Binding and PRO in the SPEC of NP*

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0. Introduction

This article is an attempt to analyze some facts concerning around the binding theory under a new assumption based on the A/A′-division of the subjects of NP suggested in Kim(1987).

In section 1, the motivation and explanatory power of the division is briefly reviewed, followed by a new interpretation and assumption of the structure of NP. In section 2, the problem of positing PRO in the SPEC of NP is discussed. The theories for the PRO in the SPEC of NP and those against the PRO in the SPEC of NP are carefully examined to draw the conclusion that PRO must be posited in the SPEC of NP. Especially in section 2.2., it is argued that the intermediate projection N′ of an NP is actually acting as a maximal projection and should be understood as such at least for a proper analysis of binding phenomena in English NPs.

The new assumption of the structure of NP not only enable us to analyze data without any extra conditon or cost to the standard binding theory, but also gives a unified explanation of previously problematic failure of complementary distribution between anaphors and pronominals.

1. A Proposal

1.1. A/A′-subject of NP

It was argued in Kim(1987) that the subject positions of an NP should be divided into two kinds: A-position and A′-position. The NP with A-subject, which is nexal in its nature, is a barrier if the NP is not L-marked, whereas the NP with A′-subject as well as the NP with non-specific determiner, i.e., non-nexal NPs, are an inherent barrier, for they cannot be L-marked.[1] Consider the following examples:

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1) The term 'nexal' and 'non-nexal' here is adopted from Pustejovsky (1984). According to his distinction, NPs that are clause-like in thematic structure are nexal, whereas NPs that are not are non-nexal. Nexal NPs must be viewed as thematically propositional in their nature. They are arguments which are thematically saturated. Therefore they are considered as an argument together so that they may be considered as a predicate. According to Chomsky (1986b), prediate XPs form inherent barriers both for government and for movement.

(1) a. Kripke's proof of the theorum
Bill's comment on the book
Mary's performance of the opera
the enemy's destruction of the city
b. Bill's loaf of bread
John's bottles of wine
Bill's play about city life
c. a loaf of bread
a book about Chomsky
a bottle of wine
a play about city life

Examples in (1a) are nexal NPs with A-subject, those in (1b) are non-nexal NPs with A′-subject, and those in (1c) are non-nexal NPs with non-specific determiner.

With this distinction in mind, Kim(1987) tried to explain some interesting facts about the Specificity Condition in terms of the Empty Category Principle(ECP). Compare the following examples of extraction from within NP:

(2) a. What$_i$ did Mary eat [a loaf of t_i]?
b. What$_i$ did John read [a book about t_i]?
c. What$_i$ did Mary drink [a bottle of t_i]?
d. What$_i$ did John read [a play about t_i]?
(3) a. *What$_i$ did John eat [Bill's loaf of t_i]?
b. *What$_i$ did Mary drink [John's bottle of t_i]?
c. *What$_i$ did John read [Bill's play about t_i]?

In the examples given above, we cannot find any violation of Subjacency Condition, since complement NPs are L-marked under the proposals of Chomsky (1986). He attributes ungrammaticality of the examples in (3) to the Specificity Condition, which says that a variable may not be free in a specific NP. But the examples in (4) below show that the Specificity is not a cure-all, for it says nothing about their grammaticality:

(4) a. Which theorum$_i$ did you read [Kripke's proof of t_i]?
b. Whose book$_i$ did you read [Bill's comments on t_i]?
c. the opera$_i$ that we saw [Mary's performance of t_i]
d. the city$_i$ that I witnessed [the enemy's destruction of t_i]

Under the Specificity Condition the sentences in (4) are predicted ungrammatical since they all contain specific NPs.

With the distinction of A/A′-subject of NP, it is possible to rule out the ungrammatical sentences in (3) in terms of the ECP, and correctly predict that the sentences in (2) and (4) are grammatical. The relevant structure of the sentence (3a) at which the

ECP applies would be something like (5):

(5) *What$_i$ did John [$_{VP}$ t_i' [$_{VP}$ eat [$_{NP}$ Bill's loaf of t_i]]]?

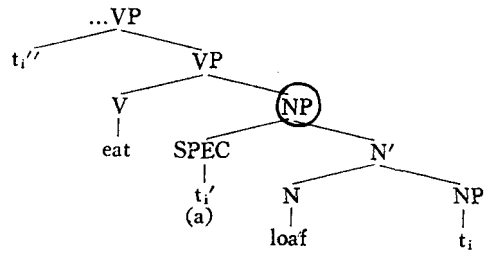
The NP, which is non-nexal in its nature, cannot be L-marked by a lexical head *eat*, for it is a predicate. Hence the NP is an inherent barrier to government: antecedent t'_i fails to antecedent-govern t_i, resulting in the violation of the ECP.[2] The S-Structure of (4a) is similar to that of (3a):

(6) Which theorum$_i$ did you [$_{VP}$ t_i' [$_{VP}$ read [$_{NP}$ Kripke's proof of t_i]]]?

The NP, which is nexal in its thematic structure, is not a barrier, even though it is an argument, for it is L-marked by the lexical head *read*. Therefore, the antecedent t'_i in adjoined VP position can properly govern t_i with no violation of the ECP.

The facts in (2) can be accomodated by an analysis in which the complement of N must move through the SPEC position of NP in order to escape, as is proposed in Franks (1986) and Torrego (1985). That the indefinite article is substituted by t'_i at the representation at which the ECP applies is not unnatural. The relevant representation would be something like (7):

(7)



The substitution is reasonable on the ground that the SPEC of non-nexal NP may be regarded as an adjunct position with no external θ-role assigned and that indefinite article is non-specific in its nature. The circled NP is a barrier, for it is a predicate which cannot be L-marked. The t_i'' in adjoined VP position fails to properly govern t_i' in the SPEC position of the NP because of the barrier NP, but t_i' can be deleted by Affect-α after antecedent-governing t_i in complement position. Hence, it turns out to be grammatical.

1.2. Adjunct as a Subject of NP

So far we made some review of Kim (1987) to show that the proposed A/A′-distinction of the subject of NP is well supported by some facts concerning the Specificity Condition. Before we try to find another evidence in favor of the distinction, let us clarify the

2) It is assumed in Kim (1987) and in this paper, too, that N is not a θ-governor (hence not a proper governor) following the ideas of Kayne (1984).

concept that some NPs may have a A′-subject.

Chomsky (1986b) argues that the subject of an NP must be regarded as falling in the category of adjunct, not arguments, with regard to the ECP. Chomsky (1986, 46) says that "This is not unreasonable. The intuitive motivation that Lasnik and Saito suggest for the distinction in the treatment of arguments and adjunct, which remains to be precise, is in terms of the Projection Principle: arguments are necessary at S-Structure but adjuncts are not. Pursuing the intuition, we might assimilate "Subject of NP" to adjuncts, in that these elements are not in the domain of the Projection Principle and can in fact missing freely. Subjects of clauses are crucially different; by the Extended Projection Principle, they must be present at S-Structure. Hence, they must be subjected to the ECP (receive γ-marking) at S-Structure."[3)]

Following this line of argument, we may regard the SPEC of an NP as a subject of as an adjunct. Assuming the X′-schema of NP proposed in Chomsky (1986a, 1986b), I suggest that the X′-structure of NP (8a) represent at least the structures (8b) and (8c):[4)]

(8) a. NP→(SPEC) N′ (ADJ)
b. NP→SPEC N′
c. NP→ADJ N′

Pustejovsky (1984) says that (9a) has at least a couple of meanings, (9b) and (9c):

(9) a. your performance of the opera
b. your actual performance of the opera as an actor
c. your account of a performance of the opera

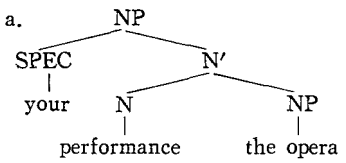
The structures (8b) and (8c) well represent the two meanings, (9b) and (9c), of (9a). What is meant by my proposal is that (9a) should be represented with different struc-

3) Consider the following examples from Chomsky (1986, 45):
(i) a. By which painter$_j$ did you[$_{VP}$ tell me[$_{CP}$ that they are going to[$_{VP}$ exhibit[several drawings t_j]]]]]?
b. *By which painter did you[$_{VP}$ ask me[$_{CP}$ whether they are going to[$_{VP}$ t_i′[$_{VP}$ exhibit[several drawings t_i]]]]]?
(ia) is a standard example of successive cyclic movement. Let us take a closer look at why the (ib) would be an ECP violation. The *wh*-phrase first moves from t_i to VP and moves from its position across the *wh*-island. It must be that t_i′ is the offending trace, yielding an ECP violation. Still assuming the framework of Lasnik and Saito (1984), t_i′ must be present at LF with the feature [$-\gamma$]. The trace will indeed be assigned this feature since it is not properly governed, but t_i′ must not be permitted to delete in the LF component or there will be no ECP violation. Lasnik and Saito argue that for adjunct γ-assignment takes place at LF, whereas for arguments it takes place at S-Structure.

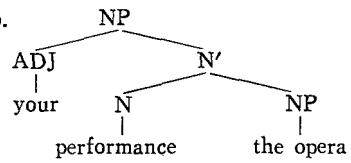
4) The term 'NP structure' is carefully avoided here for fear of the confusion with that of Williams.

tures shown in (10b) and (10c):

(10) a.



b.



(10a) represents the structure corresponding to the meaning (9b), whereas (10b) corresponds to the meaning (9c). In (10a) *your* receives a θ-role, agent, from the head *performance* just in the same way as in the sentence, and it is the logical subject of the whole proposition. Syntactically it acts as an A-subject. In (10b) the relation between *your* and the remaining part of the NP is that of the so-called R-relation. In other words, *your* in (10b) is not the logical subject in the whole NP, but a teller of the account about a performance. Anderson (1984) says that *your* has a possessor role given by the context. Syntactically it acts as an A′-subject. In section 2, it will be shown that the proposal on the structure of NP based on Chomsky's idea has some explanatory power in dealing with the examples of binding in NP.

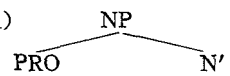
2. Binding in NP

2.1. PRO in the SPEC of NP

2.1.1. PRO

As noted by Williams (1985), there are number of attractive reasons for positing a PRO subject of NP as is shown in (11):

(11)



The simplest reason is to account for the meaning of NPs in certain contexts:

(12) The leaves curl during maturation.

By (12) we mean that the leaves curl during leaves' maturation, and this can be attributed to control of a PRO in the SPEC of the NP, $[_{NP}$ PRO $[_{N'}$ maturation $]$, control by the subject NP *the leaves*, especially since a full NP in the position of the SPEC gets the 'subject' interpretation; 'the leaves' maturation.'" Example (12) would be completely parallel to (13), a case that undoubtedly involves control of PRO:

(13) The leaves curl while PRO maturing.

The second argument that there is in some cases a PRO subject of NP is based on

θ-theory. The θ-Criterion predicts a recipient for the external θ-role in action nominalizations like *the destruction of the city*, and in fact an agent is understood. Then we would expect the agent to be syntactically realized:

(14) a. the PRO [$_{N'}$ destruction of the city]
b. Caesar's [$_{N'}$ destruction of the city]

We can assume that NP assigns the external θ-role of *destruction* to PRO via predication. This assumption is quite similar to the claim that in (14b) *Caesar* is θ-assigned by N'. Hence it is desirable for PRO to be posited to recieve the external θ-role in action nominalization.

The third argument that has been forwarded in favor of a PRO in the SPEC of NP is provided by control theory. Consider (15):

(15) a. any attempt [PRO to leave]
b. the desire [PRO to succeed]

In the first example, the attempter is necessarily the same as the leaver, and the desirer is the same person as the one who desires to succeed in the second example. This is explained if we assume that a configuration of obligatory control is involved, and that there is a PRO subject of *attempt* or *desire*.

Binding theory[5] also provides arguments for the existence of PRO in the subject of NP. The simplest examples are the following:

(16) a. [Pictures of themselves] bother the man.
b. [Criticisms of oneself] is necessary in moderation.

The anaphors *themselves*, *oneself* lack overt antecedents. Condition A insists that a local antecedent exist; therefore, it must be non-overt. A PRO subject of NP would be

5) Here we assume the following version of binding theory suggested in Chomsky (1981):
(i) Binding Theory
A. An anaphor is A-bound in its governing category.
B. A pronominal is A-free in its governing category.
C. An R-expression is free.
(ii) Governing Category
X is the governing category for α iff
X is the minimal category containing α, a governor of α ($=\beta$), and a SUBJECT accessible to α ($=\gamma$).
(iii) Accessibility
α is accessible to β iff
α c-commands β and the assignment of the index of α to β does not lead to a violation of the i-within-i Condition.
(iv) i-within-i Condition
* [$\gamma\cdots\delta\cdots$]
where γ and δ have the same index

the most likely candidate.

Parallel to (16b) is the example like (17):

(17) *PRO$_i$ criticism of them$_i$

In (17), the criticizer(s) cannot be *them*$_i$. This can be accounted for as a Condition B violation, if there is a PRO subject of *criticism*.

Further examples come from Ross (1967):

(18) a. The PRO$_i$ realization that he$_i$ has broken the law.
b. The PRO$_{*i,j}$ realization that John$_i$ has broken the law.

In (18), the realizer can be *he*. In (18b), on the other hand, the realizer cannot be *John*, but must be someone else. This is explicable as a Condition C violation, assuming there is a PRO present.

Besides, consider these examples from chomsky (1986a):

(19) a. They$_i$ heard [stories about each other$_i$].
b. They$_i$ heard [PRO$_j$ stories about them$_i$].
c. They$_i$ told [stories about each other$_i$].
d. *They$_i$ told [PRO$_i$ stories about them$_i$].

Assuming Chomsky's (1981) binding theory (see footnote 5), the judgements are as would be expected, except for the (19b) sentence. Since the whole sentence is the governing category for *them*, we would expect a violation of Condition B, just as in (19d). On the other hand, if PRO optionally appears in the noun phrase, the noun phrase becomes the governing category. Thus, sentence (19b) becomes acceptable, where PRO is not coindexed with *them*. And in fact, the only interpretation available is one in which they heard someone else's stories about them. In sentence (19d), on the other hand, the PRO must be coindexed with the subject, hence with *them*, because of the meaning of *tell*. Thus (19d) cannot be saved by allowing the optional PRO to appear.

So far, we presented a series of arguments in favor of positing PRO in the SPEC of NP. In next section, a few arguments against PRO in the SPEC of NP will be followed. These corolleries will be compromised in section 2.2. with the analyses of further examples.

2.1.2. No PRO

There may be several arguments against positing PRO in the SPEC position of NP. Some of them will be presented below, followed by the comments on their inadequacies.

The simplest argument against PRO in NP is related to the above mentioned example. Abney(1987) observes the *I wanted (the) book* cannot mean either "I wanted my book," or "I wanted someone's book." This may indicate that there is neither a controlled nor arbitrary PRO present. But as Williams(1982) says that in a noun phrase the relation

between the determiner and the head noun can be anything, i.e., any meaning relation at all.[6] Actually my observation is that *I wanted the book* can mean anything including meanings in (20):

(20) a. I wanted my book written by someone other than me.
b. I wanted my book written by myself.
c. I wanted someone's book written by myself.
etc.

This indicates, contrary to Abney (1987), that there should be PRO to cover the meanings shown in (20).

Williams (1985) presents several arguments against having PRO in the noun phrase. One argument is that temporal adjuncts can fill the subject position in a noun phrase under certain circumstances. When they do so, they will displace PRO, yet rationale clauses are still licensed. Williams claims that the fact indicates that the licensing of rationale clauses is not evidence for the presence of PRO at all:

(21) Yesterday's destruction of the ship [PRO to collect the insurance].

Williams's argument, however, can be nullified if we assume that *yesterday* in (21) does not occupy the position in which the PRO might be posited. A solution for the analysis of (21) will be presented in 2.2.2.

Another argument of Williams against having a PRO in the noun phrase is that the PRO in the noun phrase differs from sentential PRO in its properties as a controlee. PRO in the sentence must usually be controlled; otherwise it must be *arb*. PRO in the noun phrase may be both non-controlled and non-arbitrary (i.e., non-generic). Consider the examples from Williams(1982). Control in the two cases work differently:

(22) a. The leaves$_i$ should not be bothered while PRO$_i$ desicating.
b. The leaves$_i$ should not be bothered during PRO$_i$ desication.
(23) a. *You should not bother the leaves$_i$ while PRO$_i$ desicating.
b. You should not bother the leaves$_i$ during PRO$_i$ desicating.

Examples show that control in the case of the gerund is restricted to surface matrix subject, whereas control of the NP PRO could be subject or object, or does not even require an antecedent at all:

(24) a. *You shuold not enter the chamber while PRO$_j$ detoxificating the samples.
b. You should not enter the chamber while PRO$_j$ detoxification of the samples.

6) This claim is expressed as the Det Rule in Williams (1982):
(i) Det Rule
The relation between the possessive NP and the following N′ can be any relation at all.

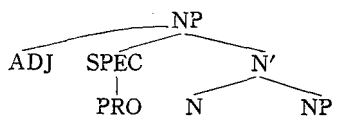
If there were actually a PRO in the noun phrase, one would expect it to behave like PRO in the sentence. Since PRO in the sentence cannot take a discourse antecedent, this suggests that PRO in the noun phrase either does not exist or is not PRO.[7] The apparent difference between PRO in gerund and PRO in NP in (24), however, does not seem to come from their inherent properties. As we will see in next section, there are sufficient reasons to conclude that the N' between the subject PRO of an NP and the head noun behaves as a maximal projection blocking the government, whereas the PRO in the gerund is in some way governed. It is not yet clear, however, the speculation is right or not. At least it gives us a way of saving cost in grammar by unifying the suggested difference between the two PROs.

In next section, I will show that the arguments against positing PRO in NP are actually misleading, since they began with an assumption that an NP may have only one subject position.

2.1.3. PRO as an A-subject of NP

So far we examined the corollery about positing PRO in the subject position of NP. The confusing arguments can be settled down with the well-motivated A/A′-distinction of the subject of NP. As a category required by the Projection Principle, PRO can only appear in A-position. With our division of the subject of NP into two kind; A-subject and A′-subject, it is possible theoretically to posit PRO in the A-subject position, SPEC of an NP:

(25)



The tree (25) represents the structure where both of the subjects appear simultaneously.

The problem is that under the standard analysis PRO in the subject position is governed by the head noun, which we will discuss in the following section.

2.2. Binding in NP

2.2.1. N′ as a Maximal Projection

As Abney(1986, 1987) claims, there are several reasons for believing that N′ is in fact a maximal category. First, assuming that N′ is maximal allows us to simply the definition of c-command. For most purposes, the definition of c-command which is

7) Roeper (1972) also note the obligatoriness of control into sentences, but not into noun phrases. They compare different kinds of gerunds. Consider:

(i) a. I_i detest PRO_j loud singing.

b. *I_i detest PRO_j singing loud.

The verbal gerund is bad with disjoint reference. The noun is relatively good. The difference apparently leads us at least to the conclusion that the PRO in NP and that in S are different.

required is one in which the c-domain of a node is the first maximal category which dominates that node. But with respect to binding in the noun phrase, Reinhardt's(1976) original "branching node" definition is necessary. Consider the noun phrase of (26):

(26) a. John's$_i$ [$_\alpha$picture of himself$_i$]
b. the city's$_i$ [$_\alpha$destruction t$_i$]
c. his$_i$ [$_\alpha$picture of himself$_i$]
d. its$_i$ [$_\alpha$destruction t$_i$]
e. *himself's$_i$ [$_\alpha$picture of himself$_i$]
f. *himself's$_i$ [$_\alpha$destruction t$_i$]

If we assume the maximal category definition of c-command, i.e., m-command of Chomsky(1986),[8] and assume that α is not maximal, the subject and the object position mutally m-command. So we would expect that (26a) would violate the Condition C of the binding theory, as the R-expression *John* is m-commanded and bound by *himself*. Similarly (26c) and (26d) should violate Condition B, and (26e) and (26f) should arguably good, with each anaphor binding the other. We can avoid this duplication of relations by supposing that α is in fact maximal. Then a noun's complement would not m-command its subject, as desired.

Secondly, the evidence that N′ is maximal rests on the assumption that only maximal categories can be adjoined to. It has been argued that N′ can be adjoined to. It is widely assumed that adjectives adjoin to N′, for instance. These considerations lead us to conclude that N′ is in fact a maximal category.

Thirdly, Giorgi's(1986) observation will be nicely incorporated to lead to the same conclusion if we assume "m-command" relation in the binding theory. Consider the following examples from Italian:

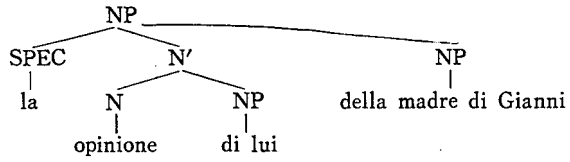
(27) a. L'opinione di lui$_i$ della madre di Gianni$_i$ è troppo lusinghiera.
The opinion of him of Gianni's mother is too flattering.
(Gianni's mother has an opinion concerning him.)
b. *La sua$_i$ opinione della madre di Gianni$_i$ è troppo lusinghiera.
His opinion of Gianni's mother is too flattering.
(Gianni has an opinion concerning his mother.)

According to Giorgi, since Italian *di* (of) is obligatorily transparent to c-command, linguistic theory predicts no contrast between (28a) and (28b). The *lui* (him) ends up

8) The following versions of configurational notions are assumed here:
(i) a. c-command
α c-commands β iff α does not dominate β and every γ, γ a branching node, that dominates α dominates β.
b. *m-command*
α m-commands β iff α does not dominate β and every γ, γ a maximal projection, that dominates α dominates β.

m-commanding via matrix NP *Gianni* in (28a), which therefore should be ungrammatical. Giorgi tries to solve this problem by arguing that there is an intermediate projection N′, which plays a crucial role with respect to m-command, inhibiting a phrase it dominates from c-commanding another one hanging from a higher projection NP. The structure for (28a) is roughly as follows:

(29)



If we assume that N′ is maximal, then we get the desired result. There is no violation of Condition C since the NP *di lui* (of him) cannot m-command *Gianni*.

Finally, consider the θ-marking of the subject of NP. θ-marking meets a condition of "sisterhood" that is expressible in terms of X′-theory, independently of government: a zero-level category α directly θ-marks β only if α is the complement of β in the sense of X′-theory. We might extend the definition of direct θ-marking to include θ-marking of the subject by VP. Given our assumptions about the structure of clauses, we would carry out this extension in terms of a specific notion of sisterhood that takes VP to be a sister of the subject of its clause even though I′ dominates VP but not the subject. Suppose we say that α and β are sisters if they are dominated by the same lexical projection. Then a condition on θ-marking will be that the θ-marker and the recipient of the θ-role be sisters, where the θ-marker may be a head or a maximal projection. Note that if we define sisterhood in terms of lexical projections, it follows that the subject is only indirectly θ-marked by the verbal head of a clause or gerund or by the head of a nominal. Consider an NP:

(30) John's [$_{N'}$ refusal of the offer]

If we were to define sisterhood in terms of maximal rather than lexical projections, then we would have direct θ-marking in the case of (30). Here if we assume that N′ is a maximal projection, we will be able to dispense with the distinction between direct and indirect θ-marking, unifying the notion of θ-marking.

Before we go to next section, a simple digression is necessarily in order. The standard analysis appears to make a false prediction for examples like *PRO *book*. Here PRO is claimed to be governed by *book* resulting in the violation of PRO theorum, which says that PRO may not be governed. Under our assumption that N′ is maximal, such an analysis cannot be correct, since *book* cannot govern PRO across N′. Abney (1987) suggests a solution, which I agree to, that *PRO *book* violates the θ-Criterion: there is no role for PRO, as there is no *-'s*.

2.2.2. A New Analysis

Now consider more examples to testify the adequacy of our framework presented above. First, any linguistic theory must account for the fact *John* is understood as corresponding to the maker argument of *picture:*

(31) John took [Mary$_i$'s picture t_i].

Under the framework presented above in (25), the relevant structure would be (32):

(32) John$_j$ took [Mary$_i$'s PRO$_j$ picture t_i].

Here the specifier position is occupied by PRO and the adjunct position is occupied by *Mary*. (32) means that *John* took or make a picture of *Mary* and the meaning is well represented in (32), for *Mary* occupies A′-position to receive its patient or possessor role with respect to *picture*, while PRO, which is controlled by *John*, occupies A-position to exprerss its inherent maker relation with *picture*.

Let's consider again some examples from Roeper (1984):[9]

(33) a. The sinking of the ship to collect the insurance.
b. *The ship's sinking to collect the insurance.

The relevant structures under our assumption would be (34):

(34) a. The PRO$_i$ sinking of the ship [PRO$_i$ to collect the insurance].
b. *The ship$_j$'s sinking t_j [PRO$_i$ to collect the insurance].

In (34a) PRO in embedded clause is controlled by PRO in the A-position of matrix NP. In (34b) A-position of matrix NP is already occupied by the moved *the ship* so that PRO cannot appear. The PRO in embedded clause then has no antecedent to control, resulting in ungrammaticality.

Williams (1984) suggests some other examples against positing PRO with regard to the fact that wth different verbs, we find different arguments of the embedded nominal controlled. For example, while the verb *perform* specifies association of its subject with

9) Roeper's (1984) analysis goes as follows:
(i) a. John's sinking of the ship [PRO to collect the insurance.]
b. The sinking of the ship [PRO to collect the insurance.]
c. *The ship's sinking [PRO to collect the insurance.]
In (ia) *John* controls the purpose clause PRO. Roeper explains the contrast between (ib) and (ic) by arguing that the PRO must be controlled. In (ib), he proposes, there is an implicit argument controlling the PRO, while in (ic), the implicit argument has been displaced by the fronted object, *the ship*. The most natural way to make this insight concrete would be to suppose that there is a PRO in the subject position in (ib), which is displaced by *the ship* in (ic). This hypothesis implies that the subject is not governed by N.

agent or maker roles, the verb *undergo* seems to specify patient role:

(35) a. John performed an operation.
b. John underwent an operation.

Under our assumption (25), (35) would be analysed as (36):

(36) a. $John_i$ performed an PRO_i operation.
b. $John_i$ underwent an PRO_i operation.

In (36a) *John* is an actor or a performer and it controls the PRO as desired. In (36b) *John* is a patient and controls the PRO as desired.[10]

Now consider the problematic sentence which Williams suggested as a strong counter-evidence to the analysis positing PRO in the SPEC of NP.

(37) Yesterday's destruction to collect the insurance

It is argued by Williams that in the NP (37) *yesterday* is said to substitute the subject position of the NP so that there is no position to appear to control the implicit subject of enbedded sentence. Under our assumption, however, *yesterday* only occupies the A′-subject position and the controller PRO occupies the A-subject position as is shown in (38):

(38) Yesterday's PRO_i destruction [PRO_i to collect the insurance].

Now consider how the binding theory would apply under our assumption:

(39) a. John took his picture.
b. John took a picture of him.

Both sentences mean that John took some other person's picture. Under our assumption, (39) would have structures shown in (40):

(40) a. $John_i$ took [$_{NP}$ his_j PRO_i picture].
b. $John_i$ took [$_{NP}$ a PRO_i picture of him_j].

In (40a) the pronominal *his* (α) is governed by PRO (β),[11] and the accessible SUBJECT

10) PRO in (36a) and (36b) denote different *John*s according to the meaning of head noun. This can be demonstrated by a little musing of some derived nominals. For example, in (ia) *destruction* corresponds to the verb *destroy*, while *destruction* in (ib) would be an equivalent of the VP *be destroyed*.
(i) a. (the city's) destruction
b. (the enemy's) destruction

11) As was shown in the previous section, N′ is a maximal so that it blocks *picture* from governing *his*.

(γ) of *his* is PRO, too. The governing category (GC) for *his* is, therefore, the object NP. In the GC, *his* is not bound, so that the whole sentence proves to be grammatical. The same explanation holds for the sentence (40b). The GC for *him* (α) is the NP containing *picture* (β) and PRO (γ).

Next let's consider the case of anaphors:

(41) a. John took his own picture.
b. John took a picture of himself.

Both sentences mean that John took John's picture. Under our assumption, the relevant structures would be (42a) and (42b):

(42) a. John_i took [$_{NP}$ his own_i picture].
b. John_i took [$_{NP}$ a PRO_j picture of himself_i].

The GC for the anaphor *his own* (α)[12] in (42a) is the matrix S, since it contains *his own* (α), *took* (β), and the accessible SUBJECT *John* (γ). *His own* is bound in GC so that the whole sentence is grammatical. In (42b), the GC for *himself* is the NP containing *himself* (α), *picture* (β), and PRO (γ).

Some more examples are in order. We find symmetrically different facts with verbs like *submit x to* and *undergo*, which trigger association to the patient role of the embedded N, rather than the maker or agent role.

(43) a. John submitted himself to her scrutiny.
b. *John_i submitted himself to his_i scrutiny.
c. John submitted himself to his own scrutiny.

In (43a) *John* is the patient of scrutiny, and *her* is the agent. The disjointness is enforced in (43b), but not in (43c). Under our assumption, the relevant structures would be (44):

(44) a. John_i submitted himself_i to her_j scrutiny.
b. *John_i submitted himself_i to [$_{NP}$ his_i PRO_i scrutiny].
c. John_i submitted himself_i to his own_i scrutiny.

In (44a) the GC is the matrix sentence containing *her* (α), *to* (β), *John* (γ). In its GC the pronominal *her* is not bound, hence the grammatical sentence results. In (44b) on the other hand the GC for *his* is the NP, since it contains *his* (α), PRO (β), and the accessible SUBJECT PRO (γ). *His* is bound by PRO in the GC, hence the ungra-

12) Williams (1984, 305) says that *his own* is not a pronoun but an anaphor, of sorts. At least, it does not undergo Condition B; it seems to undergo neither Condition A nor Condition B, so it is unclear what to call it.

mmaticality results. In (44c), the GC is the matrix sentence again containing ***his own*** (α), ***to*** (β), and ***John*** (γ). In the GC, the anaphor ***his own*** is bound by ***John***, so that the whole sentence is judged to be grammatical.

A couple of sentences which were proved to be problematic in Chomsky (1981) are neatly explained under our assumption:

(45) a. The children thought that each other's pictures were on sale.
b. The children thought that their pictures were on sale.

Under our assumption the relevant structures would be (46):

(46) a. The children$_i$ thought that [each other$_i$'s pictures] were on sale.
b. The children$_i$ thought that [their$_i$ PRO$_j$ pictures] were on sale.

In (46a) the GC for the anaphor ***each other*** is the matrix sentence containing ***each other*** (α), governor ***were*** or INFL (β), and the accessible SUBJECT, ***the children*** (γ). In the GC ***each other*** is bound by ***children***. In (46b), on the other hand, the GC is limited to the NP in the embedded sentence, since the NP contains the pronominal ***their*** (α), its governor PRO (β), and the accessible subject PRO (γ). In the GC, a pronominal ***their*** is not bound: hence the grammaticality results. We are now able to explain the apparent exception of complementary distribution between anaphor and pronominal without any revision of the original Binding theory.

So far we have examined how the binding theory A and B work well with our assumption. Finally consider how the binding theory C explains some sentences under our assumption, which was alluded before.

(47) The promise that John would win.

Here, ***John*** is disjoint from both the agent and goal roles. The facts of disjointness can be seen in the oddity of both of the following:

(48) a. *The promise that John would win made to him yesterday.
b. *The promise that John would win made by him yesterday.

The relevant structure, therefore, would be (49):

(49) The PRO$_j$ promise that John$_i$ would win.

Binding theory C requires that an R-expression ***John*** be A-free. A candidate antecedent PRO cannot bind ***John***, since they bear different indices.

3. Conclusion

In this paper, an attempt is made to support the conclusion which was drawn in Kim (1987): A/A′-distinction of the subject of NP. Pursuing the idea suggested in Chomsky (1986), we assumed that A′subject of NP occupies the adjunct position which is posited before SPEC, which is a slight modification (but without any additional cost to grammar) of the X′-schema. Such a framework enabled us to solve the problem of positing PRO subject of NP, by automatic positing of PRO in the A-subject position (SPEC) of NP. With another assumption that N′ is a maximal projection along with the new X′-structure of NP, it was possible to solve some problematic examples which had been regarded as exceptions to the complementarity of the distribution between pronominal and anaphor, as well as a lot of examples which were presented in the literature against syntactic treatment of PRO in GB theory.

This paper leaves much to be desired. However, if the conclusions drawn in this paper are right, they will be a little contribution to the theory of Universal Grammar as well as to a proper analysis of the structure of NP.

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