase as in the following, each will be assigned [nom] or [acc] by (39):

(58)
```
                          S
            ┌────────────┼────────────────┐
        NP[str]       NP[str]              V
           ⇓             ⇓              ┌──┴──┐
        NP[nom]       NP[acc]           V     V
          △             △              │     │
        Nay-ka       sakwa-lul       mek-ci anh-ass-ta
```

On the other hand, when the auxiliary verb *anh-* in (52b) attracts the complement of the verb *kulip-*, the case for the complement of *kulip-* is already specified in the lexicon:

(59) a. kulip- ⌈ SUBJ <NP[str]> ⌉
                ⌊ COMPS <NP[nom]> ⌋

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b. <u>kulip-ci anh-</u> $\begin{bmatrix} \text{SUBJ} <\text{NP[str]}> \\ \text{COMPS} <\text{NP[nom]}> \end{bmatrix}$

In (59b), the structural NP in the SUBJ list of *kulip-ci anh-* is specified as nominative by (39) in the same way.

Our analysis also enables us to explain case marking of complex predicates that contains more than one auxiliary verbs. Consider the following examples:

(60) a. Nay-ka sakwa-lul mek-ci anh-key toy-ess-ta.
       I-nom apple-acc eat   don't   become-past-dec
       'I came not to eat an apple.'
     b. Nay-ka pata-lul/*-ka kuliw-e-ha-key   toy-ci anh-ass-ta.
       I-nom   sea-acc/*-nom miss-deemotionizer become don't-past-dec
       'I didn't come to miss the sea.'

In (60a) the structural NP *sakwa-lul* surfaces as accusative, since it is in the COMPS list of the complex verb *mek-ci anh-key toy*. On the other hand, in (60b), the accusative case of the verb *kuliw-e-ha* is obtained by a lexical rule in (49) and this information is propagated to the complex verb *kuliw-e-ha-key toy-ci anh-ass-ta*.

5.2. A Remaining Problem

With the auxiliary verb *sip-*, we have an interesting case alternation as follows:

(61) a. Nay-ka sakwa-ka/-lul   mek-ko sip-ta.
       I-nom apple-nom/-acc eat   want-dec
       'I want to eat an apple.'
     b. Nay-ka sakwa-ka/-lul   mek-ko sip-ci anh-ta.
       I-nom apple-nom/-acc eat   want   don't-dec
       'I don't want to eat an apple.'
     c. Nay-ka sakwa-ka/-lul   mek-ko sip-ci anh-key toe-ess-ta.
       I-nom apple-nom/-acc eat   want   don't   become-past-dec
       'I came to not want to eat an apple.'

What is different in (61) from other complex predicate constructions is that the auxiliary verb *sip-* behaves like an emotion verb. When *sip-* forms a complex verb with its governed verb, it shows the characteristics in (44). Moreover, *-ha-* is attachable to this complex verb changing it to a non-emotion verb. (62) exemplifies this:

(62) John-i   sakwa-lul/*-ka   mek-ko sip-e-ha-n-ta.
     John-nom apple-acc/*-nom eat   want-deemotionizer-pres-dec
     'John wants to eat an apple.'

Thus the nominative case of the NP *sakwa* in (61) which does not appear in (51) with other

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auxiliary verbs can be presumed to come from the emotion auxiliary verb *sip*-. As I assumed that emotion verbs lexically specify case on their NP complements, there is no reason that *sip*- cannot have this property. In fact, it would seem natural to assume *sip*- has the same property as other emotion verbs. However, the fact that we have case alternations in (61) suggests that *sip*-does not always assign lexical nominative case to its complement. In order to represent optional lexical case assignment by *sip*-, we can assume two separate lexical entries for *sip*- as in (63):

(63) a. sip_1- $\begin{bmatrix} \text{SUBJ} <NP_{[1]}> \\ \text{COMPS} [2] \\ \text{GOV} \quad V[\text{SUBJ} <NP_{[1]}>, \text{COMPS} <[2] NP[str]>] \end{bmatrix}$

  b. sip_2- $\begin{bmatrix} \text{SUBJ} <NP_{[1]}> \\ \text{COMPS} <NP[nom]_{[3]}> \\ \text{GOV} \quad V[\text{SUBJ} <NP_{[1]}>, \text{COMPS} <NP[str]_{[3]}>] \end{bmatrix}$

The information in (63a) is the same as that of other auxiliary verbs, while (63b) contains information about lexical case assigned by *sip*- as an emotion verb.

However, it is questionable whether the separate lexical entries in (63) are fully motivated. As the distinction in (63) is primarily based on the difference in case marking, and there is no other significant syntactic or semantic differences between sip_1- and sip_2-, one might ask whether we need to assume separate lexical entries in this case. I leave this question for future study.

6. Conclusion

In this paper, I examined how case marking in so called ECM constructions and complex predicate constructions can be accounted for in HPSG. Though there are still many kinds of constructions for which we need to give a more specific account of case assignment, I proposed that the notion of structural case and the Case Principle presented in 3.3 be the basic mechanism of case marking in Korean, along with the lexical specification of case for emotion verbs.

   I believe that this proposal may shed light on the study of case assignment in other constructions such as passive, double nominative, and double accusative. Let me take an example. It has been observed that the HI passive (which is formed by -*i/hi/li/ki* affixation) and the CI passive (which is formed with the auxiliary verb *ci*-) in Korean exhibit an interesting contrast in case assignment as follows:

(64) a. Minswu-ka   totwuk-eykey ton-ul   ppayass-*ki*-ess-ta.
       Minswu-nom   robber-by   money-acc   take away-passive-past-dec
       'Minswu was robbed of his money by a robber.'
   b. Minswu-ka   emma-eyuyhay ot-i-/*ul   ip-hie   *ci*-ess-ta.
      Minswu-nom   mother-by   clothes-nom/*acc wear-causative passive-past-dec
      'Minswu was dressed by his mother.'

(Hong, 1991:491)

In the Hi passive in (64a) the complement is marked accusative, whereas in the CI passive in (64b) only nominative case is available. For the account of (64b), we can assume separate lexical rules for HI passive and CI passive, and posit a lexical rule for CI passive in such a way that all complements are passivized and are in the SUBJ list of the passive verb. Then two structural NPs *Minswu* and *ot* in (64b) will surface as nominative by the Case Principle.

This is interesting because (64b) is reminiscent of the double nominative construction in (65), which might perhaps be assumed to have two structural NPs in the SUBJ list of a verb:

(65) Minswu-ka   ot-i   manh-ta.
     Minswu-nom clothes-nom   many
     `Minswu has many clothes.'

The above discussion is just a little speculation about a possible way of extending my analysis to other constructions. I will leave detailed examination of case marking in other constructions for further study.

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Different Semantics for Different Syntax:
Relative Clauses in Korean*

Jae-Hak Yoon

1 Introduction

C.-T. James Huang (1984) cites Ross (1982) as he borrows the contrast between 'hot' and 'cool' from McLuhan's (1964) 'hot-cool' division of the media. According to McLuhan's division, a medium is 'hot' if the communication process requires little or no audience participation, and 'cool', otherwise. Thus, a TV commercial is hot in that one usually requires no considerable effort on the viewers' part, whereas a philosophical writing such as Russell's *An Inquiry into Meaning and Truth* is cool, since a successful communication between the writer and its readers will not be carried out without readers' deep contemplation. Ross extends this analogy to classifying languages in terms of their explicitness in expression of anaphoric elements. Thus, when it comes to zero pronouns, English and French are hot, whereas Chinese, Korean, and Japanese are cool. For example, (1) shows that a sentence is not grammatical with zero pronouns in English that could be recovered from the context, while (2) shows that Korean allows these sentences. In this way Korean is more sensitive to and dependent on the context for interpretations than English is. Therefore Korean is cool, and English is hot.

(1)   Speaker A: Did John see Mary yesterday?

           Speaker B: a. Yes, he saw her.
                      b. *Yes, *e* saw her.
                      c. *Yes, he saw *e*.
                      d. *Yes, *e* saw *e*.

(2)   Speaker A: John-i   ecey   Mary-lul poassni?
                      John-nom yesterday Mary-acc saw
                      'Did John see Mary yesterday?'

           Speaker B: a. Ung, ku-ka   kunye-lul poasse.
                            yes   he-nom   she-acc   saw
                            'Yes, he saw her.'

                      b. Ung, *e* kunye-lul poasse.
                            'Yes, [he] saw her.'

                      c. Ung, *e e* poasse.
                            'Yes, [he] saw [her].'

I observe that there is another manifestation of the hot-cool contrast between the two groups of languages in relative clause (RC) constructions. For example, English requires that there be tight syntactic dependencies between an RC and its head noun in that there should be some unrealized element in an RC which would be present otherwise. Hence, while (3) is a standard example of RC construction in English, where an argument of the verb *loved* is not realized, (4a) is

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ungrammatical, where there is no unrealized element in the RC. However, the so-called cool languages are non-syntactic in this regard and allow examples like (4).

(3)   a spy that I loved

(4)   a. *the sound that a baby cries
         (intended:)'the sound that characterizes a baby's crying'

        b. ai-ka   wun UN soli   (Korean)
           baby-nom cry REL sound
           'the sound that characterizes a baby's crying'

        c. xiaohai ku de   shengyin   (Mandarin Chinese)
           child   cry REL sound

        d. akatyan-ga naku koe   (Japanese)
           baby-nom   cry   voice

On the other hand, semantists in general seem to have assumed, despite various syntactic types of RC constructions in the world, that the semantic value of a restrictive RC construction like (3) is more or less the same across languages (cf. Quine (1960), Montague (1973), Partee (1975), Bach and Cooper (1978), and Cooper (1983)).[1] PTQ's translation rule (5) will gives (3') for *spy that I loved* in (3). If we apply the same rule to (4a), we will get (4a'). But this will not give the reading we intend, because there is no connection between the sound and a baby's crying. In fact, (4a') denotes any set of sounds as long as there is a baby crying in the given world of evaluation. Chomsky (1982) suggests that an RC construction like (4a) is filtered out in the syntax of LF because of a Universal Principle preventing a vacuous quantification.

(5)   T3: If $\zeta \in P_{CN}, \phi \in P_t$, and ζ, ϕ translate into ζ', ϕ', respectively,
            then $F_{3,n}(\zeta, \phi)$ translates into $\lambda x_n [\zeta'(x_n) \& \phi']$.

(3') $\lambda x [spy'(x) \& loved'(I,x)]$

(4a') $\lambda x[sound'(x) \& cry'(a\text{-}baby')]$

However, if we adopt this popular PTQ-style semantics for RC constructions and assume Chomsky's suggestion in the analysis of the cool languages, two problems arise. First, the semantic value (4a') is not appropriate for (4b,c,d). Second, (4b-d) will be ruled out, even though they are acceptable.

In this paper, thus, I will argue against the popular assumption that an RC universally requires an unrealized element. Moreover, I will propose a semantic rule that can appropriately capture the relationship between the head noun and its RC in the cool languages.

It has been generally the case in the Government-Binding literature that a relative clause construction like (6) is analyzed in one of the following two ways (cf. Chomsky (1982, 1986)):

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[1] There has been a disagreement among them concerning whether Nom-S or NP-S is an adequate analysis of constituency in RCs. The point here is that most approaches seem to agree that $\lambda Q \exists x[spy'(x) \& loved'(I,x) \& Q(x)]$ is the semantic value for *a spy that I loved*.

(6)   a man (whom) John met

a.   b.

Both analyses propose a Wh-movement of the empty operator or the relative pronoun, leaving behind a Wh-trace. The coindexation between the head noun and the relative pronoun or the operator is carried out by the rule of predication (Williams 1980). In a nontransformational approach, Pollard and Sag (in press) do not employ movement of a relative pronoun or an operator. Instead of positing a trace in the RC, they capture the intuitive notion of an implicit 'gap' in RCs by waiving a valence requirement.

Kuno (1973) discusses Japanese RCs and suggests that a relative clause in a topic prominent language like Japanese has a gap in the topic position. In fact, Kuno's work was done in the Standard Theory framework (cf. Chomsky 1965). Kuno's analysis adapted to Chomsky's (1986) framework would be close to (6b). I will call this approach the Topic-gap analysis. Tagashira (1972) adopts Kuno's approach in her discussion of Korean RCs.

If all the above approaches to RCs are considered 'gapped' in one way or another, this paper is an attempt to show that a 'gapless' approach is more adequate in explaining Korean RCs from both syntactic and semantic points of view. By gapless, I mean that we don't posit any kind of traces in the RC or structure sharing between a head noun or the relative pronoun and its modifying clause. The only empty category that I posit is a null pronominal, i.e. *pro*. I will provide a nontransformational analysis within the Head-driven Phrase Structure Grammar (HPSG) framework (Pollard and Sag 1987, in press). While it is conceivable that this approach may equally explain RC contructions of other cool languages such as Chinese and Japanese, I will limit the discussion to Korean.

2 Basic Data

To start the discussion, let me first introduce some basic facts about RCs in Korean. I will occasionally use an underscore to indicate a putative gap for the time being for the sake of clarity. Considering (7), we can see three characteristics of Korean RCs here:

(7)   John-i   [[__ na-lul   salangha-n   UN] yeca-lul]   mannasse.[2]
        John-nom   I-acc   love-pres   REL woman-acc   met
        'John met a woman who loves me.'

---

[2] There are phonologically-driven rules governing forms of the markers: the topic marker *nun*, the nominative marker *ka*, and the accusative marker *lul* are realized after a closed syllable as *un*, *i*, and *ul*, respectively.

First, there is no relative pronoun corresponding to English *who* in Korean. Second, there is a relativizer *UN* which relates the RC to the head noun.[3]

Another fact worth mentioning is that Korean is a pro-drop language. Not only can there be a phonologically empty subject (i.e. subject *pro*) possible, but object *pro* is also possible.[4] Consequently, ambiguities arise in (8). *Pro* being construed as referring to the speaker here, the sentence (8) can mean (8a) or (8b), depending upon whether *pro* is the subject or the object. (8a) corresponds to (8'a) and (8b) to (8'b).

(8)   [__ __ salanghan UN] yeca-ka   ttenassci.
                love   REL woman-nom left

      a. 'A woman who loves me left.'

      b. 'A woman who I love left.'

(8')   a. [__ pro salanghan UN] yeca-ka ttenassci.

      b. [pro __ salanghan UN] yeca-ka ttenassci.

Also, it is not required that the relativized clause contain an argument position related to the head noun. As (9) shows, the relative clause has neither an overt subject nor an overt object, even though the head verb in the clause *kitali* 'to await' subcategorizes for an object as well as a subject. What the head noun in the RC does seem to be related to is a locative adjunct.[5] Consequently, both of the argument positions can be presumed to be occupied by *pro*'s. So, a more detailed analysis of (9) will be something like (9').

(9)   [__ __ ssulssulhakey kitali   UN] tapang
              lonely   awaited REL coffeeshop
    'A coffeeshop in which someone waited lonely for somebody'

(9')   [pro$_1$ pro$_2$ ssulssulhakey kitali UN] tapang

Moreover, subjacency appears to be generally violated in Korean RCs. (10) shows cases of extractions out of a subject NP; (11), cases of extractions out of an object NP; and (12), cases of extractions out of an adjunct. Nevertheless, all of them are acceptable.

(10)   a [[__ ipko   issn UN] yangpok-i telep UN] sinsa
              wearing is   REL suit-nom dirty REL gentleman
        'the gentleman such that the suit that <u>he</u> is wearing is dirty'

---

[3] Tense markers in RCs are merged with the relativizer, resulting in *un*, *ul*, and *nun* in most of the cases. Therefore, I will use the capital *UN* to refer only to the relativizer.

[4] Chinese is a language very close to Korean in this regard. Huang (1982) claims that an empty object is a variable, never *pro*, bound by the topic. His claim is based on a conclusion that the relation between a topic and an empty object is subject to the Strong Cross-over Condition, which is taken to be a diagnostic for variable binding. Xu (1986) disputes this claim. Korean data are along the line with Xu's claim in Chinese. For example, (i) is good:

    (i) John$_i$-un, ecey   caki$_i$-ka cipcep Mary-ka e$_i$ pelyessta-ko   kopaykhayssta.
        John-top yesterday self-nom directly Mary-nom   deserted-comp confessed
        'John, he himself confessed yesterday that Mary dumped him.'

Without going further to prove it, I will assume that Korean has object *pro*.

[5] Obviously there are two other readings: (i) the coffeeshop awaited someone and (ii) someone awaited the coffeeshop. In these cases the head noun is construed as the subject in (i) or the object in (ii). But I am not concerned with these readings here.

b. [[__ ilhepeli UN] salam-i   na-lul chachao UN] cikye
         lost   REL person-nom I-acc visited   REL watch
   'the watch such that the person that lost it visited me'

(11) a. [Nay-ka ecey   [__ manna-l UN] sikan-ul icepeli UN] yeca
        I-nom yesterday   meet-fut REL time-acc forgot REL woman
     'the woman such that yesterday I forget the time that I would meet her'

     b. [Nay-ka [ecey   __ sa   UN] kes-ul hwuhoyhan UN] computer
        I-nom   yesterday   bought   REL thing-acc regret   REL computer
     'the computer such that I regret that I bought it yesterday'

(12) a. [[__ cwuk-ese] motwu-ka sulpheha   UN] salam
          die-because all-nom grieved   REL person
     'the person such that all grieved because he died'

     b. [[__ cwuk-unhwuey] motwu-ka kuliwehan UN] yeca
          die-after   all-nom   miss   REL woman
     'the woman that all miss after she died'

A more striking characteristic of Korean RCs is that there is a class of RCs which seem to lack even a putative gap. For example, the RCs in (13) are not interpretable as containing a gap which is related to the head noun.

(13) a. [ai-ka   wun UN] soli
        baby-nom   cry REL sound
     (literally: 'the sound such that a baby cries')
     'the sound that characterizes a baby's crying'

     b. [wuli-ka   achim-ul   mek UN] ccikkeki
        we-nom   breakfast-acc ate REL   leftover
     (literally: 'the leftovers such that we had breakfast')
     'the leftovers that came from our having breakfast'

     c. [John-i   kom-ul cwuki UN] sichey
        John-nom   bear-acc killed REL   corpse
     (literally: 'the corpse such that John killed the bear')
     'the corpse that came from John's killing the bear'

     d. [thayphwung-i cinaka   UN] huncek
        typhoon-nom   passed.by REL debris
     (literally: 'the debris such that a typhoon passed by')
     'the debris that resulted from a typhoon's passing'

     e. [komwu than UN] naymsay
        rubber burn REL smell
     (literally: 'the smell such that rubber is burning')
     'the smell that characterizes burning of rubber'

Even though the heads of the RCs in (13) are characterized by the RCs, the way they are related is not by coindexing. Instead, what distinguishes (13) from other RCs is that the head nouns are related characteristically with the eventualities that the RCs describe. I will continue to refer to RCs as in (13) as 'Korean-type' RCs. Also RCs which are not Korean-type will be called 'English-type' RCs.

3 Topic-gap Analysis

It is standard to distinguish between English-style and Chinese-style topics (cf. Chafe 1976), since the Chinese-style topic doesn't require the comment clause to have an element which is syntactically related to it. Korean appears to belong to the Chinese-style topic languages in this respect. The contrast is apparent between (14) and (15) that the gap is syntactically related to the topic in (14) but there is nothing in the matrix clause of (15) in which could be related to the topic. However, it seems that there are Korean sentences with an English-style topic as well. For example, (14') can be analyzed in the same way as (14).

(14)   This book, John liked ___.

(15)   Yenkuk-un   John-i   Shakespeare-lul   coahay.
       play-Top   John-nom   Shakespeare-acc   like
       'As for plays, John likes Shakespeare.'

(14') I   chayk-un, John-i   ___   coahaysse.
       this book-top   John-nom   liked
       'This book, John liked'

This led many, e.g. Kuno (1973), Xu and Langendoen (1985), and H.Yoon (1987), to propose a topic node in Japanese, Chinese, and Korean respectively. This topic node is considered to be base-generated in cases like (15) (cf. Kuno (1973) for Japanese and Yoon (1987) for Korean).

Kuno (1973) maintains that there is a correlation between topicalization and relativization and then he proposes a Topic-gap analysis. His analysis is basically the form of (16), in which there is a dependency between the topic and the head noun.[6]

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[6] His analysis is different from the standard approaches in GB in that an NP in the topic node identical to the head NP is deleted. In order to make the discussion more relevant for the current theoretical framework, let us assume that topics possess the same position as wh-moved elements and also that Kuno really meant structures like (ia) for a Korean-type RC like (13), and (ib) for an English-type RC like (7) above:

(i) a.   b.

In (ia) there is no trace in IP which would be coindexed with the head noun or the empty operator. The empty operator O_i is base-generated and coindexed with the head noun. The analysis in (ib) is popular in the currrent GB literature for non-wh relatives (cf. Recall that Korean and Japanese don't have a relative pronoun. Therefore the empty operator O_i is the only option under Spec of CP.) In (ib) the operator which is in IP in the D-structure moves to Spec of CP in the S-structure.

(16)

```
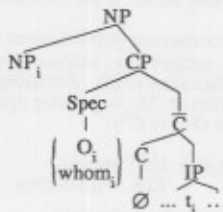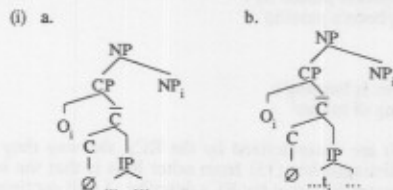           NP
          /  \
         S    NPᵢ
        / \    |
    Topic  S
      |     \
      eᵢ     S
```

Kuno's claim is based on the following four observations.

First, some case markers are deletable if they are in the topic position (N.B. nominative and accusative markers are deleted obligatorily in topics). This results in a form of NP+topic marker. One observation is that a relativization appears to be correlated to the deletability of a case marker in the topic. In other words, Kuno claims that the deletability of a case marker in the topic position is a necessary and sufficient condition for relativization. The sentences (17) and (18) illustrate this point. (17b) is the topicalized counterpart of (17a). The sentence (17c) is good and the same as (17b) except that the latter is without the locative case marker *ey* in the topic. The RC in (17d) is also good and presumably 'relativized' from (17a).

(17) a. Yak   osipmyeng-i   ku tongney-ey   wasse.
        approx 50.people-nom the village-to   came
        'About 50 people came to the village.'

     b. Ku tongney-ey -nun, yak osipmyeng-i wasse.
                       -top
        'To that village, about 50 people came.'

     c. Ku tongney-∅ -nun, yak osipmyeng-i wasse.
                      -top
        'As for that village, about 50 people came.'

     d [yak   osipmyeng-i   o   UN] tongney
         aprox. 50.people-nom came REL   village
        'the village which about 50 people came to'

But in (18) the case marker in the topic of (18b) is not deletable, as shown in (18c). This is correlated with the ungrammaticality of (18d). This correlation is the basis of the claim that (17d) and (18d) are derived from (17c) and (18c) respectively.

(18) a. Mary-ka   John-kwa   kasse.
        Mary-nom John-with went

     b. John-kwa-nun, Mary-ka   kasse.
        John-with-top Mary-nom went
        'With John, Mary went.'

     c. *John-∅-un, Mary-ka kasse.

     d. *[Mary-ka   ka   UN] salam
         Mary-nom   went REL person
        '(int.) the person with whom Mary went '

Second, both constructions allow what appear to be resumptive pronouns in the same environments. This is shown in (19) and (20). (19a) is a case of topicalization from an adjunct and (19b) is its corresponding relative clause construction. The resumptive pronoun *ku* 'he' is allowed in these cases. Similarly, (20a) is a case of topicalization out of a complex NP and (20b) is its corresponding relative clause construction.

(19) a. Ku salam$_i$-un, ku$_i$-ka cwuk-ese motwu-ka sulphehaysse.
the person-top he-nom die-because all-nom grieved
'That person, all grieved because he died.'

b. [ku$_i$-ka cwuk-ese motwu-ka sulpheha UN] salam$_i$
'the person such that all grieved because he died'

(20) a. Ku sinsa$_i$-nun, [ku$_i$-ka ipko issn UN] yangpok-i telewue.
the gentleman-top he-nom wearing is REL suit-nom is.dirty
'As for the gentleman, the suit that he is wearing is dirty.'

b. [[ku$_i$-ka ipko issn UN] yangpok-i telep UN]sinsa$_i$
'the gentleman such that the suit that he is wearing is dirty'

Third, Kuno maintains that there are some cases in which subjacency is not observed in topicalization, involving elements in adjunct clauses, complex noun phrases, and sentential subjects. He also claims that there are some relative clauses which don't observe subjacency. His claim is that even though it is hard to define the environments where subjacency is violated, violations occur exactly in the same environments for both constructions.[7] The sentences (19') and (20') are exactly like (19) and (20) except that the latter have resumptive pronouns. An adjunct clause is involved in (19'), and a complex phrase and a sentential subject are involved in (20'):

(19') a. Ku salam-un, __ cwuk-ese motwu-ka sulphehaysse.
the person-top die-because all-nom grieved
'That person, all grieved because he died.'

b. [__ cwuk-ese motwu-ka sulpheha UN] salam
die-because all-nom grieved REL person
'the person such that all grieved because he died.'

(20') a. Ku sinsa-nun, [__ ipko issn UN] yangpok-i telewue.
the gentleman-nom wearing is REL suit-nom is.dirty
'As for the gentleman, the suit that he is wearing is dirty.'

b. [[__ ipko issn UN] yangpok-i telep UN] sinsa
wearing is REL suit-nom is.dirty REL gentleman
'the gentleman such that the suit that he is wearing is dirty'

Fourth, a topic sentence without a gap in the comment clause has the corresponding RC as shown in (21) below. (21a) is a Chinese-style topic sentence as discussed in (15) above, in that there is no syntactic gap in the comment clause that can be related to the topic. Likewise, there is no gap in the corresponding RC in (21b).[8]

(21) a. Ku nala-nun, nay-ka swuto-lul pangmwunhayssta.
the nation-top I-nom capital-acc visited
'As for the country, I visited the capital'

b. [nay-ka swuto-lul pangmwunha UN] nala
I-nom capital-acc visited REL nation
'the country such that I visited the capital'

---

[7] In Korean, however, relative clauses seem to be generally not subject to subjacency as shown in (10-12) above. See Na and Huck (1993) for the claim that a nonsyntactic account should explain seemingly subjacency effects in some Korean sentences. I will return to this point in Section 5.1.

[8] In fact, these examples don't show that one is related to the other construction. Rather, what they show is that a topic is relativizable and that there is a topic gap in these examples.

Plausible as this analysis may appear based on the proposed parellel between topicalization and relativization, it also brings some empirical problems with it. The next section will provide arguments against Kuno and propose an analysis which involves no gap in a RC, not even a topic gap.

4 Problems with Kuno's Approach

It is undeniable that there are some similarities between a topic sentence and an RC in Korean. However, when we consider other facts of RCs below, these similarities do not seem to be strong enough to support Kuno's proposal that they are syntactically related to each other, let alone that one is derived from the other. The similarities may well be due to some overlap in their functions as Na (1986) suggests. I will provide four arguments against the proposed correlation between topic sentences and RCs in this section.[9]

First, there are some RCs for which the corresponding NP-*nun* sentences do not exist, as Kuno himself admits for Japanese examples similar to (22) and (23). For example, according to Kuno's proposal, (22c) is unexpected. Comparing (22b) and (22c) with (18c) and (18d), we would predict that (22c) should be bad. But (22c) is a perfect RC. (23a,b,c) show the same effect as in (22).

(22) a. Ku khal-lo-nun, Mary-ka John-ul ccilesse.
 the knife-with-top Mary-nom John-acc stabbed
 'With the knife, Mary stabbed John.'

 b. *Ku khal-∅-un, Mary-ka John-ul ccilesse.

 c. [Mary-ka John-ul ccilu UN] khal
 Mary-nom John-acc stabbed REL knife
 'the knife with which Mary stabbed John'

(23) a. Ku yenghwa-lo-nun, John-i kyelsekhaysse.
 the movie-with-top John-nom was.absent
 'Because of the movie, John was absent.'

 b. *Ku yenghwa-∅-nun, John-i kyelsekhaysse.

 c. [John-i kyelsekha UN] yenghwa
 John-nom was.absent REL movie
 'the movie for which John skipped the class'

Second, there are some sentences for which no topicalization involving a certain constituent is possible at all. Examples are (24a) and (25a). Both are ungrammatical no matter what particle we may attach to the fronted constituents. In fact, there are no plausible 'source' sentences for (24b) or (25b), as shown in (24a) and (25a).[10]

---

[9] Kuno doesn't make claims about Korean. But the relevant points in Japanese remain more or less the same in Korean.

[10] A clarification is in order at this point. There are two types of topics in Japanese (cf. Kuno 1973), which take the same topic marker: a contrastive topic and a thematic topic. A contrastive topic can appear in embedded clauses and non-clause-initial positions. A sentence with a contrastive topic sounds incomplete if the sentence is uttered in isolation. On the other hand, a thematic topic can appear only clause-initially. Also it cannot appear in embedded clauses. Kuno (1973) is concerned only with thematic topics when he claims existence of correlation between topicalization and relativization. The same kind of distinction between two types of topics are attested in Korean. Thus, I will be concerned with thematic topics. If (25a) is uttered in a series such as 'As for that leftover, ... and as for this leftover, ...', i.e. if the topic is contrastive, it is somewhat more acceptable. (24a) does not seem to be

(24) a. *I   naymsay-nun,   komwu-ka   thanta.
         this smell-top   rubber-nom burn
         (int.) 'This smell, rubber is burning.'

    b. [komwu than UN] naymsay
        rubber burn REL smell
        'the smell that characterizes burning of rubber'

(25) a. *I   ccikkeki-nun,   wuli-ka   achim-ul   mekesse.
         this leftover-top   we-nom   breakfast-acc ate
         (int.) 'These leftovers, we ate breakfast.'

    b [wuli-ka   achim-ul   mek UN] ccikkeki
        we-nom   breakfast-acc ate REL leftover
        'the leftovers which came from our having breakfast'

Third, there is a type of RC called hydra relatives which have more than one head, as shown in (26a). The head nouns are a coordination of a 'complement' and an 'adjunct', descriptively speaking. This type of construction is hard to explain if we assume the correlation between topicalization and relativization. (26a) is perfect, whereas its counterpart topic sentence (26b) is ungrammatical regardless of the presence of an appropriate particle before the topic marker. Consequently, this constitutes another argument against the suggested correlation.

(26) a. [mwulken-ul hwumchi UN] salam-kwa   cangso
         goods-acc   stole   REL person-and place
         'the person; that stole the goods and the place that he; stole the goods'

    b. *John-kwa sicang-(eyse-)nun,   mwulken-ul hwumchyesse.
        John-and   market-(at-)top   goods-acc   stole
        '(int. truth-conditionally) John stole the goods at the market.'

Finally, the examples in (27) are all grammatical. But the denotation of the time adverbial *taum nal* 'next day' in (27c) is different from the others. While *taum nal* is cotemporal with the time of my friend's departure in (27a) and (27b), the one in (27c) refers to the day which is one day after my friend's departure.[11] As a result, this cannot be explained by a hypothesis that (27c) is derived from (27b).

(27) a. Chinkwu-ka   taum   nal ttenassta.
         friend-nom   next   day left
         'My friend left the next day.'

    b. Taum nal-un, chinkwu-ka ttenassta.
        next   day-top friend-nom left
        'The next day, my friend left.'

    c. [chinkwu-ka ttena UN] taum nal
        friend-nom   left   REL next day
        'the day after my friend left'

---

ameliorated even in this way. I consider the two kinds of topics to be treated separately. Hence, I will not discuss contrastive topical readings.
[11] It is possible for (27c) to refer to 'the day after (some other contextually salient event) when my friend left'. This is a nonrestrictive relative clause in this reading. But my point is that the reading in (27c) has the same relative clause structure but lacks a corresponding topic sentence.

Based on the discussion in this section, I conclude that the four types of examples given above cast doubt on the suggested correlation between topicalization and relativization. Given the differences that we have discussed, any similarities between them simply reflect their overlapping functions, as Na (1986) claims. In the next section, I will propose an approach which does not posit a gap in an RC.

5 A Gapless Approach

5.1 Is There a Gap in RCs?

As I noted in section 2, there are some RCs in Korean which cannot easily be explained by adapting typical analyses of English RCs. This subsection will discuss some examples for which gapped analyses seem unavailable and will provide a basis for formulating a gapless analysis of Korean RCs.

At this point let us reconsider the analysis in (6b), repeated here. This analysis was assumed in Section 3 for the RC structure in (7), repeated below.

(6) b.

(7)   John-i   [[__ na-lul salangha-n UN] yeca-lul]   mannasse.
      John-nom   I-acc love-pres   REL woman-acc met
      'John met a woman who loves me.'

This is essentially the standard GB analysis for non-wh relatives like (28) below, except that Korean is a head-final language so that the head noun follows the RC. The sentence (28) by itself does not provide any argument for or against movement of the empty operator as analyzed in (6b). There is another seemingly plausible analysis for (28) as in (29a). In (29a) the coindexing occurs between the head noun *the man* and the empty category *in situ*.

(28)   I know the man that John will invite.

(29)   a. I know the man$_i$ [that [John will invite e$_i$]]

       b. I know the man$_i$ [O$_i$ that [John will invite t$_i$]]

In fact, the movement analysis of the empty operator is not motivated if we consider only this type of examples. However, it is argued in Chomsky (1977), Haegeman (1991), and Cowper (1992) that the analysis in (29b) is favored because of examples like (30). They show the subjacency effect which is considered to be a diagnostic for movement. In other words, if the RC in (28) were a simple coindexing *in situ* as in (29a), we would expect the sentences in (30) to be good, because there is nothing in the theory to prevent a coindexing between two NPs in these environments. For example, the coindexing of the NPs in (31) is licensed in these environments.

However, if we adopt the analysis of (29b) and propose movement of the empty operator, we can explain by subjacency why the sentences in (30) are not acceptable. The ungramaticality in (30) is predicted under this analysis, because the empty operator needs to move to [Spec, CP]. The movement has to cross two bounding nodes as shown in (30'). As a result, the grammaticality judgement and the movement hypothesis in (29) and (30) are consistent.

(30)   a. *This is the man that John made the claim that he will hire e.
          b. *This is the man that John told me when he will hire e.
          c. *This is the man that John visited me after e left.
          d. *This is the man that a lady that taught e was disappointed.

(31)   The man$_i$ made a claim that Mary told Sue that she will hire him$_i$.

(30')

$$* \ldots \text{the man } [_{CP} O_i \text{ that [John} \ldots \text{the claim that} \ldots t_i]]$$

Now recall that RCs in Korean are generally not subject to subjacency as shown in (10), (11), and (12) above. Then, there is no theoretical superiority of (6b). Movement analysis of (6b) is, rather, unmotivated in Korean. Thus, (32) is a better analysis for the RC in (7) than (6b) is. This analysis doesn't require any syntactic dependency in the RC. The only condition that is required appears to be that the head noun and an empty category are coindexed.

(32)

If we consider the nature of the type of empty categories in (7) and (32) in GB terms, they cannot be NP-traces because they are case-assigned. They cannot be wh-traces because they are not subject to subjacency as shown in (10), (11), and (12) above. They cannot be PRO because they are in a governed position. The only type of empty category possible is *pro*, if we consider the fact that Korean has object *pro* as well as subject *pro*. Consequently I assume that they are *pro*'s.

Up to this point, it has been shown only that there is no movement necessary for RCs in Korean. But it has not been shown clearly yet whether *pro* is a necessary component of RCs. Now the real question is, is it necessary for an RC to have pro which is coindexed with the head noun? If *pro* were necessary in an RC, then the only relevant difference in RCs between Korean and languages like English would be that Korean has *pro* in the place of a wh-trace in English. As it turns out, however, a genuine difference lies in the fact that there are RCs which don't have a gap, not even *pro*.

If the argument against gaps in RCs above is syntactic, the following argues against gapped analyses from a semantic point of view. Consider once again the examples from (13) above, repeated here. These RCs lack an apparent gap that we would find in an ordinary RC structure in English. We have seen that we cannot posit a gap in the topic positions of these examples because their topicalized counterparts are ungrammatical (cf. (24) and (25)).

(13) a. [ai-ka   wun UN] soli
          baby-nom cry   REL sound
          'the sound that characterizes a baby's crying'

     b. [wuli-ka achim-ul   mek UN] ccikkeki
          we-nom   breakfast-acc ate   REL leftover
          'the leftovers that came from our having breakfast'

     c. [John-i   kom-ul   cwuki UN] sichey
          John-nom bear-acc killed REL corpse
          'the corpse that came from John's killing the bear'

     d. [thayphwung-i cinaka   UN] huncek
          typhoon-nom   passed.by REL debris
          'the debris that resulted from a typhoon's passing'

     e. [komwu   than UN] naymsay
          rubber   burn REL smell
          'the smell that characterizes burning of rubber'

The RC involving time adverbials was also mentioned in section 4, and we noticed that they are problematic when we compared (27b) with (27c), repeated below, because the meanings are different. As a result, we cannot assume a gap in the RC of (27c), either.

(27) a. Chinkwu-ka   taum   nal   ttenassta.
          friend-nom   next   day   left
          'My friend left the next day.'

     b. Taum nal-un,   chinkwu-ka ttenassta.
          next   day-top friend-nom   left
          'The next day, my friend left.'

     c. [chinkwu-ka   ttena UN] taum   nal
          friend-nom   left   REL next   day
          'the day after my friend left'

Thus, I hypothesize that there is no gap, not even in the topic node, in RC constructions like (27) and (13). Consequently, there is no necessary coindexing between the head noun and some constituent in the RC. As a result, an analysis for those structures should be something like (33), rather than (ia) in footnote 6 above.

(33)

We are apparently left, then, with two types of RC constructions which appear to have two different generative mechanisms: (i) English-type RCs, with coindexing of the head noun with *pro in situ*, and (ii) Korean-type RCs which have no coindexing. A question then arises. Are they really two generatively distinct structures? The answer is no. Examining the two tentative analyses of the two types of RCs, we seem to be able to incorporate the two analyses into one.

Let us take another look at (32). The empty category is a pronominal. Is it really necessary that the head noun and a pronominal should be coindexed? It seems not. Suppose that (34a) is an analysis for all RCs in Korean. If the RC contains *pro* coindexed with the head, (34a) is instantiated as (34b). If the RC contains *pro* not coindexed with the head, it is instantiated as (34c). And if there is no *pro*, the RC is instantiated as (34d). (34b) is the same as (32); (34c,d) are instantiations of (33) above.

(34) a.

b. (i = j)

c. (i ≠ j)

d. (e = ∅)

As a result, (34a) seems to serve as an appropriate analysis for both types of RCs in Korean. My proposal is that syntax allows any structure like (34) as candidates for RCs but that pragmatics provide conditions on possible RCs. This pragmatic issue will be addressed in Section 6.

5.2 Modification without a Gap

It has been a normal practice in the linguistic literature to relate a nominal to a gap in a clause that restrictively modifies it. Now I will consider how to get the semantics right without positing a gap in a relative clause. I will follow Larson's (1983;107-137) line of argumentation in this regard.

Larson (1983) separates 'reason relatives' like (35) from other adverbial relatives and proposes a structure like (36) for the reason that reason relatives have some idiosyncratic properties.[12]

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[12] Larson observes that reason relatives of all the adverbial RC constructions show the most limited and the most idiosyncratic distributional patterns.
First, *why* RCs accept as heads a very limited class of nominals, i.e. those headed by the noun reason:

(i)   the reason (*design/*cause/*motive/*purpose) why Mary punched Bill

This is in strong contrast with other adverbial RCs. For example, *when* RCs allow as heads any nominals which can be reasonably construed as referring to times, as shown in (ii):

(ii) the vacation (occasion/month/day) when you traveled to Madison

Second, there are no *wh*-PPs which are both acceptable and yield the same semantics as *why*. (iii) shows the contrast between reason RCs and other adverbial RCs:

(iii)   a.   the reason why (?*because of which/?for which) Mary punched Bill

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(35) I left for [$_{NP}$ the (same) reason that John left.]

(36)

```
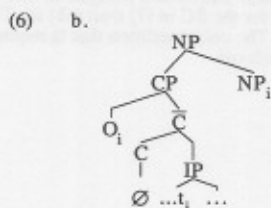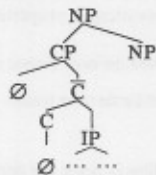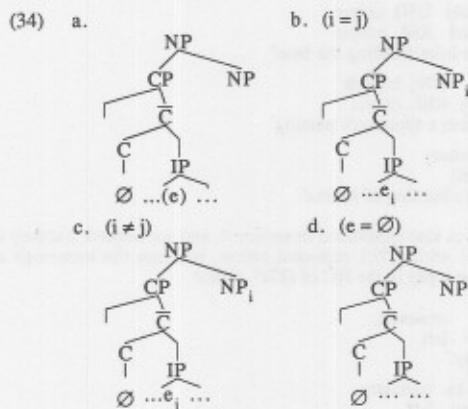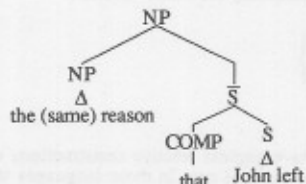                    NP
                   /  \
                 /      \
              NP          S̄
              |          /  \
              Δ        /      \
    the (same) reason COMP      S
                       |        |
                       |        Δ
                      that    John left
```

The sentential complementizer *daß* in German differs from its English counterpart *that* by being unable to introduce RCs. Consider the sentences below. The complementizer *that* can be used in a RC in English. However, this is not acceptable in German as shown in (37b,c). A complementizer combines with a sentence without a gap as in (37a) and (38).

(37) (= Larson's (98))
  a. Hans sagte [daß er krank war]
      'Hans said that he was sick.'
  b. ein Mann $\left\{{*da\beta \atop den}\right\}$ ich gesehen hatte
      'a man who I had seen'
  c. der Ort $\left\{{*da\beta \atop wo}\right\}$ er wohnt
      'the place where he lives'

(38) (= Larson's (99))
      die Tatsache daß die Welt rund ist
      'the fact that the world is round'

(39) (= Larson's (100))
      der Grund $\left\{{da\beta \atop warum}\right\}$ Hans weggangen ist
      'the (same) reason $\left\{{that \atop why}\right\}$ Hans left'

There is an exception to this general property of the German complementizer *daß* . Namely,*daß* is allowed just for reason relatives in German as in (39). Larson concludes from these that reason relatives as in (35) have the same structure as that of complex NP complements like (40), which are gapless.

(40) I realized [the fact that linguistics can be fun].

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    b. the vacation when (on which/during which) you traveled to Madison
    c. the place where (at which/on which/ near which) you live

    Third, reason RCs are exceptions to the correlation between what can appear as the head of a *that/that*-less RC and what can appear as a bare-NP adverb. The correlation shown in (iv) is in contrast with (v).

(iv) a. the way/*manner (that) you pronounce my name   b. You pronounced my name that way/*manner.
      c. the direction/*course (that) we were traveling   d. We were headed that direction/*course.
(v)   a. the reason (that) Mary punched Bill
      b. *Mary punched Bill that reason.

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Also notice that gaps are not a general prerequisite for restrictively modifying clauses. Even though *before the boss returns* and *red* restrictively modify their head in (41) and (42), we don't usually analyze them as each having a gap, but by uniformity we would have to.

(41)   every Tuesday $\left\{ \begin{array}{c} \text{before the boss returns} \\ \text{since John has been away} \\ \text{after you left} \end{array} \right\}$

(42)   red apples

Now if we accept that English and German have gapless relative constructions which are limited to reason relatives, we could generalize this special case in these languages into all the relative constructions in Korean. Consequently I conclude based on the discussion thus far that a RC in Korean requires neither a gap nor coindexing.

5.3 An HPSG Analysis

So far I have used GB notations and terminology for expository purposes in arguing against the movement and gap approach which is typical of GB. I will adopt the HPSG framework for threee reasons. First, we have seen that a configurational syntactic theory based on movement and gap analysis is not adequate for the Korean data. Second, since there is no coindexing required in the RCs in Korean, a rule of predication is not appropriate for the data. Third, we obviously need the notion of 'relativizer' which contains as part of its lexical meaning semantic constraints that will make RCs appropriate. And relativizers are a notion that is well established in HPSG.

As a crucial component in Korean RCs, I propose a relativizer *UN*, though it has been implicit thus far. This relativizer mediates between a RC and its head noun in the same way Pollard and Sag's (in press) null relativizers do. A simplified RC structure in this analysis is represented in (43):

(43)   RC structure in Korean[13]

The relativizer *UN* is the head of RP, subcategorizing for a sentential complement. Then RP in turn modifies N'. Adopting Pollard and Sag's (in press) HPSG framework, I give a simplified SYNSEM value of the lexical entry for the relativizer *UN* below in (44):

---

[13] I adopt the adjunction of RC to N', rather than NP, for semantic reasons along the lines of Partee (1975).

(44)　SYNSEM value of the relativizer *UN*:[14]

$$
\begin{bmatrix}
\text{CAT} \begin{bmatrix}
\text{HEAD MOD N'} \begin{bmatrix} \text{INDEX} & \boxed{2} \\ \text{RESTR} & \boxed{3} \end{bmatrix} \\
\text{VAL} \begin{bmatrix} \text{SUBJ} <> \\ \text{COMPS} <\text{S;CONTENT: ...} \boxed{1} \; psoa \; ... > \end{bmatrix}
\end{bmatrix} \\
\text{CONTENT} \begin{bmatrix}
\text{INDEX} & \boxed{2} \\
\text{RESTR} & \boxed{3} \cup \begin{bmatrix} \text{RELN R-rel} \\ \text{ARG1} \; \boxed{2} \\ \text{ARG2} \; s \, | \, s \, | = \boxed{1} \end{bmatrix}
\end{bmatrix}
\end{bmatrix}
$$

The relationship between an RC and its head noun is unspecified in SYNSEM. In order to account for this unspecification, I propose a parameterized state of affairs (psoa) *R-relation* as in (45). In R-relation, ARG1 has an index as argument, but ARG2 has as its argument a situation that supports the psoa which is the CONTENT value of its RC (or the CONTENT value of an embedded clause of its RC in the long-distance RC construction such as (65) below). R-relation is a relation parameter that is anchored by the utterance context. Therefore, many different relations can be instantiated as *R-relations* depending on the given context. This will be also addressed in the next section.

(45)　A parameterized state of affairs: R-relation

$$
\begin{bmatrix}
\text{RELN R-rel} \\
\text{ARG1 index} \\
\text{ARG2 situation}
\end{bmatrix}
$$

Now, I will show how we generally represent a RC in this analysis. (46) is a simplified partial feature description of an RC (13c), repeated here.

(13)　c.　[John-i　　kom-ul　cwuki　UN]　sichey
　　　　　John-nom　bear-acc　killed　REL　corpse
　　　　　'corpse that came from John's killing the bear'

---

[14] The parameter s for a situation as the value of ARG2 must be an unabsorbed parameter at the level of the N' content.

(46)

$$
\left[\begin{array}{ll}
\text{CAT} & \left[\begin{array}{ll}\text{HEAD N'} \\ \text{VAL}\left[\begin{array}{l}\text{SUBJ <>} \\ \text{COMPS<>}\end{array}\right]\end{array}\right] \\
\text{CONTENT} & \boxed{4}
\end{array}\right]
$$

$$
\left[\begin{array}{ll}
\text{N'} \\
\text{INDEX} \boxed{2} \\
\text{RESTR} \boxed{3}\left[\begin{array}{l}\text{RELN corpse} \\ \text{INSTANCE} \boxed{2}\end{array}\right]
\end{array}\right]
$$

Δ
sichey

$$
\left[\begin{array}{ll}
\text{CAT} & \left[\begin{array}{ll}\text{HEAD MOD N'}\left[\begin{array}{l}\text{INDEX} \boxed{2} \\ \text{RESTR} \boxed{3}\end{array}\right] \\ \text{VAL}\left[\begin{array}{l}\text{SUBJ <>} \\ \text{COMPS<>}\end{array}\right]\end{array}\right] \\
\text{CONTENT} & \boxed{4}
\end{array}\right]
$$

$$
\left[\begin{array}{ll}
\text{CAT} & \left[\begin{array}{ll}\text{HEAD MOD N'}\left[\begin{array}{l}\text{INDEX} \boxed{2} \\ \text{RESTR} \boxed{3}\end{array}\right] \\ \text{VAL}\left[\begin{array}{l}\text{SUBJ <>} \\ \text{COMPS<} \boxed{6}\left[\begin{array}{ll}\text{CAT S} \\ \text{CONTENT} \boxed{1}\left[\begin{array}{l}\text{RELN killing} \\ \text{KILLER John} \\ \text{KILLED the-bear}\end{array}\right]\end{array}\right] >\end{array}\right]\end{array}\right] \\
\text{CONTENT} & \boxed{4}\left[\begin{array}{l}\text{INDEX} \boxed{2} \\ \text{RESTR} \boxed{3} \cup \left\{\begin{array}{l}\text{RELN R-rel} \\ \text{ARG1} \boxed{2} \\ \text{ARG2 s | s |=} \boxed{1}\end{array}\right\}\end{array}\right] \\
& \quad\quad\quad\quad | \\
& \quad\quad\quad\text{UN}
\end{array}\right]
$$

$\boxed{6}$

John-i kom-ul cwuki

6 Semantics of RCs[15]

Given the lexical entries of the relativizer *UN* in (44) and (46), whether or not a given RC construction is acceptable depends solely on *R-relation*. In this subsection, I will discuss semantic differences between English and Korean RCs and spell out the conditions in which an *R-relation* holds properly so that it leads to an acceptable RC construction in Korean.

For expository purposes, I will discuss the matter in a Montague-style framework with the addition of a version of Neo-Davidsonian Event Semantics adapted by Parsons (1980), instead of the Situation Semantics framework with which HPSG is most compatible. It seems that we can address the issues at hand in this way, because the notion of situation in Situation Semantics appears to be compatible with the notion of eventuality in Event Semantics.[16]

The intuitive idea of RCs, which goes back to Quine (1960), is that the head noun is characterized by its RC in a relative clause construction. Montague's (1973) PTQ analysis gives the semantic value (47b) to the expression (47a). Montague himself is not explicit about whether a free variable is required for an RC in English. Hence, PTQ in principle allows expressions such as (48). However, most linguists seem to rule out expressions like (48), where there is no free variable x in the RC. Higginbotham (1984) asserts that they are ungrammatical due to a prohibition of vacuous quantification. Chomsky (1982, 11) uses this type of example to suggest that prohibition of vacuous quantification is a principle on the syntax of LF in natural languages, as part of Universal Grammar.

(47) a. person that John met
 (in fact, *person such that John met him* in PTQ)

 b. $\lambda x[\text{person'}(x) \& \text{met'}(j, x)]$

(48) a. *man who John saw Bill
 $\lambda x[\text{person'}(x) \& \text{saw'}(j, b)]$

 b. *book that it rains
 $\lambda x[\text{book'}(x) \& \text{rains'}]$

Chomsky's generalization seems to be wrong for Korean RCs. Let us take an example. The Montague-style representation of the meaning of (13c) above is (49b) below. In (49b) what the relative clause in (49a) amounts to is the underlined portion. There is no free variable x in this portion.

(49) a. [John-i   kom-ul cwuki UN] sichey
 John-nom bear-acc killed REL corpse
 'corpse that came from John's killing the bear'

 b. $\lambda x[\text{corpse'}(x) \& \underline{\exists e[\text{killing}(e) \& \text{AGENT}(e,j) \& \text{THEME}(e,\text{the-bear'})} \& \text{R-rel}(e,x)]]$

Instead of a free variable in an RC, Korean requires a nonsyntactic *R-relation* which holds between an eventuality in an RC and its head noun. This *R-relation* is of a pragmatic nature in that a given context determines its value. It is a relation parameter which is instantiated as a specific relation in

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[15] Craige Roberts suggested to me that the relation in Korean-type RCs be between the head and the event that the RC describes, when I was not quite sure about that. This suggestion was crucial to the development of the theory.
[16] I will use 'eventualities' as a cover term for states, processes, and events, as Bach (1986) does. Also, for simplicity, I will frequently omit eventuality arguments when unnecessary.

a given context. It is also in part semantic in the sense that a certain predicate makes certain *R-relations* available as part of its lexical meaning.

Thus the ways head nouns are characterized in RCs may be different from language to language, contrary to the common assumption about the semantics of RCs. For instance, English requires that there be a tight syntactic relation involving filler-gap dependencies, while Korean doesn't require a syntactic dependency to the same degree. This nonsyntactic nature of binding in Korean RCs is really what makes Korean 'cool', whereas the syntactic dependencies in English RCs make English 'hot'.

If we compare (49) with (18d), repeated below, we come to realize that there is something more to be said than just concluding that Korean RCs are a pragmatic matter. In almost all contexts, (49) is good, while (18d) is unacceptable. What such examples suggest is, then, that while we only need some appropriate nonsyntactic relation between an RC and its head noun, the question of what appropriate means needs to be addressed here.

(18)   d. *[Mary-ka   ka   UN] salam
            Mary-nom   went   REL person
            'person such that Mary went'

I propose that a relation between an RC and its head noun is appropriate if it is familiar and salient in the discourse. More specifically, the relation must be familiar in the sense of the Familiarity Condition of Heim (1982) and salient in the common ground of discourse. Consequently, I provide (50) as the condition for acceptable RCs in Korean:

(50)   Condition for *R-relations* in Korean:

        R-relations must be familiar and maximally salient

The condition (50) allows (49), as we want it to. Normally, if someone kills a bear, then the bear becomes a corpse. As a result, there exists a familiar *R-relation* which holds between 'killing a bear' and a corpse. On the other hand, the condition (50) is not satisfied in (18d), because 'to go' doesn't typically involve a third person who is not the agent. In this way we can explain from (50) that (18d) is an unacceptable RC construction.

At this point I propose in (51) below a partial inventory of familiar relations which can make R-relations in RCs appropriate.

(51)   (Partial) Inventory of Potential Familiar Relations:

        {AGENT, THEME, LOCATION, SOURCE, GOAL, TIME, INSTRUMENT,
        REASON, CAUSE, BENIFICIARY, RESULT, SIGN, METHOD, TOPIC}

I assume without discussion that if an eventuality occurs, unique instances will ensue for some or all of the familiar relations in (51) such as its location, time, instrument, cause, method, and result, depending on the type of its predicate. For example, an eventuality of 'a person meeting someone' has relations with a time, location, reason, and method, but not normally with an instrument, whereas 'a person stabbing someone' implies some relation with a time, location, cause, method, and instrument. Also an eventuality is assumed to have a familiar relation of *RESULT* with a resulting entity if its predicate typically brings one about. For example, a person killing an animal has a relation with a corpse.

(52) below is the Korean counterpart of (47) above. Comparing (52) with (47), we notice that nothing in the formula in (52b) requires that the head noun be coindexed with the pro in the RC. The only requirement is that there be a familiar *R-relation* between the person x and the event that

the RC describes. I propose the coindexing process between x and x' as follows. There are several candidates for *R-relation* between x and e, e.g. AGENT, THEME, REASON, etc. A person is not usually considered as a reason for an event of meeting in a normal context. Therefore, it is not familiar and salient enough in that context. AGENT and THEME are familiar and salient enough for such an event with a transitive verb. There is only one free variable x' in the RC in (52a), which has the THEME role of the event. Thus, x' is eventually coindexed with x, assuming that thematic roles are unique (cf. Chomsky (1981)). In fact, this is the only way the RC in (52a) is licensed in a normal context under the condition (50). This results in coindexing of x and x'. Eventually, it leads to (52c) as one, probably the only in most contexts, instantiation of R-relation.

(52) a. [John-i   pro$_i$ manna UN] salam$_i$
           John-nom   met   REL person
           'person that John met'

      b. $\lambda x[person(x) \& \exists e[[meeting(e) \& AGENT(e,John) \& THEME(e,x')]$
                          $\& \text{R-rel}(e,x)]]$

      c. $\lambda x[person(x) \& \exists e[[meeting(e) \& AGENT(e,John) \& THEME(e,x')]$
                          $\& THEME(e,x)]]$

I will assume that a full NP cannot be coindexed with another full NP for a pragmatic principle that one should 'be as explicit as the conditions permit' (Reinhart 1983:76)[17]. This principle will rule out (53a) essentially in the same way it rules out (53b). Notice that Principle C of HPSG cannot rule out (53b), nor can Condition C of the standard GB binding theory if we assume that the *when*-clause is a sentential modifier.

(53) a. *[John$_i$-i   pro   manna UN] salam$_i$
           John-nom   met   REL person
           'person$_i$ that John$_i$ met him'

      b. *I met the student$_i$ when John$_i$ was at the hospital.

The condition (50), together with this principle, rules in (54a) but rules out (54b): (54a) is licensed as we have seen above, because *salam* 'person' is related with the event of meeting as a familiar relation of THEME; on the other hand (54b) is not, because there is no familiar relation available between *salam* 'person' and John's meeting Mary. In other words, we don't usually assume that if a person x meets a person y, this eventuality has any regular relationship with a person z.

(54) a. [John-i   pro$_i$ manna UN] salam$_i$
           John-nom   met   REL person
           'person that John met'

      b. *[John-i   Mary$_i$-lul manna UN] salam$_i$
           John-nom Mary-acc met   REL person
           'person such that John met Mary'

Now let's reconsider (23c), (22c), (13e), (13b), (26a), repeated in (55) in that order. None of the RCs in (55) can be accounted for in Kuno's approach or in an English-type analysis as we have seen in the previous sections.

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[17] Carl Pollard pointed out that this condition may be too strong, since (i) is good.

(i) John$_j$'s father realized that John$_j$ was smarter than he$_i$ is.

(55) a. [John-i   kyelsekha   UN] yenghwa
        John-nom   was.absent REL movie
        'the movie for which John skipped the class'

    b. [Mary-ka   John-ul   ccilu   UN] khal
       Mary-nom   John-acc   stabbed REL knife
       'the knife with which Mary stabbed John'

    c. [komwu   than UN] naymsay
       rubber   burn REL smell
       'the smell that characterizes burning of rubber'

    d. [wuli-ka   achim-ul   mek UN] ccikkeki
       we-nom   breakfast-acc ate REL leftover
       'the leftovers which came from our having breakfast'

    e. [pro mwulken-ul hwumchi UN] salam-kwa   cangso
           goods-acc   stole   REL person-and place
       'the person; that stole the goods and the place that he; stole the goods'

They can all be explained in my analysis; (55a) is ruled in, because the head noun is in an
appropriate relation with the eventuality. Namely the head noun is the CAUSE of the eventualities.
The R-relation in (56) is familiar because a cause always seems to be presupposed when we talk
about an eventuality. It is easy to consider an exciting movie as a cause of someone's skipping
school. Therefore, this appropriate relation between the RC and its head noun licenses (55a).

(56)   R-rel(a movie, John-skipped-the-class)

    (55b) is ruled in, because the head noun is in a relation with its RC as the instrument. This is
shown in (57a). A knife has a natural relation with an eventuality of someone's stabbing someone
else. But this kind of relation may not hold if we have an RC construction like (57b), in which the
head noun is a bagel. The entity denoted by the head noun must be a sharp object in order to have
an appropriate relation with the RC like (55b). A knife can serve such a purpose, but a bagel
cannot. Therefore a bagel cannot stand in an R-relation in (57c) to a stabbing event as an
instrument :

(57)   a. R-rel(a knife, Mary-stabbed-John)

        b. *[Mary-ka   John-ul   ccilu   UN] bagel
           Mary-nom   John-acc   stabbed REL bagel
           'bagel such that Mary stabbed John'

        c. *R-rel(a bagel, Mary-stabbed-John)

(55c) is ruled in because the typical smell characterizes an event of rubber burning as one of its
SIGNs. (55d) is ruled in because the eventuality typically brings about entities like those denoted
by the head noun. Thus, the relations in (58) are appropriate in the sense that its smell
characterizes rubber burning and having a meal normally produces leftovers.

(58)   a. SIGN(smell, Rubber-is-burning)

        b. RESULT(leftovers, We-had-breakfast)

(55e) is ruled in because the first conjunct of the head noun phrase is related to the RC as AGENT
of the eventuality and the second conjunct is related as a place to the RC as shown in (59).

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(59) a. AGENT(person, stealing event)

   b. LOCATION(place, stealing event)

It should be noted that the notion of familiar relation is situated in a context. This entails that there could be differences in acceptability of RCs in different contexts. This is exactly the case. In a normal context, for example, (60) below is not acceptable. This can be explained, because at least out of the blue, it seems that the head noun is not appropriately related to the RC. Even though it may be true that the event occurred in some kind of weather, it appears not to have a salient and familiar relation with it. However, if it is uttered in a rich context where John is seasonally depressive and homocidal, it is acceptable. In this case, the weather can be identified as being in an R-relation to the RC: the weather functions as CAUSE. In this rich common ground, the weather is closely related with John's behavior. Therefore, it is a familiar relationship with an event involving John as an agent.

(60) a. [John-i   Tom-ul   ccilu   UN] nalssi
          John-nom Tom-acc   stabbed REL weather
          'weather under which John stabbed Tom'

   b. CAUSE(weather, John-stabbed-Tom)

This line of explanation can be extended to cover most examples. Take for example (18d) above, repeated below. We judged it as unacceptable in a normal context. Now, let us provide an enriched context so that each person in the domain has to go to some place for someone. And suppose that John went for Tom and that Mary went for someone else. In this context, (18d) is an acceptable RC. In other words, the R-relation in (61) is one of BENEFICIARY which is familiar in the context.

(18) d. *[Mary-ka   ka   UN] salam
          Mary-nom   went   REL person
          'person such that Mary went'

(61) BENEFICIARY(person, Mary-went)

Likewise, (57b) is acceptable if we assume a context where Mary stabbed John because they had a big fight over a bagel. In this case, the R-relation in (57c) is one of CAUSE. In view of this, the * marks in the examples above should be understood as indicating their unacceptability in a normal context, since, after all, most examples can be ameliorated if we enrich their contexts.[18]

In this way the condition (50) appears to cover the full range of examples in RC constructions. Let me illustrate some derivations of RC constructions. In the current semantic framework, one obvious way to get the semantics right appears to be the following. I propose schematically that the relativizer *UN* has the denotation (62). The relativizer functions as abstracting over eventuality variables when it combines with an RC. Then, it in turn combines with the head noun. This is illustrated in (63) for Korean-type RC like (49) and in (64) for an English-type RC like (52a). The variable p in (62) ranges over sets of eventualities in a similar way that a sentence is given a type temporal abstracts in Stump (1985: 105).

(62) *UN'*: $\lambda p \lambda Q[\lambda x[Q(x) \& \exists e[p(e) \& \text{R-rel}(e,x)]]]$
      (cf.Types(extensional): Q:<e,t>, x:<e>, p:<e,t>, a variable over sets of eventualities)

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[18] Therefore, it is not a matter of grammaticality but of acceptability that is at stake here in Korean RCs. To be precise, * should be replaced by #. But since I opened the exposition with grammaticality judgements compared to English, I will keep the notations as they are.

(63) [l *John-i   kom-ul   cwuki   UN* l]
      John-nom bear-acc killed   REL

:λpλQ[λx[Q(x) & ∃e[p(e) & R-rel(e,x)]]](λe'[killing(e') & AGENT(e',John)
                                                        & THEME(e',the-bear)])

=>λQ[λx[Q(x) & ∃e[λe'[killing(e') & AGENT(e',John) & THEME(e',the-bear)](e)
                                                        & R-rel(e,x)]]]

by λ-conversion

=>λQ[λx[Q(x) & ∃e[killing(e) & AGENT(e,John) & THEME(e,the-bear)
                                    & R-rel(e,x)]]]

by λ-conversion

[l [*John-i   kom-ul   cwuki   UN*] *sichey* l]
    John-nom bear-acc killed   REL   corpse
'corpse that came from John's killing the bear'

:λQ[λx[Q(x) & ∃e[killing(e) & AGENT(e,John) & THEME(e,the-bear)
                            & R-rel(e,x)]]] (corpse')

=> λQ[λx[corpse'(x) & ∃e[killing(e) & AGENT(e,John) & THEME(e,the-bear)
                            & R-rel(e,x)]]]

by λ-conversion

=> λQ[λx[corpse'(x) & ∃e[killing(e) & AGENT(e,John) & THEME(e,the-bear)
                            & RESULT(e,x)]]]

by instantiation of R-rel

(64) [l *John-i   pro manna   UN* l]
      John-nom   met   REL

:λpλQ[λx[Q(x) & ∃e[p(e) & R-rel(e,x)]]](λe'[meeting(e') & AGENT(e',John)
                                                        & THEME(e',x')])

=> λQ[λx[Q(x) & ∃e[λe'[meeting(e') & AGENT(e',John) & THEME(e',x')](e)
                            & R-rel(e,x)]]]

by λ-conversion

=> λQ[λx[Q(x) & ∃e[meeting(e) & AGENT(e,John) & THEME(e,x') & R-rel(e,x)]]]

by λ-conversion

[l [*John-i   pro_i manna   UN*] *salam_i* l]
    John-nom   met   REL   person
'person who John met'

:λQ[λx[Q(x) & ∃e[meeting(e) & AGENT(e,John) & THEME(e,x')
                                                    & R-rel(e,x)]]](person')

=>λx[person'(x) & ∃e[meeting(e) & AGENT(e,John) & THEME(e,x') & R-rel(e,x)]]

by λ-conversion

=>λx[person'(x) & ∃e[meeting(e) & AGENT(e,John) & THEME(e,x')
                                                    & THEME(e,x)]]

by instantiation of R-rel (as one of the possibilities)

However, while this works for simple sentences, the denotation of the relativizer in (62) cannot handle long-distance RC constructions such as (65). Because arguments that the relativizer takes

are an abstraction over eventuality variables in the matrix clause, the relation between a head noun and the eventuality of an embedded sentence cannot be captured in the way proposed in (62) - (64). For this reason, we need some way to get an access to an embedded clause and match it with the head of the RC.

(65) [John-i   [Mary-ka   ttenass-tako] malha UN] iyu
      John-nom   Mary-nom   left-comp   said   REL reason
      'reason that John said Mary left'

In Yoon (in progress) I attempt to provide a semantic account for data like (65) in the framework of Dynamic Montague Grammar.

7 A Problem to Resolve

There is a possible problem to resolve which arises from adopting my analysis. Observe that a sentence like (66) is not acceptable. Nothing appears to rule out this structure in my analysis.

(66) ??[ku$_i$-ka   ka   UN] salam$_i$
      he-nom went REL person
      'person who went'

I have proposed that a relative clause does not have a gap. Then it follows automatically that an empty category in a RC must be *pro* . Then, *kan salam* 'person who went' must be analyzed as in (67).

(67) [pro$_i$ ka   UN] salam$_i$
            went REL person
      'person$_i$ that he$_i$ went' = 'person who went'

If we assume that *pro* and an explicit pronoun are always compatible in a pro-drop language such as Korean, we face a problem. The oddity of (66) is unexpected according to our theory, because the head noun and the pronoun are supposed to be syntactically independent. (66) is minimally different from (67): the only change made in (67) is that the pronoun is now explicit. An example like (66), being unacceptable, appears to dispute my claim that the empty category in a RC is *pro*. This example might appear to support a gapped approach to RCs.

However, consider (68) and (69) below. The relation between them is analogous to the relationship between (66) and (67) inasmuch as the sentences in (69) result from replacing *pro*s in (68) by overt pronouns. What they show is that a sentence with *pro* is not always the same in grammaticality as a sentence in which an explicit pronoun replaces *pro*. Namely, (69a) and (69b), both ungrammatical, are the corresponding sentences with explicit pronouns of (68a) and (68b), respectively. Now, the contrast between (66) and (67) seems not very surprising. It seems that what we have to do is discard the assumption that *pro* and overt pronouns have exactly the same distribution.[19]

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[19] Incidentally, as mentioned above, there is a gap possible in environments like (i) and (ii) where subjacency would block an extraction, such as in a complex NP and in a subject. Now the gaps here are considered to be *pro* in my analysis. Its explicit counterpart is optional when *pro* is embedded.

(i) [[$_S$ (kukes$_i$-ul) poko nase] hwacangsil-ey kalswu epsnu UN] yenghwa$_i$
        it-acc   see after restroom-to   can.go not   REL movie
     'movie$_i$ that you can't go to restroom after you watch it$_i$'

(68) a. John$_i$-i   tochakha camaca,   pro$_i$ phyenci-lul ponayssta.
        John-nom arrive   as.soon.as   letter-acc   sent
        'As soon as he$_i$ arrived, John$_i$ sent a letter.'

    b. pro$_i$ tochakha camaca,   John$_i$-i   phyenci-lul ponayssta.
            arrive   as.soon.as John-nom letter-acc   sent
        'As soon as he$_i$ arrived, John$_i$ sent a letter.'

(69) a. ??John$_i$-i   tochakha camaca,   ku$_i$-ka   phyenci-lul ponayssta.
        John-nom arrive   as.soon.as he-nom letter-acc   sent
        'As soon as he$_i$ arrived, John$_i$ sent a letter.'

    b. *Ku$_i$-ka   tochakha camaca,   John$_i$-i   phyenci-lul ponayssta.
        he-nom arrive   as.soon.as John-nom letter-acc   sent
        'As soon as he$_i$ arrived, John$_i$ sent a letter.'

Moreover, most speakers find (70) acceptable. (70) contrasts with (66) and (67) in
grammaticality. If we conclude from (66) and (67) that the empty category in (67) is in fact a wh-
trace because an overt pronoun is not allowed in (66), then we have to conclude in the same logic
that the empty category in (70b) is *pro*. Since (67) and (70b) have exactly the same structure, it is
not convincing to argue that they have different types of empty categories.

(70) a. [caki$_i$-ka caki$_i$-lul phamyelsikhin UN] salam$_i$
            self-nom self-acc destroy   REL person
        'person who destroys himself'

    b. [pro$_i$ caki$_i$-lul phamyelsikhin UN] salam$_i$
            self-acc destroy   REL person
        'person who destroys himself'

Thus examples such as (66) do not necessarily undermine my analysis that empty categories in
a RC are *pro*'s. However further research will be needed to establish the precise distributional
differences between overt and empty pronouns. I suspect that some constraint would rule out
sentences like (67) in the same way it would rule out sentences such as (69).

8. Conclusion

In conclusion, it was shown at the beginning that Korean-type RCs cannot be accounted for by the
standard syntactic and semantic approaches available, both because syntactically they lack a
syntactic gap and because semantically the relation between an RC and its head noun is not one that
is directly describable in the popular approaches.

It was observed that the context plays a central role in Korean RCs, binding free *R-relations*.
An analysis was proposed which involves no wh-trace or movement of empty operators. In this
analysis, Event Semantics is incorporated to address and determine the discourse-bound *R-
relation*.

Then, it is not a random fact that Korean, along with Chinese and Japanese, has this type of
RCs, while English does not. I claim that this is just another manifestation of the general tendency
of cool languages to depend more on the context for interpretations than hot languages like English
do, in the same way that only cool languages allow zero pronouns.

(ii) [$_{RC}$[$_{RC}$ (ku$_i$-ka)   ipko   issnu UN] yangpok-i telep   UN] sinsa$_i$
            he-nom   wearing is   REL suit-nom is.dirty REL gentleman
    'gentleman$_i$ that the suit that he$_i$ is wearing is dirty'

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