



# 数理逻辑之美

——方立教授纪念文集

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 北京语言大学出版社  
BEIJING LANGUAGE AND CULTURE  
UNIVERSITY PRESS

## 图书在版编目(CIP)数据

数理逻辑之美:方立教授纪念文集 / 王路江主编.  
—北京:北京语言大学出版社, 2012. 8  
ISBN 978-7-5619-3340-4

I. ①数… II. ①王… III. ①方立(1942~2010)—纪念文集 ②数理语言学—文集 IV. ①K825.5-53 ②H087-53

中国版本图书馆CIP数据核字(2012)第187218号

## 序

王路江

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书 名:数理逻辑之美——方立教授纪念文集  
责任印制:陈 辉

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出版发行:北京语言大学出版社  
社 址:北京市海淀区学院路15号 邮政编码:100083  
网 址:www.blcup.com  
电 话:发行部 010-82303650 / 3591 / 3651  
编辑部 010-82303700 / 3592  
读者服务部 010-82303653 / 3908  
网上订购电话 010-82303668  
客户服务信箱 service@blcup.net  
印 刷:北京东海印刷有限公司  
经 销:全国新华书店

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版 次:2012年8月第1版 2012年8月第1次印刷  
开 本:787毫米×1092毫米 1/16 印张:20  
字 数:407千字  
书 号:ISBN 978-7-5619-3340-4 / H·12133  
定 价:55.00元

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北京语言大学外国语学院博士生导师方立教授不幸辞世已经一年多了。在此期间,学界同行以及方立教授的生前好友和弟子们纷纷撰写纪念文章,追思方立教授的良好道德风貌和杰出的学术成就。现在,方立教授培养的第一个博士生、外国语学院教授司富珍组织编写方立教授纪念文集,并邀请我担任文集主编。方立教授生前为北京语言大学的学科建设、人才培养特别是理论语言学 and 整个外国语学院的发展做出了有目共睹的成绩,也在为人处事上为广大后学竖立了良好风范。我因此欣然接受并愿意为这本纪念文集写上几句话,聊以表达我本人对方立教授的悼念之情。

方立教授1942年1月17日出生于浙江省嘉善县,是中国共产党党员,著名语言学家。1965年至1966年期间,他曾跟后来任欧盟驻华大使的英国专家魏根森(Engdymon Wilkinson)先生学习英语;1982年至1991年期间,他两度赴美留学,其中1982年10月至1983年10月在俄亥俄州立大学语言学系和东亚语系访学;1990年11月,应俄亥俄州立大学邀请并受其资助再度前往该校语言学系访问;在此期间,他还应时任斯坦福大学语言学系系主任、前美国语言学会主席、美国文理科学院院士、著名语言学家Arnold M. Zwicky的邀请在斯坦福大学语言学系作短期访问研究。

方立教授是北京语言大学语言学及应用语言学专业理论语言学方向的奠基



## Empty Operator Movement in Chinese Passive Syntax<sup>1</sup>

Feng Shengli

### 1. Introduction

In GB-theory, passive constructions have been taken as a fundamental syntactic process involving NP-movement. According to Chomsky (1986), movement never occurs unless the interactions of some principles or subtheories require it. Passivization, a case of NP-movement, is triggered by passive morphology and forced by Case Theory. But the same syntactic process with respect to passivizations is not easy to extend into languages like Chinese. Simply there is no such passive morphology in Chinese as in English, for example:

- (1.1) a. Zhangsan was hit by Lisi.  
b. \*Zhangsan was hit him by Lisi.

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<sup>1</sup> This paper was written in 1989 when I was a graduate student at UPENN. Since then, it has been circulated, quoted and even further developed among Chinese formal syntacticians. However, the English version of the original form has never been published, although it has been frequently requested by colleges and new learners. It is therefore worthwhile to print the English version not only for the historical record and the research convenience, but also for, in particular, the memorialization of the most respectful scholar and my dearest friend, Professor Fang Li, who is the earliest grammarian to promote formal syntax in Mainland China.

- (1.2) a. Zhangsan bei Lisi da-le.  
Zhangsan bei Lisi hit  
"Zhangsan was hit by Lisi."  
b. Zhangsan bei Lisi da-le ta henduo ci.  
Zhangsan bei Lisi hit him many times.  
"Zhangsan was hit by Lisi many times."

"BEI" is usually called a passive marker, and the pattern of passive sentences in Chinese is therefore:

NP1 bei NP2 V Pro(noun) Freq(uecy) P

NP1, the subject of a passive, is the logical object, and NP2 is the logical subject. Since the Pronoun in the object position needs Case according to the Case-filter; the verb in (1.2) must have the ability of assigning Case to it. Therefore the passive marker BEI does not function like *-en* in English. Furthermore, Feng (1989) has raised the problem in considering the following sentence:

- (1.3) [jiaoshi<sub>i</sub>] BEI Laoshi pai John zhao ren qu sao t<sub>i</sub> le.  
"The room was cleaned by someone who the teacher sends John to find."

There is no reason to assume that the passive marker BEI can take away the ability of assigning Case from the verb by crossing so many materials in a sentence.

Several questions arise: (1) What is the syntactic property of the passive marker BEI? (2) Is move  $\alpha$  involved in BEI-sentences? If so, is it an NP-movement? (3) Is the subject position of passives an A-position with a dethematized Theta-role?

Recently, several approaches have been made. The most popular one in GB literature is Li's 1986 proposal. She argues that the subject position of passive sentences is a dethematized A-position, and the passive marker BEI is a preposition, but the verb in a passive sentence can still assign Case to its object. Since, in her system, the direction of Theta-role assignment in Chinese is from right to left, and Case assignment is from right to left, the D-structure of passives, therefore, is:

(1.4) \_\_\_ BEI NP2 NP1 Frq.P V

To derive the S-structure, she argued that NP1 can move into either the position to the right of the verb or the subject position of the sentence

in order to get Case. Since the subject position is dethematized, and since Chinese has no Dummy subject like "it" in English, but the dummy subject position somehow has to be filled as she argued, NP1 has to move to the subject position of the sentence to satisfy the "dummy subject" requirement, and therefore it is a case of NP-movement. Also, since the verb still assigns Case to NPs to its right, the Frq.P can move into this position to get Case from the verb. Thus, the S-structure is:

(1.5) NP1 [<sub>VP</sub> [<sub>PP</sub> BEI NP2] V Frq.P]

This system works well for passives like (1.1).

## 2. Problems of Previous Accounts

Although Li's account explains quite a wide range of data, there are some problems in her account. First, it is obvious that the subject position cannot be filled by the Frq.P; if the subject position has to be filled anyway, why does the filler have to be the NP1, but not the Frq.P? The second problem involved in her account is examples like the following:

- (2.1) Zhangsan<sub>i</sub> Bei ren BA ta<sub>i</sub> da-le.  
Zhangsan bei someone BA him hit  
"Zhangsan was hit by someone."

As outlined above, in Li's account, BEI is analyzed as a preposition (see also Huang, 1982 and many others). This treatment leads to a non-avoidable consequence: passive constructions must be a mono-clause structure. But if this is so, sentences like (2.1) would not be grammatical, simply because the pronoun *ta* (he) is the matrix object (BA is an object Case marker in Mandarin) and it is bound in its GC, namely by the matrix subject *Zhangsan*. This is an obvious violation of Principle B of the Binding Theory. How could (2.1) be grammatical? This is a big problem for Li's account among others.

Huang (1982) argued that the object pronoun *ta* in (2.1) is spelt out at PF, rather than base-generated at D-structure. Since, as he assumed, the general ban of preposition stranding in Chinese is a constraint on PF, the stranded position must be spelt out by a pronoun at PF if the object of a preposition is extracted. Therefore the object pronoun is irrelevant to the Binding Theory (assuming the Binding Theory applies at S-structure). But, even so, sentences like (1.2) still create the same problem for a mono-clausal

analysis, repeated here as (2.2)

- (2.2) Zhangsan bei Lisi da-le ta henduo ci.  
Zhangsan bei Lisi hit him many times.  
“Zhangsan was hit by Lisi many times.”

(2.2) is grammatical for native speakers, and *ta* (he) is obviously co-indexed with *Zhangsan* in its GC, which again is not allowed by Principle B. Since there is no preposition like BA at all, the preposition stranding strategy cannot apply here; therefore example (2.2) remains unexplained for any account in terms of a mono-clausal analysis. The third problem concerns the distribution of the agent NP and the pronominal object of the verb. Let us look at the following paradigm:

- (2.3) a \*Zhangsan Bei e BA ta da-le.  
Zhangsan bei Ba him hit  
“Zhangsan was hit.”  
b. Zhangsan Bei wo BA ta da-le.  
Zhangsan bei me Ba him hit  
“Zhangsan was hit by me.”
- (2.4) a \*Zhangsan Bei e da-le ta yixia.  
Zhangsan bei hit him once  
“Zhangsan was hit once.”  
b. Zhangsan Bei wo da-le ta yixia.  
Zhangsan bei me hit him once  
“Zhangsan was hit by me once.”  
c. Zhangsan Bei wo da-le yixia.  
Zhangsan bei me hit once  
“Zhangsan was hit by me once.”

These show that the presence of a pronoun object is licensed by the agent NP: if the agent NP did not appear, the pronoun object could not appear. The question then is why this should be the case. This cannot be properly explained under Li's analysis. Cheng (1986) proposed a reanalysis rule to deal with passive sentences like the one we consider now:

$$[vp \ P + e + V] \rightarrow [v \ PV] \quad (\text{Cheng, 1986: 64})$$

It states that in the domain of VP, a preposition which is followed by an empty NP is reanalyzed as part of a compound verb. In Cheng's system

the reanalysis is obligatory if the agent NP is empty. Cheng would rule out sentences (2.3a) and (2.4a) by saying that BEI is not adjacent to the verb and thus cannot be compounded with the verb. But, sentences like (2.1) and (2.2) will be also ruled out under her system, because there is no way to allow a pronoun to appear in the object position in a mono-clausal analysis. Also, sentences like the following will be ruled in, but it is ungrammatical (see Li, 1986):

- (2.5) \*Zhangsan Bei ren da-le ziji yixia.  
Zhangsan bei someone hit self once  
“Zhangsan was hit himself by someone once.”

This is the most difficult situation for the mono-clausal analysis. At first place, it cannot explain why a pronoun object CAN occur in the object position; at second place, it cannot explain why a reflexive CANNOT occur in the object position. There is no way to capture this phenomenon on principled ground, except to follow the descriptive generalization for passive constructions:

- (i) Reflexives cannot appear in the object position;  
(ii) Objective pronouns cannot appear without the agent NP.

Note that in this situation we would not expect the co-occurrence of an agent NP with a resumptive pronoun to have properties of its own. On the contrary, the co-occurrence would be a consequence of independent properties. Secondly, as we can see below, it is not always true that reflexives cannot appear in the object position of passives. Then the question is why both pronoun and reflexives can occur in the object position? Clearly, we lack a principled explanation here.

### 3. Toward a Solution

In this paper, I shall argue, in Section 3.1, that the passive sentence is a Bi-clausal construction. Secondly, in Section 3.2, I propose that the syntactic process of passivization involves the application of Null-operator. In Section 4.1, a comparison between Tough-movement in English and passivization in Chinese is given to support this hypothesis. And also some structural parallel phenomena between passivization, topicalization and relativization are given in Section 5. Finally, quite a range of passivizations, including long distance passives, are discussed.

### 3.1 The Structure of Passives: A Bi-clausal Analysis

As we have seen before, as long as examples (2.1) and (2.2) are considered, we are forced by the Binding Theory to treat BEI-sentences as a Bi-clausal construction, and the only way to analyze it is to adopt the following structure, rather than the one proposed in (1.5).

(3.1) [s1 NP1 BEI [s2 NP2 V NP]]

In this structure, BEI must be analyzed as a verbal element, rather than a preposition, and the embedded clause is a complement of BEI. Further, let us assume that the embedded verb can still assign Case to its complement/s. This is quite reasonable, because unlike passive morphology *-en* in English, the passive marker BEI cannot take away the ability of assigning Case from the verb as maintained before. This can also be tested further by the fact that the embedded clause in (3.2a) can stand alone as an independent sentence as in (3.2b):

(3.2) a. [s Zhangsan<sub>i</sub> Bei [s wo da-le ta<sub>i</sub> yixia]]  
Zhangsan bei I hit-Asp. him once  
b. Wo da-le ta yixia.  
I hit-Asp. him once.

With this structural analysis, we can now explain readily the pronominal object phenomena we have questioned earlier: since the verb can still assign Case to its complement/s, *ta* (he) and *yixia* (once) will receive Case from the verb *da* (hit), if we assume *yixia* also needs Case. Therefore the embedded clause is well-formed. Here, the GC for *ta* (he) is the embedded clause, and *ta* (he) is free in that GC, therefore (3.2a) is well-formed. Now consider the pronominal object within BA-construction:

(3.3) Zhangsan<sub>i</sub> Bei wo BA ta<sub>i</sub> da-le.  
Zhangsan bei I BA him hit-Asp.

*ta* (he) is the object of *da* (hit), since BA is an Acc-Case marker (it absorbs the Case-marking ability from the verb, see Cheng (1986), and *ta* is the object of the verb *da*, the GC for *ta* is still the embedded clause. Clearly, *ta* (he) is free in its GC; the sentence is grammatical as we expected.

### 3.2 The Syntactic Processes of Passivization

Under the Bi-clausal analysis, elements in passives given above would all be base-generated in the structure of (3.1). Since there is no gap at all, therefore

there would be no movement involved. Before we go into further, let us look at the following examples:

(3.4) a. Zhangsan<sub>i</sub> Bei wo BA ta<sub>j</sub>\* da-le.  
Zhangsan bei I BA him hit-Asp.  
b. Zhangsan<sub>i</sub> Bei wo da-le ta<sub>j</sub>\* yixia.  
Zhangsan bei I hit-Asp. him once.  
c. Zhangsan Bei wo da-le \*Lisi yixia.  
Zhangsan bei I hit-Asp. Lisi once.

A natural question about these examples arises: if there is no movement involved at all, what kind of syntactic constraint/principle ensures that the embedded object pronoun has to be co-indexed with the matrix subject? Furthermore, some other examples which contain a gap at the object position would also need to be explained:

(3.5) a. \*Zhangsan<sub>i</sub> Bei wo da-le e<sub>j</sub>.  
Zhangsan bei I hit-Asp.  
b. Zhangsan<sub>i</sub> Bei wo da-le e<sub>i</sub>.  
Zhangsan bei I hit-Asp.

[e] is required by the Projection Principle and the interpretation of these sentences makes it clear that the empty category [e] in (3.5) must be co-indexed with the matrix subject, which is analogous to the relationship in which the pronoun has to be co-indexed with the matrix subject in (3.4).

In considering examples such as (3.4) and (3.5), I propose that there is indeed a movement involved, namely, the empty operator movement.

To begin with, let us examine the [e] in (3.5b) first. [e] is in an object position in (3.5b). It cannot be PRO, since it is governed. It cannot be an NP-trace as well, since it is not bound in its GC, namely by the embedded subject *wo* (I). Finally, it is not pro, because it does not satisfy the Generalized Control Rule (Huang, 1984)<sup>2</sup>, and in general, pro cannot occur in object position even in pro-drop languages. Furthermore, [e] cannot be locally A-bound by *Zhangsan*, or it will be an NP-trace violating the Binding Theory. Therefore, it must be a variable. That is, it must be A'-bound by an operator O. The actual S-structure of (3.5), then, must be (3.6):

<sup>2</sup> The Generalized Control Rule states "co-index an empty pronominal with the closest nominal element" (Huang, 1984).

(3.6) Zhangsan Bei [s' O<sub>i</sub> [s wo da-le e<sub>i</sub>]]

Following Chomsky (1982), since [e] is a variable A'-bound by O, the S-structure (3.6) must have been derived by application of "Move alpha from the D-structure"(3.7):

(3.7) Bei [s' COMP [s wo da-le O]]

Notice that the operator O is an EC and is semantically empty, therefore, [e<sub>i</sub>] is in effect a free variable, assigned no range by its operator in the embedded clause. As a result, it violates the principle barring vacuous operators. To satisfy the requirements that each LF variable either be assigned a range by its operator or be assigned a value by an antecedent that A-binds it, it follows that [e<sub>i</sub>] must be bound by an NP in the matrix subject position as in (3.8):

(3.8) Zhangsan<sub>i</sub> [ BEI [ O<sub>i</sub> [ wo da le e<sub>i</sub>]]  
Zhangsan was hit by me.

In (3.8) [e<sub>i</sub>] must be bound by *Zhangsan*, though [e<sub>i</sub>] is not locally bound by *Zhangsan* (rather, by O) and is not the trace of *Zhangsan*. Under this analysis, sentence (3.5a) can be readily ruled out:

(3.9) \*Zhangsan<sub>i</sub> Bei [s' O<sub>j</sub> [ woda-le e<sub>j</sub>]]

First, [e<sub>j</sub>] is bound only by O<sub>j</sub>, and is in effect a free variable, which must be ruled out.

The analysis provides answers of why the object pronoun has to be co-indexed with the matrix subject. It can also explain the question of why a full NP or a pronoun with a different reference from the matrix subject in object position must be ruled out as in (3.4). I will come back to this question in the following sections. The crucial point here is that all the ungrammatical sentences will be ruled out at an independent ground.

As we have seen above and will see below, under the Bi-clausal analysis and the movement account, all grammatical sentences we have considered so far can be generated correctly, and all the ungrammatical sentences given above can be ruled out naturally.

#### 4. Tough-movement in English and Passivization in Chinese

If a Null-operator is in fact involved in passivization in Chinese, one would expect to find similarities between the so-called "Tough-movement" in

English and passivizations in Chinese. And if the comparison is successful, it would be a strong support to the hypothesis given above. It is well-known that "easy" type of Tough-movement is different from "stubborn" type of Tough-movement, in that a resumptive pronoun can appear in the object position if the embedded subject is present in "stubborn-type", but not "easy-type" of Tough-movement:

- (4.1) a. \*John is easy for Bill to please him.  
b. John is too stubborn for Bill to talk to him.

The nature of the difference between the two kinds of Tough-movement is irrelevant here. It is clear that the comparison between English Tough-movement and Chinese passivization with respect to the Null-operator analysis must take the "stubborn-type" sentences, because this type of sentences provides many interesting binding phenomena, which "easy-type" sentences lack. What we found, then, is that the binding relations in the "stubborn-type" sentences are exactly the same with the binding relations in the passivizations in Chinese.

- (4.2) (i) Resumptive pronoun:  
a. John is too stubborn for Bill to talk to him.  
b. Zhangsan Bei Lisi da-le ta yixia.  
(ii) The reflexive with a present embedded subject:  
a. \*John is too stubborn for Bill to talk to himself.  
b. \*Zhangsan Bei Lisi da-le ziji yixia.  
(iii) The reflexive without the embedded subject:  
a. \*John is too stubborn to talk to himself.  
b. \*Zhangsan Bei da-le ziji yixia  
(iv) The absent of the embedded subject with the resumptive pronoun:  
a. \*John is too stubborn to talk to him.  
b. \*Zhangsan Bei da-le ta yixia.

"him" is allowed in (i-a), because "Bill" is the SUBJECT and the embedded clause is the GC for "him". For the same reason, (i-b) is therefore grammatical.

In (ii-a) and (ii-b), the embedded subject is the SUBJECT and the embedded clause is the GC for "himself/ziji", and "himself/ziji" is bound in its GC, thus the sentence would have been grammatical in both English and Chinese. But they are not. The reason is not a violation of Condition

A of the Binding Theory; rather it is due to a violation of the semantic interpretation. Because (ii-a) would mean that “John is too stubborn in doing that Bill is talking to Bill himself”. It is semantically non-interpretable, hence the ungrammatical sentence of (ii-a). The situation is the same for (ii-b), because (ii-b) would mean that “Zhangsan was affected directly by an action of hitting such that Lisi hit Lisi himself”. Here, “Lisi hit himself” has nothing to do with “Zhangsan”. Therefore the sentence does not make sense semantically. As a result, (ii-b) is out just like (ii-a).

If we take *pro* as a subject of the embedded clause in (iii), then the grammaticality of (iii-a/-b) will be the same as of (ii), i.e., the semantics of these sentences is not interpretable. I will come back to this in next section.

The situation in (iv) is not so straightforward. The reason why when the embedded subject position is an EC, rather than a full NP, the resumptive pronoun must be ruled out in both English Tough-movement and Chinese passivizations, will be given in Section 7. However, if (iv-a) is out, for whatever reason/s, the same will be true for (iv-b).

The four pairs of sentences provide parallel relations in terms of their binding relations and their grammaticality between passivizations in Chinese and Tough-movement in English. These strongly indicate that the structure of Chinese passivizations is the same as the structure of English Tough-movement (stubborn type). As has been shown earlier, the object resumptive pronoun must be taken into account in analysis of passivizations in Chinese, and under the Null-operator analysis, it is not surprising that if both passive constructions and the “stubborn type” of sentences actually involve a Null-operator, their binding relations will equally show up in both cases.

#### 4.1 Reflexives in Chinese Passivization

We have seen that when passivization is formed with a reflexive and a zero subject in an embedded clause, the zero subject is *pro* and it is the antecedent of the reflexive, such as (4.2 iii), repeated here as (4.3):

- (4.3) a. \*John is too stubborn *pro* to talk to himself.  
b. \*Zhangsan Bei *pro* da-le ziji yixia.

The sentence is out because of the non-interpretable reasons. But, one would argue, in this case, that reflexives in Chinese can take higher clause NP as its antecedent, for example:

- (4.4) Zhangsan zhidao Lisi bu xihuan ziji.  
Zhangsan know Lisi not like self.  
a. Zhangsan knows that Lisi does not like himself (Lisi).  
b. Zhangsan knows that Lisi does not like him (Zhangsan).

Therefore, “*ziji*” in (4.3b) would also take the matrix subject “Zhangsan”, rather than the embedded zero subject *pro*, as its antecedent, such as:

\*Zhangsan<sub>i</sub> BEI PRO da-le ziji<sub>i</sub>.

The question, then, is why “*ziji*” can take a higher clause NP in (4.4b) but cannot in (4.3b)? The reason, I suggest, is that in Chinese a reflexive can take an upper clause NP as its antecedent if it can also take the one in its own clause (in its GC). That is, the grammar of reflexives cannot tolerate a violation of Condition A of the Binding Theory at the first place—the immediate GC—in order to save the structure by taking a higher NP as its antecedent. In our case, “*ziji*” has to take *pro* to be its antecedent by Condition A, and then goes up to take “Zhangsan” as its antecedent. Obviously, the process failed at the first place due to the semantic reasons given above and the sentence cannot be saved by any means.

If, on the other hand, the nearest subject is not valid for being an antecedent of reflexive, for example:

- (4.5) Zhangsan zhidao shitou yao zaziji.  
Zhangsan know stone will hitself.

then we have the following interpretations:

- a. \*Zhangsan knows that the stone will squash itself (stone).  
b. Zhangsan knows that the stone will squash on himself (Zhangsan).

That is, the reflexive can skip the first SUBJECT (inanimate) to take the higher one (animate). If this is so, why cannot reflexives in (4.3b) skip the embedded subject (if it refers to an inanimate entity) to take the higher NP—“Zhangsan” as its SUBJECT? No particular attention has been paid to this question. What we find is only a general observation that reflexives cannot appear in passivizations as cited above. But there are actually some very interesting phenomena, that is, sentences like (4.6a) are grammatical:



- (4.6) a. Zhangsan BEI shitou za-le ziji yixia.  
 b. \*Zhangsan BEI ren za-le ziji yixia.  
 c. \*Zhangsan BEI pro za-le ziji yixia.

(4.6a) denies the general observation that reflexives cannot appear in passivizations. A question then is why (4.6a) is grammatical but not (4.6b) and (4.6c). (4.6b) is out because of the non-interpretable reasons. As for (4.6c)—the zero subject refers to an inanimate entity, I will discuss it later. Nevertheless, according to the discussion given above, this is clear that:

- (i) The embedded subject must be the first SUBJECT for “ziji”;  
 (ii) If and only if the first SUBJECT is inanimate, “ziji” can take the higher NP as its SUBJECT;  
 (iii) If the embedded subject is an EC, the sentence is out no matter if it refers to an animate or an inanimate entity.

Notice that, these observations are clearly supporting the hypothesis made in this paper, that is,

- (i) The passivization in Chinese is Bi-clausal structure, otherwise there is no unique theory to rule in (4.6a) and to rule out (4.6b) and (4.6c). The semantic violation can only hold if we assume that the reflexive takes embedded clause as GC.  
 (ii) The grammaticality of (4.6a/4.6b) is the same as the grammaticality of the “stubborn-type” sentences according to the semantic reasons. On the other hand, once the inanimate SUBJECT takes place, the sentence is interpretable semantically. This is why (4.6a) is grammatical.  
 (iii) The structure of passivization in Chinese is the same as Tough-movement (stubborn) in English.  
 (iv) The only difference between English and Chinese is that English does not allow long distance reflexive, but Chinese does.

So far, everything seems to be quite positive to my analysis. The only thing left is the grammatical passive constructions with an inanimate subject pro in an embedded clause. The theory predicts that it must be grammatical. In Section 7 we can see that the question has to do with pro vs. full NP in the embedded subject position.

## 5. Empty Operator Movement

If passivizations in Chinese involve Move-alpha, it follows that the gap must satisfy island conditions, along with other conditions that follow from the assumption that movement is involved in these constructions. This is, in fact, the case as illustrated in (5.1):

- (5.1) a. \*Lisi<sub>i</sub> [<sub>S</sub> Zhangsan chi le [<sub>NP</sub> [<sub>S</sub> e<sub>i</sub> zuo e<sub>j</sub>] DE<sub>COMP</sub>] rou<sub>j</sub>]  
 Lisi Zhangsan eat Asp. cook DE meat  
 Lisi<sub>i</sub> Zhangsan ate the meat that [ e<sub>i</sub> cooked ]  
 b. \*[Zhangsan renshi [<sub>NP</sub> [<sub>S</sub> e<sub>i</sub> zuo e<sub>j</sub>] DE<sub>COMP</sub>] rou<sub>j</sub>] [<sub>NP</sub>] DE<sub>COMP</sub>] Lisi<sub>i</sub>  
 Zhangsan know cook DE meat DE Lisi  
 Zhangsan knows Lisi<sub>i</sub> who the meat that [ e<sub>i</sub> cooked ]  
 c. \*Lisi Bei [Zhangsan chi le [<sub>NP</sub> [<sub>S</sub> e<sub>i</sub> zuo e<sub>j</sub>] DE<sub>COMP</sub>] rou<sub>j</sub>]  
 Lisi<sub>i</sub> Bei Zhangsan ate the meat that e<sub>i</sub> cooked

(5.1a) is topicalization and (5.1b) is relativization. Both are cases of Move alpha, assumed in GB literature. Since the moved NP has crossed two bounding notes, NP and S in each case, it violates Subjacency. (The empty category in subject position is properly governed, see Huang (1982), and therefore they are not a violation of ECP.) (5.1c) is passivization and it is also ill-formed as (5.1a) and (5.1b). This indicates that Move-alpha must have been applied here, otherwise it is difficult to rule (5.1c) out.

The movement analysis presented above leads directly to a natural logical conclusion:

- (5.2) Wherever the application of Move-alpha can apply to topicalization or relativization, it can apply to passivization.

As we can see below, this is indeed the case. (In the following examples, P stands for passivization, T for topicalization and R for relativization.)

- (5.3) P. [John<sub>i</sub>] BEI Laoshi pai t<sub>i</sub> qu zhao ren sao jiaoshi le.  
 “John was sent to find someone to clean the classroom by the teacher.”  
 T. John<sub>i</sub>, Laoshi pai t<sub>i</sub> qu zhao ren sao jiaoshi le.  
 “John, the teacher sent (him) to find someone to clean the classroom.”  
 R. [ Laoshi pai t<sub>i</sub> qu zhao John sao jiaoshi ] de ]ren<sub>i</sub>  
 “The person who the teacher sent [e] to find John to clean the class room.”

- (5.4) P. [ren<sub>i</sub>] BEI Laoshi pai John zhao t<sub>i</sub> qu sao jiaoshi le.  
“Someone was found to clean the classroom by John who the teacher sent.”  
T. [Xuesheng<sub>i</sub>], Laoshi pai John zhao t<sub>i</sub> qu sao jiaoshi le.  
“The students, the teacher sent John to find (them) to clean the classroom.”  
R. Laoshi pai John zhao t<sub>i</sub> qu sao jiaoshi] de ] xuesheng<sub>i</sub>  
“The student who the teacher sent John to find [e] to clean the classroom.”
- (5.5) P. [jiaoshi] BEI Laoshi pai John zhao ren qu sao t<sub>i</sub> le.  
“The classroom was cleaned by someone who the teacher sent John to find.”  
T. [jiaoshi<sub>i</sub>], Laoshi pai John zhao ren qu sao t<sub>i</sub> le.  
“The classroom, the teacher sent John to find someone to clean it.”  
R. Laoshi class pai John zhao ren qu sao t<sub>i</sub>] de ] jiaoshi<sub>i</sub>]NP  
“The classroom was cleaned by someone who the teacher sent John to find.”

On the other hand, the explanatory power of the movement account can also turn the conclusion in (4.2) the other way round:

If the application of Move-alpha cannot apply to topicalization or relativization, for whatever reason, it cannot apply to passivization.<sup>3</sup>

This is in fact the case as we see in (5.1) above and in (5.6) below:

- (5.6) a. \*Zhangsan<sub>i</sub>, Lisi bi e<sub>i</sub> mai le fangzi.  
Zhangsan, Lisi forces [e] sell house.  
Zhangsan, Lisi forces [e] to sell the house.

<sup>3</sup> There is one exception:

- T. Zi, wo xie le.  
The character, I wrote.  
R. Wo xie DE zi...  
The character I wrote...  
P. \*Zi BEI wo xie le.  
The character was written by me.

This is because, as Cheng (1986) discussed, the passive marker BEI only occurs with verbs indicating adversity. Sentence (c) is unacceptable, not because Move-alpha cannot apply here syntactically, rather it is because the embedded sentence does not have any adverse connotation. What seems to me to be correct here is that BEI selects an S-complement that must have the feature [+adversity]. In other words, the following rule must be added to the lexicon:

- d. BEI, < V, \_\_\_ S [+adversity] >

According to rule d, sentence (c) is ungrammatical because it violates the selectional requirement of the verb BEI.

- b. \*Lisi bi e<sub>i</sub> mai le fangzi le DE Zhangsan<sub>i</sub>.  
Lisi force [e] sell house Asp. DE Zhangsan.  
Zhangsan who Lisi forces [e] to sell the house.  
c. \*Zhangsan<sub>i</sub> BEI Lisi bi e<sub>i</sub> mai le fangzi.  
Zhangsan Bei Lisi force [e] sell house.  
Zhangsan was forced [e] to sell the house by Lisi.

Among P, R, and T, the parallelism of grammaticality in (5.3-5) and the parallelism of ungrammaticality in (5.1) and (5.6) are now easy to explain, because both relativization and topicalization as well as passivization all involve not only movement but also the same kind of movement, i.e., the *O* operation. Whatever happens to topicalization or relativization, happens to passivization. Under the present theory these three kinds of syntactic operations collapse naturally into one syntactic process and can be accounted for in a unique way.

## 6. The Long Distance Movement in Passivization

Now let us consider the following long distance passivization (Feng, 1989):

- (6.1) Laoshi pai John (qu) zhao ren (qu) sao jiaoshi le.  
Teacher send John to find someone to clear classroom.  
“The teacher sends John to find someone to clear the classroom.”

There are three NPs which are properly governed in the positions where they occur. What is interesting here is that if this sentence is passivized, the following pattern will be impossible if passivization is analyzed in the standard way:

- (6.2) [ ] INFL [<sub>vp</sub> BEI NP V NP<sub>1</sub> V NP<sub>2</sub> V NP<sub>3</sub> ]

In fact, each of these movements is possible, as the following three sentences show:

- (6.3) a. [John<sub>i</sub>] BEI Laoshi pai t<sub>i</sub> qu zhao ren sao jiaoshi le.  
“John was sent to find someone to clean the classroom by the teacher.”  
b. [ren<sub>i</sub>] BEI Laoshi pai John zhao t<sub>i</sub> qu sao jiaoshi le.  
“Someone was found to clean the classroom by John who the teacher sent.”  
c. [jiaoshi<sub>i</sub>] BEI Laoshi pai John zhao ren qu sao t<sub>i</sub> le.  
“The classroom was cleaned by someone who the teacher sent John to find.”

All (6.3a-c) are well-formed sentences. Notice that, in each of these three sentences, any one of these three objects can be moved into the subject position in a single movement, and the remaining two stay in their basic positions. It shows that before the movements take place, all of these objects are already assigned Case by their governors; otherwise we must assume that these three NPs are all non-Case-marked NPs for the reason that each of them is available for movement to the subject position. Clearly the assumption that they are not Case-marked is an undesirable one, because two of these NPs have to stay in their original position and therefore have to have Case. Ultimately these three NPs are all Case-marked NPs. If so, there is no reason to assume the standard NP-movement in the long distance passivization. For one thing, the passive marker BEI cannot take away the ability of assigning Case from the verb (say, SAO "to clean") because the verb occurs so far away from BEI. Secondly, even though one does assume that BEI could take away the ability of assigning Case from the verb by crossing so many materials, this process must be arbitrary, since all these three NPs can move into the subject position and also can stay in their object positions. Note that there is no problem for the Null-operator analysis. Actually, the existence of long distance passivization itself argues for the analysis of the empty operator movement.

## 7. Final Remarks

Although the problem concerning resumptive pronouns in passivizations no longer is a problem under our account, the question we raised before about examples like the following still remains:

- (7.1) a. \*Zhangsan<sub>i</sub> Bei da-le ta<sub>i</sub>  
Zhangsan bei hit-Asp. him  
b. \*Zhangsan<sub>i</sub> Bei BA ta<sub>i</sub> da-le  
Zhangsan bei BA him hit-Asp.

We still have no way to account for this ungrammaticality, since under the Bi-clausal analysis I proposed, they would have been equally as well-formed as examples given in (7.2):

- (7.2) a. Zhangsan<sub>i</sub> Bei wo da-le ta<sub>i</sub> yixia  
Zhangsan bei I hit-Asp. him once  
b. Zhangsan<sub>i</sub> Bei wo BA ta<sub>i</sub> da-le  
Zhangsan bei I BA him hit-Asp.

Structurally, the grammaticality of (7.2) could not be affected by the absence of the agent NP under the Binding Theory, since the Bi-clausal structure under assumption ensures that the pronoun is free in its GC. But, in fact, sentences like (7.1) are ungrammatical. Can we account for the ungrammaticality in a principled way?

Notice that, if we remove the pronoun in examples (7.1a-b), they are, then, all perfectly grammatical:

- (7.3) Zhangsan<sub>i</sub> Bei da-le e<sub>i</sub>  
Zhangsan bei hit-Asp.  
"Zhangsan was hit."

This fact shows that the ungrammaticality is a violation of Condition B of the Binding Theory, resulting from the absence of the agent NP, because sentences can be grammatical without the agent NP. Now the question is why the binding condition varies with respect to the absence of the agent NP. The only plausible resolution is that the absence of the agent NP causes a different structure, at least to the binding domain.

How could the absence of the agent NP cause a structural change? Following, but somehow different from Cheng (1986), I propose that a structural reanalysis is involved in passives. Recall that BEI is analyzed as a verb in our account. But it has often been argued in traditional grammar and in GB-analysis that BEI should not be a verb, since it lacks some properties of verbs<sup>4</sup>. In our theory, BEI has to be a verb, because the binding condition demands it to be so. But on the other hand, it does not behave like a "real" verb. I would like to suggest that BEI is a passive auxiliary verb subcategorizing for an S' complement, but unlike other Aux-verbs, it is a bound form which must be "supported" by a phonetically realized element. A structural reanalysis is therefore motivated and a rule for reanalysis is given below:

- (7.4) Bei X ... Y ... → Bei-X ... Y ...

It states that BEI takes an element that is adjacent to it as its reanalyzee. The reanalysis, I assume, takes place at S-structure and after all syntactic operations at that level. With this assumption, let us see how (7.1) can be ruled out after reanalysis.

<sup>4</sup> Li (1986) also argued in detail that BEI cannot be a verb, since it cannot be "A-not-A" questioned; and it cannot take aspect *le* ...

- (7.5) a. \*Zhangsan<sub>i</sub> Bei da le ta<sub>i</sub>  
Zhangsan bei hit Asp. him  
\*Zhangsan<sub>i</sub> [Bei-da] ta<sub>i</sub>  
Zhangsan bei-hit him

[Bei-da] (was hit) now has been reanalyzed as a verb compound, and since the two verbs have been reanalyzed as one after reanalysis, the structure is no longer a Bi-clausal, but a mono-clausal structure. As a consequence, the GC for “ta” is the root sentence and “ta” is bound by the subject NP “Zhangsan”, which is not allowed by Condition B.

This assumption makes a perfect prediction with respect to the empty object. As we have seen before, when the embedded object is an empty category, it is functionally determined as a variable:

- (7.6) Zhangsan<sub>i</sub> [ BEI [ O<sub>i</sub> [ e da le e<sub>i</sub> ] ] ]

After reanalysis the structure would be (3.17):

- (7.7) Zhangsan<sub>i</sub> [Bei-da]<sub>e<sub>i</sub></sub>

[e<sub>i</sub>] is, now, governed but not Case-marked, since this is reasonable to assume that when BEI is morphologically attached to the verb, BEI as a reanalyzer absorbs the ability of assigning Case from the reanalyzee<sup>5</sup> in a similar fashion as *-en* in English does. Therefore, [Bei-da] cannot assign Acc-Case to [e<sub>i</sub>] and the GC of [e<sub>i</sub>] now is the root sentence and it is bound by “Zhangsan”. This is, in fact, what we expected for [e<sub>i</sub>], because if the sentence is a mono-clause after reanalysis, [e<sub>i</sub>] cannot be a variable co-indexing with the subject “Zhangsan”, otherwise Principle C will be violated. On the other hand, if the object empty category is coindexed with the subject, it cannot carry Case. Therefore, [e<sub>i</sub>] must be like an NP-trace—an empty category which is governed, but not Case-marked. As we can see, this is what the theory demanded. Now [e<sub>i</sub>] must follow from Condition A, i.e., it must be

5 In modern Chinese, there are many kinds of BEI-verb compound. For example, Bei-gao (defendant), Bei-po (be compelled)... All these indicate that BEI has fused with the lower verb in the lexicon. The verb “Bei-po” also shows that, as long as “po” (force) is attached by BEI, “po” cannot assign Case to its object anymore. Therefore, sentence (a) is grammatical, but (b) is not.

- a. Ta Bei-po qu shangxue  
“He is forced to go to school.”  
b. \*Bei-po ta qu shangxue  
Bei-force he to go to school.

bound in its GC, and it is bound by the subject of “Zhangsan” which is exactly predicated by the theory.

The next open question we consider is the embedded empty subject. It is reasonable to assume that the embedded clause is a finite clause<sup>6</sup> and the empty subject is therefore a pro, rather than PRO, since the subject is always properly governed in a finite clause in Chinese (Huang, 1982). The question is why is the empty subject to be understood as having the arbitrary interpretation of free pro? Let us first begin with a more concrete question of this sort: Why the empty subject of an embedded clause cannot be controlled by the matrix subject as in structure (4.1)?

- (7.8) Zhangsan<sub>ij</sub>\* [ BEI [ O<sub>i</sub> [ e<sub>j</sub> da le e<sub>i</sub> ] ] ]

First, as we can see, the interpretation of the sentence makes it clear that “Zhangsan” is coindexed with e<sub>i</sub>. If e<sub>j</sub> is coindexed with “Zhangsan”, it follows that e<sub>j</sub> and e<sub>i</sub> are coindexed. But e<sub>i</sub> is a variable ( see Section 3.2), and a variable is functionally determined as an R-expression. Therefore, the empty subject e<sub>j</sub> cannot be co-indexed with the matrix subject “Zhangsan”, otherwise there will be a Principle C violation. In fact, the empty subject e<sub>j</sub> can neither be pro, since, as Cheng (1986) pointed out, it does not satisfy the Disjoint Reference Condition and the Generalized Control Rule (Huang, 1984)<sup>7</sup>, nor is the possibility of being an NP-trace available. The last possibility is to consider e<sub>j</sub> a variable. However, if it is a variable, it must be bound by an empty topic, an A'-operator, or by an antecedent that A-binds

6 The assumption that an embedded clause is a finite clause can be attested by considering the fact that the embedded clause can take *le*, an Aspect marker which cannot be taken by an infinitive clause in Chinese (Huang, 1988). For example:

- Zhangsan xianxie mei BEI ren tou le  
Zhangsan almost not Bei someone steal Asp.  
“Zhangsan was almost stolen by someone.”

- Zhangsan bing mei BEI ren BA ta tou le ya.  
Zhangsan was not Bei someone BA him steal Asp. prt.  
“Zhangsan was not stolen by someone.”

- \*Zhangsan bing mei BI ren BA ta tou le ya.  
“Zhangsan did not force someone to steal him.”

- Zhangsan bing mei BEI ren tou le ta de qian  
“Zhangsan was not stolen his money by someone.”

- \*Zhangsan bing mei BI ren tou le ta de qian  
“Zhangsan did not force someone to steal his money.”

7 The Disjoint Reference states that: “A pronoun must be free in its governing category.” The Generalized Control Rule states “co-index an empty pronominal with the closest nominal element.” (Huang, 1984)

it. However, neither is possible.<sup>8</sup> Since  $e_j$  cannot be PRO, pro, NP-trace or a variable, it cannot be present at S-structure and if it were the sentence would be ungrammatical. Yet, why are sentences like (4.11) perfectly well-formed? The answer is obvious: because of the rule of reanalysis:

$vp[BEI [s'[s e X \dots Y] \rightarrow v[BEI-X] \dots Y]$

It states that in the domain  $vp[\dots[s' \dots e vp[ \dots ]]]$ , an element X (P or V in general) which is preceded by an empty NP is reanalyzed as part of a compound verb:  $[_v BEI-X]$ . This is why sentences like (4.12) are grammatical:

(7.9) Zhangsan<sub>i</sub> [<sub>VP</sub> [<sub>V</sub> BEI-da] le e<sub>i</sub> ]

Last, let us consider examples (7.10a). After reanalysis, its structure is (7.10b):

(7.10) a. \*Zhangsan<sub>i</sub> Bei da-le ziji<sub>i</sub>  
Zhangsan hit-himself

b. \*Zhangsan<sub>i</sub> [Bei-da-le] ziji<sub>i</sub>  
Zhangsan hit-himself

As we have assumed before, BEI as a reanalyzer absorbs the ability of assigning Case from the reanalyzee (hit), and therefore the verb cannot

<sup>8</sup> Suppose, first, that  $e_j$  is a variable and bound by an empty topic. Since  $e_i$  is a variable as well, we therefore have the following structure:

1. BEI [COMP O<sub>i</sub> O<sub>j</sub> [ e<sub>j</sub> da le e<sub>i</sub> ]]

The barrier against free variables demands  $e_i$  and  $e_j$  must be assigned a range by its operator or be assigned a value by an antecedent that A-binds it. Suppose, both  $e_i$  and  $e_j$  can be assigned a value by their antecedent that A-binds them, since multiple subject is possible in Chinese. Then we have:

2. NP<sub>i</sub>NP<sub>j</sub>BEI [COMP O<sub>i</sub> O<sub>j</sub> [ e<sub>j</sub> da le e<sub>i</sub> ]]

Notice that the morpho-syntactic requirement of BEI demands a reanalysis in this structure, and after that we have:

3. NP<sub>i</sub>NP<sub>j</sub> BEI-da le e<sub>i</sub>

Now the NP<sub>i</sub>- $e_i$  form a perfect function-chain, but NP<sub>j</sub> is totally unlicensed in the non-Case-marked position (recall that the subject position is a non-theta position). Therefore NP<sub>j</sub> must be ruled out by theta criteria.

Suppose that  $e_j$  is bound by an empty topic and  $e_i$  is bound by an antecedent that A-binds it:

4. [TOPIC NP<sub>j</sub> [ NP<sub>i</sub> BEI [COMP O<sub>i</sub> O<sub>j</sub> [ e<sub>j</sub> da le e<sub>i</sub> ]]

After reanalysis, we have the following structure:

5. [TOPIC e<sub>j</sub> [ NP<sub>i</sub> BEI-da le e<sub>i</sub> ]]

The empty topic cannot be licensed without a variable in the sentence, which is in violation of the Bijection Principle. What about letting  $e_i$  be bound by an empty topic and  $e_j$  be bound by an antecedent that A-binds it such as:

6. [TOPIC e<sub>i</sub> [ NP<sub>j</sub> BEI [COMP O<sub>i</sub> O<sub>j</sub> [ e<sub>j</sub> da le e<sub>i</sub> ]]

And after reanalysis, we have the following structure:

7. [TOPIC e<sub>i</sub> [ NP<sub>j</sub> BEI-da le e<sub>i</sub> ]]

Now NP<sub>j</sub> must be ruled out for the same reason as NP<sub>i</sub> in (4.3.4), i.e., NP<sub>j</sub> cannot appear in a non-Theta marked position without an independent theta role.

assign Case to its object, although it governs its object. Sentence (7.10b) is out, because "ziji" has no Case.

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