LOGICAL RELATIONS IN CHINESE AND THE THEORY OF GRAMMAR

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Submitted to the Department of Linguistics and Philosophy
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ABSTRACT

The nature of Logical Form is studied through an examination of the syntax and semantics of a range of constructions in Chinese that pertain to scope phenomena, anaphora, and the syntax of empty categories.

At the descriptive level, we provide an extensive account of Chinese quantificational sentences, wh questions, A-not-A questions and cleft sentences. Several aspects of anaphora are also discussed. At the theoretical level, we consider what the observed facts would mean for an optimal theory of Universal Grammar (UG) and linguistic typology.

An important intuition captured in traditional treatments of scope phenomena is that the surface order among quantifiers corresponds directly to their scope order in LF. A direct formulation of this idea as a principle of scope assignment, however, has been found to be insufficient in important respects. Certain recent accounts have now abandoned this idea, thus treating scope order of elements in simple sentences as essentially free. Consideration of an important typological distinction between Chinese and English, however, suggests that the more recent accounts are quite defective: while English exhibits scope ambiguity over a wide variety of construction types, Chinese does not. We propose to incorporate and modify the traditional idea as a principle of UG and explain the typological difference by the postulation of Restructure α, which applies freely in the construction types in question in English, but not in Chinese, due to an independent language-specific phrase structure principle.

A comparison of certain facts of anaphora in English and Chinese shows some problems with the binding theory. We propose a minimal modification of the notion of governing category. The "pro-drop" phenomenon in Chinese is examined, as well as certain facts concerning pronominal anaphora. Some similarities and differences between coreference and pronominal binding are also discussed.

The bounding theory embodying Subjacency and a condition on extraction domain is observed to obtain only in Syntax, not in LF. The Empty Category Principle (ECP) is shown to obtain both in SS and LF. Although Chinese lacks a full range of standard ECP effects, we argue on learnability grounds not to take the ECP as a parameter, but as a property of UG. This assumption is supported by our analysis of a range of data concerning an important argument/adjunct asymmetry under movement both at SS and at LF. Our account thus treats familiar subject/object asymmetries as but a special case of a more complement/non-complement asymetry.

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TABLE OF CONTENTS

	Page
Abstract	2
Acknowledgments	4
Table of Contents	6
CHAPTER 1. OVERVIEW	9
CHAPTER 2. PHRASE STRUCTURES AND THE $\bar{X}$ THEORY	25
2.0. Introduction	25
2.1. Basic Structural Patterns	26
2.2. Autonomous Typology and $\bar{X}$ Typology	32
2.3. Head-Initial Constructions	41
2.4. Head-Final Constructions	61
2.4.1. Noun Phrases	61
2.4.2. Predicates	73
2.5. Quantifier Phrases and Supersentences	79
2.5.1. Quantifier Phrases	79
2.5.2. Supersentences	83
2.5.2.1. Complementizers	83
2.5.2.2. Topic-Comment and Topicalized Sentences	86
Footnotes	90
CHAPTER 3. PHRASE STRUCTURES AND SCOPE RELATIONS	109
3.0. Introduction	109
3.1. Scope Relations	110
3.2. Characterizing Scope Relations	124
3.2.1. Linear Representations	124
3.2.2. Hierarchical Representations	126
3.2.3. Comparing the Two Approaches	132
3.3. On the Notion of Configurationality	152
3.3.1. Scrambling and Its Correlates	152
3.3.2. "Flat" vs. Configurational Structures	155
3.3.3. A Government Theory of Configurationality	159
3.3.4. The Sentential Structure of Chinese	166
Footnotes	173

Table of Contents (continued) Page

CHAPTER 4. SOME MAPPINGS IN LF 185

4.0. Introduction 185
4.1. Quantificational Sentences 187

4.1.1. Sentences with Q-NPs Contained in Other Q-NPs 187

4.1.1.1. Sentential Scope and NP-Internal Scope 187
4.1.1.2. Two Theories of NP-internal Quantification 192
4.1.1.3. NP-internal Scope and the Syntactic Nature of LF 196
4.1.1.4. An Account of the Chinese/ English Contrasts 202

4.1.2. Other Quantificational Sentences 235

4.2. Wh Questions 251

4.2.1. Wh Words as Q-NPs 251
4.2.2. Move Wh in Chinese 254
4.2.3. The Wide Scope Property of Wh Words 263

4.3. Conjunction, Disjunction, and A-Not-A Questions 269

4.3.1. Conjunction 269
4.3.2. Disjunction 275
4.3.3. A-Not-A Questions 277
4.3.4. A Note on Non-Objectual Quantification 286

4.4. Cleft Sentences 289

4.4.1. The Construction 289
4.4.2. An LF Account of Clefts 292
4.4.3. On the Analysis of SHI 299

Footnotes 307

CHAPTER 5. ANAPHORA AND BINDING 315

5.0. Introduction 315
5.1. How the Binding Theory Works 317
5.2. Some Problems with the Binding Theory 323
5.3. A Modification 336
5.4. On PRO in Chinese and the Pro-Drop Parameter 348

Table of Contents (continued) Page

5.4.1. The Distribution PRO: Some Problems 348
5.4.2. The Pro-Drop Principle 365

5.5. On the Non-Coreference Rule 377

5.5.1. Coreference and Referential Dependency 377
5.5.2. Pronoun Anaphora in Chinese 388

5.6. Definite Pronoun Anaphora and Pronominal Binding 400

5.6.1. Some Similarities 400
5.6.2. Some Properties of Pronominal Binding 406
5.6.3. Why the Properties of Pronominal Binding 426

Footnotes 439

CHAPTER 6. MOVE α, SUBJACENCY, AND THE ECP 450

6.0. Introduction 450
6.1. Subjacency 455
6.2. The Empty Category Principle 470
6.3. On Kayne's ECP Extensions 482

6.3.1. Kayne's Reformulation 482
6.3.2. Some Problems with Kayne's ECP 488

6.4. The Condition on Extraction Domain 503

Footnotes 515

CHAPTER 7. FURTHER EXTENSIONS OF THE ECP 524

7.0. Introduction 524
7.1. Some Islands Effects in LF 525
7.2. A Subjacency Account 534
7.3. Inadequacies of the Subjacency Account 543
7.4. An ECP Account 550
7.5. Problems Solved 565
7.6. Some Consequences 569
7.7. Some Problems Raised 574

Footnotes 581

References 587

CHAPTER ONE: OVERVIEW

One of the topics that have figured prominently in recent research in generative grammar is the nature of Logical Form (LF), the linguistic level of mental representation that may be construed as an "interface" between language and other cognitive systems. Questions that are generally raised under this topic are: (a) What are the essential properties of LF representations? (b) What is the nature of the rules that form them? and (c) What is the relation between this level and the level of phonetic representation on the one hand, and the level of "real semantics", where one speaks of the "objects" that linguistic expressions represent, on the other?

This essay represents yet another attempt to provide partial answers to these questions. We attempt to do this by examining the syntax of LF in a Chinese grammar together with an occasional comparison of relevant facts in Chinese and English. While we will be concerned with Universal Grammar (UG) and linguistic typology, we also intend, by way of our discussions, provide a fairly substantial amount of descriptive and analytical material concerning a number of aspects of the structure of Chinese.

There is good reason to believe that LF exists as a level of representation distinct from the level of real world semantics. For example, Chomsky (1981c) indicates that there is a linguistic

level where the sentences in (1) are treated on a par:

(1) a. He found a fly in the cup.

b. He found a flaw in the argument.

At this level, one can infer the two sentences in (2) from (1):

(2) a. There is a fly in the cup.

b. There is a flaw in the argument.

No one, however, would use (1b) and (2b) with the understanding that there exist flaws in the world, some of which are in arguments. In real world semantics, one would assign (1b) a very different representation from that assigned to (1a), even though the distinction may play no role in natural-language inference. There is also evidence that at some level two sentences may be treated differently, though at the level of real semantics they are somewhat on a par. For example, it is a common observation that (3a) is scopally ambiguous while (3b) is not:

(3) a. One student bought every book.

b. There was one student who bought every book.

Besides the meaning equivalent to that of (3b), (3a) can be used to assert that every book was purchased by one student or another. A speaker who intends to make this assertion can use (3a) but not (3b). We might give (3a) and (3b) rather different representations. It has often been argued that sentences like (3a) are not ambiguous, but just vague: it has the reading that every book was bought by one student or another because it is entailed by the reading that there was a student who bought every book. But note that (3b) also has the

same entailment property. At the level of real semantics, one would presumably treat (3a) and (3b) on a par, but it remains true that there is a level where (3a) must be distinguished from (3b) in that the latter cannot be used to convey a linguistic message that the former can.

There can be more than one linguistic level of semantic representation, but our main concern in this thesis will be with the level of LF which has the essential appearance of familair first order logic formulae, exibiting quantifier-variable configurations. Thus the sentence (4a) has the form of (4b) at this level:

(4) a. Every man is mortal.

b. [Every x; x a man] [x is mortal]

We further assume that LF has the following properties. First, all quantificational expressions appear in operator positions, while all non-quantificational expressions occur in argument positions (where "argument positions" refer to positions of subject, object, etc., and "operator positions" refer to non-argument positions like COMP(lementizer), or positions adjoined to certain nominal or sentential nodes. Secondly, all quantifiers (or operators) bind (c-command) variables and all variables are bound. That is, there is no vacuous quantifier, nor free variable in a well-formed representation at LF. Whether or not UG contains this level with the properties just described is, of course, a question of fact and not of necessity. Thus, it is true that the postulation of this level has the consequence that natural language is (at least partially) disambiguated here. This consequence is sometimes taken to be the sole motivation for the level of LF, but

a level of disambiguated language certainly need not have the properties we have just indicated. In asking whether such a level exists in UG one must ask whether natural language exhibits properties which constitute significant linguistic generalizations whose statement is best made by referring to properties at such a level. Three important pieces of evidence jointly suggest that such a level does exist. First, interpretation of pronouns as variables bound to quantified NPs in so-called "weak crossover" configurations shows that quantified NPs occurring in surface argument positions are on a par with empty categories left-over by displaced wh phrases (Chomsky 1976). Secondly, the distribution of certain unmoved wh phrases and other quantified NPs parallels that of the empty categories left over by certain overtly moved phrases under the Empty Category Principle (ECP) of Chomsky (1981a). Thirdly, the scope properties of certain constructions involving what is called "inversely-linked quantification" (May 1977) suggest that quantificational NPs in surface argument positions do undergo movement in LF, on a par with overtly moved elements. We shall review each of these cases below in discussions of certain facts in Chinese and English. To the extent that our analysis of the data concerned is correct, this will provide confirming evidence for the assumption adopted here.

Although our discussion can be carried out in somewhat different frameworks, we will assume, in line with recent developments in linguistic theory, a version of the Extended Standard Theory, in particular the theory of Government and Binding as set forth in Chomsky (1981a).

Within this framework, a grammar provides a small number of subsystems of rules and subsystems of principles. In the former category, a grammar provides a module of Syntax, where thematic relations (agent, patient, etc.) and thematically relevant grammatical functions (subject, object, etc. which bear thematic roles) are represented at the level of deep structure (DS). These mental representations are mapped into S-structure (SS) by the single transformational rule Move α. The rule gives rise to thematically irrelevant grammatical funtions (surface subject, object, etc.) but preserves information of thematic relations by leaving a coindexed trace for every moved category. Representations at S-structure are mapped by interpretive rules into the level of LF on the one hand and the level of Phonetic Form (PF) on the other. The trace-leaving requirement on movement processes is assumed to follow (largely) from the Projection Principle, which provides that all thematic properties of lexical items be categorially represented at every level of syntactic representation (DS, SS, LF). The processes that map SS to LF are the rule of quantifier scope interpretation (OR, May 1977) and the rule interpreting wh phrases not affected by Move α in Syntax (Move WH in LF). Both these rules are assumed to be special instances of the same rule Move α.

The subsystems of principles consist of the $\bar{X}$ theory, the θ-theory (of thematic relations), the binding theory (of anaphoric relations), the Case theory, the control theory, the bounding theory, and the theory of government. These subsystems are each independent of the other, applying in one or more of the rule components, but interact in ways

that give rise to a full range of complicated observed facts in language. Some of these subsystems of principles are directly relevant to our discussion below, and their substance will be introduced to the unfamiliar reader in due course.

Given the assumption of a level of LF with the properties indicated above, where quantificational expressions are treated differently from expressions of other types, a topic that falls naturally under our subject matter is the nature of scope phenomena exhibited by quantificational expressions and how these phenomena should be treated in an optimal grammar. Another topic that enters into our discussion is the nature of anaphoric relations that hold between anaphoric elements and their quantificational antecedents. The first topic is discussed in Chapters 3 and 4 and the second, in Chapter 5. An important consequence of the assumption we make in this study is the existence of various empty categories at LF, including those created in the component of Syntax, and those created in LF. The nature of such empty categories, as well as the relation between these two types of empty categories, is therefore of important consequence to our inquiry about the nature of LF. The last two chapters are devoted to a discussion of these matters.

We begin our investigation with a look into the phrase structures of Chinese. Chinese exhibits a full range of head-final constructions, but allows only a limited range of head-initial constructions. In terms of the $\bar{X}$ theory, we point out that in the internal stucture of any major

category, the head may branch to the left only once, and generally only at the lowest level of phrasal expansion. In particular, every level of $\bar{X}$ structure in Chinese may be characterized as either (5a) or (5b):

(5) a. $[_{X}n\ X^{n-1}\ YP^{*}]$ iff n=1 and X≠N

b. $[_{X}n\ YP^{*}\ X^{n-1}]$ otherwise

The existence of the restriction (5a) on head-initial constructions is supported by the existence of a number of phenomena whose explanation calls for such a restriction. For example, the otherwise unconstrained optional rule of Move α becomes obligatory or inapplicable precisely when its non-application or application would give rise to a structure in violation of (5a). A process of verb reduplication applies precisely under such circumstances, but not otherwise. These and other phenomena "conspire", so to speak, to bring an otherwise ill-formed structure into conformity with the condition. A consequence of this is that a hierarchical representation of any given phrase will give it a uniformly right-branching structure.

It is observed that the order among peripheral elements within certain categories is quite free, but that every difference in order almost always entails a difference in meaning. The observed meaning differences are naturally seen as differences in scope (of modification) defined in terms of c-command on each right-branching structure.

The existence of (5a) in Chinese, as opposed to its apparent non-existence in English, is shown to be related to certain systematic differences between the two languages with respect to the scope phenomena exhibited by quantifiers and other logical elements, in the

manner we explain below.

In previous treatments of scope phenomena (e.g. Lakoff 1971b, Kroch 1974, Reinhart 1976), it is usually assumed that the surface linear and /or hierarchical order among quantifiers and other logical elements corresponds directly to their relative scope order. This assumption (or a direct formulation thereof) is now taken to be inadequate, however, in view of the fact that sentences like (6) and (7) are scopally ambiguous, each admitting a reading according to which the two quantifiers hold a scope order directly inverse of their surface (linear) order.

(6) Many people bought two books.

(7) I saw every picture of three people.

(6) can mean that there are two books (each of) which many people bought, and (7) that there are three people who I saw every picture of. (Besides the inverse reading, (6) also admits the reading that there are many people who bought two books, and (7) admits a reading according to which three people takes scope internal to the NP headed by picture, so that the sentence can mean that I saw all pictures each of which is a group picture of three people). Given facts of this sort and other complications, linguists have questioned the relevance of surface order with respect to scope order in LF. Ioup (1975), for example, explicitly denies word order as a relevant parameter, and May's (1977) theory of quantification also treats, in effect, the surface linear and hierarchical order between two quantifiers or two quantified NPs as

essentially irrelevant to the determination of their relative scope.

This more recent account, however, is insufficient in view of the fact that Chinese sentences are scopally quite unambiguous. Each of the two readings admitted by the English sentences (6)-(7) has a unique structural rendering in Chinese:

(8) a. henduo ren mai-le liangben shu.
many man buy-ASP two book
'There are many people who bought two books.'

b. you liangben shu henduo ren mai-le.
have two book many man buy-ASP
'There are two books that many people bought.'

(9) a. wo kanjian-le [meizhang liangge ren de hua]
I see-ASP every two man 's picture
'I saw every three-people picture.'

b. wo kanjian-le [liangge ren de meizhang hua]
I see-ASP two man 's every picture
'There are two people who I saw every picture of.'

It is extremely unlikely that the typological difference between these two languages can be directly learned. We propose, instead, to make use of the traditional theory, but revise and modify it in such a way that UG provides the following general principle of scope interpretation:

(10) Suppose that A and B are both quantificational NPs or both quantifiers, then if A c-commands B at SS, then A also c-commands B at LF.

(8a) and (8b) represent situations where one quantificational NP (not its quantifier) c-commands another, and (9a) and (9b) represent situations where two quantifiers (not two quantificational NPs) hold a relation of c-command. (In the latter situations, we have one quantificational NP properly contained in another). The situation represented by (8)-(9)

is thus taken to be the core case of quantification, following directly from the provisions of (10). To account for the ambiguity exhibited by the English sentences, we assume that UG provides an optional rule of Restructure α. This rule enables two books in (6) to undergo a vacuous extraposition (as in rightward dislocation), giving rise to a structure in which the vacuously displaced constituent c-commands the subject many people. It also enables NP structures of the form $[_{np}$Det $[_{\bar{n}}$ N PP]] to be converted into structures of the form $[_{np}$ NP PP]. Thus the object NP of (7) admits both the two structural analyses below at a time prior to the application of QR:

(12) a. $[_{np}$ every $[_{\bar{n}}$ picture of three people]]

b. $[_{np}$ $[_{np}$ every picture] of three people]

An independent motivated theory of adjunction sites and other well-formedness conditions at LF will ensure, together with (10), that each of the two possible structural analyses of (6) and (7) will give rise to one unique scope interpretation, as the Chinese sentences (8)-(9) do. The Chinese sentences do not exhibit ambiguity, on the other hand, because Restructure α happens to be inapplicable in these cases. Since restructuring is subject to the general condition that its output representations cannot violate principles of the $\bar{X}$ theory, including the conditions indicated in (5), any result of the required application of Restructure α would violate (5), giving rise to unallowed left-branching structures. Since English allows a full range of left branching structures, the typological distinction follows.

This approach not only has the advantage of tying together two otherwise unrelated differences between the two languages (in phrase structure and scope interpretation), but is also highly plausible from

the viewpoint of language acquisition. What is an unlearnable distinction in scope interpretation is derived from something more directly learnable, i.e. a distinction in overt phrase structure.

Our theory says that when a certain scope relation is already determined at SS (or a stage prior to QR), this relation is preserved at (or projected to) LF. The condition (10) is stated as a left-to-right condition, so that when no c-command relation obtains between two terms at SS, it is simply irrelevant. In this case, QR will automatically derive unmarked readings under the provisions of general principles of locality and well-formedness. Certain genuine marked cases, on the other hand, will have to be attributed to idiosyncratic properties of individual lexical items.

The analysis we adopt for quantificational sentences can be naturally extended to certain other construction types. In particular, the formation of wh questions, A-not-A questions and cleft sentences in Chinese does not involve the overt dislocation of any constituent. A treatment of these constructions in LF on a par with ordinary quantificational sentences offers a convenient way to explain certain cross-linguistic generalizations and reveals interesting insights concerning the syntax and semantics of such constructions.

Investigation of basic facts of anaphora in Chinese suggests that they fit rather naturally into the framework of the binding theory. An outstanding problem persists in both Chinese and English, however, in its prediction of the complementary distribution of pronouns and anaphors in certain configurations. In particular, in constructions of the following sort and their counterparts in Chinese, both pronouns and anaphors may occur, expressing the same relation of anaphora:

(12) a. They saw each other's books.

b. They saw their books.

(13) a. They expected that pictures of themselves would be on sale.

b. They expected that pictures of them would be on sale.

We propose a minimal modification of the binding theory by redefining the notion of a governing category in such a way that, while the domain for defining anaphor binding requires the presence of an accessible SUBJECT (as defined in Chomsky 1981a), the notion of accessibility is irrelevant to the characterization of the domain for defining pronominal disjoint reference. We show that this modification has the further advantage of solving a related conceptual problem, while retaining all the attractiveness of the original formulation of the theory.

Besides the opacity condition on anaphor binding and pronominal disjoint reference as expressed by the first two conditions of the binding theory, there is a general condition on anaphora which prohibits a referential dependent from occurring in a position so as to c-command its antecedent. This condition is observed to be sufficient for pronoun anaphora in English, but not in Chinese. While traditional treatments would take this as indication for the need for a principle based on the linear notion of precedence, we argue that a language-specific requirement based on a stricter hierarchical notion than c-command accounts for the observed typological differences between English and Chinese.

We also discuss some similarities and differences between definite pronoun anaphora and quantificational pronominal binding, and offer a number of preliminary remarks on why the observed differences exist.

Among the subsystems of principles that enter into discussion of the syntax of empty categories is the bounding theory. We give a description of relevant facts in Chinese which show that overt movement processes in Syntax obey a full range of island conditions subsumed under Subjacency. We note an important problem with the standard formulation of Subjacency with respect to certain asymmetries which the bounding condition fails to capture in a meaningful way. In line with recent work by Kayne (1981) and others we assume that the theory of proper government also interacts with the bounding theory. Contrary to Kayne, who proposes to collapse Subjacency with the Empty Category Principle (ECP), we propose the Condition on Extraction Domain, which provides that extraction may take place only from properly governed domains. Both this condition and Subjacency are assumed to have a role only in Syntax, but have no effect on mapping processes in the LF component. Relevant evidence for this conclusion includes contrasts of the following sort:

(14) a. *Who did pictures of please you?

b. Who believes pictures of who will be on sale?

c. Pictures of everybody will be on sale.

The second occurrence of who in (14b) and everybody (14c) may both be construed as having scope over the entire sentence. The mapping processes that derive the relevant construal violate both bounding conditions in question. Evidence from Chinese also shows that both QR and Move WH may violate the Complex NP Constraint, though overt movement cannot:

(15) a. *Zhangsan$_i$, wo mai-le [t_i xie de shu]
I buy-ASP write DE book
'*Zhangsan$_i$, I bought books that t_i wrote.'

b. ni mai-le [shei xie de shu]?
you buy-ASP who write DE book
'Who is the x such that you bought books that x wrote?'

c. wo mai-le [sange ren xie de shu]
I buy-ASP three men write DE book
'There are three men x such that I bought books x wrote.'

Another subsystem of principles that enters into discussion of the syntax of empty categories is the ECP. We observe that Chinese lacks a full range of standard ECP effects: no significant subject/object asymmetry under overt movement, nor under QR, nor under Move WH in LF. Based upon learnability considerations we argue that one cannot conclude from here that the ECP is a language-specific principle. Rather the principle must be regarded as a property of UG, and superficial difference across languages with respect to it must be derived from something more directly learnable. This assumption is supported by our analysis of data indicated below.

Although interpretation of wh phrases in situ in both Chinese and English generally violates a full range of island conditions, a systematic exception appears to arise with wh words like why and how and the Chinese counterparts weisheme, zeme, in that their interpretation cannot violate the Complex NP Constraint or the Wh Island Condition. Furthermore, interpretation of A-not-A questions and cleft sentences in Chinese also exhibits the same restrictions. While this may be taken to indicate the relevance of Subjacency with respect to these exceptional cases, we argue on both esthetic and empirical grounds that what is involved is really the ECP. What appears to be a CNPC effect

can also be derived from the ECP, and what appears to be an effect of the Wh Island Condition is in fact a subcase of the ECP formerly brought under the term superiority (Chomsky 1973). Thus we treat the contrast between (16a) and (16b) on a par with the contrast between (17a) and (17b):

(16) a. Who bought what?

b. *What did who buy?

(17) a. Who remembers why we bought what?

b. *Who remembers what we bought why?

This account, embodying the ECP, is strengthened by the observation that overt wh movement of adjuncts obeys a much stricter locality restriction than overt movement of arguments. We extend the ECP account by requiring that the principle apply not only at LF but also at SS (and by null hypothesis,also at DS, i.e. at every level of syntactic representation). This treats (18a) as on a par with (18b), in contrast to (19):

(18) a. *This is the man who I wonder whether bought the book.

b. *This is the reason why$_i$ I wonder whether [you bought it t_i].

(19) ?This is the book which I wonder whether you bought.

To the extent that it is correct, our theory thus shows that well known subject/object asymmetries should be seen as constituting a special case of a more general complement/non-complement asymmetry. The traces of adjuncts are like the traces of subjects. They are not lexically governed, so must be governed by their own antecedents. And this is what the ECP says. Since Chinese does show ECP effects on the traces of adjuncts, the lack of subject/object asymmetry in this language cannot support the assumption that the ECP is a language-specific principle.

An important observation we make in Chapters 6 and 7 is that the syntax of Syntax is both similar and dissimilar to the syntax of Logical

Form: the bounding theory applies only in Syntax but not in LF, while the ECP applies in both modules of grammar. This relation between Syntax and Logical Form argues for a theory of grammar that provides an apparatus to capture both their similarities and their dissimilarities. In particular, the fact that the bounding theory obtains only in Syntax argues for the autonomy of Syntax and for a level that separates Syntax from LF. Furthermore, the fact that the ECP must apply at SS also argues for the existence of that level. On the other hand, the fact that the ECP must once again apply at LF argues for a syntax of LF that creates empty categories of the same sort as those created in Syntax.

CHAPTER TWO: PHRASE STRUCTURES AND THE $\bar{X}$ THEORY

2.0. Introduction

One of the most important factors that determine the logical relations in a given language is its syntactic structures. It is therefore appropriate to begin investigation of our subject matter with a discussion of the phrase structures of Chinese. Our major concern will be to see how and where Chinese may fit into an optimal theory of phrase structure. The discussion will first outline the basic phrase structure patterns and briefly consider them in reference to a theory of linguistic typology. As will be seen, an adequate account of Chinese syntactic structures is best given in terms of a properly construed $\bar{X}$ theory and a typology derived from such a theory. Although Chinese and English are both SVO in word order, their structural similarity does not go far beyond this point. Within the theory of phrase structure adopted, the two languages differ in that while English employs a full range of head-initial constructions, Chinese is largely head-final, allowing only a very limited range of head-initial constructions. In particular, within any given surface phrase in Chinese, the head may branch to the left only once, and only on the lowest level of expansion. Thus while English permits a full range of left branching structures, Chinese phrases are strictly right-branching. The consequences of this latter restriction are shown to account for a number of facts with respect to the surface acceptability and possible interpretations of a wide variety of constructions. It will also be recalled in Chapters 3 and 4 that the existence

of this restriction in Chinese, as opposed to its non-existence in English, corresponds to non-trivial typological differences between the two languages with respect to the determination of scope relations concerning quantifiers and other logical elements.

The discussion in this chapter is mainly focused on the phrasal categories NP, VP, AP, and PP, but we will also extend our discussion to the structures of quantifier phrases and of "supersentences" containing complementizers and topicalized phrases.

2.1. Basic Structural Patterns

The basic word order of a Chinese sentence is subject-verb-object, with adverbial modifiers most generally occurring between the subject and the verb:

(1) Zhangsan zuotian zai xuexiao kanjian-le Lisi.
yesterday at school see-ASP
'Zhangsan saw Lisi at school yesterday.'

Sentences containing adjectives as their main predicates also exhibit the same pattern:

(2) ta zai xuexiao hen gaoxing zheijian shi.
he at school very happy this matter
'He was very happy about this matter at school.'

A fairly common variant of the word order of a transitive sentence has the object of the verb occurring in the form of a preverbal PP headed by the preposition ba. This is the so-called ba-construction. The two sentences below are identical in thematic structure in that both the postverbal NP in (3) and the preverbal PP in (4) bear the same thematic relation to the verb, namely the role 'patient'.

(3) ta pian-le Lisi.
he cheat-ASP
'He cheated Lisi.'

(4) ta ba Lisi pian-le.
he BA cheat-ASP
'He cheated Lisi.'

The alternation (3)~(4) has motivated a traditional rule of ba-transformation, by which a postverbal object is preposed. Transitive adjectival sentences like (2) may also have the postverbal object occur preverbally in the form of a PP, headed by dui 'towards':

(5) ta hen gaoxing zheijian shi.
he very happy this matter
'He is very happy about this matter.'

(6) ta dui zheijian shi hen gaoxing.
he towards this matter very happy
'He is very happy about this matter.'

These sentences show that what is semantically (or thematically) the object of a predicate may precede or follow the main predicate in surface structure. Syntactically, however, an object occurs preverbally only when embedded as part of a PP and, if it occurs without a preposition, the rule is for it to follow the main predicate (except for cases involving "long distance" movement, e.g. topicalization). This rule holds for VP and AP, and can also be extended to PP. The internal structure of a PP is P followed by its object NP, in accordance with the requirement that an object of the syntactic category NP must follow the head. PPs, unlike VPs and APs, are somewhat degenerate in that they never take any modifiers before the P.

The internal structure of noun phrases largely follows the pattern of that of VPs and APs in that all modifiers must precede the head noun.

These include the possessive phrases, the determiner-quantifier-classifier phrases (henceforth, the QPs), adjectives, and modifiers of other categories:[1]

(7) [$_{np}$[$_{np}$ ta de][$_{qp}$ neishuang][$_{vp}$ hui shuohua de][$_{ap}$ piaoliang
he DE that-pair can speak DE pretty
'That pair of pretty eyes of hers that can speak.'

de] yenjing]
DE eye

An important difference between NPs and the other categories is that the object complement of a noun can only precede, but not follow, the noun, whereas the rule is the opposite with APs and VPs if the object occurs as an NP not dominated by PP. Semantically, there is no reason why a noun cannot have an object, especially if the noun is the nominalized form of a verb. However, while an intransitive verb may be directly nominalized without any change of word order (either by a transformation or by lexical nominalization), as shown by (8), such a process produces ill-formed results with transitive verbs, as shown by (9) and (10):

(8) a. yesu fuhuo-le.
Jesus resurrect-ASP
'Jesus resurrected.'

b. yesu de fuhuo.
Jesus DE resurrection
'Jesus' Resurrection.'

(9) a. ta re-ai guojia.
he hot-love country
'He loves the country enthusiastically.'

b. *ta de re-ai guojia.
he DE hot-love country
'His enthusiastic love of the country.'

(10) a. ta liaojie zheijian shiqing.
he understand this matter
'He understands this matter.'

b. *ta de liaojie zheijian shiqing.
he DE understand this matter
'His understanding of this matter.'

The acceptable nominalized forms of (9a) and (10a) must have the object complement occur in a PP headed by dui 'towards' preceding the head:

(11) ta dui guojia de re-ai.
he towards country DE hot-love
'His enthusiastic love of the country.'

(12) ta dui zheijian shiqing de liaojie.
he towards this matter DE understanding
'His understanding of this matter.'

The facts we have seen so far pose an important question for the linguist interested in looking at them from the viewpoint of Universal Grammar (UG) understood as a facet of the innate cognitive capacity of mankind. What are the word order and/or phrase structure principles of UG, and how are they parameterized in such a way that, when the relevant parameters are fixed, a grammar "grows" in the mind of the child learning Chinese which gives rise to the facts we see?[2] These facts are particularly interesting in that they constitute a counter-example to certain generally quite valid claims made in Greenberg's (1966) well known study of universal word order patterns. For example, Greenberg's typological scheme claims that if a language has the relative clause preceding its head noun then it is a postpositional language. This is contradicted by the fact that Chinese relative clauses are strictly prenominal, and that the language is prepositional, as we have seen.[3] Furthermore, the fact that modifiers of the noun, the verb, and the adjective precede their heads would predict in Greenberg's framework that Chinese is an SOV (and, if we restrict

objects to be of the category NP, it is absolutely SVO). These apparently confusing facts have motivated a recent debate over whether to treat the language as purely SOV or SVO at some level of abstraction. For example, Tai (1973a) proposed that Chinese should be treated as having SOV underlying structure and that the surface non-SOV characteristics should be derived by some transformational mechanism. His position, while supported by a number of writers, has come under attack from others, including Mei (1980) and Chu (1980), among others. The fact is that Chinese exhibits a systematic set of properties that are characteristic of SOV languages and another systematic set that are characteristic of SVO languages. Therefore, whether it is assumed to be strictly SOV or strictly SVO, either hypothesis must carry the burden of accounting for the existence of non-SOV or non-SVO characteristics, respectively. From what I can see, however, attempts to account for the "irregular" properties have not produced arguments that are particularly convincing, and the question of whether Chinese is SVO or SOV remains unsettled today.

On the other hand, the apparent confusing word order facts in Chinese have led Li and Thompson (1976b, 1978) to question the significance of Greenberg's word order typology, and even to deny the usefulness of such a typology for a description of Chinese. In its place, Li and Thompson (1976b) introduced a pragmatic typology based on functional notions such as "topic-prominence" vs. "subject-prominence". They claim that the word order possibilities in Chinese are in the main determined by pragmatic or semantic factors, but are largely irrelevant to grammatical structure. Their hypothesis, however, simply dodges the issue. Although

there may be some ground for looking at language typology from a pragmatic or functional point of view, this is no sufficient reason for them to conclude that the word order possibilities in this language are not determined by structural principles. According to their theory, languages like Chinese are "topic-prominent" while those like English are "subject-prominent". From this they have been able to derive a number of very interesting and otherwise unexplained differences between the two types of languages. But the question that just arose in our discussion is not answered by such a theory, for it is hard to see why a "topic-prominent" language should use prenominal relatives and a "subject-prominent" language should use postnominal relatives, while both use prepositions. Nor does it seem likely that the question we raise is a non-issue. If pragmatics and semantics were all there is that determines the word order possibilities in Chinese, it seems one would expect to find just every imaginable word order in this language, though this is, of course, contrary to fact.[4]

In 2.2 below, I will suggest that the seemingly confusing facts regarding Chinese word order need not, in fact, pose any problem if Greenberg's theory of typology is embedded in a broader framework of UG, an approach that is obviously inherent in the works of several recent writers (e.g. Hale 1979, 1980, Stowell 1981, Farmer 1980). In particular, rather than taking an autonomous veiw of typology, if it is assumed that the major features of Greenberg's typology are derived as the results of some simple parametrization of the general principles of UG, namely those of the X-bar theory, the word order facts we have seen in

Chinese need not present any problem any more than do the word order facts in, say, English.

2. 2. Autonomous Typology and $\bar{X}$ Typology

One of the most significant facts revealed in Greenberg's study is that the word order properties of a typical VSO language cluster in such a way as to form a mirror image to the cluster of word order properties of a typical SOV language. In particular, despite the exceptions noted and qualifications made by him, it holds true in a great many cases that a language either has all the four properties indicated in (13), or all the four indicated in (14):

(13) a. It is SOV.
b. It is postpositional.
c. Its nominal modifiers precede the head noun.
d. Its adverbial adjuncts precede the main verb or head adjective.

(14) a. It is VSO.
b. It is prepositional.
c. Its nominal modifiers follow the head noun.
d. Its adverbial adjuncts follow the main verb or head adjective.

Greenberg accounts for such clusterings of properties by listing a number of "implicational universals". However, such an approach leaves a number of important questions unanswered. For example, it does not explain why there should be such implicational universals, i.e. why the existence of a certain property should entail that of another. Furthermore, in the case of exceptions to these universals as we have seen in Chinese, his approach does not provide a principled basis to explain how such exceptions may come about in the way they do, and why other imaginable

exceptions are perhaps less likely to occur (for example, the combination of VSO and postposition and that of SOV and preposition are extremely rare cases among the 142 languages included in Greenberg's Appendix II).

The essential weakness of Greenberg's approach is, I believe, his autonomous view of the theory of typology. He sets up the opposition SVO:SOV:VSO as a basic independent parameter for classification, alongside with two other such criteria, the preposition:postposition parameter and the adj-N:N-Adj parameter. In such a view, there is no reason to expect that fixing the SVO:SOV:VSO parameter, for example, should automatically predetermine the value of the preposition:postposition parameter to be fixed.

In trying to understand why the properties in (13) and (14) should pattern in such a way as to give rise to certain of Greenberg's universals, it makes sense to ask what they have in common. The most salient common feature among (13a-d) is that each of them indicates that the structure of a phrasal category has the head occurring in the final position following all of its peripherals, i.e. modifiers and/or complements. On the other hand, the common feature of (14a-d) is that a phrase has its head occurring in initial position preceding all its peripherals. (There have been arguments in the literature for the claim that in many languages V or VP is the head of a sentence, and the fact that (13a) patterns with (13b-d) while (14a) patterns with (14b-d) is just a piece of evidence in its support.) Given this observation, the problem as to why the properties in (13) and (14) should cluster to give rise to the "implicational universals" simply does not arise. If a language is head-final, then of course it is typically verb-final, noun-final, adjective-

final, postpositional or adposition-final. Exactly the opposite happens with head-initial languages. There is nothing surprising in this respect, and indeed it would be surprising if the normal majority of languages exhibited a range of properties including (13a,c) and (14b,d), for example. In the Greenbergian framework, this need not be a surprise, nor can the universals be taken for granted.

The correct generalization to be drawn from (13) and (14) is that languages are to be classified as having endocentric constructions which are either all head-final or all head-initial cross-categorially (i.e. in the simplest cases).[5] This generalization, missed in the Greenbergian autonomous typology, can be readily captured by the $\bar{X}$ theory of phrase structure of Chomsky (1970), originally proposed as a foundation for a lexical theory of nominalization. The most general form of the X-bar theory states that a category X of level n immediately dominates a string consisting of a category of the same type X of level n -1, optionally followed or preceded by one or more peripheral phrases. Two major rule schemata can be distinguished (although they are conflatable into a mirror-image rule):[6]

(15) $X^n \rightarrow YP^* \quad X^{n-1}$

(16) $X^n \rightarrow X^{n-1} \quad YP^*$

Given rules of the form (15) and (16), endocentricity of phrase sturctures is captured by the appearance of the same category type symbol X on both sides of the arrow. Cross-categoriality, on the other hand, is expressed by the use of X as a variable ranging over the categories N, V, A, P. The variable is used as a shorthand for the

feature complex [αN, β V] with α and β unspecified for + or - as originally proposed by Chomsky. Less general types of cross-categorial generalizations are captured by the use of partial specification of the value of α, β in the feature complex of X.[7]

What may be called an X-bar typology, as opposed to an autonomous typology, then , will take the two rules (15) and (16) as two values of a parameter. It captures the generalization concerning (13) and (14) by asserting that a major typological split of languages is simply made in the choice between the head-final rule (15) and the head-initial rule (16) in their most general form, with X ranging over all categories. Put in acquisitional terms, the child need only fix the single (15) vs. (16) parameter before he develops a grammar incorporating all the knowledge represented in (13) or in (14) as a consequence of UG. This is a piece of support for our contention that a good theory of typology should not be autonomous, but should, in the words of Ken Hale, fall out as a by-product of a proper theory of UG.

Turning now to languages that are less well behaved in varying degrees with respect to the single typological distinction between (15) and (16), we may say that these languages employ both the head-final rule and the head-initial rule in ways that may differ from language to language. The head-final vs. head-initial parameter need not have its value fixed in a given language for all categorial levels and types. It is often possible, for example, that at a given level of phrase structure, say the double-bar level, a language employs the head-final rule, but at a lower level it employs the head-initial rule. And at

each level the choice between (15) and (16) need not always be made at once for all categorial types, but may be made only for a certain natural subclass of types or even just a single type. In these cases the simplicity metric in conjunction with the feature system of the $\bar{X}$ theory is expected to reflect the relative markedness of the languages not falling under the types defined by (13) and (14). For example, a language that does not use the same rule to expand all phrasal categories at a given level will be treated as relatively marked with respect to one that does, because it contains a more complicated grammar with more rules required and with more features specified for rules with smaller range of application. This prediction of markedness is largely correct, as far as I know, at least in so far as it is made on the basis of cross-categoriality, although a few moments' thought will suggest, undoubtedly, that the matter is somewhat more complicated, since it is not clear if a VSO language is in any true sense "less marked" than any of the vast number of SVO languages of the world.[8] If V is the head of a sentence, then a VSO language need only involve the head-initial rule (16), while an SVO language will need to employ both the rule types (15) and (16). Given the assumption that any endocentric $\bar{X}$ structure must be either head-final or head-initial, any "head-medial" structures must necessarily employ expansion rules of both types (15) and (16). An example of a language exhibiting such structures is of course, English. It is fairly uncontroversial that in English the internal structure of an NP, AP, or PP may involve a head-final rule in the first expansion, followed by a head-initial rule in the second expansion, as shown in the following

paradigm:

(17) a. $[_{\bar{n}}$ Their $[_{n}$ $[_{n}$ destruction] of the city]]

b. $[_{\bar{a}}$ How $[_{a}$ $[_{a}$ happy] about the news]]

c. $[_{\bar{p}}$ So much $[_{p}$ $[_{p}$ off] the track]]

Furthermore, certain writers have argued that the verb in English may be analyzed as the head of a clause (cf, e.g. Jackendoff 1977, Marantz 1980). According to this view, the structure of a sentence may likewise be taken to exhibit the same pattern as indicated in (17):

(18) $[_{\bar{v}}$ They $[_{v}$ $[_{v}$ destroyed] the city]]

There are also reasons for not taking the verb in English, but rather the INFL (or AUX), as the head of a sentence (see e.g. Chomsky 1981, Hale 1978, and others). According to this view, one may take the internal structure of a sentence to be of the same pattern as (17) if INFL and VP are taken to form a constituent (cf. Chomsky 1965):

(19) $[_{\bar{\bar{infl}}}$ They $[_{\bar{infl}}$ $[_{infl}$ did] destroy the city]]

In all of the structures (17)-(19) we have considered, the use of both the head-final and the head-initial rule for the expansion of a single phrasal category makes it necessary to recognize at least two levels of phrase structure, $X^{=}$ and $\bar{X}$. This gives rise immediately to the configurationality of English. On the other hand, in typical head-final or head-initial languages, only either (15) or (16) may be needed, but not both, and there is no motivation of the same kind for assuming a level of structure higher than one bar, $\bar{X}$. It is therefore possible to argue that Japanese, for example, has a "flat" structure, with all

peripheral elements occurring in linear order to the left of their heads (see Hale 1980, Farmer 1980). It has sometimes been suggested (e.g. Chomsky 1981a) that the typological split between so-called configurational languages and non-configurational languages may be made by setting up the parameter [±configurational], but it is clear that the required distinction may follow directly from whether a language may use a level of $\bar{X}$ structure higher than one bar or not. And one of the reasons that lead a language to employ $\bar{X}$ structures of depth higher than one bar is head-medialness, which requires the use of both rule types (15) and (16).

Another factor that may lead one to the postulation of the existence of $\bar{X}$ structures higher than one bar in depth is the fact that certain elements within a given phrase may constitute a proper sub-constituent within the phrase. For example, although the VOS order of Malagasy sentences need only the head-initial rule type, certain writers (e.g. Keenan 1976) assume that the verb forms a VP constituent with the object. Similarly, there is good reason to believe that in English there is a closer relationship between a noun and its complement than between a relative clause and its head, even though both the complement and the relative clause follow the head noun. Thus, Jackendoff (1977) argues that while noun phrase complements are dominated by $\bar{N}$, following N, restrictive relative clauses or other modifiers are best analyzed as dominated by $\bar{\bar{N}}$, and non-restrictive modifiers dominated by $\bar{\bar{\bar{N}}}$. There is likewise good reason to consider that adverbial phrases in English are dominated by phrasal nodes of a higher order than are object complements to verbs, as is pretty well accepted in the literature.

Turning now to Chinese, let us consider where it stands in a theory of X-bar typology. It is clear that, like English, Chinese requires both (15) and (16) in characterizing its phrase structures, since verbs and adjectives occur medially between non-object and objects. It is therefore a configurational language to the extent that at least a double-bar structure is required ($\bar{\bar{V}}$, $\bar{\bar{A}}$, for sentences, if the head of a sentence is V or A). There are two ways in which Chinese differs from English, however. While the head-initial rule is used in Chinese for the categories VP, AP, PP, it is not used for the expansion of NP.[9] This may be directly taken as a somewhat marked property of Chinese (as compared to English) with respect to cross-categoriality, although there may be a better account at some level of abstraction.[10] We may, in other words, assume that the parameters [$\pm$ head-final] and [$\pm$head-initial] may be fixed for each categorial type for each language, though languages tend to fix the parameters once and for all categories. Thus, English selects [+head-final] and [+head-initial] for all categories. Chinese differs from English in selecting only [+head-final] but not [+head-initial] for NP. Another distinct property of Chinese. as compared to English, is that among those categories which involve both the head-final and the head-initial rule, Chinese places only <u>complements</u> after their heads, not modifiers such as adverbial clauses or phrases, whereas in English not only complements to a noun or a verb, but also their modifiers (relative clauses, adverbial clauses, etc.) may occur in post-head position. On the other hand, Chinese allows a wide variety of peripheral phrases to occur in the pre-head position, while the variety

of possible pre-head elements in English is quite limited. In general, what may appear in pre-head position in English is limited to those categories that function as specifiers, subjects, intensifiers, and single word modifiers (adjectives and adverbs). Other adnominal or adverbial phrases or clauses must follow their heads as a general rule. To account for the difference between these two languages, we may assume that the [±head-final] and [±head-initial] parameters may be fixed at each level of phrasal expansion for each language. Chinese, in particular, selects the head-initial rule only at the lowest level of expansion, i.e. only at the $\bar{X}$ level, and allows complements to occur to to the right of their heads in certain phrases (VP, AP, PP). For all higher levels of expansion ($\bar{\bar{X}}$, $\bar{\bar{\bar{X}}}$, etc.), however, Chinese requires the use of the head-final rule, and places subjects, specifiers, and all modifiers to the left of their heads. English, on the other hand, permits the use of the head-final rule only for one or two of the highest levels of expansion (X^{max}, X^{max-1}, etc.), but requires the head-initial rule for all other levels. Chinese, then, is trivially head-initial but largely head-final, while English is largely head-initial and trivially head-final. Both, however, are SVO.

Given the characterization in terms of (15)and (16), plus the assumption that languages may parametrize on both the type and the level of a category, there is then no reason to expect the existence of a "typical SVO" or for that matter any "typical" head-medial language. All head-medial languages are "untypical" in some sense, in varying degrees, in being "deviant" from each of the two opposite "typical" types, head-final and head-initial (but see footnote 8).

It does not seem to make much sense to talk about English being a "typical SVO language" (cf. e.g. Lehman 1978). There is, in other words, no need to worry about the word order facts in Chinese on the grounds that they are not "typical SVO" facts, nor any motivation for proposing an SOV order at some level of abstraction.[11]

2.3. Head-Initial Constructions

We have argued for the superiority of an X-bar typology over an autonomous typology and, consequently, for the appropriateness of accounting for the word order facts in Chinese within the framework of the X-bar theory. We have indicated that a major word order property of Chinese is that it uses the head-initial rule only for the lowest level expansion but requires the head-final rule for all higher levels. Furthermore, noun phrases never involve the head-initial rule. In other words, the child learning Chinese must learn the following rule (and probably few others):

(20) The $\bar{X}$ structure of Chinese is of the form:[12]

a. $[_{\bar{X}}n \quad X^{n-1} \quad YP^*]$ iff n=1 and $X \neq N$

b. $[_{\bar{X}}n \quad YP^* \quad X^{n-1}]$ otherwise

In this subsection I will show that the language exhibits a number of phenomena whose existence is best attributed to the structural condition indicated in (20) but not, obviously, to any pragmatic or semantic factors. As will become clear soon, I will assume that (20) is a surface structure constraint, construed as a filter applied at the level PF.

First of all, although the "ba-construction" is normally an optional variant of a sentence with an object NP appearing in postverbal position (as is illustrated by examples (3) and (4) above), there are cases where the ba- construction is obligatory.

(21) a. ta ba wuge pingguo chidiao-le liangge.
he BA five apple eat-ASP two.
'Of the five apples, he ate two.'

b. ta ba juzi buo-le pi.
he BA orange peel-ASP skin
'He peeled the orange.'

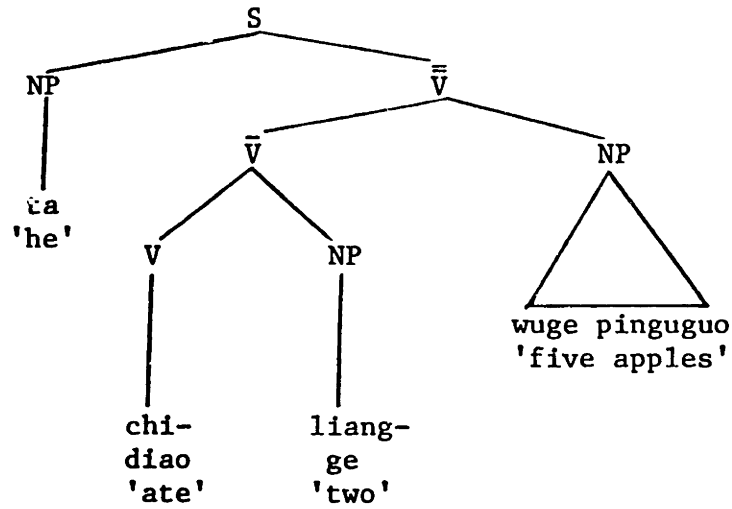
c. ta ba zhimen ti-le yige dong.
he BA paper-door kick-ASP one hole
'He kicked a hole in the paper-door.'

d women ba ta dang shagua.
we BA he treat-as fool
'We regard him as a fool.'

Each of these sentences contains a ba-phrase, which is normally assumed to be derived from a postverbal object. However, there is also an NP in postverbal position which is already the object of the verb, the so-called "retained object", first studied by Lü (1955). Clearly, each of the ba-phrases bears some thematic relation (in particular the relation "patient", see Teng 1975) to some verbal element, but since the verb already has a direct object (which may or may not be patient), it is natural to sssume that the ba-phrase does not bear a direct thematic relation to the verb. Rather, it is more reasonable to say that the ba-phrase is the logical object of the verb-object combination following it. That is, the verb directly assigns a thematic role to the object following it, and then the verb-object phrase compositionally assigns the role "patient" to the ba-phrase. As Thompson (1973b) argues, this

fact may be taken to justify an underlying structure of the form of (22a-d) where the ba-object of (21) appears in a position following the small verb-object phrase:[13]

(22) a.



b. [$_S$ ta [$_{\bar{V}}$[$_V$ buo-le pi] juzi]]
he peel-ASP skin orange

c. [$_S$ ta [$_{\bar{V}}$[$_V$ ti-le yige dong] zguneb]]
he kick-ASP one hole paper-door

d. [$_S$ women [$_{\bar{V}}$[$_V$ dang shagua] ta]]
we treat-as fool he

Given that the object of the V^o in each of (21) or (22) (the "inner object") follows the V^o, it is natural to expect that the object of the $\bar{V}$ (the "outer object") also follows the $\bar{V}$. Therefore, the structures in (22), as posited by Thompson, are not implausible. But the relevant question is not whether the ba constructions in (21) are really derived by Move α (in particular, the ba-transformation) from the deep structures in (22). If they are not, i.e., if the sentences in (21) are base-generated in their surface form, the relevant question is why each of the ba-constructions does not have a grammatical non-ba counterpart, with the "outer object" occurring postverbally as in (22), as one

would expect given the free alternation of (3) and (4) illustrated in 2.1. On the other hand, if one accepts Thompson's hypothesis that each of (21) derives from its counterpart in (22) by Move α, the relevant question is why Move α is obligatory in this case, although the free alternation of (3) and (4) shows that the rule is otherwise optional. Suppose, for expository purposes, that Thompson's hypothesis is right. The answer to the question just raised does not seem at all related to pragmatics or semantics. But, given the X-bar structure condition in Chinese just proposed in (20), the answer is transparent. In all of (22), both $\bar{V}$ and $\bar{\bar{V}}$ have their heads occurring to the left of a complement. This violates the condition (20). In order to satisfy the condition, which we may assume to be a filter at the level of PF, one must somehow remove the "outer object" from its posthead position. The ba-transformation, which turns structures like (22) into structures like (21), is one of the processes that have just this effect.

Note that the contrast between (21) and (22) does not lie in any special requirement on an "outer object" to take a ba form, but in the general unacceptability of structures that violate the X-bar filter (20). This is because the ba-transformation is not the only possible process whose application has the effect of saving otherwise ill-formed structures from the filter. For example, removal of the "outer object" from the postverbal position may also take the form of passivization:[14]

(23) a. wuge pingguo bei ta chidiao-le liangge.
five apple by he eat-ASP two
'Of the five apples, two were eaten by him.'

b. juzi bei ta buo-le pi le.
orange by he peel-ASP skin ASP.
'The orange was peeled by him.'

c. zhimen bei ta ti-le yige dony
paper-door by he kick ASP one hole
'The paper got kicked a hole by him.'

d. ta bei women dang shagua.
he by we treat-as fool
'He was treated as a fool by us.'

The structures given in (22) above have some English analogues:

(24) a. John made fun of Mary.

b. John took advantage of Bill.

We may assume that the DS representation of (24a), for example, is such that fun is the "inner object" of made and Mary is the "other object" of the $\bar{V}$ made fun:

(25) a. $[_S$ John $[_{\bar{\bar{V}}} [_{\bar{V}}$ made fun] Mary]]

b. $[_S$ John $[_{\bar{\bar{V}}} [_{\bar{V}}$ took advantage] Bill]]

Under usual assumptions, $\bar{V}$s do not assign Case (cf. footnote 14). In order to save (25a-b) from the Case filter, therefore, of insertion applies to turn them into (24a-b). Since English allows the head of $\bar{\bar{V}}$ to branch to the left on the basis of the head-initial rule, the structures of (24a-b) are well-formed. In this view, note that the structures in (22) may be ruled out by either the Case filter or by the $\bar{X}$ structure condition (20a). The relevant point to note, however, is that the $\bar{X}$ structure condition is needed independently of the Case filter. If all that matters were the Case filter, the structures could be saved if we inserted the preposition ba right between the V and the "outer object". The fact that these structures must undergo either ba-transformation (which preposes the "outer objects" and inserts ba) or passivization, then, shows that the $\bar{X}$ condition (20a) is really at work.

A second piece of evidence in support of the $\bar{X}$ structure filter may be derived from the fact that "inverted-subject" sentences are acceptable only when the verb is intransitive and is not followed by any material. Consider first the following sentences:

(26) a. yu xia-guo le.
rain fall-ASP ASP
'It has rained.'

b. xia-guo le yu le.
fall-ASP ASP rain ASP
'It has rained.'

In (26a), the verb 'fall' is not followed by any complement or modifier, Therefore, if the subject is postposed to the right of the verb, it can be accommodated in a position under the dominance of $\bar{V}$, whose head is the verb, without violating the X-bar filter. Hence the well-formedness of (26b). However, if the verb is transitive or is otherwise followed by other material, subject inversion is impossible. For example, (27a) cannot be turned into (27b) since the verb is transitive:

(27) a. you sange ren mai-le shu.
HAVE three man buy-ASP book
'Three men bought books.'

b. *mai-le shu sange ren.
buy-ASP book three man

Furthermore, in (28) below the verb is followed by an "extent" complement clause headed by the COMP de 'till'. Therefore, subject inversion is disallowed also, whether it places the postposed subject immediately after the verb or after the complement, as shown by the ill-formedness of both (29a) and (29b):

(28) [$_S$ yu [$=_V$ xia [de hen da]]] le.
rain fall till very big ASP
'It has been raining very heavily now.'

(29) a. *[$_S$[$_{\bar{V}}$= xia [de hen da] yu]] le.
fall till very big rain ASP

b. *[$_S$[$_{\bar{V}}$=[$_V$ xia yu] [de hen da]]] le.
fall rain till very big ASP

Clearly, the reason is that, with the subject inverted, either the subject or the extent clause would have to be dominated by $\bar{\bar{V}}$, thus violating the X-bar filter.[16] (Note that the ill-formedness of (29) has nothing to do with the individual properties of a verb, as the same verb 'fall' is involved in (26a), which allows subject inversion.)

A third piece of evidence for the $\bar{X}$ structure condition (20) may be derived by comparing the unacceptable (29b) with the acceptable (30):

(30) xia yu xia de hen da le.
fall rain fall till very big ASP
'It has been raining very heavily now.'

The crucial difference between the sentences (29b) and (30) is that in (29b) a V-NP sequence is directly followed by an extent clause while in (30) the verb is reduplicated in the position between the V-NP sequence and the extent clause (the reduplicated verb in (30) is the second occurrence of 'fall'). This contrast in grammaticality is not a special property of sentences involving subject inversion, but a property shared by (29b)-(30) and the following sentences:[17]

(31) a. *wo qi ma de hen lei.
I ride horse till very tired
'I rode a horse until I got very tired.'

b. wo qi ma qi de hen lei.
I ride horse ride till very tired
'I rode a horse until I got very tired.'

(32) a. *ta chang ge de hen haoting.
he sing song till very good-to-the-ear
'He sings very well.'

b. ta chang ge chang de hen haoting.
he sing song sing COMP very good-to-the-ear
'He sings very well.'

(33) a. * ta nian shu le sange zhongtou.
he read book ASP three hour
'He studied for three hours.'

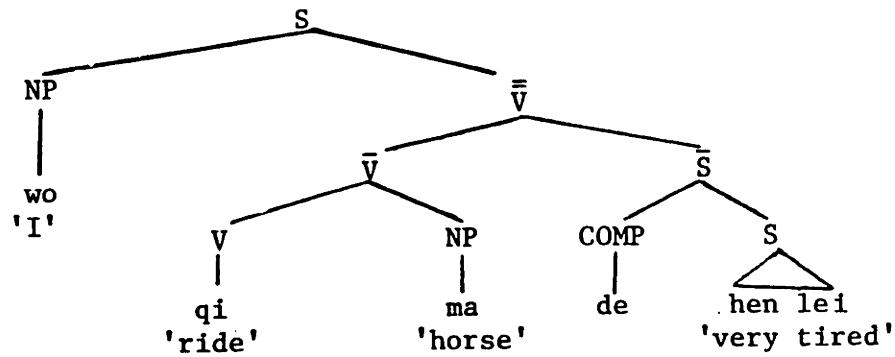
b. ta nian shu nian le sange zhongtou.
he read book read ASP three hour
'He studied for three hours.'

(34) a. *ta kai che le liang ci.
he drive car ASP two time
'He drove twice.'

b. ta kai che kai le liang ci.
he drive car drive ASP two time
'He drove twice.'

Wha do sentences (29)-(34) have in common? Clearly, the first thing is that all of them are well-formed just in case each of their verbs is reduplicated, and ill-formed otherwise. Secondly, in each of these sentences the verb is followed by two constituents, an NP argument and an adverbial phrase denoting extent, result, duration, frequency, or manner, etc. Mei (1972, 1978) has put forth a number of good arguments showing that these adverbial phrases are what he calls "verb phrase complements" whose position in a phrase structure is higher than that of "verb complements" such as object NPs and complement clauses that follow so-called "control" verbs. In terms of the $\bar{X}$ theory, the "verb phrase complements" are those directly dominated by $\bar{\bar{V}}$ and the "verb complements" are those dominated by $\bar{V}$. The correct representation of (31a), for example, where verb reduplication has not taken place, should be (35):

(35)



I think that a representation like (35) for the sentences (29c)-(34) before verb reduplication takes place is well justified, but we must now ask the deeper question as to why the sentences under consideration have exactly the two common properties: that they have an underlying source of the form (35) with a VP complement dominated by $\bar{\bar{V}}$ and that their well-formedness depends upon a process of verb reduplication. Note that sentences with "verb complements" that are dominated by $\bar{V}$ do not involve verb reduplication at all:

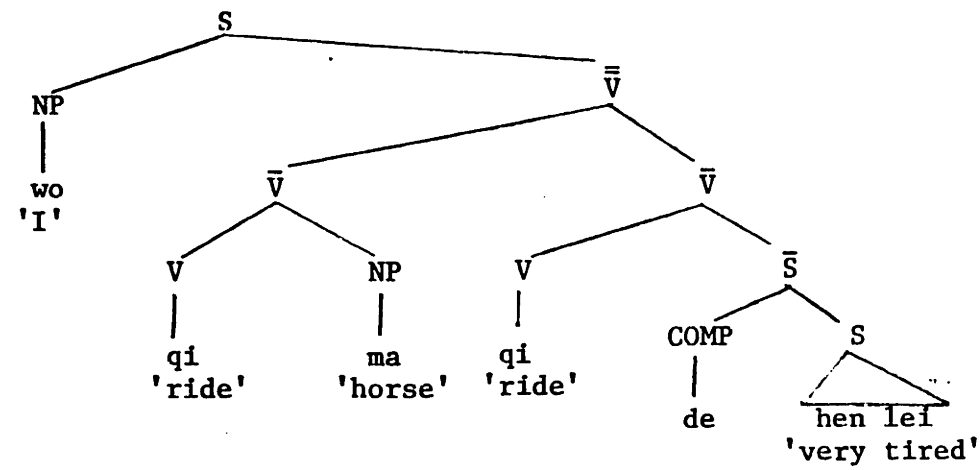
(36) a. ta bi wo nian shu.
he force I read book
'He forced me to study.'

b. *ta bi wo bi nian shu.
he force I force read book

Any theory that treats these two common properties as unrelated is sure to miss a generalization. Given the structural filter assumed here, however, the relatedness of these two properties is fairly clear. As we have seen, structures of the form (35) are ill-formed with respect to the filter. Evidently, the function of verb reduplication is to creat a structure meeting the requirements of the filter, thus saving the otherwise ill-formed structures. To see this more clearly, let

us ask what the structure (35) will become after reduplication takes place. Since the reduplicated verb is placed immediately before the resultative clause of (35), it is plausible to assume that this allows the structure to be turned into (37), where the reduplicated verb forms a constituent with the following resultative clause under the dominance of a newly created $\bar{V}$ node, with the reduplicated verb treated as the head of this $\bar{V}$ occurring to the left of the resultative clause:

(37)



Note that (37) may now be taken as a structure that satisfies the $\bar{X}$ filter. The only thing to note is that the filter forces one now to consider the newly created $\bar{V}$ on the right as the head of the $\bar{\bar{V}}$, not the original $\bar{V}$ on the left.[18]

The assumption embodied in the structure (37), whose form we take to represent all the grammatical sentences of (29)-(34), is justified in a number of ways. Phonologically, the reduplicated verb may be separated from the preceding V-NP sequence by a pause, but not from the following $\bar{S}$, thus confirming the constituency of the new $\bar{V}$. Semantically, the claim that the newly created $\bar{V}$ is

the head of $\bar{\bar{V}}$ is justified by the observation that has sometimes been made (cf. Tai and Chou 1974) that the new $\bar{V}$ containing the resultative in (37) constitutes the main assertion or the "center of predication" of the sentence. That is, the original $\bar{V}$, qi ma 'ride a horse' functions more like an adverbial indicating the manner in which or cause by which one gets tired. Thus, a more appropriate translation for (31b) should be 'I got tired by riding a horse'. This observation is further strengthened syntactically by the fact that the perfective aspect marker le, which signals the finiteness of a verb, may only accompany the reduplicated verb, but not the original one. Compare the well-formed (33b) and (34b) with the ill-formed (38) and (39).

(38) *ta nian le shu nian sange zhongtou.
he read ASP book read three hour

(39) *ta kai le che kai liang ci.
he drive ASP car drive two time

Note that if the verb in each of (31)-(34) is intransitive and is directly followed by a "verb phrase complement", there is no need to reduplicate the verb. This is already shown by the well-formedness of (28) above, where the subject is not inverted. Compare also (31)-(34) with the following:

(40) ta ku de hen lei.
he cry COMP very tired
'He cried until he got very tired.'

(41) ta ku de hen haoting.
he cry COMP very good-to-the-ear
'He cried with a nice voice.'

(42) ta ku le sange zhongtou.
he cry ASP three hour
'He cried for three hours.'

(43) ta ku-le liang ci.
he cry-ASP two time
'He cried twice.'

Although Mei has argued that the "verb phrase complements" modify a verb phrase consisting of a verb and its object (or an inverted subject as in the case of (30)) and not just the verb, his claim has empirical content only when the verb is followed by an object (or an inverted subject). In a structure like (35), the resultative clause is represented as a sister to a $\bar{V}$. This configuration shows that the resultative clause "modifies" the entire $\bar{V}$, rather than just the V or the object contained in the V. If the verb is not followed by an object (or an inverted subject), however, the configurational relationship between the verb and the resultative clause will be the same whether the resultative is directly dominated by $\bar{\bar{V}}$ or $\bar{V}$. Since the $\bar{V}$ in such situations is non-branching, it <u>is a</u> V. Therefore, it makes no difference whether the resultative occurs in a position to modify a $\bar{V}$ or a V. There is then no need to assume that the "verb phrase complements" in (28) and (40)-(43) are directly dominated by $\bar{\bar{V}}$ <u>and not</u> by $\bar{V}$. The structures of these sentences therefore do not violate the $\bar{X}$ filter, and consequently do not call for verb reduplication.

The situation represented by (40)-(43) is only one of the several ways in which a verb need not be reduplicated before a "verb phrase complement". In such a situation, verb reduplication is unnecessary from the start, i.e., the complement may simply be inserted under $\bar{V}$. In other situations, however, the need for reduplication may be eliminated by certain operations of Move α. In (44)-(47) below, the (a) sentences require verb reduplication. When the object following each verb is removed from its position under $\bar{V}$, as by

passivization, ba-transformation, topicalization, or object-preposing, verb reduplication becomes unnecessary, as shown by the (b)-(e) sentences (t the trace of each dislocated phrase):

(44) a. ta qi neizhi ma qi de hen lei.
he ride that horse ride COMP very tired
'He rode that horse until he got very tired.'

b. neizhi ma bei ta qi t de hen lei.
that horse by he ride COMP very tired
'That horse was ridden by him until it got very tired.'

c. ta ba neizhi ma qi t de hen lei.
he BA that horse ride COMP very tired
'He rode that horse until it got very tired.'

d. neizhi ma, ta qi t de hen lei.
that horse he ride COMP very tired
'That horse, he rode it until he got tired.'

e. ta neizhi ma qi t de hen lei.
he that horse ride COMP very tired
'He rode that horse until he got very tired.'

(45) a. ta diao neizhi wu tiao de hen hao.
he dance that dance dance COMP very good
'He danced that dance very well.'

b. ta ba neizhi wu tiao t de hen hao.
he BA that dance dance COMP very good
'He danced that dance very well.'

c. neizhi wu, ta tiao t de hen hao.
that dance, he dance COMP very well
'That dance, he did very well.'

d. ta neizhi wu tiao t de hen hao.
he that dance dance COMP very good
'He danced that dance very well.'

(46) a. ta tuoyen neijian shiqing tuoyen le san nian.
he delay that matter delay ASP three year
'He delayed that matter for three years.'

b. neijian shiqing bei ta tuoyen t le san nian.
that matter by he delay ASP three year
'That matter was delayed for three years by him.'

c. ta ba neijian shiqing tuoyen t le san nian.
he BA that matter delay ASP three year
'He delayed that matter for three years.'

d. neijian shiqing, ta tuoyen t le san nian.
that matter he delay ASP three year
'That matter, he delayed it for three years.'

e. ta neijian shiqing tuoyen t le san nian.
he that matter delay ASP three year
'He delayed that matter for three years.'

(47) a. ta tuoyen neijian shiqing tuoyen le liang ci.
he delay that matter delay ASP two time
'He delayed that matter twice.'

b. neijian shiqing bei ta tuoyen t le liang ci.
that matter by he delay ASP two time
'That matter was delayed twice by him.'

c. ta ba neijian shiqing tuoyen t le liang ci.
he BA that matter delay ASP two time
'He delayed that matter twice.'

d. neijian shiqing, ta tuoyen t le liang ci.
that matter he delay ASP two time
'That matter, he delayed twice.'

e. ta neijian shiqing tuoyen t le liang ci.
he that matter delay ASP two time
'He delayed that matter twice.'

We have assumed that each of the "verb phrase complements" in (44)-(47) is dominated directly by $\bar{\bar{V}}$. With the application of Move α, a trace is left in the original position of the dislocated phrase, still dominated by $\bar{V}$. Therefore, Move α does not alter the structural configuration in any relevant way with respect to the $\bar{X}$ filter at the level SS or LF. In PF, however, the semantically relevant traces may be assumed to be "invisible", and at the time derivations enter PF the $\bar{V}$ dominates only a V but no object.[19] It is plausible, therefore, to assume that it is this vacated position under $\bar{V}$ that renders verb reduplication

unnecessary.[20] In particular, we may assume that the structures of the sentences in question undergo a restructuring process, by which the "verb phrase complements" become sisters of the verbs under the domination of $\bar{V}$, thereby satisfying the $\bar{X}$ filter.[21]

The actual execution of this restructing process may take the form of abstract movement of the complement leftward down into $\bar{V}$, in a way similar to the Standard Theory treatment of "raising-to-object" sentences (though the latter involves upward movement), or it may take the form of directly relabelling the $\bar{\bar{V}}$ as $\bar{V}$ and erasing the original $\bar{V}$ node. Also, one may hypothesize that the verb is moved rightward to the position directly under $\bar{\bar{V}}$, followed by $\bar{\bar{V}} \rightarrow \bar{V}$, etc. There is some indeterminacy here, but it is likely that distinguishing among these alternatives is not necessary. Instead, the actual rule that has any real status may take the maximally generated form (48):[22]

(48) Restructure α, α a category.

Of course, outputs of this rule, like those of Move α, must be subject to various independently motivated principles of grammar, among them the $\bar{X}$ filter under consideration. Although an adequate formal characteristion of the rule Restructure α has yet to be given, it seems clear from the existing literature that it typically involves rebracketing and/or relabelling of a tree without the overt movement of constituents. Thus, Restructure α may be considered to subsume the process that derives (37) from (35) following verb reduplication, as well as the "regularization"

process that saves the (b)-(e) sentences of (44)-(47) from the $\bar{X}$ filter.

The existence of something like Restructure α is probably beyond doubt. It has been observed in Lü (1965) that the following sentence is two-way ambiguous:

(49) ta de toufa li de hen hao.
he DE hair cut COMP very well

a. 'His hair was well cut.'
b. 'He cuts one's hair well.'

On the first reading, the person alluded to had his hair cut, and the sequence ta de toufa 'he DE hair' is simply a possessive construction. On the second reading, the person is a good barber; the sequence ta de toufa does not mean 'his hair' although it has the form of a possessive construction. In fact, on the second reading ta de toufa is not even a constituent semantically, although phonetically there is no question that it is a constituent.

The availability of the second reading is quite clear to the native speaker. In certain sentences only the second type of interpretation is available due to the absurdity of the otherwise available first reading:

(50) a. ta de wu tiao de hao.
he DE dance dance COMP well
'He dances well.'

b. ta de shuxue jiao de hao.
he DE math teach COMP well
'He teaches math well.'

As has been argued in the literature (see e.g. Mei 1980, Huang 1979), sentences like (40 and (50a-b) may have as one of their underlying sources a structure in which the NPs 'hair', 'dance', math' are

postverbal objects. In other words, after these objects are preposed (by the same instance of Move α that yields the last sentence in each of (44)-(47), the sentence (49) has the S-structure on its second reading:

(51) $[_{s}$ ta $[_{vp}$ toufa$_i$ $[_{vp}$ li t_i [de hen hao]]]]
he hair cut till very well

In LF, (51) receives the interpretation that he cuts hair very well. In PF, suppose we assume that the juxtaposition of ta 'he' and toufa 'hair' enables the structure to undergo optimal Restructure α, which reanalyzes the sequence ta toufa 'he hair' into one NP constituent, turning (51) into (52):

(52) $[_{s}[_{np}$ ta toufa] $[_{vp}$ li [de hen hao]]
he hair cut till very well

The output of this restructuring process entails the insertion of the subordinator de, which marks the modifierhood of a prenominal modifier (see footnote 1). The process of de-insertion, somewhat analogous to genitive Case assignment or of-insertion in English or its counterpart in other languages, may be assumed to take the form of (53):[23]

(53) DE-insertion

$[_{np}$ XP N] → 1 de 2
1 2

Application of de-insertion to (52) will turn it into a surface string identical to (49). The sequence ta de toufa 'he-'s-hair' thus bears the same appearance as a possessive construction, but will not be interpreted as such because, by assumption, it takes on this appearance only in PF, which has no direct bearing on LF.

Another instance of Restructure α made possible by an application of Move α is observable by comparing the ill-formed (33a) and (34a) with the following grammatical ones:

(54) ta nian-le sange zhongtou shu.
he read-ASP three hour book
'He read for three hours.'

(55) ta yigong kai-le liang ci che.
he all drive-ASP to time car
'He drove twice in all.'

These sentences may be assumed to be derived from (33a) and (34a) by moving the duration and frequency expressions leftward. The juxtaposition of 'three hours' and 'book', and that of 'two times' and 'car' make it possible to restructure the elements in juxtaposition as a single NP constituent. This, again, has the effect of saving the structures from $\overline{X}$ filter. Hence the grammaticality of (54)-(55). The assumption that Restructure α has applied to the surface forms of (54) and (55) is quite plausible, because 'three hours' and 'two times' are, in some real sense, QPs, with 'three' and 'two' filling the slot of a numeral quantifier within the structure of QP and 'hour' and 'time' filling the slot of a classifier or measure word (more on the structure of QP below). What very probably has happened is that these QPs (the 'measure phrases for verbs" as they are sometines called in traditional Chinese grammar) get reanalyzed, by analogy, as the QPs of NPs taking the following nouns, 'book', 'car', as their heads. It is also possible to treat the duration and frequency adverbials as NPs in their own right, in which case restructuring will entail de insertion, giving the reanalyzed NPs the appearance of a

possessive construction:

(56) ta nian-le sange zhongtou de shu.
he read-ASP three hour DE book
'He read three hours' books.'

(57) ta yigong kai-le liang ci de che.
he all drive-ASP two time DE car
'He drove twice in all.'

Thus far we have provided evidence for the existence of a heavily structure-based principle in Chinese by showing that there are phenomena whose explanation calls for such a principle. The otherwise unconstrained optional rule Move α, for example, becomes obligatory under some circumstances (as in the case of the "retained object" constructions) and inapplicable under others (as in the case of inapplicable subject-inversion). Given the $\overline{X}$ structure principle proposed here as a surface structure filter, the rule Move α may remain in its optimal form as an optional rule in both cases. Furthermore, we have shown that certain processes exist in the language, including verb reduplication and certain instances of Move α, whose function is to save an otherwise ill-formed structure by providing a situation in which the structure may undergo certain rebracketing and/or relabelling in order to satisfy the filter. It should be easy to see that the facts we have discussed are largely unexplained in semantic or pragmatic terms, but are very much configurational in nature. In fact, it is hard to imagine that a language without morphology, like Chinese, will not make full use of some rigid structural principles (in terms of linear as well as hierarchical order) to signal grammatical and/or semantic properties of its sentences. These

facts are, I think, strong indications that Li and Thompson's (1978) claim cannot be right that the word order facts in Chinese are in the main determined by pragmatic or semantic factors, but largely irrelevant to grammatical structure.[24]

The kind of explanation we have given to the phenomena discussed here undoubtedly reminds one of Emonds' (1976) structure-preserving hypothesis. Rather than adopt his hypothesis (which is a constraint on Move α), however, we have construed the $\overline{X}$ structure principle (20) as a surface filter. The reason is that there are sentences whose structures at DS, SS and LF are often such that they would violate the $\overline{X}$ filter. For example, as Mei (1978) has argued, "verb phrase complements" that occur after a V-NP sequence are best considered to be directly dominated by $\overline{V}$ at the semantically relevant level of LF and, in the absence of arguments to the contrary, also at SS and DS by natural assumption (i.e. by the Projection Principle of Chomsky 1981a). Likewise, the deep structures of "retained object" (or "inner object") constructions like (21) may be of the form (22), if we accept Thompson's (1973) hypothesis, with an NP occurring to the right of $\overline{V}$ and directly dominated by $\overline{\overline{V}}$, and by the trace theory of movement, a trace is left in the same position at SS and LF. In both cases, the $\overline{X}$ filter is violated at DS, SS and LF. It is more appropriate to say, then, that certain grammatical processes, such as Move α, Restructure α, and verb reduplication, do not "preserve" structures in Emonds' sense of the term, but rather "conspire" to bring certain otherwise ill-formed structures into conformity with

output well-formedness conditions like the $\overline{X}$ filter. This conception of the phrase structure principle is consistent with the view that, given the Projection Principle, there is little need for UG to employ a component of phrase structure rules to generate deep structures. Rather, structures conforming to the general principles of the $\overline{X}$ theory may be generated freely at the DS level, subject to the Projection Principle, which requires them to reflect relevant aspects of their representations at LF on the one hand, and to the $\overline{X}$ filter stipulated at PF, on the other.[25]

2.4. Head-Final Constructions

We have shown in 2.3 that there is a structural principle in Chinese that says that the internal structure of any given node may be of the head-initial form (20a) only if that node is a single-bar category. In this section we will take a closer look at the structure of peripheral elements that occur before their heads. The discussion will be divided into two parts. 2.4.1. discusses the internal structure of noun phrases, and 2.4.2. the internal structure of preverbal elements in sentences (where the predicates may be of the category VP or AP). Since PPs are degenerate in having only a single-bar level of structure, they do not have pre-head peripherals and have no place in the following discussion. It will be shown that, given two pre-head modifiers M_1 and M_2 in that order, M_2 must always fall within the scope of M_1 but the reverse is not true. This can be accounted for either with a left-to-right interpretive principle, or by analyzing all the

phrases as constituting strictly right-branching $\bar{X}$ trees together with their heads, so that an element on the right is always in the scope of an element on the left, but not conversely.

2.4.1. Noun Phrases

As we have mentioned, noun phrases have all their peripheral elements occurring before the head. These peripherals include phrases of almost every categorial type. Except for the determiner-quantifier-classifier phrase (QP), each of these phrases is followed generally by the grammatical marker de, glossed in our examples as the morpheme DE, which marks subordination. Thus an NP followed by de is a possessive phrase, a clause followed by de is a relative clause or a noun phrase complement clause, etc. Besides the categories QP, NP, and clause, a peripheral element may also be a PP, an AP, or VP. Example (7) above shows a noun phrase with peripheral elements of the type NP, QP, VP, and AP, in that order. Examples (11) and (12) each show an NP with the peripheral elements of the type NP and PP. Of the following two examples, (58) contains clausal complements and (59) contains relative clauses, among others:

(58) zhe shi $[_{np}[_{s}$ women gai-bu-gai lai de] wenti],
this is we should-not-should come DE question

bushi $[_{np}[_{s}$ gai zeme lai de] wenti].
not should how come DE question

'This is a question of whether we should come or not, not a question of how we should come.'

(59) [$_{np}$[$_{s}$ wo zui xihuan de][$_{np}$ Lisi de][$_{qp}$ na yiben]
I most like DE DE that one
[$_{s}$ qunian chuban de][$_{np}$ Zhangsan de] shu].
last-year publish DE DE book

'This one book by Zhangsan published last year that belong to Lisi that I like most.'

Note that in (59) a possessive NP and a relative clause may occur on both sides of the QP na yiben 'that one'. The same is generally true, in fact, of other categories in prenominal position. In general, nominal modifiers may occur in free word order among themselves. This fact might be taken to indicate that there is no internal structure within a noun phrase other than the minimal structure that specifies the head to follow all of its modifiers. One might claim, in other words, that all noun phrases may be generated each with a "flat" structure by a single operation of the head-final rule (15), where X^n is $\overline{N}$, namely an instantiation of the "W* rule" of Hale (1979), thus sharing the properly of "scrambling" with "non-configurational" languages like Japanese, Warlpiri, Malayalam, etc.:[26]

(60) $\overline{N}$ → XP* N

On the other hand, note that although the modifiers (the XPs in (60)) may occur in random order without significant difference in grammaticality, each order almost always entails a difference in meaning. Take the following for example:

(61) a. Zhangsan de sanben shu.
DE three book
'Zhangsan's three books.'

b. sanben Zhangsan de shu.
three DE book
'Three of Zhangsan's books.'

Although both (61a) and (61b) are acceptable, the former, with the possessive 'Zhangsan's preceding the QP 'three', tends to have a referential or specific interpretation, while the latter is entirely nonspecific with the QP preceding the possessive. This difference is evidenced by the fact that only (61a) may appear in subject position but not (61b). Since, as has long been observed, non-specific NPs may not occur in subject position without the existential quantifier you, the difference between (61a) and (61b) with respect to specificity shows up as a grammatical contrast in the following pair:

(62) a. Zhangsan de sanben shu zai zher.
DE three book at here
'Zhangsan's three books are here.'

b. *sanben Zhangsan de shu zai zher.
three DE book at here

The following contrast also shows the same point, given that only non-definite NPs may be existentially quantified:

(63) a. *you Zhangsan de sanben shu zai zher.
EXIST DE three book at here

b. you sanben Zhangsan de shu zai zher.
EXIST three DE book at here
'There are three books here belonging to Zhangsan.'

The grammatical contrast below may obviously be attributed to the same constrast in specificity:

(64) a. *wo yigong kanjian-le dai yanjing de
I altogether see-ASP wear glasses DE
sange xuesheng.
three student

'*Altogether, I saw the three students who had glasses on.'

b. wo yigong kanjian-le sange dai yanjing de xuesheng.
I altogether see-ASP three wear glasses DE student
'Altogether, I saw three students who had glasses on.'

The adverb yigong 'altogether' forces a quantificational interpretation on an NP with a numeral quantifier. Therefore, while (64b) sounds natural with a numeral QP preceding the VP or relative clause dai yenjing 'wear glasses', (64a) is ill-formed since the reverse order of the two modifiers gives a referential or specific interpretation of the NP, contradicting the requirement of the adverb 'altogether'.

Another difference between (61a) and (61b) is that while the latter implies (or presupposes) that Zhangsan has more than three books, the former carries no such implication. If it implies anything at all, the implication will be that Zhangsan has only three books. The same difference can be observed between (65a) and (65b). These two noun phrases need not differ in meaning from each other,[27] but if they do, they will contrast in the way indicated in the translation (never the other way round):

(65) a. wo zui xihuan de Zhangsan xie de shu.
I most like DE write DE book
'The book(s) that I like most among the ones that Zhangsan wrote.'

b. Zhangsan xie de wo zui xihuan de shu.
write DE I most like DE book
'The book(s) that Zhangsan wrote among the ones that I like.'

That is, while the second relative clause in each of (65a-b) specifies a set of books from all possible books, the final relative clause further specifies a subset within that set.

The facts we have seen so far concerning (61)-(65) clearly indicate the following generalization: Given a sequence P consisting of two modifiers preceding the head noun, M_1-M_2-HD, the meaning of P may be a function of M_1 and a subsequence Q of P consisting of everything following M_1 (i.e. M_2-HD). The meaning of Q may in turn be a function of M_2 and the head. However, the meaning of the entire sequence P cannot be a function of M_2 on the one hand and a combination of M_1 and HD on the other. That is, while M_1 may include M_2 in its scope of modification, the reverse is not true.

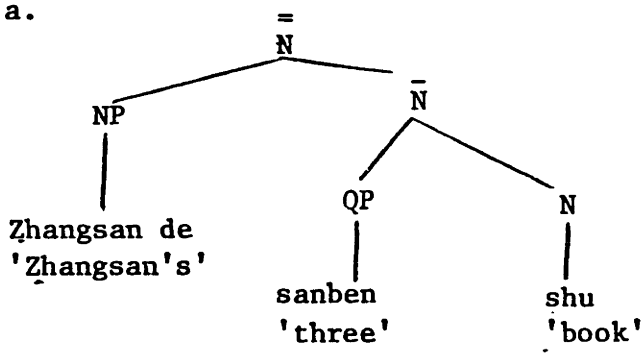
There are two possible ways to account for this asymmetry in the directionality of modification. On the one hand, one may continue to assume a flat structure for each noun phrase, with all modifiers occurring in linear order to the left of the head. To account for the asymmetrical direction of modification, one may invoke a rule of interpretation (in LF) along the following lines:

(66) Given a linear sequence P_1, P_2, .., P_n, for all $\underline{i}$ and $\underline{j}$, $1 \leq i \leq j$ n, interpret P_j as in the scope (of modification) of P_i (but not conversely).

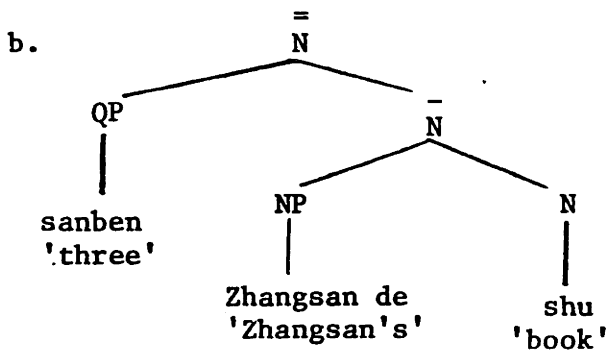
Alternatively, one may assume that instead of a linear representation, the Chinese noun phrase has a uniformly right-branching structure. Thus, (61a) has the structure (67a) and (61b) has the

structure (67b):[28]

(67) a.



b.



Given auch hierarchical representations, the scope facts we have observed may follow directly from the definition of scope given in Reinhart (1976), without recourse to the linear interpretation rule (66):

(68) A is in the scope of iff A c-commands B, where α c-commands β iff neither α nor β dominates the other and the first branching node dominating α also dominates β.

In (67), then, the possessive Zhangsan's has the QP 'three' in its scope, but the reverse is not true, since the possessive asymmetrically c-commands the QP. The situation is reversed in (67b), with the QP now asymmetrically c-commanding the possessive.

As far as the facts that we have seen are concerned, the linear hypothesis, in conjunction with the interpretive rule (66), is empirically equivalent to the hierarchical hypothesis in conjunction

with the definition of scope (68). I will opt for the hierarchical hypothesis, however, for reasons that will be given in Chapter 3. For the moment, I will continue to show that there is extensive evidence for the view that the relative order (linear or hierarchical) among the modifiers of an NP corresponds directly to the asymmetry in the interpretation of their scope of modification.

It has been observed by Chao (1968) that relative clauses in Chinese tend to be interpreted as restrictive or non-restrictive according to their position relative to that of the demonstrative, which is treated here as a constituent of the QP (see 2.5.1 for the structure of QP). In particular, post-QP relatives tend to be interpreted as descriptive or non-restrictive, and pre-QP relatives as restrictive:

(69) neiben wo zuotian mai de shu
that I yesterday buy DE book
'That book, which I bought yesterday.'

(70) wo zuotian mai de neiben shu
I yesterday buy DE that book
'The book that I bought yesterday.'

The distinction is sometimes hard to detect and may appear to some to be somewhat artificial, and it may even be argued that speakers often feel free to use either order without intending a difference in meaning.[29] Nevertheless, it is important to note that the distinction does exist, however subtle it may be. The distinction may become more obvious and may show up as one in gramaticality under some circumstances. For example, when a relative clause occurs within a noun phrase used in apposition to a proper name, it must follow the QP:

(71) a. [Zhangsan] [zheige koushixinfei de ren]
this hypocritical DE man
'This man, Zhangsan, who is a hypocrite.'

b. *[Zhangsan] [koushixinfei de zheige ren].
hypocritical DE this man

(72) a. [Niuyue] [zheige renren douxiaode de chengshi].
New York this everyone all know the city
'This city, New York, which everyone knows.'

b. *[Niuye] [renren dou xiaode de zheige chengshi].
New York everyone all know DE this city

It is reasonable to regard the restrictive/non-restrictive distinction as but another case of the asymmetrical direction of modification. Consider the hypothesis that each noun phrase is represented in a right-branching tree. What a right-branching structure means is that a relative clause has the following demonstrative QP in its scope of modification, but not a preceding demonstrative. Thus, in (69), with the demonstrative outside of the scope of the relative, the relative modifies only the head noun but not the demonstrative. The demonstrative, whose referential function is not under the effect of any modifier (as it is not c-commanded by any modifier), is in this case used "deictically". It establishes the unique reference of the noun phrase, not on the basis of any information within the noun phrase, but on the basis of certain outside, possibly pragmatic or discoursal, information. The relative clause following it therefore need not participate in the determination of the NP's reference (since the reference is already sufficiently determined by the deictic demonstrative), and has only a descriptive or continuative function. On the other hand, in (70) the demonstrative is within the scope of a relative clause. It is, in this case, an "anaphoric" demonstrative, as its referential value is

subject to the modification of the c-commanding relative clause. This is a typical "referential description", in which the "gap" within the relative functions as a variable bound to the head $\bar{N}$ (QP+N). The relative is therefore essential to the value of the "quantificational" $\bar{N}$ binding the variable, and is restrictive.

The contract in grammaticality between the (a) and (b) sentences in (71) and (72) follows from the same explanation. Since the proper names Zhangsan and New York, as "rigid designators" (Kripke 1972), already establish their own reference, the appositive noun phrases following them need not depend upon any internal information for their reference. A "referential description" is thus inappropriate as in the (b) sentences. Rather, the relative clauses there may have only a descriptive or non-restrictive role.[30]

Another phenomenon that falls under the same right-branching structural principle has to do with the often observed fact that the word order used to report time and address in Chinese is as illustrated below, almost the exact opposite of English:

(73) gunian er yue ershijiu hao xiawu si shi shiyi
last-year two month 29 day p.m. four o'clock eleven

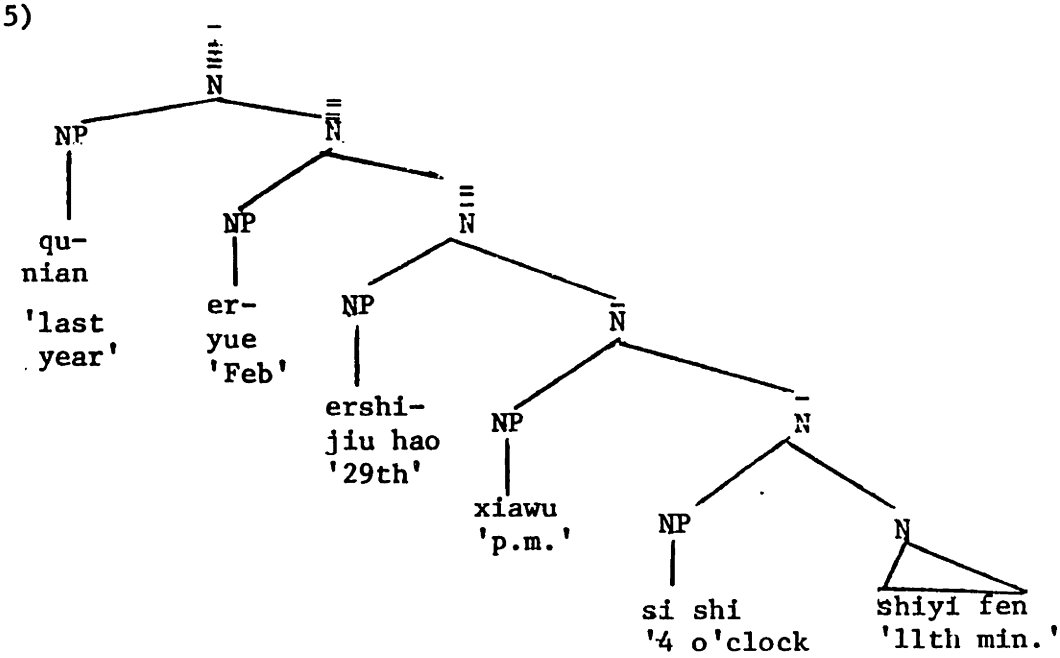
fen.
minute
'4:11 p.m., February 29 last year.'

(74) meiguo huashengoun shi binxifania jie yiqianliubai hao.
U.S. Washington city Pennsylvania street 1600 number
'1600 Pennsylvania Avenue, Washington D.C., U.S.A.'

The fact represented by (73) and (74) has obviously been widely observed even in non-technical literature, but even the most serious linguistic account to date does not go beyond the observational or

purely descriptive level. For example, Tai (1980) proposes to account for (73) and (74) by a principle to the effect that, if the conceptual state represented by a syntactic constituent falls within the temporal or spatial scope of the conceptual state of another constituent, then the constituent representing a more inclusive scope must precede the one representing a less inclusive scope. Such a principle not only does not allow itself to be generalized to the two facts we have reviewed above, but in fact appears to contradict the explanation proposed for the latter. As just remarked, in a string of M_1-M_2-HD, the rightmost constituent (the head) represents the most general (or least specific) set of entities, of which M_2 specifies a subset which is in turn subject to further specification by the preceding M_1. But Tai's principle seems to suggest the opposite, since it requires the most inclusive (or most general) constituent to occur in leftmost position. This principle, which is defined in terms of physical notions like temporal or spatial scope, can be dispensed with in the presence of our right-branching principle coupled with the linguistic notion of modificational scope defined in terms of "c-command". For example, (73) has the following structure.[31]

(75)



Within each binary tree or subtree of this structure, the constituent on the left is the modifier and the constituent on the right is the head. The reference of the $\bar{N}$ '4:11' is extremely general, but is made more specific by the modifier 'p.m.'; but there are some 30 possible references of "4:11 p.m." in a month, so the modifier '29th' in turn makes it more specific; etc. Thus, with the addition of a modifier on he left c-commanding everything on the right, the entire NP takes on a more specific referential meaning than before. This clearly represents the same phenomenon as what we observed concerning the relative position of relative clauses with respect to demonstratives, etc. The only difference is that the modifiers in sequences like (73) must be fixed, as sequences like (76) are unacceptable:

(76) *...ershijiu hao er yue....
29th day 2nd month

But this is clearly due to the fact that such sequences are informationally and semantically anomalous. Given the $\bar{X}$ principle of Chinese, 'February' must be considered the head of (76), and '29th' a modifier, whose function is to make the reference of 'February' more specific. In general, the reference of an object may be made more specific by a modifier if the latter specifies its external class membership, but not if it singles out a member of the class the object represents. Thus, "the computer science department of MIT" is well-formed, because "of MIT" can serve the function of modification on the head, but not "*MIT of the computer science department". Similarly, '29th' in (76) cannot serve its function of modification because it specifies a member of February instead of specifying the latter's external class membership.

2.4.2. Predicates

Like the prenominal modifiers discussed above, preverbal modifiers may also occur in free word order with respect to each other so long as they precede their head $\bar{V}$ or $\bar{A}$. But, again, each order difference almost always entails a difference in meaning. For example, both sentences in each of the following pairs are grammatical; yet they differ precisely in the relative scope interpretation of the preverbal elements in question, as had been observed in Tai (1973b) and Teng (1973b, 1975b):

(77) a. wo zai xuexiao changchang ma ta.
I at school often scold he
'At school I often scold him.'

b. wo changchang zai xuexiao ma ta.
I often at school scold he
'Often I scold him at school.'

(78) a. ta chang bu lai.
he often not come
'Often he doesn't come.'

b. ta bu chang lai.
he not often come
'He doesn't often come.'

(79) a. ta keneng bu lai.
he possibly not come
'Probably he will not come.'

b. ta bu keneng lai.
he not possibly come
'He can't possibly come.'

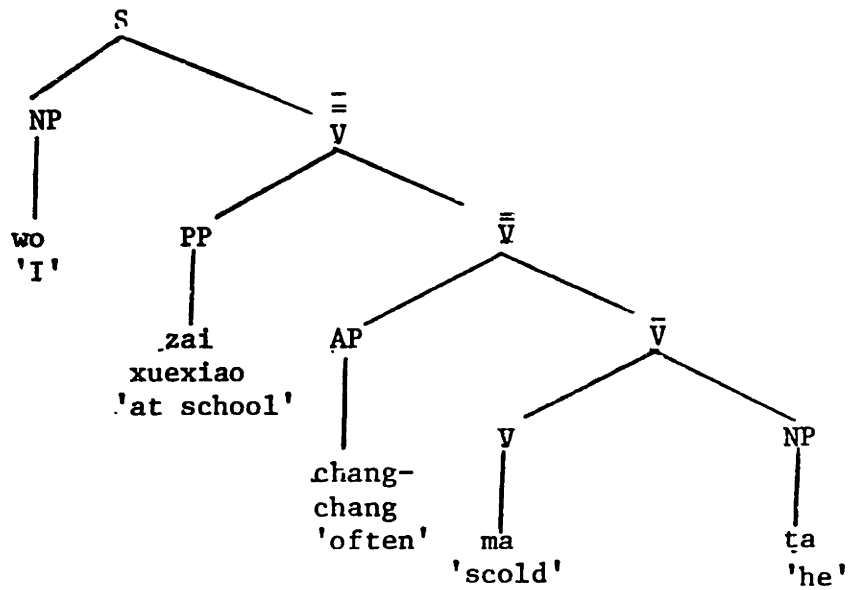
(80) a. ta xiawu changchang lai.
he p.m. often come
'In the afternoon he often comes.'

b. ta changchang xiawu lai.
he often p.m. come
'Often he comes in the afternoon.'

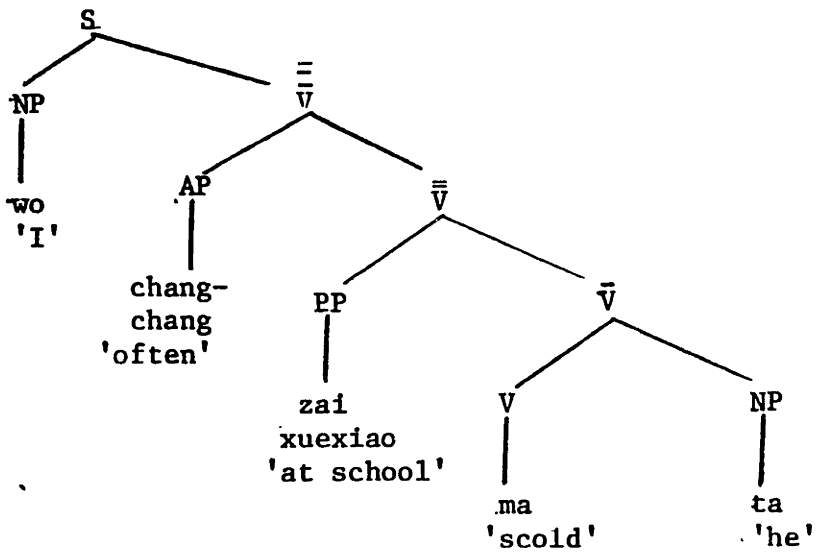
To account for the difference in scope between the members of each pair above as indicated in the translation, one may again assume either a linear or a hierarchical representation of these structures. In the linear account, since the verb may be followed by an element under $\bar{V}$ (if the element is an object) or under $\bar{\bar{V}}$ (if it is an extent complement, etc.), the preverbal elements may be generated in linear order by a single operation of the head-final rule (15) with $X^n=\bar{\bar{V}}$ or $\bar{\bar{\bar{V}}}$, i.e. $\bar{\bar{V}} \rightarrow$ XP* $\bar{V}$, or $\bar{\bar{\bar{V}}} \rightarrow$ XP* $\bar{\bar{V}}$. The linearly ordered XPs may then be subject to the same rule of interpretation given in (66). In the alternative hierarchical account, each of the examples in (77)-(80) has a uniformly right-branching structure. Thus, in the structure (81a) for (77a), for example, the adverbial 'often' c-commands or has scope over only the $\bar{V}$ 'scold him', but the adverbial 'at school' c-commands the $\bar{\bar{V}}$ containing both 'often' and 'scold him'. (77b), on the other hand, has the

structure (81b):

(81) a.



b.



Sometimes the purported scope differences may not seem to exist due to the "non-qualificational' nature of certain preverbal elements:

(82) wo yong daozi zai chufang qie cai.
I with knife at kitchen cut food.
'I cut food in the kitchen with a knife.'

(83) wo zai chufang yong daozi qie cai.
I at kitchen with knife cut food.
'I cut food with a knife in the kitchen.'

But if these elements are quantificational, the differences between (82) and (83) show up clearly:

(84) wo yong meiyiba daozi zai sange difang qie cai.
I with every knife at three place cut food.
'With each knife I cut food at three places.'

(85) wo zai sange difang yong meiyiba daozi qie cai.
I at three place with every knife cut cood.
'At three places I cut food with every knife.'

Note that (80a) and (80b) are both well-formed only when the temporal expression 'afternoon' is interpreted non-referentially, i.e. only when it means "in the afternoon" but not "on the afternoon". In the latter reading only (80a) will be grammatical, meaning "that afternoon, he came often", but not (80b), which would have the anomalous interpretation, "*often he came that afternoon". The same grammatical contrast also shows up in (86) and (87):

(86) ta qunian changchang lai.
he last-year often come
'He came often last year.'

(87) *ta changchang qunian lai.
he often last-year come
'*Often, he came last year.

Given a right-branching structure for these sentences, the explanation is straightforward. In (86), the time reference of 'often' is non-specific, but it can be made more specific by the addition of the c-commanding 'last year'. In (87), 'last year' already establishes a unique time reference for the event 'come' by itself; therefore the addition of a c-commanding non-specific modifier 'often' not only cannot fulfill the function of modification by also produces informa-

tional anomaly. The ill-formedness of (87) is due obviously to the same principle of modification governing the structure of noun phrases that makes (71b), (72b), as well as (76) ill-formed. There is then a real cross-categorial generalization to be captured here, and of course, this is captured by the $\bar{X}$ theory.[33]

The head-final right-branching principle also allows one to account for the difference between (88) and (89):

(88) ta zai xuexiao bei wo piping le.
he at school by I criticize ASP
'He was criticized at school by me.'

(89) ta bei wo zai xuexiao piping le.
he by I at school criticize ASP
'He was criticized at school by me.'

Since Chinese lacks verbal morphology to indicate the active vs. passive mood distinction, the distinction relies solely on the syntactic presence or absence of the by phrase. Therefore, a verb phrase containing a by phrase is a "passive verb phrase" while a verb phrase not containing such a phrase is treated as active. In (88), the locative 'at school' has a verb phrase containing the by phrase 'by me' in its scope, so it has the meaning that the passive event of his undergoing my criticism took place at school. But in (89) the by phrase is outside the domain of the locative. The latter therefore c-commands only an "active verb phrase", so the sentence conveys only the meaning that my criticism of him took place at school, but says nothing as to whether he was actually at school undergoing my criticism.

In this conneciton, it is easy to see that the contrasts below, due first, I believe, to Hashimoto (1971), come as no surprise:

(90) ta xinganqingyuan de bei wo da le.
he willingly DE by I beat ASP
'He willingly underwent my beating.'

(91) *ta bei wo xinganqingyuan de da le.
he by I willingly DE beat ASP
'He underwent my willing beating.'

(92) *ta henhen de bei wo da le.
he cruelly DE by I beat ASP
'*He cruelly underwent my beating.'

(93) ta bei wo henhen de da le.
he by I cruelly DE beat ASP
'He underwent my cruel beating.'

Since the meaning of the adverby 'xinganqingyuan' has a receptive or passive connotation in it besides what the English word 'willingly' says, it is natural to assume that it can modify only a "passive verb phrase". On the other hand, the adverb 'cruelly' is natural as a modifier of action verbs but not of stative or passive verb phrases. The contrasts above thus follow from the asymmetrical scope relations of the preverbal modifiers.[34] Exactly the same explanation applies to the contrast below, on the assumption that instrumentals, like the manner adverb 'cruelly', can modify only active verb phrases:

(94) *ta yong gunzi bei ren dasi le.
he with club by man beat-dead ASP
'*With a club he was beaten to death by someone.'

(95) ta bei ren yong gunzi dasi le.
he by man with club bead-dead ASP
'He was beaten to death with a club by someone.'

2.5. Quantifier Phrases and Supersentences

Up to now we have discussed the $\bar{X}$ structure of the major categories N,V,A,P. As for the structure of S, this depends upon whether we treat an S as a projection of V or A, or not. We will delay discussion of this question until Chapter 3 (see Section 3.3). In the rest of this chapter we will discuss two other construction types. One is the QP, and the other includes constructions larger than S, i.e. $\bar{S}$ etc.

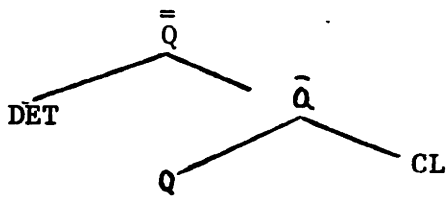
2.5.1. Quantifier Phrases

We have described the sequence determiner-quantifier-classifier as constituting a modifier of NP dominated by the node QP. This constituent itself has a fairly full-fledged internal structure of its own. The leftmost position within QP may be occupied by a demonstrative like zhe 'this' or na 'that', or it may be occupied by the interrogative na 'which' or a distributive like mei 'every' or renhe 'any'. The second position is that of a numeral quantifier. The third position is occupied by "classifier" or measure word, like ben 'volume' zhang 'sheet', etc. The occurence of a classifier following a quantifier is generally obligatory, whether the head noun is countable or mass, concrete or otherwise. This is not only typical of Chinese, but also of most Sino-Tibetan languages.

Following popular terminology (see Bresnan 1973), I have referred to the determiner-quantifier-classifier sequence as a quantifier phrase (QP) and will continue to do so. This treats the quantifier as the head of the sequence. Under such a conception, the structure of a QP

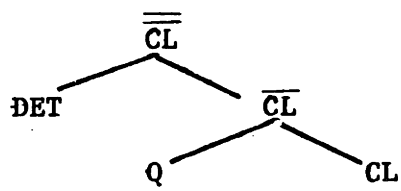
may reasonably be assumed to have the following form, conforming to the requirements of (20), with the head branching to the left only under a single-bar node:

(96)



It is also possible to consider the classifier or measure word as the head of QP, in which case the term "classifier phrase (CP)" or "measure phrase" will be more appropriate. This appears to be reasonable especially in view of the fact that the selection of the classifier is often idiosyncratically determined by the head noun. For example, 'book' is classified by <u>ben</u> 'volume', 'paper' by <u>zhang</u> 'sheet', etc. Under the conception that the classifier is the head of QP, this kind of "agreement" will be treated as obtaining from head to head, as is standard. The $\bar{\bar{X}}$ structure in this case would be of the form (97):

(97)



This structure again conforms to the requirements of (20). Unlike Q, which branches to the left, CL must branch to the right as classifiers are undoubtedly nominal in nature. In fact, many words may be inserted either under N or under CL. For example, <u>tou</u> 'head' is a noun in <u>ta de tou</u> 'his head', but a classifier in <u>yi-tou niu</u> 'a head of cattle; a cow'.

Although the category QP most often occurs as a constituent of NP, there is good reason to assume its cross-categorical existence. Bresnan (1973), for example, has shown that QPs may also be posited in APs. In traditional Chinese grammar (see e.g. Lu 1942), such QPs are called the "measure phrases for adjectives". Among the examples of its occurences are the following:

(98) zheitiao shengzi chang ba-ci.
this rope long eight-foot
'This rope is eight feet long.'

(99) neike guoshu liangge ren gao.
that fruit-tree two man tall
'That fruit-tree is as tall as two men.'

In (98) the QP is 'eight feet', which quantifies the adjective 'long', and in (99) the QP is 'two men', which quantifies the adjective 'tall'. 'Foot' is of course a classifier, just like ben 'volume' for 'book'; 'man' is also being used as a classifier denoting the unit of tallness equivalent to that of a man.

There are also "measure phrases for verbs". These include adverbs of duration and frequency like those in (42) and (43), repeated below for convenience:

(100) ta ku-le sange zhongtou.
he cry-ASP three hour
'He cried for three hours.'

(101) ta ku-le liang ci.
he cry-ASP two time
'He cried twice.'

Here 'three hours' and 'two times' may be considered to quantify the action of crying, with 'hour' and 'time' naturally treated as classifiers of the quantity. Often the classifier ci 'time' may be

replaced by other words:

(102) ta ti-le yi jiao.
he kick-ASP one foot
'He kicked once, he gave a kick.'

(103) ta yao-le yi kou.
he bite-ASP one mouth
'He bit once; he took a bite.'

Both 'one foot' and 'one mouth(ful)' indicate the quantity of some action, as indicated in translation. It is natural to analyze 'foot' and 'mouth' as classifiers idiosyncratically selected by the head verb as they obviously are, as in the case of idiosyncratically selected nominal classifiers.[35]

The QPs within VPs and APs may occur after their heads under the provisions of (20a). They may of course also occur preverbally. (99) is an example with a QP preceding its head adjective. Within VPs, QPs may also occur preverbally, in which case they usually take on a referential or definite appearance or are so interpreted, in accordance with general word order principles regarding definite and non-definite elements (cf. footnote 27):

(104) tamen liang-ci jingong dou meiyou chenggong.
they two-time attack all not succeed
'For both times they attacked, they did not succeed.'

(105) ta zhe san nian zhu zai Meiguo.
he this three year live at America
'He lived in America threse three years.'

2.5.2. Supersentences

There are two kinds of "supersentential" construction to be considered here. One is the construction involving complementizers and the other the construction involving topics or topicalized elements.

2.5.2.1. Complementizers

We have already encountered a complementizer in our foregoing discussion, the element de receding an extent or resultative complement clause. Hashimoto (1971) has suggested that the element is derived from the directional verb or preposition dao 'arrive at; until'. This seems to be fairly reasonable, and in the Amoy dialect, where dao has two renderings (gao, as in cao gao chu 'run and arrive home'; dioh, as in lia dioh jite lang 'to have caught someone'), either ga or dioh may have an extent/resultative complement:

(106) i cao [ga jin tiam]
he run COMP very tired
'He ran until he got very tired.'

(107) i cao [dioh jin tiam]
he run COMP very tired
'He ran until he got very tired.'

It is a fairly common phenomenon for a preposition (or deverbalized verb) to be treated as a COMP. In this connection, observe that the preposition BA, gen 'with', lian 'even ; including', bi 'than', dui 'towards', etc. may take a sentence as its object.[36]

(108) ta ba [Lisi jiehun] bu dang yihui shi.
he BA marry not treat one matter
'He does not take it serious that Lisi is getting married.'

(109) zheijian shi gen [ta lai bu lai] meiyou guanxi.
this matter with he come not come no relation
'This matter has nothing to do with whether he is coming or not.'

(110) ta lian [Lisi lai bu lai] dou bu guan.
he even come not come all not care
'He doesn't even care whether Lisi is coming or not.'

(111) [wo guolai] bi [ni guolai] yao shihe.
I come-over than you come-over will fit
'It will be more appropriate for me to come than for you to come.'

(112) ta dui [Lisi sheme shihou lai] yidian dou bu guanxin.
he towards what time come a-bit all not care
'He doesn't care a bit about what time Lisi is coming.'

If the de preceding an extent/resultative complement is treated as a COMP, then there is reason to treat the prepositions in (108)-(112) also as COMPs. After all, $\bar{S}$s dominating [COMP S] and PPs dominating [P NP] are probably to be regarded as the same thing in some way (cf. Emonds 1980), their difference being essentially a terminological one. The only theoretical difference between the two terms is that the use of $\bar{S}$ suggests that S is the head while the use of PP suggests that P is the head. Both these conceptions are probably justified, each from a different point of view. On the one hand, categorially the COMP for in [for [John to come]] is the head, given the $\bar{X}$ theory, although semantically the head is clearly the S [John to come] in the sentence "For John to come would be difficult". (See also Stowell 1981, Chomsky 1981a for some discussions for treating COMP as the head of $\bar{S}$.) Certain sequences of P-NP have also been treated as headed by NP if the P is of little semantic content, notably the of inserted in

English nominalizations (cf. Ross 1967, who takes an even stronger position, treating all PPs as NPs).

In the same spirit, what are sometimes called conjunctions or sentence-connectives may be analyzed also as COMP (or P) forming a higher clause (or PP) with the following S:

(113) yinwei [ta meiyou kong], wo meiyou qu jian ta.
because he no leisure I no go see he
'Because he had no free time, I did not go to see him.'

(114) suiran [ta meiyou kong], wo rengran qu jian ta.
though he no leisure I still go see he
'Although he had no time for me, I went to see him nevertheless.'

(115) ruguo [ni meiyou kong, wo jiu bu qu.
if you no leisure I then not go
'If you have no time, I won't go.'

In the examples we have discussed so far, COMPs are clause-initial or phrase-initial.[37] On the other hand, it has sometimes been suggested that the subordinator de has the status of a clause- and phrase-final COMP,[38] as it occurs after a clause or phrase marking the status of a relative clause, a possessive NP, etc. within a noun phrase and also that of a manner adverb and of an intensifier within a VP or AP. In 2.3 we showed that certain occurrences of this de, in particular those in (50), (52)-(53), and (49) under its second reading are most reasonably assumed not to appear at DS, but to be introduced by an insertion rule applied in PF, following some instances of Move α either in the DS → SS or in the SS → LF component. Given the existence of de-insertion, it is theoretically desirable to assume that all instances of de are inserted by the same rule in PF, for in this

case not only the obvious redundancy of base-generating de can be eliminated, but also the rule may be simplified to its maximally general form possible. If this reasoning is correct, then the clause- and phrase-final COMP de occurs in PF only and does not exist in Syntax or LF, in the absence of evidence to the contrary. This has the consequence that its occurrence does not interact with processes in Syntax or LF. Clause- or phrase-initial COMPs, on the other hand, are present in Syntax and consequently also in LF and PF. Since we assume that empty categories can be generated in the base, it is natural to make the null hypothesis that every clause may be headed initially by a COMP in Syntax and LF, whether that COMP has a lexical content. This hypothesis has interesting consequences for the theory of bounding to be discussed in Chapter 6.

2.5.2.2. Topic-Comment and Topicalized Sentences

Sentences having the form of "topic-comment" have been known for some time to figure more prominently in Chinese than in many other languages (cf. Chao 1968, Li and Thompson 1976). Many such sentences must be treated as no less "basic" than ordinary subject-predicate sentences in the sense that they cannot be derived from sentences having the latter form. For example:

(116) shuiguo, wo zui xihuan xiangjiao.
fruit I most like banana
'As for fruit, I like bananas most.'

The sentence cannot be derived from a "more basic" sentence by a movement process by which the topic is fronted from within the comment clause, because there is no plausible source position for

it within that clause. Similarly, in (117):

(117) tamen, wo kan ni; ni kan wo.
they I see you you see I
'They looked at each other.'

where the initial NP 'they' serves as an antecedent (or quantifier) binding the "split" anaphors 'you' and 'I'. Again, it is impossible to posit an underlying source in which 'they' does not already occur in the initial position as it does in (117). Therefore the initial NP must be base-generated. This conclusion is already reached in Teng (1974).

On the other hand, certain topic-comment sentences are naturally analyzable as derived from underlying subject-predicate sentences by the rule Move α:

(118) Zhangsan, ta zhidao wo xihuan t.
he know I like
'Zhangsan, he knows I like.'

(119) Zhangsan de baba, ta hen zhunjing t.
DE father he very respect
'Zhangsan's father, he respects very much.'

In sentences like (118)-(119) the pronoun 'he' is interpreted as disjoint in reference from the name 'Zhangsan'. If they are analyzed as derived from sentences like (120)-(121) below, respectively, by Move α, this fact may then be naturally related to the same disjoint reference interpretation of the 'he' in the source sentences:

(120) ta zhidao wo xihuan Zhangsan.
he know I like
'He knows that I like Zhangsan.'

(121) ta hen zhunjing Zhangsan de baba.
he very respect DE father
'He respect Zhangsan's father very much.'

Note that there may be more than one topic per sentence:

(122) na sanben shu, na yiben ni zui zihuan?
that three book which one you most like
'Of the three books, which one do you like most?'

(123) na sanben shu, mei yiben wo dou kanguo le.
that three book every one I all read-ASP ASP
'Of the three books, I have read every one.'

These sentences demonstrate that there are two functions of the phrase that is generally referred to as the "topic" of a sentence. The first NP 'those three books' in both (122) and (123) represents old information and is referential. The second NP, 'which one (book)' in (122) and 'every one (book)' in (123), represents a part of the new information of the sentence and is non-referential. The first NP is the "theme" and the second NP the "focus".

There may even be three topics within one sentence:

(124) Zhangsan, neixie ren, lian yige ta dou bu renshi.
those man even one he all not know
'(As for) Zhangsan, of those men, not even a single one he knows.'

Note also that sentences with topics can be embedded:

(125) wo xiangxin [neixie shu, mei yiben ta dou kan bu
I believe those book every one he all read not
'I believe that those books, he doesn't understand any

dong].
understand
one of them.'

(126) [neixie shu, mei yiben ta dou kan bu dong]
those book every one he all read not understand
'It is a real pity that those books, he doesn't

zhen kexi.
real pity
understand any of them.'

(127) zheijian shi gen [neiben shu ta kan bu dong]
this matter with that book he read not understand
'This matter has nothing to do with the fact that that

mei guanxi.
no relation
book, he does not understand.'

(128) ta ku de [neixie shu, mei yiben wo dou kan bu
he cry COMP those book every one I all read not
'He cried so much that those books, I couldn't continue

xia-que le].
down ASP
to read any of them.'

(129) yinwei [neixie shu, mei yiben ta dou kan bu dong], ...
because those book every one he all read not understand
'Because he doesn't understand any one of those books, ...

Of the five examples above, the last three further show that a COMP occurs to the left of a topic. Thus, in contrast to the structure proposed in Chomsky (1977), where COMP occurs to the right of Topic, the correct representation for the complement clauses in (127)-(129) should take the form of either (130) or (131), depending on whether the topics are assumed to be adjoined to S or dominated by $\bar{S}$, $\bar{\bar{S}}$, etc.:

(130) $[_{\bar{\bar{S}}}$ COMP $[_{\bar{S}}$ Topic $[_{\bar{S}}$ Topic $[_{S}$ ....]]]]

(131) $[_{\bar{S}}$ COMP $[_{S}$ Topic $[_{S}$ Topic $[_{S}$ ....]]]]

CHAPTER TWO: FOOTNOTES

1. The morpheme de (glossed as DE in the example (7) and henceforth) is a marker of a pre-head, especially prenominal, modifier. Thus an NP followed by de before the head noun is a possessive, a clause followed by de is a relative clause or a noun phrase complement clause, etc. This element, obviously, is analogous to the Japanese no, sometimes called a "nominalizer" and taken to be the realization of the genitive case. There is evidence, however, that the same element no exists at some level of abstraction as a relative clause marker, exactly as is the de in Chinese, even though it is not, in this case, a realization of the genitive Case. See Kitagawa and Ross (1982) for some discussion on the parallelism of de and no, and evidence that no marks a relative clause in Japanese

Note that unlike the QP in Japanes, the QP in Chinese does not generally take de. For some speakers, however, de is optional with a QP:

(i) ta mai-le $[_{np}$ sanchang (de) hua]
he buy-ASP three-sheet (DE) picture
'He bought three pictures.'

Besides functioning as a prenominal modifier marker, de may also occur with an intensifying or manner adverb to mark the latter's modifierhood, as in feichang de 'very'; yongli de 'forcefully'; manman de 'slowly.'

2. Chomsky (1981c) has remarked that it is more appropriate to speak of the growth of grammar in a child rather than of his learning of it.

3. Certain descriptive clauses may follow non-specific NPs as in:

(i) wo you yiben shu [hen youqu].
I have one book very interesting
'I have a book and it is very interesting.'

The clause '(it is) very interesting' has sometimes been regarded as a postnominal relative. Simpson (1979), however, has argued that such a clause is best regarded as part of an appositive NP whose empty head follows the clause and is co-indexed with the preceding NP:

(ii) wo you $[_{np}$ yiben $shu_i]$, $[_{np}[_{s}$ hen youqu] $e_i]$
I have one book very interesting

This analysis has the advantage of being capable of explaining the fact that postnominal clauses are always non-restrictive: they never directly modify the preceding NP, only a following head noun in apposition.

4. See Smith (1980) for a brief critique of their approach.

5. The point made here, as well as throughout this subsection, is directly derived from the insights provided in Jackendoff's (1977) study of the $\bar{X}$ theory.

6. The exponent in the rules indicates the level of phrasal structure in terms of the number of bars. YP stands for a phrase of category Y, Y a variable, of the maximal-bar level. The asterisk following YP indicates that the position of YP contains an arbitrary string of n YPs, $n \geq 0$, where each instantiation of the variable Y need not be identical to another. We ignore the possibility that a rule of the form (i) may exist:

(i) $X^n \longrightarrow YP^* \quad X^{n-1} \quad ZP^*$

This rule may account for certain head-medial patterns, but such patterns may also be generated by the conjunction of both rule (15) and (16), in which case "configurationality" arises, as explained below. Or they may be generated by either (15) or (16) followed by a permutation rule (such as scrambling, or "Verb Second").

7. As is explained in Bresnan (1976) and Jackendoff (1977). Thus, according to Chomsky's original suggestion, [+N] designates the subclass N and A, as opposed to the [-N] subclass V and P. [+V] includes V and A, while [-V] includes N and P. The use of [+V], for example, thus allows a generalization to be stated across the two categories V and A. See Jackendoff (1977) for the use of a different set of features.

8. It appears that head-initial rule (16) is somewhat more marked than the head-final rule (15). This may explain the relatively small number of VSO languages reported. It may also be related to the two observations made by Greenberg (1966): "All languages with dominant VSO order have SVO as an alternative or as the only alternative basic order," and "in regard to verbal-modifying adverbs and phrases as well as sentence adverbs, languages of type I [VSO] show no reluctance in placing them before the verb so that the verb does not necessarily begin the sentence" (p. 79). This relative markedness may be simply a matter of fact that must be stipulated in UG. It is also possible that there is a principled reason for it. For example, Aoun (1979) suggests that VSO languages are marked for the reason that their VPs are discontinuous.

9. There have been arguments in the literature that V and A should be collapsed as one and the same category, in both Chinese and English. Furthermore, V and P may also be collapsed as one category in Chinese. This does not seem implausible, given that there is much in common between V and A, and that many prepositions are, in fact, derived from verbs historically. Arguments based on similarity, however, are not sufficient to require the identification of one category with another, as far as the two categories are not identical in every respect. As Jackendoff (1977) points out, all the similarities require is a feature system within the $\bar{X}$ theory by which the two categories can be referred as a natural class. Thus I will continue to follow tradition in recognizing all the four lexical categories, since V and A are not identical, nor V and P. For a discussion of certain cross-categorial similarities and differences, see Tang (1979).

10. In particular, one might assume that this follows from the theory of abstract Case. Suppose that all the categories V, A, P are Case assigners, but not N. Then a post-nominal NP will be excluded by the Case filter, which requires every overt NP to be marked by an (abstract) Case (see Chomsky, 1981a, and references cited). There are two questions that have to be settled, however, before this explanation can be considered satisfactory. First, even noun phrase complement clauses cannot follow the head, as (i) shows, although clauses need not be Case-marked, as indicated by the English example (ii):

(i) a. $[_{np}[_{s}$ ta lai-bu-lai de] wenti
he come-not-come DE question
'The question whether he will come or not.'

b. *$[_{np}$ wenti $[_{s}$ ta lai-bu-lai]]
question he come-not-come

(ii) The claim that this is right.

Secondly, even though the Case filter may rule out a postnominal NP that has no Case, we still must explain why such an NP cannot be saved by the use of a preposition immediately before it, by analogy to the use of <u>of</u> in English:

(iii) a. *the destruction the city.

b. the destruction of the city.

Before an answer can be given to these questions, it seems we must assume that the child must learn not to use the head-initial rule for NPs.

11. Certain writers (e.g., Lehman, 1978; Vennmann, 1972; Li and Thompson, 1978) classify all SVO languages under the more general type VO, as opposed to SOV languages, with are OV. Under such a classification, the common properties of VSO and SVO languages are taken to be "typical characteristics" of a VO language. Those SVO languages, like English, which share many properties with VSO languages, are then regarded as somehow more "typical" SVO languages than those that share less VSO properties like Chinese. Such a view seems to me to be arbitrary. The same point is made separately in Hawkins (1980), although he still subscribes to an "implicational" view of word order universals, making use of the postposition/

preposition distinction as an autonomous parameter, for reasons that do not appear entirely convincing to me.

12. The condition X ≠ N may be eliminated if it is assumed to be a consequence of the theory of abstract Case, subject to the remarks of footnote 10 above.

13. An objection to such a representation may arise from the fact that it does not directly represent the semantic "part-whole" relation between the ba-phrase and the "retained object" or "inner object" of (21a-b). There is no evidence, however, that these two constituents should form a single NP at any stage of syntactic representation. As will be shown in Chapters 5 and 6, interpretation of "inalienable possession" constructions, including that of partitives, need not rely on the presence of a trace of movement, and consequently not on the constituency of the inalienable possessor and the possessed (or of the whole and the part) at any stage of representation.

14. The four sentences behave differently under topicalization:

(i) wuge pingguo, ta chidiao-le liangge.
five apples he eat-ASP two
'Of the five apples, he ate two.'

(ii) ?juzi, ta buo-le pi le.
orange he peel-ASP skin ASP
'The orange, he peeled.'

(iii) *?zhimen, ta ti-le yige dong.
paper-door he kick-ASP one hole
'The paper door, he kicked a hole in it.'

(iv) *?ta, women dang shagua.
he we treat-as fool
'Him, we regard as a fool.'

As a speculation, the ill-formedness of (iii) and (iv) may be attributed to the assumption that the trace of a topic needs to be Case-marked (while NP traces need not). The well-formedness of (i) and (ii), on the other hand, may be attributed to the fact that no traces of movement are involved following the $\bar{V}$ in each of them. The fact that they have each an interpretation may be attributed to the hypothesis that inalienable possessive nouns have property of getting themselves interpreted as possessed by some NP, in this case the topic in (i) and (ii).

15. I am adopting the proposal made in Hashimoto (1971) to treat this de as a resultative or extent complementizer. For arguments that the de involved here is a different element from the de that marks a prenominal modifier, see Paris (1979). The only objection that I know of against treating the resultative de as a clause-initial COMP is that phonologically de goes with the preceding verb and belongs to the same intonational phrase as the latter, but does not go with the resultative. This, however, can be a result of cliticization. The fact that the de is unstressed and toneless can be some indication that cliticization is involved here.

16. We obviously want to exclude the possibility that both the inversed subject and the extent clause are dominated by $\bar{V}$. To do so, one may assume that structurally there is only one position following a verb under $\bar{V}$ regardless of whether the verb is transitive. (This requires some modification of the condition (20) or the

rules (15) - (16), of course.) Double object constructions and constructions involving complements to "control" verbs are sanctioned, on the other hand, by the marked features of the verbs, which require both constituents following them to be subcategorized elements.

17. For certain speakers (33a) and (34a) are not outright ill-formed. Furthermore, in sentences like the following, no reduplication is necessary:

(i) ta zhu zai Meiguo liang nian le.
he live at America two year ASP
'It has been two years he has lived in America.'

(ii) ta yigong da-le taitai liang ci.
he altogether beat-ASP wife two time
'Altogether it has been twice that he beat his wife.'

The reasons for the well-formedness of (i) and (ii) are not entirely clear to me. If we accept Teng's (1975b) suggestion that 'two years' and 'two times' are higher one-place predicates taking all elements preceding them as a sentential subject, then it is natural to expect no reduplication to occur, as will be clear in the text immediately below. The task will then be to show that in (33a) and (34a), but not in (i) and (ii), the duration and frequency expressions have become non-higher predicates such that they will entail reduplication in the fashion explained below.

18. Note that the original $\bar{V}$ is now taken to be a maximal projection in accordance with the X-bar theory (cf. footnote 6). In this study, we do not assume the Uniform Level Hypothesis of Jackendoff (1977), which states that the maximal level of every major category is uniformly

three-bar (or uniformly any number of bars across all categories). Therefore, in my conception, every node that is not the head of a higher node is automatically a maximal category. This has the desirable consequence that the degenerate categories like PPs, modals and pronouns, etc., need not be assumed to be dominated by non-branching two- or three-bar nodes. We could, of course, adopt Jackendoff's hypothesis, and invoke a convention to add $\bar{\bar{V}}$, etc. on top of the first $\bar{\bar{V}}$ in (37) after reduplication takes place.

19. This notion of "visibility" is somewhat different from that proposed in Aoun (1979). Aoun proposes that Case-marked traces are visible in PF (as well as in LF). This accounts for the fact that wh traces block contraction (cf. Jaeggli, 1980). It may be that Case-marked traces are visible to certain rules only, or visible in some languages only (whose PF rules may be different from those of others). Evidently, variables in Chinese must be assumed to be "invisible" at least at the time the $\bar{X}$ filter applies, given that no verb need be reduplicated if the object is topicalized, as is shown in (44) - (47). Whatever the execution of the idea that the lack of a verb-reduplication is related to the fact that an object has been removed under NP- or wh-movement, at least the idea is supported by the fact that no contraction is known to be blocked by a variable. For example, the "haplology" rule that is generally assumed to take place (cf. Chao, 1968) and turn the two le's that are separated by a wh-trace in (ii) into a single le can occur regardless

of the intervening variable or wh-trace:

(i) ta chi-le fan le.
he eat-ASP rice ASP
'He has been eating rice now.'

(ii) fan_i, ta chi-le t_i le.
rice he eat-ASP ASP

(iii) fan, ta chi le.
rice he eat ASP

(The first le in (i) and (ii) is the perfect aspect marker, and the second le marks the inchoative aspect. See Teng (1973a) for some discussion of the two le's.)

20. Instead of having verb-reduplication apply in PF when necessary, one may assume that it applies in the Syntax, where all traces are visible. However, if the object between the original verb and the reduplicated verb is removed by Move α, as in (44) - (47), then the original and the copied verb are separated by traces only in PF. If we now hypothesize that the two copies of the verb get "haplologized" into one regardless of an intervening trace (Case-marked or otherwise), we will also get the right result that no reduplication is observed on the surface.

21. Restructuring need not be assumed if, instead of the requirement in (20a) that post-head elements must be dominated by a single-bar phrase, we assume that they must be dominated by the lowest branching node within a given phrase.

22. Chomsky (1981a) has remarked that in the derivation of (ii) from (i) below:

(i) [[e] was believed [John to be honest]].

(ii) [John was believed [t to be honest]].

it is difficult, and also unnecessary, to determine whether raising or passive only has applied. The only movement rule that has any real status is Move α, and in the derivation of (ii) from (i) a single operation of the rule fulfills the functions of both raising and passive.

23. As it stands, the rule given here for de insertion is not precise enough. On the one hand, de is generally not required (and for some not allowed) after a QP modifier. On the other hand, apparently the same de also appears to mark an intensifier or a manner adverb. Cf. footnote 1.

24. This is, of course, not to deny the obvious fact that pragmatics and semantics do play certain roles in language, but it is methodologically wrong to give up fairly systematically structural accounts in favor of a rather loose pragmatic theory.

25. For discussion of the view that the Base component is largely eliminable given the Projection Principle, see Stowell (1981).

26. For the "scrambling" nature of these languages, see Farmer (1980), Hale (1979, 1980), Nash (1981), Mohanan (in press). We will discuss further the notion of non-configurational languages in Chapter 3, Section 3.3. Note that the rule given in (60), as well as the more general (15) and (16) or (20a-b), allows peripheral elements of the same type to occur more than once in construction with their heads.

This appears to be the best formulation, given that modifiers like relatives and possessives, etc. really can occur more than once. Certain peripheral types, such as arguments or certain adverbials, which enter into thematic or (optional) semantic relations with their heads, cannot recur, but it is safe to assume that this is due to independent principles of grammar, such as the θ-criterion or its equivalent (see Chomsky, 1981a; Hale, 1980; Freidin, 1978). Likewise, the fact that there cannot be more than one QP per NP: *sange liangge ren* 'three two men' is not likely to be a property of a languages's $\bar{X}$ structure. Chomsky (1981 fall lectures) has made the suggestion that this fact may plausibly follow from the general ban on "vacuous quantification" in natural language, a property of the LF of UG. If the presence of a QP triggers the application of May's (1977) rule of Quantifier Raising, then the presence of two QPs would give two operators at LF each of which must bind a variable, a requirement that cannot be satisfied since both QPs occur in one single NP.

27. In such case the modifiers must be assumed to have only a flat structure or to be in coordination.

28. For a similar suggestion of the structure of Amoy NPs, see Simpson (1980).

29. See, e.g., Tang (1979). Tang himself observes that noun phrases with relative clauses preceding an indefinite QP like youxie 'some' and suoyou 'all' are unacceptable:

(i) a. youxie dai yanjing de xuesheng.
some wear glasses DE student
'Some students who had glasses on.'

b. *dai yanjing de youxie xuesheng.
wear glasses DE some student

(ii) a. suoyou dai yanjing de xuesheng.
all wear glasses DE student
'All students who had glasses on.'

b. *dai yanjing de suoyou xuesheng.
wear glasses DE all student

The contrasts shown above are obviously related to that between (64a) and (64b) in the text. The QPs youxie 'some' and suoyou 'all' are inherently quantificational and require the NPs they occur in to be non-referential. However, the sequence with a relative clause preceding such QPs requires a somewhat referential reading, thus producing a contradiction. Tang further claims that there is a difference in grammaticality between NPs with relative clauses containing a "gap" in subject position and those with relatives containing a gap in object position, and the case where the entire NP occurs as a subject and the case where it occurs as an object, but I find no such distinction, as both the sentences in each of the following pairs are equally good:

(iii) a. tan Zhangsan de liangben shu.
discuss DE two book
'The two books that discuss Zhangsan.'

b. Zhangsan xie de liangben shu.
write DE two book
'The two books that Zhangsan wrote.'

(iv) a. Zhangsan xie de liangben shu zui gui
write DE two book most expensive
'The two books that Zhangsan wrote are the most expensive.'

b. wo mai-le Zhangsan xie de liangben shu.
I buy-ASP write DE two book
'I bought the two books that Zhangsan bought.'

30. Note that the term "non-restrictive relative" is used in a different sense from that usually applied in the description of English relative clauses. To be more precise, a non-restrictive relative does have the effect of modification on the following head noun; it specifies a subclass if the head noun is a common noun, and makes a comment about it if it is a proper name. It is non-restrictive only in the sense that it does not specify the reference of a <u>preceding</u> QP.

31. Recall that we do not assume Jackendoff's Uniform Level Hypothesis (cf. footnote 18).

32. It seems that speakers tend to perceive the reference of an event first in terms of its spatial dimension then its temporal dimension. Thus, other things being equal, a verb is first modified by a locative adverbial and then the whole phrase is modified by a time adverbial:

(i) [ta [qunian [zai wo jia [kanjian-le Lisi]]]]
he last-year at my home see-ASP
'He saw Lisi at my home last year.'

(ii) *[ta [zai wo jia [qunian [kanjian-le Lisi]]]]
he at my home last-hear see-ASP

However, if the locative is more specific than the time adverb, the latter may be placed in the scope of the former:

(iii) [ta [zai Meiguo [meitian [zhi [chi liang can]]]]]
he in America every-day only eat two meal
'In America, he eats only two meals every day.'

33. In this connection, note the often observed fact that there is a general tendency in the language to position a definite NP preverbally and a non-definite NP postverbally. It seems that this may be looked upon as a special case of the more general principle that elements that have more specific referential function are placed before elements that have less, so that the latter are in the c-command scope of modification of the former. The details of how this idea may be executed have yet to be worked out.

34. Hashimoto (1971) also notes that both forms below are acceptable when an adverb like <u>huoshengsheng de</u> 'while alive; from the state of being alive' appears:

(i) ta huoshengsheng de bei Lisi dasi le.
he while-alive DE by beat-dead ASP
'He was beated to death by Lisi from the state of being alive.'

(ii) ta bei Lisi huoshengsheng de dasi le.
he by while-alive DE beat-dead ASP
'He was beated to death by Lisi from the state of being alive.'

The reason is that the adverb 'from the state of being alive' can go with either active or passive verb phrases, since it indicates the objective circumstances in which a certain action or a state occurs, not the manner in which the action or state occurs. Since Hashimoto treats the adverbs 'cruelly,' 'willingly,' and 'from being alive' as higher two-place predicates taking the NP immediately preceding them as the subject, the acceptability of (ii) is a counterexample to her analysis, since it is not the agent Lisi who was alive before he beat someone to death. If they are treated as adverbs as they are on the

surface, (ii) need not present a problem. An adverb whose occurrence need not be determined on the basis of the active-passive distinction of a verb phrase may occur in free order with respect to the by-phrase.

35. Teng (1975a) proposes to treat 'foot' and 'mouth' etc., as the "cognate objects" of 'kick' and 'bite' etc., respectively. However, they must be distinguished from the real "cognate objects" traditionally considered to occur in 'sing a song,' 'dance a dance' etc. First of all, although 'sing' both selects and is subcategorized for 'a song,' 'kick' only selects but is not subcategorized for 'foot.' In other words, while 'a song' or 'a dance' is the real object of 'sing' or 'dance,' neither 'foot' nor 'mouth' is the object of 'kick' or 'bite.' The real objects of the verbs 'kick' and 'bite' can be spelled out in addition to the so-called "cognate objects":

(i) ta ti Zhangsan ti-le ji jiao.
he kick kick-ASP one foot
'He kicked Zhangsan once.'

(ii) ta yao Zhangsan yao-le yi kou.
he bite bite-ASP one mouth
'He bit Zhangsan once.'

Secondly, 'foot,' 'mouth' etc., in the above examples must always be preceded by a quantifier; this is consistent with the assumption that 'foot' and 'mouth' etc. are classifiers making up a QP each with a preceding quantifier. Real "cognate objects" can be unquantified:

(iii) a. ta chang-le yi-shou ge.
he sing-ASP one-cl song
'He sang one song.'

b. ta chang-le ge le.
he sing-ASP song ASP
'He sang.'

(iv) a. ta ti-le yi jiao.
he kick-ASP one foot
'He kicked once.'

b. *ta ti-le jiao le.
he kick-ASP foot ASP

(iv-b) is acceptable only if 'foot' is interpreted as an object subcategorizing the verb, i.e., 'He kicked (a few) feet.' Thirdly, note that 'foot' in (iv-a) and (i) and 'mouth' in (ii) are directly preceded by a numeral quantifier without an intervening classifier, while in (iii-a) a classifier (shou) is required between the quantifier 'one' and the real cognate object 'song.' The reverse situation is ill-formed:

(v) *ta chang-le yi ge.
he sing-ASP one song

(vi) *ta ti-le yi-zhi jiao.
he kick-ASP one-CL foot

This fact follows directly from the assumption that 'foot' and 'mouth' are themselves classifiers and require no more classifier before them, and that 'song' and 'dance' are head nouns and require classifiers in the presence of a numeral quantifier. All the three facts indicated here argue against Teng's treatment of 'foot' and 'mouth' etc. as "cognate objects."

36. C. Y. Ning (p.c.) has suggested that the somewhat deverbalized rang 'let' may be likewise treated as a COMP, analogous to English for in purposive clauses:

(i) ni qi-lai [rang [ta guo-qu]].
you stand-up let he pass
'Please stand up for him to go.'

Likewise, the preoposition gei below is most suitably a COMP:

(ii) ta mai shu [gei [wo kan]].
he buy book for I read
'He bought a book for me to read.'

Constructions like (i) and (ii) have been usually treated as a type of "serial-verb constructions" with rang and gei treated as verbs meaning 'let' and 'give' respectively. Note, however, that in (ii) the NP 'I' immediately following gei is not the object or recipient of any act of giving. The sentence does not mean that he actually gave a book to me, only that he bought a book so that I could read it. It is more appropriate to analyze the sequence wo kan 'I read' as a clause complementing gei, in which case 'gei' will not mean 'give,' but has the meaning 'so that.'

37. An example of a phrase- rather than clause-initial COMP is the de in (i) below, where it heads the AP 'well':

(i) ta tiao de hao.
he dance COMP well
'He dances well.'

Also in (114) and (115) the correlative conjunctions rengran 'still' and jiu 'then' may be seen as COMPs each heading a VP.

38. An additional piece of support for the view that the de involved in extent/resultative complement clauses is not what we have been calling a modifier marker (DE) may be derived from comparative facts. In Amoy, the first de is rendered as either ga or dioh (see (106) and (107)). The second de, on the other hand, is rendered as e:

(i) i e pingyiu.
he DE friend
'His friends.'

(ii) i xia e ceh.
he write DE book
'The books that he wrote.'

(iii) jin ho e pingyiu.
very good DE friend
'Very good friends.'

CHAPTER THREE: PHRASE STRUCTURES AND SCOPE RELATIONS

3.0. Introduction

This chapter will discuss the relation between phrase structures and scope phenomena exhibited by quantifiers and other logical elements. We will indicate that while English is known to allow various scope ambiguities, Chinese sentences are very rigidly unambiguous. Although the scope facts in English have led certain writers (e.g. May 1977) to the proposal of a theory according to which scope order among two or more quantifiers within a sentence is basically free, the Chinese facts argue against such a conception of natural language quantification. Rather, we assume, more in line with tradition, that there is a general principle that requires that quantificational expressions that already stand in a c-command relation at SS hold the same relation at LF. The distinction between certain sentences exhibiting ambiguity and certain others exhibiting no ambiguity in English is derived from the $\overline{X}$ theory in conjunction with a proposed rule of restructuring. A slight extension of the same idea allows one to derive an important typological distinction between Chinese and English from the fact that Chinese incorporates an $\overline{X}$ structure condition of the form (2.20) while English does not have such a condition. This way of looking at the typological distinction is supported by the observation that the distinction cannot be directly learned, and therefore must be derived from something that is learnable.

We will also indicate that an optimal theory should refer to the hierarchical structure of a given string in determining its scope properties, rather than at its linear structure. We will adopt, furthermore, May's (1977) rule of quantifier interpretation (QR), together with the assumption that each application of QR affects the lowest maximal NP node that dominates a given quantifier. The output of this mapping process will be assumed to be subject to the two well-formedness conditions, the Condition on Proper Binding (CPB), which disallows free variables at LF, and the Condition on Quantifier Binding (CQB), which disallows vacuous, non-variable-binding, quantifiers.

In Section 3.3, we discuss the notion of configurationality and the internal structure of S in Chinese, a topic that was not dealt with in Chapter 2. It will be argued that, within a government theory of configurationality, Chinese is a mixed-type between configurational and non-configurational languages in that it has a maximal VP and an INFL, but allows free word order among peripheral elements in certain phrasal categories.

3.1. Scope Relations

In discussing head-final constructions in Chinese in 2.4, we indicated that certain differences in meaning among noun phrases containing identical prenominal modifiers, or among sentences containing identical preverbal modifiers, correspond directly to the differences in left-to-right word order among the modifiers in the noun phrases or

sentences. We indicated that each word order difference of a modifier with respect to another is naturally seen as a difference in the relative scope of modification among the modifiers in question.

It should be obvious that this "scope of modification" is closely related to, and most likely a special case of, the more general phenomenon of scope that figures most prominently in discussions of natural language quantification. This is already clearly the case with some of our examples in the previous section. In any familiar discussion of natural language quantification, certain adverbial categories are always taken to be quantificational on the basis of their scope-bearing properties. These include frequency expressions like changchang 'often', the negative marker bu 'not', and modals like keneng 'can, possibly' (whether they are treated as adverbs or verbs). Thus, the difference between the (a) and (b) sentences of (78) and (79) in Chapter 2 is a difference in scope of quantificational or "logical" expressions like NEG with respect to others like 'often', 'possibly'. Similarly, it is natural to consider adverbial clauses or phrases indicating motivation as "quantificational" in the sense that they can enter into scope relations with other scope-bearing elements (cf. Lasnik 1975), and such differences in meaning as shown between (1) and (2) below we would have also described as those in scope of modification, on a par with (2.78-79):

(1) Zhangsan meiyou [yinwei ta piaoliang] jiehun
not because she pretty marry
'Zhangsan did not get married because she was pretty.'

(2) Zhangsan [yinwei ta piaoliang] meiyou jiehun.
because she pretty not marry
'Zhangsan did not get married, because she was pretty.'

According to (1), Zhangsan got married for some reason other than his wife's appearance, but according to (2), Zhangsan did not get married at all, because the woman was (too) pretty.

If the difference between (1) and (2) and those between the (a) and (b) members of (2.78-79) are matters of scope, there appears to be no special reason to consider the facts shown by other examples given in 2.4 to be of a fundamentally different type and nature.

Let us now consider the scope phenomena of normal quantifiers. It is easy to see that quantificational NPs enter into scope relations among themselves and with other logical ements in a sentence in much the same way that the different pre-head modifiers we have seen interact with each other. That is, as has recently been pointed out by S.F. Huang (1981), the surface word order among the quantificational NPs and logical ements directly corresponds to their scope order in a standard predicate calculus representation of sentences containing such elements. Thus, in Chinese the sentences (3) and (4) each have a unique unambiguous interpretation:[1]

(3) meige xuesheng dou mai-le yiben shu
every student all buy-ASP one book
'For every student x, there is one book y such that x bought y.'

(4) you yiben shu meiyige xuesheng dou mai-le
have one book every student all buy-ASP
'There is one book that every student bought.'

As indicated in the translation, (3) can only mean that each of the

students bought one book or another, but does not assert that they bought the same book. If it happened that they bought the same book, it would be a matter of coincidence, and not the message intended by the speaker. To get the latter reading it is necessary to topicalize, or otherwise prepose, the existentially quantified 'one book', as shown in (4). Clearly the same correspondence between word order and scope order that we saw in Chapter 2 applies here, except that (3)-(4) involve NP arguments rather than modifiers. The standard first order logic representations of (3) and (4) are given respectively below:[2]

(5) [ALL x; x a student [ONE y; y a book [x bought y]]]

(6) [ONE y; y a book [ALL x; x a student [x bought y]]]

Standard quantifiers also interact with other logical elements in exactly the same way. Again, the sentences below are each unambiguous, as indicated in the translation:[3]

(7) youyige xuesheng bu mai suoyoude shu.
one student not buy all book
'There was a student who did not buy all the books (only some).'

(8) youyige xuesheng suoyoude shu dou bu mai.
one student all book all not buy
'There was a student who did not buy any books.'

(9) Bushi suoyoude shu dou youyige xuesheng mai.
not all book all one student buy
'It is not the case that all books were sold to one student or another.'

(10) meiyou yige xuesheng mai-le suoyoude shu.
not one student buy-ASP all book
'No student bought all books.'

(11) suoyoude shu dou youyige xuesheng bu mai.
all book all one student not buy
'For all books x, there is a student that did not buy x.'

(12) suoyoude shu dou meiyou yige xuesheng mai.
all book all not one student buy
'For all books x, no student bought x.'

The surface order of the three scope-bearing elements, all books, one student, and NEG, is [E ∿ A] in (7) and [E A ∿] in (8). In (9)-(12), their surface order is, respectively, [∿ A E], [∿ E A], [A E ∿], and [A ∿ E]. The translation in English for each sentence should make it clear that the scope interpretation for each sentence directly reflects the surface order among the scope-bearing elements.

The observation that the surface word order of logical elements corresponds to the scope order of these expressions in familiar logical formulae is, of course, not a fresh one. Among others, for example, Kroch (1974) argues that in the unmarked situation this correspondence also generally obtains in English, although, as is well known, the system of quantification in English is considerably more complicated. According to Kroch, the unmarked scope order of logical operators in an English sentence is determined by the following general rule:

(13) General Scope Principle (obligatory) (Kroch 1974:145)

> If within a simplex sentence there are operators with the surface order W X Y Z..., then the operators are indexed in order of appearance, giving W_1 X_2 Y_3 Z_4 ..., and a scope marker is established as follows:
>
> $[W'_1\ X'_2\ Y'_3\ Z'_4\ \ldots.]$
>
> where V is a quantifier of type V' (e.g., all is a quantifier of type "universal" or "(A)").

Where the scope order of operators in a sentence deviates from the prediction from surface order made by this rule, Kroch proposes a number

of "scope readjustment rules" which operate on structures derived from this general principle. Because of the effects of such scope readjustment rules, Kroch argues, the correspondence between surface order and scope order is often obscured in English. This accounts, among other things, for the fact that an English sentence like (14) below allows at least the scope possibilities indicated in (15), in sharp contrast to the unambiguous Chinese sentences (7)-(12) above.

(14) Every student did not buy one of the books.

(15) a. [A E ∿]

b. [E A ∿]

c. [∿ A E]

d. [E ∿ A]

Since scope ambiguities of the sort illustrated here are very common in English, one has reason to wonder whether there is any real point in regarding as the normal case the scope order that corresponds to surface word order, and deriving the vast number of "exceptions" by means of a number of "marked" rules of scope readjustment. Many writers have expressed alternative views. Ioup (1975), for example, explicitly claims that surface word order is not even a relevant parameter for scope interpretation. For her, the only parameters that enter into scope interpretation are: (a) the inherent properties of individual quantifiers, and (b) the grammatical relations that the quantified NPs may bear in a sentence.

The view that inherent properties of individual quantifiers make a difference is probably not controversial.[4] The innovative part of

Ioup's theory is that, other than such inherent properties, grammatical relations alone, and not word order, determine the scope interpretation of natural language sentences. According to this theory, a quantified NP that is both the deep and the surface subject has a higher tendency to take wide scope than one that is either the deep or the surface subject. A quantified NP that is either the deep or the surface subject has, in turn, wider scope than one that is neither. A direct object Q-NP, on the other hand, tends to take narrow scope with respect to all other Q-NPs. Ioup bases her theory on a sampling of fourteen languages and proposes her principle as a universal. Her theory is counterexemplified immediately, however, by Chinese. S.F. Huang (1981) has given extensive evidence showing, convincingly I think, that the theory based on grammatical functions cannot be right for Chinese. For example, in (3) the universal Q-NP 'every student' bears the (deep and surface) subject relation, and the existential 'one book' bears the relation 'object' to the verb. This situation is preserved in (4), although the object occurs in preverbal position. The same obtains in the sentences (7)-(12). If all that matters were simply grammatical relations, it would not be clear why a change of word order in these sentences would make a clear difference in scope interpretation. It is of course possible to modify the theory based on grammatical relations so as to accommodate the empirical facts we have seen. One may, as does Ioup, stipulate that the NP bearing the discourse function Topic must have wide scope over a deep and surface subject (and all other relations), even though it is not a grammatical relation in the ordinary

sense and may originate, say, as direct object. The point, however, is not that there is no plausible way to modify the theory so as to accommodate the counterexamples, but that such ad hoc moves are unnecessary once we assume a simple account based upon word order. Furthermore, a theory of scope based on grammatical relations has nothing to say about the scope facts concerning modals, adverbs, negation, and the various prenominal modifiers. Even if the notion of grammatical relations is extended in such a way as to allow general statements to be made across such scope-bearing elements, it should be clear from the discussion in 2.4 that no satisfactory scope principle can be given in terms of the "grammatical relation" that a modal, say, bears with respect to the "grammatical relation" that NEG bears. Contrasts such as the one between (16) and (17) with respect to the scope of the modal adverb (or verb) and NEG certainly have nothing to do with grammatical relations!

(16) ta keneng bu lai.
he may not come
'Possibly he won't come.'

(17) ta bu keneng lai.
he not may come
'He can't possibly come.'

Another approach to quantification that differs from Kroch's has been developed in May (1977). According to May, scope interpretation is carried out by the application of his Quantifier Raising rule (QR) on S-structures:[5]

(18) Quantifier Raising (May 1977):

Chomsky-adjoin a quantificational NP to S.

Two general conditions are proposed on the well-formedness of output representations at LF. The first is the Condition on Proper Binding, which requires that a sentence may not contain free variables:

(19) Condition on Proper Binding:

Every variable in an argument position of a predicate must be properly bound.

(A is properly bound by B if A is coindexed with and c-commanded by B.) The other general condition is the Condition on Quantifier Binding, which requires that all quantifiers not be "vacuous":

(20) Condition on Quantifier Binding:

Every quantified phrase must properly bind a variable.

Since there are no other conditions on the output nor the application of QR, an S-structure like (21) may be mapped into either (22a) or (22b) representing the [A E] and the [E A] scope orders, respectively:

(21) Every man saw some woman.

(22) a. $[_s$[Every man]$_i$ $[_s$[some woman]$_j$$[_s$ t_i saw t_j]]]

b. $[_s$[Some woman]$_j$ $[_s$[every man]$_i$ $[_s t_i$ saw t_j]]]

Each of the adjoined Q-NPs in (22) may be directly translated into a restrictive or generalized quantifier and its trace interpreted as its bound variable:

(23) $[_s$[For every x; x a man]$[_s$[for some y; y a woman]$[_s$ x saw y]]]

(24) $[_s$[For some y; y a woman]$[_s$[for every x; x a man]$[_s$ x saw y]]]

In effect, then, May claims that every sentence containing two or more quantifiers is ambiguous in the unmarked cases, thus denying that there is any basic correspondence between "matters of form" (word order at SS)

and matters of interpretation (scope order at LF). May bases his denial of the correspondence on two fundamental observations in English. One of them is the ambiguity of the sort we have just seen. Although it is true that English sentences containing two or more quantifiers are often ambiguous, there is also reason to consider that the scope order which corresponds to surface order represents the primary interpretation. Kroch (1974: 179) says that such a conception is supported by two facts:

> First, unless scope order incompatibilities associated with certain lexical items block it, the surface order scope reading is always present, while other orders may or may not be. Second, when a sentence has a surface scope order reading along with readings based on other orders, the surface scope order reading is, all other things being equal, the preferred one.

The argument from considerations of primary vs. secondary interpretation of sentences in English may not be entirely convincing to proponents of the view represented by May (1977), since "all other things" are often not equal due to the subtleties involved and the interaction of various complicating factors. A more convincing argument is available, however, from languages like Chinese, where ambiguities of the sort seen in English are entirely lacking, and the only available reading in each sentence is the one in which scope order corresponds to surface order. In other words, while the scope order that corresponds to surface order is systematically present in sentences containing two or more quantifiers in both English and Chinese, any other scope order is <u>not</u> systematically present in English and systematically <u>absent</u> in Chinese. This fact casts grave doubts on any theory of quantification which treats scope order of quantifiers as fundamentally free.

Another observation that May makes use of to argue for the insufficiency of surface structure on scope interpretation concerns the existence of sentences exhibiting what he dubs "inversely-linked quanitification". In sentences of the form represented by (25), a quantified NP contains a PP complement or modifier which in turn contains another quantified NP:

(25) a. Some people from every walk of life like jazz.

b. Each of the members of a key congressional committee voted for the amendment.

Such sentences are generally interpreted with the quantifier on the left having narrow scope with respect to the quantifier on the right, directly inverse to the relative surface order of the two quantifiers. Thus, (25a) means that every walk of life has some people who like jazz, and (25b) means that there is a key congressional committee such that each member in it voted for the amendment. (25a) does not mean that there are some people such that for every walk of life they are in, they like jazz, and (25b) does not mean that each person is such that for some congressional committee of which he is a member, he voted for the amendment. Similarly, (26) has only the interpretation according to which the scope order of some, every, and a is directly inverse of their surface order.[6]

(26) Some exits from every freeway to a large California city are badly constructed.

Having shown that the surface structure left-to-right order of quantifiers in sentences like (25)-(26) does not correspond to their scope order, May then shows that if they are assumed to undergo QR in

LF, there is a simple answer to the otherwise unexplained inverse-linking of quantification. May assumes that the applicability of QR is subject to a general condition on analyzability in the form of (27):

(27) Condition on Analyzability

> If a rule Φ mentions SPEC, then Φ applies to the minimal [+N] phrase dominating SPEC which is not immediately dominated by another [+N] phrase.

This condition has the desirable consequence, among others, that it ensures that QR (originally formulated in the simple form "adjoin Q to S"--cf. footnote 5) will move quantificational NPs, not just quantifiers.[7] Another consequence can be illustrated with the example (25a). When QR is triggered by the quantifier some in the sequence some people from every walk of life, it is this entire sequence, rather than some people, that must be moved, regardless of whether the sequence is analyzed as (28a) or (28b):

(28) a. $[_{np}$ Some $[_{\bar{n}}$ people $[_{pp}$ from every walk of life]]]

b. $[_{np}[_{np}$ Some people$][_{pp}$ from every walk of life]]

In (28a), the minimal nominal node dominating some is the NP node dominating the entire sequence. In (28b), the minimal nominal node dominating some is the small NP some people, but this small NP is not analyzable by QR since it is immediately dominated by another NP node. The highest NP node in (28b) is analyzable by QR, however, as is the NP node of (28a). Therefore, in both cases it is the entire sequence some people from every walk of life that gets moved when QR applies. On the other hand, if QR is triggered by the quantifier every, which is

contained in the PP in the same sequence, only the NP dominating the sequence every walk of life, and not the entire sequence some people from every walk of life, is moved. Now, consider the available interpretation on (25a), according to which every walk of life has wider scope than some people from every walk of life:

(29) $[_s$[Every walk of life]$_i$ $[_s$[some people from t_i]$_j$ $[_s$ t_j like jazz]]]

This representation is well-formed with respect to the Condition on Proper Binding (19), since both t_i and t_j are properly bound, and the Condition on Quantifier Binding (20), since both the quantifier [every walk of life] and the quantifier [some people from t_i] properly bind their variables, t_i and t_j, respectively. Therefore, the inversely-linked representation is derivable from (25a) as a well-formed representation. On the other hand, consider the interpretation that is unavailable, one whose representation at LF would be (30):

(30) $[_s$[Some people from t_i]$_j$ $[_s$[every walk of life]$_i$ $[_s$ t_j like jazz]]]

Although the variable t_j is properly bound and the quantifier [some people from t_i] is non-vacuous; the variable t_i, however, is free, and the quantifier [every walk of life] is vacuous. In the latter situation, both the Condition on Proper Binding and the Condition on Quantifier Binding are violated. The non-inversely-linked reading is thus correctly predicted to be unavailable.

It is fair to say that sentences like (25)-(26) do show the insufficiency of S-structure for a straightforward statement of scope

interpretation. Furthermore, they constitute evidence of a most interesting kind for the existence of a movement process (QR) in the mapping between SS and LF, although some such process is at least implicit in any account assuming a quantifier-variable representation of LF having similar appearance to the syntax of predicate calculus. It is a general property of all normal legitimate movement rules that a moved phrase α must land at a position sister to a node dominating the original position of α, so as to properly bind its trace. Therefore, if a phrase A is to be moved out of a more inclusive phrase B, it can only land at a position c-commanding the more inclusive phrase B.[8]

It should be noted, however, that the insufficiency of surface structure for scope interpretation shown here is no sufficient reason for the effective claim that surface structure is <u>irrelevant</u>. In fact, the surface or S-structure representation of sentences involving "inversely-linked quantification" is of crucial importance in that the two quantifiers involved must be dominated by the same NP node at SS, with one quantifier appearing in the SPEC position of the highest $\bar{N}$ and another embedded within an NP properly contained in the higher NP. They are not elements that appear in just any arbitrary string.

Furthermore, if, in accordance with the Condition of Analyzability (27) or some equivalent condition, we do not look directly at the two quantifiers in such sentences as (25)-(26), but at the analyzable NPs containing them, then neither quantificational NP that is subject to QR precedes or c-commands the other in each of

these sentences at SS: One of them is internal to, or properly contained in, the other. It is somewhat misleading, therefore, to call the kind of quantification structure involved in such sentences "inversely-linked". The relation of the two Q-NPs is one of containment at SS, but one of c-command or precedence at LF.[9] There is nothing "inverse" about them. The situation is precisely the same as the one observed in the following, where a wh phrase is properly contained in an S at DS, and c-commands or precedes the S at SS:

(31) a. $[_{\bar{S}}[_{S}$ You saw who]]

b. $[_{\bar{S}}$ Who$_i$ $[_{S}$ did you see t_i]]

Given this, it is fair to conclude that although the SS representation of a sentence involving so-called "inversely-linked" quantification does not already give an adequate scope representation, its structure is of direct relevance for the interpretation of scope.

3.2. Characterizing Scope Relations

3.2.1. Linear Representations

We have indicated that sentences involving "inversely-linked" quantification constitute some support for May's theory, which assumes the existence of a movement rule (QR) which maps S-structures into quantifier-variable representations having the essential appearance of logical formulae used in predicate calculus. We have shown also, however, that the scope properties of sentences are to a great extent determined by their S-structure. This generalization concerning the

essential relevance of S-structure must be captured in any adequate theory of grammar.

In the notation of predicate calculus, the notion of relative scope is sometimes defined as the linear ordering of operators. Thus in (32a) below the universal quantifier is said to have wide scope over NOT, while in (32b) the situation is reversed:

(32) a. Ax NOT P (x)

b. NOT Ax P (x)

Evidently, the simplest way to capture the correspondence between surface order and scope order is to identify the surface or S-structure level of representation with the level where scope information is represented, i.e. to deny the existence of a level of Logical Form having the appearance of (32). However, due to well known scope ambiguity facts in languages like English, it is of course impossible to identify the two levels, if the definition of scope order is as just given. A natural way to capture the SS → LF correspondence, then, would have to allow both levels of representation but somehow ensure that LF representations differ only trivially from representations at SS, only in certain marked cases, and as a general rule must be identical to the latter. This is, of course, what Kroch (1974) has set out to do. Thus, according to his General Scope Principle, reproduced in (13) above, the Chinese sentence (33a)(=(3)) is mapped into something like (33b):

(33) a. meiyige xuesheng dou mai-le yiben shu.
every student all buy-ASP one book
'For every student x, for one book y, x bought y.'

b. [ALL$_1$ ONE$_2$][meiyige$_1$ xuesheng dou mai-le yiben$_2$ shu]
every$_1$ student all buy-ASP one$_2$ book

Similarly, the English sentence (34) is mapped into (35) by the general rule:

(34) Every student bought one book.

(35) [ALL$_1$ ONE$_2$][every$_1$ student bought one$_2$ book]

The fact that (34) has the additional reading represented in (36) is, on the other hand, treated as the result of applying one of his scope readjustment rules (p. 145 rule (30)), which flips the two operators in (35):

(36) [ONE$_2$ ALL$_1$][every$_1$ student bought one$_2$ book]

Given this system, there is a very natural way to account for the typological difference between Chinese, which does not allow a meaning corresponding to (36) for the sentence (33a), and English, which does. The scope readjustment rule that effects (36) from (35) may be assumed to exist as a marked option for English only, while the general scope rule may plausibly be assumed to be universal, applying across both languages.

3.2.2. Hierarchical Representations

Note that in Kroch's theory scope order is taken as the linear relationship between two operators. It is also a common practice, on the other hand, to assume that formulae like (32) each have a hierarchical

structure:

(37) a. [Ax [NOT [P(x)]]]

b. [NOT [Ax [P(x)]]]

The bracketing shown above can be converted to an equivalent right-branching tree diagram in the familiar way. As we remarked in Chapter 2, the notion scope may be defined in terms of the hierarchical notion "c-command" instead of the linear notion "precede", following Reinhart (1976). The following is reproduced from (2.68) for convenience:

(38) A is in the scope of B if A c-commands B, where α c-commands β iff neither α nor β dominates the other and the first branching node dominating α also dominates β.

In order to capture the general correspondence between surface structure and logical structure, Reinhart (1976:191) invokes the following principle:

(39) Reinhart's Scope Principle

> A logical structure in which a quantifier binding a variable x has wide scope over a quantifier binding a (distinct) variable y is a possible interpretation for a given structure S just in case in the surface structure of S the quantified expression corresponding to y is in the (c-command) domain [i.e., scope] of the quantified expression corresponding to x.

This principle applies to the Chinese sentence (33a) and correctly allows it to be interpreted as in (33b), and similarly to the English sentence (34), allowing the unmarked interpretation (35). This is because both (33a) and (34) have a right branching structure, in which each subject Q-NP asymmetrically c-commands its object Q-NP. Therefore,

up to now Reinhart's hierarchical account is equivalent to Kroch's linear account empirically.

Note, however, that Reinhart states her principle of scope as a bi-conditional. This amounts to denying the existence of a linguistic level of LF expressing scope relations that are otherwise not already expressed at SS under the same configurational definition of scope. Thus, it correctly allows the interpretation (35) on (34), but incorrectly rules out the reading (36) as non-existing. Reinhart is, of course, aware of counterexamples like the one presented by the existence of (36) as a possible reading. She offers two arguments to explain away such situations, neither of which, however, applies to the very case (36) at hand. First, she argues that "most putative examples of such ambiguities which are discussed in the literature are ones where one interpretation entails the other" (p. 193). Thus, Reinhart joins the group of linguists or philosophers (e.g. Kempson and Cormack 1981, Katz 1980) who regard such cases of ambiguity as cases of vagueness in interpretation. More specifically, a wide scope interpretation on the existential a student in a sentence like (40) entails a narrow scope interpretation of the same Q-NP with respect to the universal every book:

(40) A student bought every book.

This is because if a certain student bought every book by himself, then every book was purchased by at least a student, i.e. this particular student. As May (1977:56f) has correctly pointed out, this explanation does not hold up in the case of sentences like (34) under the

interpretation (36). Since "every student bought one book or another" does not entail "there is one book that every student bought", as a simple point of logic, the entailment explanation should disallow a reading like (36) on (34).

There is another argument against Reinhart's view from a typological perspective, derivable by comparing Chinese and English. Recall that in Chinese there is no scope ambiguity in such simple quantificational sentences as those we have seen. In particular, the sentence (41) has only the [E A] reading:

(41) youyige xuesheng mai-le meiyiben shu.
one student buy-ASP every book
'A student bought every book.'

This sentence, however, does entail that for every book there existed at least one student who bought it. In other words, the Chinese sentence (41) is identical to the English (49) in its mathematical or logical property of entailment, but differs from the latter in its <u>linguistic</u> property in that although the Chinese speaker may not use (41) to <u>assert</u> the proposition that every book has at least one student who bought it, the English speaker may use (40) to assert the same proposition. If the ambiguity of (41) were really a matter of vagueness or entailment, there would be no reason to expect that Chinese and English should differ in the way we have seen. This is, I think, an argument against any theory that denies the existence of a linguistic level of LF and attempts to interpret surface structures directly into semantics, where matters of entailment are also dealt

with. It argues for the existence of a level of representation (LF) where the ambiguity in assertion is allowed in certain languages, though not in others. (Note that since LF is a linguistic level, properties of LF need not be universal across all languages.)

Another argument that Reinhart presents in support of her theory is, "the violation [of her principle] is highly restricted with respect to the NP pairs which tolerate it" (p. 194). She claims that judgments of ambiguity are hard to obtain if a quantified expression in a VP is the object of a preposition rather than a direct object. This, again, has been shown by May not to hold, for the reason that there are just too many counterexamples, among them the following ambiguous sentences (May 1977:57):

(42) a. Everyone gave to some cause.

b. Some politician ran on every ticket.

A further inadequacy of Rinehart's account is that certain Q-NPs do not hold a c-command relationship with each other at SS, but do enter into scope relations at the level of LF. For example, in the sentence (43), neither the universal everyone nor the existential three books c-commands the other:

(43) Everyone's friend bought three books.

Yet the sentence allows a wide scope reading on everyone (at least). It does not seem to make sense to say that the two Q-NPs do not enter into any scope relation, as Reinhart's principle would lead her to predict. To allow the reading in question, one could probably stipulate that the term "quantified expression" used in Reinhart's

Scope Principle (39) must be understood in such a way that in sentences like (43) it will take everyone's friend, rather than everyone in the possessive, as the universal "quantified expression" for the purposes of her principle. Such a move would be similar in effect to Ross' (1967) Left Branch Condition or May's (1977) Condition on Analyzability reproduced above. This has the result that the possessive everyone is unanalyzable outside of the subject NP, and would in its natural interpretation seem to require that everyone not have scope outside of the subject NP in which it occurs. In this case (43) would be wrongly interpreted in such a way that the subject NP refers to a single person who is the common friend of everyone's. But the sentence does not mean this; there need not be a common friend to everyone. (Cf. also footnote 7.)

Even if this above clearly ad hoc move could be justified, there is still the problem of May's "inversely-linked" quantification. As noted above, May's Condition on Analyzability requires that the only analyzable existential Q-NP in some people in every walk of life be the NP dominating this entire sequence. Now if everyone should be stipulated to be unanalyzable outside of everyone's friend in (43), then there is even more compelling reason to consider some people as unanalyzable outside of some people in every walk of life. As mentioned above, this means that the two "quantified expressions" in Reinhart's sense) in this string have only a relation of containment, but not of c-command (nor precede). Reinhart's theory is thus insufficient to

allow a scope relation between every walk of life and some people in every walk of life.

There is extensive further evidence that scope order cannot possibly be entirely determined by Reinhart's principle (39). As I will show in Chapter 4, even in the logically much more transparent sentences of Chinese, one can find several instances showing the inadequacy of a purely surface scope account. The most reasonable conclusion to draw about Reinhart's scope principle, then, is that it should be treated as a general principle, not an inviolable absolute condition, in the same way that Kroch's general scope principle is treated. Deviations from such a principle must be allowed, furthermore, by special exception conditions, perhaps by adapting some or all of Kroch's scope readjustment rules.

Suppose that Reinhart's theory is now reinterpreted in this manner. The question that arises now is what differences exist between Kroch's linear principle and Reinhart's hierarchical principle and which of the two fares better in the face of these differences. We will turn to this question in the next section.

3.2.3. Comparing the Two Approaches

Before we discuss where Kroch's and Reinhart's accounts work equally well and where they differ in empirical predictions, I will first correct an essential inadequacy of Kroch's General Principle as given in (13), and consider one case where both Kroch's and Reinhart's accounts fail. What I will say with regard to both of these preliminary

points owes much to May's (1977) study of sentences involving "inversely-linked quantification".

First of all, according to Kroch's principle (13), unmarked scope orders are determined on the basis of the relative surface positions of quantifiers, and not the position of quantified NPs. However, this makes a wrong prediction on sentences like (25)-(26), where a quantified NP properly contains another quantified NP at SS. In the NP some people in every walk of life, some precedes every. Therefore, Kroch's principle wrongly assigns the scope order [E A] to a sentence containing such an NP, like (25a), a reading that never exists. The correct reading [A E] would then have to be derived as a marked case, obviously an undesirable result. If, on the other hand, we correct this principle in such a way that scope order will be assigned on the basis of the surface order of quantified NPs, at least such sentences as (25)-(26) will cease to be counterexamples. Since the two Q-NPs involved in such sentences are in the relation of containment, not in the precedence relation, his principle says nothing about them, and is therefore not counterexemplified by them. That is, the term "operator" in his rule (13) must be interpreted as the maximal phrase (of any major category N, A, V, P, where negation may be construed as A (adverbial) and modals as V or A, and SPEC is not a major category) which contains a quantifier or logical element. Rather than construing quantifiers like every, some, etc., as operators themselves, as is practiced in standard first order logic, we will follow May (1977), Chomsky (1976), Higginbotham (forthcoming), etc., and consider that what appears in the

operator position of an LF representation is a "restrictive" or "generalized" quantifier (cf. Barwise and Cooper 1981) containing a quantifier. Thus, we assume that the LF representation of (44) is (45a) or (45b), not the representation (46) used in first order logic:

(44) Every man is mortal.

(45) a. [Every man x [x is mortal]]

b. [[For every x such that x is a man][x is mortal]]

(46) [Every x [[x is a man] → [x is mortal]]]

There are at least two other arguments in favor of the conception of natural language quantification represented by (45), in addition to the one just noted concerning sentences like (25)-(26). For one thing, as J. Higginbotham (p.c.) has indicated, the representation (46) says something more than what (44) is intended to mean by the speaker, while (45) does not. In particular, (46) says that everything is such that if it is a man then it is mortal. It says something about non-humans which (44) says nothing about. (46) may be interpreted as making a trivially true statement about non-humans. (45), on the other hand, explicitly lists its domain of discourse to humans only, and is apparently a better representation of the meaning of the sentence (44).

Another argument for the use of "restrictive" quantifiers, also due to Higginbotham, concerns contrasts of the following sort:

(47) a. Which man is a bachelor?

b. Which bachelor is a man?

(47b) is a nonsensical question, since every bachelor is, by definition, a man, but (47a) is not. Within a system making use of

restrictive quantifiers, the contrast between (47a) and (47b) is preserved:

(48) a. [For which x such that x is a man][x is a bachelor]

b. [For which x such that x is a bachelor][x is a man]

If we do not use restrictive quantifiers, however, both (47a) and (47b) have the following representation:

(49) [For which x][x is a man and x is a bachelor]

The contrast between (47a) and (47b) is thus obscured in an undesirable way.

Still another argument for the use of restrictive quantifiers is that first order logic is, as is well known, incapable of expressing the meaning of sentences containing such quantifiers as most, more than one-third of, etc.

(50) Most people live in the suburb.

(51) More than one-third of the students have left.

First, there is no standard operator in the vocabulary of first order logic that can mean most or more than one-third. Furthermore, even if new operators like MOST, MORE THAN ONE THIRD, etc., are invented, neither (52a) nor (52b) expresses the meaning of (50):

(52) a. MOST x [[x a person] → [x lives in the suburb]]

b. MOST x [[x is person] & [x lives in the suburb]]

Similarly, (51) means neither "more than one-third of things are such that if they are students then they have left," nor "for more than one-third of things, they are students and they have left". On the other hand, if most people and more than one-third of the students are treated

as generalized quantifiers occurring in operator position, we have the semantically correct representation (53) for (50), and (54) for (51):

(53) a. [Most people x [x lives in the suburb]]

b. For most x such that x is a person, x lives in the suburb.

(54) a. [More than one third of the students x [x has left]]

b. For more than one third of x such that x is one of the students, x has left.

With the inadequacy of Kroch's formulation of the General Scope Rule corrected, sentences like (25)-(26) now cease to be counterexamples to his theory. Note that such sentences are still problems for Reinhart's rule (39), even if it is now interpreted as a general principle rather than an absolute condition. This principle disallows both the "inversely-linked" and the unavailable non-inversely-linked reading on (25)-(26), since it is stated as a bi-conditional. Therefore, the inversely-linked reading must be derived by a marked rule, an undesirable result. To prevent the principle from ruling out the available readings, let us then weaken the principle to a right-to-left condition, i.e. change "just in case" in (39) to "if".

Now Kroch's and Reinhart's accounts are equivalent with respect to (25)-(26) in that they have nothing to say about them. To remedy this common inadequacy, let us assume, following May (1977), that mappings between SS and LF are carried out by a process that takes the explicit form of a movement rule, i.e. QR. The "inversely-linked" reading will then be derived as an entirely unmarked case by a free application of QR, subject to the Condition of Proper Binding and the Condition of

Quantifier Binding, which prohibit free variables and vacuous quantifiers at LF. Kroch's and Reinhart's principles, then, may be now rephrased as the following:

(55) The Linear Condition

> If a quantificational or logical expression A precedes another quantificational or logical expression B at SS, then A also precedes B at LF.

(56) The Hierarchical Condition

> If a quantificational or logical expression A c-commands another quantificational or logical expression B at SS, then A also c-commands B at LF.

These conditions may be regarded as a kind of "projection principle", similar in nature to Chomsky's (1981a) Projection Principle on thematic relations. They represent a kind of "null" or minimal hypothesis about the nature of LF: unless otherwise altered by special (readjustment) rules, etc., LF and SS representations are identical. The effect on QR is thereby assumed to be a trivial one on SS representations.

Now let us compare the Linear Condition (55) and the Hierarchical Condition (56) and consider which of the two is to be preferred. It is easy, in fact, to see that the hierarchical account is superior to the linear account in a number of ways.

Suppose that two quantificational or logical expressions occur in a string in the order A preceding B. The Linear Condition will assign A wide scope with respect to B regardless of the hierarchical structure that one might assign to the string in which A and B occur. The Hierarchical Condition will assign A wide scope with respect to B just in case the string has a right-branching structure in which A c-commands

B, but will assign narrow scope to A if the string has a left-branching structure in which B c-commands A. (If the entire string is binary, dominating only A and B, then it is both right-branching and left-branching; the condition will assign it both scope orders.) Thus, the empirical predictions of (52) and (53) are the same if a given string has a right-branching structure, but differ if it is left-branching.

In Chapter 2, we indicated that the scope facts concerning prenominal and preverbal modifiers in Chinese can be accounted for by either a definition of scope defined in left-to-right linear terms or in herarchical terms (c-command), as far as the examples considered there are concerned. In order for the hierarchical definition to work, it is necessary to assume that prenominal and preverbal peripheral phrases in Chinese enter into a strictly right-branching tree among themselves and with their heads. Empirically, then, the hierarchical and the linear account are equivalent as far as the examples we have considered are concerned.[10]

Note that the two accounts are also methodologically on a par. The linear account makes a minimal assumption about the structure of a string, that the elements in a string are arranged just in left-to-right order. The hierarchical account assumes that these elements are arranged in a uniformly right-branching structure, but this assumption follows free from the $\bar{X}$ theory, plus the fact that the phrase structure of any phrase in Chinese is subject to the condition (2.20): the head of a phrase may branch to the left only on the lowest branching level, and only if the phrase is not of the category N. In all other cases,

a phrase is always head-final, with its head always branching to the right. That is, given a string containing peripherals and a head in Chinese, the head must occur, in any linear representation, as the last element in the string, as in (57a), or as the last but one, as in (57b):

(57) a. P_1 P_2 ... P_{n-1} P_n HEAD

b. P_1 P_2 ... P_{n-1} HEAD P_n

If the asymmetrical scope relations among the elements within a given string are to be accounted for via a hierarchical definition of scope, then (57a) and (57b) must be given a hierarchical structure. Now, given that every string must be either of the form (57a) or of the form (57b) and the general requirement of $\overline{X}$ theory that every level of structure must be endocentric, the only possible hierarchical structure of any phrase is automatically always uniformly right-branching:

(58) a. $[P_1\ [P_2\ [\ \ldots\ [P_{n-1}\ [P_n\ [\text{HEAD}]]]]]]$

b. $[P_1\ [P_2\ [\ \ldots\ [P_{n-1}\ [\text{HEAD}\ [P_n]]]]]]$

Therefore, as far as simple sentences and phrases are concerned, the correspondence between scope order and surface order in Chinese can be accounted for in purely linear terms as well as in hierarchical terms. Note that this does not mean that Chinese lacks left-branching structures of any sort; it only lacks a left-branching structure as the internal structure of any single phrase or sentence. If we take into account also the internal structure of peripheral elements within any given string, it is possible to have left-branching structures. For example, the following string has a left-branching structure, which indicates

both the internal structure of the matrix sentence and the internal structure of the sentential subject:

(59) [$_S$[$_S$ Zhangsan lai] hao]
come good
'That Zhangsan comes is good.'

Although the structure given in (59) is left-branching, within each maximal phrase (S in this case) in it, however, the structure is binary branching, and therefore trivially also right-branching.

Left-branching structures like (59) are where the linear and the hierarchical accounts differ empirically. One type of relevant example involves sentences with quantificational expressions in both a matric clause and a sentential subject, a preverbal clause introduced by a preposition, a sentential topic, or a relative clause embedded in a preverbal NP:

(60) [[youwuliuge ren xuan zhemen ke] dui dajia dou hao]
5-or-6 men elect this course to everyone all good
'It will be good to everyone that there are five or six people who will elect this course.'

(61) [zhejian shi [[gen Lisi meiyou lai] meiyou guanxi]]
this matter with not come not relation
'This matter has nothing to do with Lisi's not having come.'

(62) [[meige ren dou lai] wo bu tongyi]
every man all come I not agree
'That everyone should come, I don't agree.'

(63) [mai-le henduo shu de neige ren] dui meige ren dou her
buy-ASP many book DE that man to every man all very

keqi.
polite,
'The man who bought many books was polite to everybody.'

In each of these sentences, there are two logical elements. The one on the left is embedded within a subordinate clause, and the one on the

right occurs as a constituent of the matrix clause. Evidently, in none of these sentences does the logical element on the left have wide scope with respect to the one on the right. The Linear Condition (55) breaks down immediately in the face of these examples. The hierarchical account, on the other hand, is not contradicted by these examples. Since the logical element on the left does not c-command the one on the right, the condition (56) does not assign a wide scope reading on the embedded logical element with respect to the matrix logical element. In this way, the hierarchical account should be considered superior to the linear account.[11]

Note that the hierarchical account, as it stands, also does not assign a wide scope reading on the matrix logical element on the right with respect to the embedded one on the left, in each of (60)-(63). This is because the matrix logical element does not c-command the embedded logical element either. These sentences, however, are generally agreed to have the interpretation according to which the matrix logical element has wider scope than the embedded logical element. As a left-to-right principle, (56) does not prevent this interpretation, but it also does not guarantee that these sentences have this interpretation.

But the correct scope interpretation of these sentences can be easily derived, without the help of the principle (56), if we only assume that QR applies in LF. There is independent evidence that QR, when it affects ordinary Q-expressions, has the general tendency of being clause bounded (cf. Chapter 4 below). Thus, after the application of QR on these sentences, the logical element which originates from

the matrix clause asymmetrically c-commands, and has scope over, the logical element which originates from the embedded clause. The output of QR on (60), for example, is (64):

(64) [dajia$_i$ [[youwuliuge ren$_j$ [t_j xuan zhemen ke]]
everyone 5 or 6 man elect this course

du t_i dou hao]]
to all good

Thus, the hierarchical account not only is not contradicted by sentences like (60)-(63), but also correctly allows their interpretations to be derived by independent principles.

The second type of examples where the linear hypothesis breaks down but the hierarchical hypothesis does not includes sentences like (65):

(65) Zhangsan hen bu-gaoxing sanjian shiqing.
very not-happy three matter
'Zhangsan is very unhappy about three things.'

Since the negative morpheme bu is a constituent of the lexical verb 'unhappy', it c-commands only the stem gaoxing 'happy', but not 'three things'. The linear account, but not the hierarchical account, wrongly predicts that the negation has scope over 'three things'.[12] Now, it is a fundamental assumption of the Extended Standard Theory that rules of movement that apply at a syntactic (phrasal) level cannot extract material from a lexical category (the Lexical Integrity Hypothesis). The only acceptable output of QR on (65), therefore, will give 'three things' wider scope than 'not' automatically.[13]

Another argument in favor of the hierarchical account is that certain scope facts in English may be made to follow from the hierarchical account as completely normal cases, but must be treated as marked cases

under the linear account via some marked scope readjustment rules. Consider the following sets of sentences, studied in Lasnik (1975):

(66) a. Always John didn't show up.

b. John always didn't show up.

c. John didn't always show up.

d. John didn't show up always.

(67) a. Because he loved her, John didn't marry her.

b. John didn't marry her because he loved her.

(68) a. Many of the problems, I couldn't solve.

b. I couldn't solve many of the problems.

Consider first (66). Among the four sentences in (66), only (66d) may have two readings. (66a-c) are each unambiguous. In (66a) and (66b), always must be interpreted as having wide scope with respect to didn't, and in (66c) always must be interpreted as having narrow scope. Lasnik indicates that, in a sentence like (66d), if the sentence-final always is uttered within the same intonation phrase as didn't, the normal interpretation is for always to have narrow scope with respect to didn't. The other interpretation, with the scope order inversed, is readily obtained when there is an intonation break before always. Within the linear account, the fact that (66d) admits two interpretations requires a special rule of scope readjustment. To account for such facts, Kroch (1974:146) proposes the following readjustment rule:

(69) $[\alpha\ (\sim)_n\ (Q)_{n+1}\ \beta] \rightarrow [\alpha\ (Q)_{n+1}\ (\sim)_n \beta]/\text{not}_n\ \text{aux}^X]\ Y\ \text{Quant}_{n+1}$

where Y contains an intonation break.

This readjustment rule is ordered to apply to the output of the General Scope Principle (13), and it flips the position of two operators the first of which is NOT and the second of which can be anything. The rule is conditioned by the requirement that the negation operator be separated by the following operator by an intonation break. Thus, the sentence (66d) will first be assigned the scope order [NOT ALWAYS] by the General Scope Principle. If there is an intonation break before always, the sentence is further subject to (69), which turns the scope order into [ALWAYS NOT]. The other sentences in (66) may not undergo the readjustment rule, however, since always does not follow didn't in (66a) and (66b), and no intonation break may occur between the auxiliary didn't and the adverb always in (66c).

The drawback of this treatment of (66) is its obvious ad hoc nature, and the implicit view that the order [ALWAYS NOT] in (66d) is a marked option of this language. But the readjustment rule is necessitated within this linear approach, there being no way of getting the required result. Given such a readjustment rule, one may ask why a similar readjustment rule does not exist that also affects the scope order of (66a) and (66b), and why the readjustment rule applies just in case an intonation break occurs between the two operators, but not if no intonation break may occur.[14]

Within the hierarchical account, on the other hand, there is nothing surprising about (66). Since English allows fairly full-fledged head-initial constructions, the head of a phrase may branch to the left at any level of phrasal expansion. Thus, in (66d) the adverb always

may be construed as a right sister of the VP containing the preverbal didn't, or as a right sister of a smaller VP not containing the negation:

(70) a. John [[didn't [show up]] always]

b. John [didn't [[show up] always]]

Both structures in (70) are legitimate $\bar{X}$ structures for English. In (70a) always asymmetrically c-commands didn't, but in (70b) the latter asymmetrically c-commands the former. Furthermore, the phrasal boundary immediately before always in (70a) is of a higher categorial level than the phrasal boundary immediately before always in (70b); therefore it is more natural to have an intonation break before always in (70a) than in (70b). The ambiguity of (66d), then, may be attributed to the fact that it allows a dual structural analysis. On the other hand, note that none of (66a-c) may have a dual structural analysis. If we assume that these sentences have a strictly hierarchical structure (i.e. every branching node is at most binary-branching), then in order to satisfy the $\bar{X}$ principle of endocentricity, they must each have a uniformly right-branching structure:

(71) a. [Always [John [didn't [show up]]]]

b. [John [always [didn't [show up]]]]

c. [John [didn't [always [show up]]]]

What we have said concerning (66) applies equally well to (67) and (68). (67a) is not ambiguous, and the motivational adverbial clause has wide scope over the negation operator. (67b) is ambiguous, however, because the sentence allows a dual structural analysis. In

one analysis, the negation operator asymmetrically c-commands the adverbial clause, and the sentence means that John married her, not for reason of love. In the other analysis, the adverbial clause c-commands the negation, and the sentence is synonymous with (67a).

Similarly, (68a) is entirely unambiguous, since the sentence may be hierarchically represented only in a strictly right-branching structure. (68b), on the other hand, is ambiguous. Lasnik remarks that when a sentence like (68b) is given an intonation in which I couldn't solve has the contour of an independent sentence, many will be non-negated. It is natural to assume that, when uttered with such an intonation contour, the object phrase many of the problems appears in a position as if it has undergone rightward dislocation (or extraposition), in a structure like (72a) or (72b):

(72) a. [I [[couldn't solve] many of the problems]]

b. [[I couldn't solve] many of the problems]

We see therefore that an otherwise unexplained fact in English follows from the hierarchical account of scope and the independently motivated $\overline{X}$ theory of phrase structure. It is only sentences like (66d), (67b) and (68b) that may have ambiguous scope interpretation, but not the others in (66)-(68). Within a linear account, this fact would be an accident.

Note that the explanation just proposed also offers a natural account of an important typological distinction between languages like English and languages like Chinese. The Chinese counterpart of (68b), for example, is entirely unambiguous:

(73) wo meiyou jiejue henduo wenti.
I not solve many problem
'I solved few problems'

The only possible interpretation of this sentence has the scope order [NOT MANY]. This reading is available because the sentence has a strictly right-branching structure. The sentence does not admit a structural analysis either of the form (72a) or (72b), however, because, as we have seen in the preceding chapter, there is a very strict condition on possible $\overline{X}$ structures in Chinese, namely the condition (2.20). The condition says that in any given phrase or sentence, the head may branch to the left only on the lowest level of expansion. In our discussion of the condition, we assumed that it applies at PF as a filter, and allowed a limited type of violation of this condition to occur at SS and in LF. This has to do with constructions like the following (cf. 2.44-47):

(74) neizhi ma bei ta [$_{\overline{V}}$[$_{V}$ qi t] de hen lei]
that horse by he ride till very tired
'That horse was made very tired as a result of his riding it.'

Since only one lexical phrase occurs to the right of a verb in addition to a trace, and there is otherwise no evidence for the need for allowing any other further violation of the $\overline{X}$ condition (2.20) at SS or LF, it is natural to assume that the only possible exception to the $\overline{X}$ condition is of the form (74), in which the postverbal element is a sister to the $\overline{V}$ which dominates the V and the trace. That is, the lexical postverbal phrase must be dominated by the lowest VP node that dominates more than one lexical node.[15] Now, if (73) were to allow an

interpretation with 'many problems' having wide scope over 'not', we would expect the sentence to have either the analysis (75a) or (75b):

(75) a. wo $[_{\bar{V}}[_{\bar{V}}$ meiyou $[_{\bar{V}}$ jiejue $t_i]]$ <u>henduo wenti$_i$</u>$]$
I not solve many problem

b. $[_S[_S$ wo $[_{\bar{V}}$ meiyou $[_{\bar{V}}$ jiejue $t_i]]]$ <u>henduo wenti$_i$</u>$]$
I not solve many problem

In both cases, the lexical Q-NP is not dominated by the lowest VP node that dominates more than one lexical element. The absence of ambiguity in the Chinese sentence (73) thus follows from a plausible principle concerning the $\bar{X}$ structures of this language, while the possibility of allowing ambiguous internretation on the English sentence (68b) follows from the fact that the language allows a much wider variety of head-initial constructions.

I would like to suggest that many other cases of scope ambiguity in English may be plausibly accounted for along the same line. For example, consider sentences like the following:

(76) a. Someone saw everyone.

b. Everyone saw someone.

Although the sentence (68b) readily allows an interpretation with <u>many of the problems</u> having wide scope with respect to <u>couldn't</u> when there is an intonation break before the object NP, an intonation break is not always required, in fact, for this interpretation to be available. The two sentences in (76) may also each have their object Q-NP interpreted as having wide scope, even though no intonation break occurs before each object NP. Recall that it is plausible to

assume that the intonation break that may occur in (68b) is the result of a vacuous extraposition of the object NP many of the problems to the right of a VP or to the right of an entire sentence, i.e., an application of Restructure α, which may be assumed to take place in Syntax. There seems to be no special reason why the same process of restructuring may not take place in LF, subject to independent well-formedness conditions.[16] If it takes place in LF, it is not expected to cause any change in the intonation contour of a sentence. Suppose that this is possible, then, as a free option in interpreting scope. Then, the inverse scope interpretation is available in the English sentences (76a) and (76b) and the like, because the result of the assumed restructuring process is admissible as a legitimate $\overline{X}$ structure of this language. The unavailability of the same inverse scope interpretation in the Chinese counterparts of such sentences, on the other hand, may again be attributed to the special $\overline{X}$ structure restriction in this language.[17]

In summary, the hierarchical account embodying something along the lines of (56) fares better than the linear account for the following reasons. First, it correctly allows the required interpretations of complex sentences like (60)-(63) to be derived without the stipulation required of the linear condition that it applies to simplex sentences only. Secondly, it also accommodates sentences like (65) involving lexical negation. Thirdly, it derives certain scope facts concerning sentences like (66d), (67b), (68b) as perfectly unmarked cases without the need for certain marked scope

readjustment rules. Fourthly, it offers a principled explanation, in conjunction with the $\overline{X}$ theory, for the contrast in English between the unambiguous (66a-c), (67a), (68a) on the one hand, and the ambiguous (66d), (67b), and (68b) on the other. Similarly, it also offers a principled explanation for the typological distinction between English-type langagues, which exhibit certain scope ambiguities, and Chinese-type languages, which do not. The non-existence of scope ambiguities is related to the existence of the $\overline{X}$ condition (2.20), and the existence of scope ambiguities, to the absence of this condition. Undoubtedly, this theory does not account for all the scope phenomena in English or all the differences between the two languages. For example, sentences like (77) have the usual scope order [NOT ALL], inverse to their surface linear and hierarchical order:

(77) All cows aren't black.

Furthermore, there is no way to derive this reading by restructuring. What we are claiming, however, is that only such sentences constitute the genuine marked cases of quantification. A lot of other cases that have heretofore been derived as marked, can be described as falling entirely within the core system.

The last point just mentioned also argues against May's (1977) theory of quantification, in which relative scope of two or more quantifiers within a simple sentence is treated as fundamentally free. The systematic language-internal distinction between certain

sentence types in English, and the systematic typological distinction between English and Chinese, cannot be derived under this assumption.

There is a further, important argument in support of our theory, from an acquisitional point of view. How does a child learn about the distinction between English and Chinese with respect to scope interpretation? There is little reason to believe that there is any direct or indirect evidence, positive or negative, that tells the child to allow scope ambiguities if he learns English, and not to do so if he learns Chinese. This distinction is obviously not directly learnable, and so must be derived from something that is learnable. Now, the word-order, more precisely the $\overline{X}$-structure, differences between the two languages have to be learnable. The Chinese-speaking child must learn the condition (2.20), or something like it (though what actually has to be learned may be less than (2.20), cf. footnote 10 of Chapter 2). The English-speaking child, on the other hand, must not acquire (2.20) as a principle of his language. There is, furthermore, good reason to believe that various kinds of direct and indirect evidence on these word order facts are available to the child. Our theory derives the scope facts from this learnable aspect of language, and is therefore more explanatory from the viewpoint of language acquisition.

The arguments we put forth in this section will be strengthened somewhat when we consider sentences involving "NP-internal" quantification in Chapter 4 below. In the rest of this chapter we digress to a discussion of the notion of configurationality.

3.3. On the Notion of Configurationality

3.3.1. Scrambling and Its Correlates

We observed that the order of adnominal modifiers in Chinese is syntactically free, as long as each of them occurs before the head noun. The same observation was made about the order of adverbial modifiers, also as long as they each precede their head V or $\overline{V}$. Such freedom of word order is an important characteristic of many other languages of the world. In the tradition of generative grammar, this is referred to as the "scrambling" phenomenon, the term being derived from the analysis given for the free word order (cf. Ross 1967). More recently, such freedom of word order is identified as a characteristic of languages referred to as non-configurational (cf. Hale 1980, 1981, 1982, Chomsky 1981a, Farmer 1980, Nash 1980).

According to the traditional analysis of word order freedom, a certain word order is assumed to be basic, and a rule of "scrambling" operates to yield all alternate orders, as demonstrated in Ross' (1967) analysis of Japanese, for example. In Chomsky and Lasnik (1977), the rule of scrambling is assumed to apply in PF, thus treating the scrambling phenomenon as a stylistic matter. Thus, of the two possible surface forms (78a-b) below, only one is available at SS and gets interpreted in LF:

(78) a. Zhangsan de sanben shu
DE three book
'Zhangsan's three books.'

b. sanben Zhangsan de shu.
three DE book
'Three of Zhangsan's books.'

By contrast, since English does not allow free word order among prenominal modifiers, as the following shows, the difference between languages like Chinese and languages like English is taken to be one between having and not having this PF rule of scrambling.

(79) a. John's three books.

b. *Three John's books.

Note that the assumption that scrambling is a stylistic rule does not seem to be a right one. This is because although word order is syntactically free, we have seen that every order difference almost always entails a difference in meaning. The semantic difference between (78a) and (78b), for example, is one of specificity, and this difference even shows up in the form of a grammatical contrast, as seen below:

(80) a. Zhangsan de sanben shu zai zher.
DE three book at here
'Zhangsan's three books are here.'

b. *sanben Zhangsan de shu zai zher.
three DE book at here

(81) a. *wo yigong kanjian-le dai yenjing de sange xuesheng.
I altogether see-ASP wear glasses DE three student
'Altogether, I saw the three students who had glasses on.'

b. wo yigong kanjian-le sange dai yenjing de xuesheng.
I altogether see-ASP three at glasses DE student
'Altogether, I saw three students who had glasses on.'

Within the framework in which SS but not PF feeds into LF, therefore, the scrambling rule must be assumed to be a rule of Syntax.

A general drawback of the scrambling theory is the arbitrary nature in the choice of a basic form from two or more alternate word order possibilities. For example, since both (78a) and (78b) are well-formed, each having a different interpretation, there appears to be no principled basis to decide which of the two should be the base form and the other derived from it by scrambling.

A more important drawback of the scrambling theory is pointed out in Hale (1982). Hale observes that languages that allow free word order often also share certain other properties which distinguish them from languages that do not allow free word order. That is, a language that has the property (82a) often has some or even all of the properties (82b-g):

(82) a. Free word order.

b. The use of discontinuous expressions.

c. Free or frequent "pronoun drop".

d. Lack of the NP-movement transformation.

e. Lack of pleonastic NPs (like it, there, il, ...)

f. Use of a rich case system.

g. Complex verb words or verb-cum-AUX system.

To this list we may add also the following:[18]

(82) h. The lack of standard ECP effects.

Walpiri, for example, may be said to have all of the properties indicated in (82) (see Hale 1981 and Nash 1980). Japanese is known to have most of the properties of (82) (see, e.g. Farmer 1980, among others). It makes good sense to ask why certain or all of these

properties should cluster together in certain languages. It would be good to have a theory of typology which can derive some or all of these properties at once from one single parameter, thus explaining their clustering. The scrambling theory, however, does not seem to offer any explanation on this clustering. According to the scrambling theory, languages differ with respect to the parameter [± scrambling]. It is not clear, however, why a language having a scrambling rule should lack a transformation of NP-movement or should have no pleonastic NPs.

3.3.2. "Flat" vs. Configurational Structures

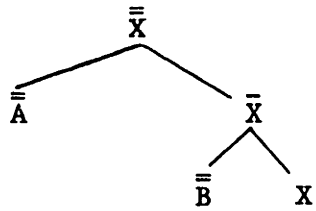
As an attempt to tie together some or all of these clustered properties of "non-configurational" languages, Hale (1982) suggests, along his own earlier work and others, that the relevant parameter is to be stated in terms of the $\overline{X}$ theory of phrase structure. Take head-final $\overline{X}$ structures for example. Hale suggests that the typology of configurationality may be stated as a parameter of having $\overline{X}$ structures defined by both the rule schemata (83) and (84), or having $\overline{X}$ structures defined solely by the rule schema (84) alone:

(83) $\overline{\overline{X}} \rightarrow \ldots \overline{X}$

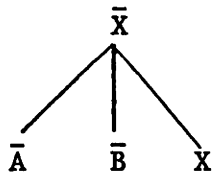
(84) $\overline{X} \rightarrow \ldots X$

The languages that make use of both (83) and (84) thus have configurational phrase structures of the form (85), and the languages that make use of only (84) have non-configurational or flat structures of the form (86):

(85)



(86)



Hale indicates that this typological scheme fits rather naturally into the theory of government and binding of Chomsky (1981a). According to one conception of this theory, government may be defined in terms of c-command in the following manner (see Chomsky 1980a:25):

(87) Government

> α is governed by β if α is c-commanded by β and no major category or major category boundary appears between α and β.

According to (87), the lexical head X of (85) governs its argument $\bar{\bar{B}}$, but does not govern its argument $\bar{\bar{A}}$. Thus, government can function in a configurational language to distinguish among the arguments of a lexical head. A subject/object asymmetry, for example, may exist therefore in a language using (85). On the other hand, since $\bar{A}$ and $\bar{B}$ in (86) are sisters of their lexical head, government does not distinguish between them, and there is no subject/object asymmetry with respect to government.

As Hale suggests, one way in which government may be related to the typology of configurationality is to assume that the principle of

government operates in configurational languages only, but not in non-configurational languages: the "principle 'clicks on', so to speak, in two-bar languages; this same principle 'shuts down' in one-bar languages". Thus, in a configurational language the principle of thematic role assignment may be plausibly assumed to depend upon government as defined in (87). Suppose that the theory of thematic relations provides that a thematic role is <u>directly</u> assigned by a lexical head (e.g. a V^0) to an argument if that position is governed by the head. Then the argument $\bar{\bar{A}}$ in (85) is not directly assigned a thematic role, but $\bar{\bar{B}}$ is. Suppose further that only positions governed by a lexical head are obligatory thematic positions. Then subject positions in English are not obligatory thematic (θ) positions, since they are not governed by a lexical head. From here it follows that, in a language like English, NP-movement rules like passive may exist (assuming that the subject position of a syntactic passive in English is not a θ-position, cf. Freidin 1975, Chomsky 1981a, etc.). It also follows that certain subjects may be pleonastic or expletive.

In a non-configurational language, on the other hand, since configuration alone cannot differentiate arguments under government, all argument positions have the same structural relations to their lexical head. Therefore, all argument positions may be assumed to be θ-positions. From here it follows that a non-configurational language lacks a syntactic rule of NP-movement, and does not allow the use of pleonastic subjects.

The distinction between configurational and non-configurational languages with respect to word order freedom can also be accounted for in this system.[19] Suppose that, as a universal principle, arguments that are thematically closer to their heads cannot stand in a more distant syntactic relation to their heads than arguments that are not so closely related to the heads. In a nominative-accusative language, objects are thematically more closely related to their verbs than subjects (see Chomsky 1981a, Marantz 1981 for some discussion). Suppose that the relative closeness of a syntactic relation is measured in terms of government: A and B are syntactically closer to each other if they hold a relation of government than if they do not hold such a relation. Then in a configurational language using structures of the form (85), the object has to occur in the position of $\bar{\bar{B}}$ (in English, $\bar{\bar{B}}$ would occur on the right of X), while the subject has to occur in the position of $\bar{\bar{A}}$. This is the only way to satisfy the requirement. Therefore, a configurational language does not allow free word order among arguments like subject, object, etc. On the other hand, in a non-configurational language having structures of the form (86), $\bar{A}$ and $\bar{B}$ are equally close (or distant) to the head X as far as government is concerned. Whether the object should occur in the position of $\bar{B}$ or $\bar{A}$ (and consequently whether the subject should occur in the position of $\bar{A}$ or $\bar{B}$) is of no significance. The "scrambling" nature of non-configurational languages therefore follows.

3.3.3. A Government Theory of Configurationality

An important intuition captured in Hale's theory is that an asymmetry may exist between various arguments of a lexical head in a configurational language, but not in a non-configurational language. While Hale assumes that the theory of government "clicks on" in one type of language but "shuts down" in the other, a slightly different execution of his idea is to assume that the theory of government operates in both kinds of languages, but that, due to the difference in structure between (85) and (86), an asymmetry exists only in (85) but not in (86). In other words, instead of saying that the two arguments in the non-configurational structure (86) have the same status because government applies to neither of them, one may say that they have the same status because government applies to both (i.e. both are governed by their lexical head according to the definition (87)).

Note that the lack of asymmetry among various arguments of a lexical head in a non-configurational language is derived directly from the assumption that each phrase in such a language has a flat, one-bar internal structure, in which every argument is c-commanded by its lexical head. If the freedom of word order among prenominal and preverbal modifiers in Chinese is to be accounted for in the same manner, as an instance of "scrambling", one will need to assume that the prenominal and preverbal modifiers occur in linear order before their heads. However, we have indicated that the semantic difference

entailed by each word order difference is best accounted for as a difference in scope order of the modifiers, which is in turn best accounted for by hierarchical representations, in particular by representing the modifiers in strictly right-branching structures. We must now try to see if this contradiction can be avoided.

I think that a possible way out of this dilemma lies in what is the proper formulation of government. As defined in Chomsky (1980a), the notion government makes crucial reference to the notion c-command originally defined by Reinhart (1976). A different formulation of government has been suggested by Aoun and Sportiche (1981). Their definition of government is the following, in effect:

(88) Government (Aoun and Sportiche)

> α governs β if and only if $\alpha = X^0$ and every maximal projection dominating α also dominates β and <u>vice versa</u>.

According to this definition, relative prominence within the same maximal projection does not matter in order for government to obtain. Thus, in both the structure (85) and the structure (86), the lexical head X governs both its arguments. There is no asymmetry among various arguments of a lexical category under this notion of government, then, whether the structure of a given phrase is configurational or not.

Suppose that we now assume that a possible parameter distinguishing free word order from fixed word order languages makes crucial reference, not to whether a language allows $\bar{X}$ structures of more than one bar in depth or not, but to whether it utilizes the earlier notion of government formulated in Chomsky (1980a)--the OB (On Binding)

government, or the formulation of Aoun and Sportiche--the AS government, for the purpose of thematic role assignment. It seems the same result can be obtained even if free word order languages are assumed to have configurational structures. More specifically, assume that fixed word order languages like English employ the more strict version of government (i.e. OB government) for thematic role assignment. As before, objects can be directly θ-marked by their lexical heads only if they are c-commanded by the latter. Therefore, subjects cannot exchange their positions with the objects:

(89) They destroyed the city.

(90) Their destruction of the city.

On the other hand, in a free word order language, θ-role assignment to a position P requires only that P be AS-governed by its lexical head, not necessarily OB-governed. Therefore, a subject may exchange its position with an object and a specifier may exchange its position with a complement, as far as they occur within the same maximal projection, even though they are not c-commanded by their lexical head. This gives the scrambling effect. The lack of NP-movement and the non-existence of expletive subjects may also be derived in the same fashion. Because AS government allows configurational sentences, we also allow the differences of scope resulting from different word orders to be accounted for by a hierarchical representation of scope.[20]

Note that the suggestion made here implies that in a language that allows "scrambling" of subject and object of a sentence, the

node S must be considered a projection of V. In other words, there is no VP in a language such that the VP is properly contained in an S and is itself a maximal projection. This consequence is necessary because an argument outside of a maximal VP would not be AS governed by a lexical verb, and is syntactically more distant from the verb than an argument in VP. By the requirement that objects may not stand in more distant relation to their verbs than subjects (where distance is measured in terms of government), a language with maximal VP does not allow subjects to occur in VP and objects outside of VP. The assumption that scrambling languages lack a VP is, of course, familiar to many working with languages like Japanese. But in the context of our notion of configurationality it should be taken to mean that such languages have no V^{max} such that V^{max} is not a clause. Any combination of an argument with V is a verb phrase, a V^{n}, where n may or may not be maximal. The assumption that Japanese does not have an S-internal V^{max} is quite consistent with the fact that there appears to be no process of VP movement in this language. Under the usual assumption that only maximal phrases are movable (cf. footnote 7), this is what is expected. By contrast, English is known to have maximal VPs internal to Ss, as shown by the fact that one may move VPs:

(91) He said he will come, and come he certainly will.

The fact that English does not allow scrambling of subject and object of a sentence may therefore be derived also from the assumption that

VP is a maximal projection in English. However, while it is true that the existence of a maximal VP internal to S precludes scrambling, it is not the case that the absence of such an internal maximal phrase always allows scrambling. For example, the $\bar{N}$ in English is not generally considered a maximal projection, yet English requires that the subject of NP always precede its complement, as in (90). There are two relevant parameters, then, that can determine whether a language allows free word order or not:

(92) a. Whether VP is a maximal projection.

b. θ-role assigned under OB- or AS-government.

If VP is a maximal projection, then a language necessarily has fixed word order in its sentences. If not, then if θ-role is assigned under OB-government, the language has fixed word order; if under AS-government then free word order. The noun phrase structures of a fixed order language like English represent the second possibility described here: order of words in NP is fixed, though there is no maximal code in NP comparable to the VP in S; we have to assume that θ-role is assigned in English under OB-government.[21]

Note that whether or not VP is a maximal projection in a given language can be partially derived from whether or not there is an INFL (or AUX) node in S and whether that node is the head of S. If INFL is the head of S, then VP is automatically a maximal node, under the principles of the $\bar{X}$ theory. If there is no INFL, or if the INFL is not the head of S, then VP may be naturally assumed to be non-maximal, with S being a further projection of VP. But one might also

assume that S is a special category headed by a maximal VP, representing some deviation from the $\bar{X}$ theory.

In English, there is some reason for regarding INFL as the head of S (see Hale 1978a,Chomsky 1981a, and Akmajian et al 1979). This has the immediate consequence that VP is maximal. Although there are also some grounds for considering S as a projection of VP (cf. Jackendoff 1977, Marantz 1980), I will assume the VP-is-maximal hypothesis, because of the desirable consequences it has on the theory of binding and the ECP. Now let us consider the internal structure of S in Chinese.

3.3.4. The Sentential Structure of Chinese

In Chinese, there is also some evidence for VP as a maximal node. Assuming that movement may affect only maximal nodes, the following sentence shows that VP is maximal:

(93) Zhangsan chifan hen hui, zuoshi yidian dou bu hui.
eat very can work at-all all not can
'Eat, Zhangsan certainly can; but work, he cannot at all.'

Note that although Chinese is not an inflectional language, there is a little evidence for the postulation of a separate syntactic constituent of INFL or AUX. There is no morpheme that may be said to be entirely equivalent to a tense in English, but there exist a handful of aspect markers which are attached to verbal elements. Aspect markers like zhe 'progressive', guo 'experiential', etc. are usually added to lexical verbs:

(94) ta zai chuangshang tang-zhe
he at bed lie-progressive
'He is lying in bed.'

(95) ta lai-guo.
he come-experiential
'He has been here before.'

In such cases, one might assume that the aspect markers are added to lexical verbs in the word formation component. The situation with the perfective aspect marker le, which appears in many of our previous examples and is glossed as ASP, is quite different. As Wang (1965) has shown, the item le alternates with you 'have'. If there is a negative marker in the VP, the perfective aspect shows up as you 'have' immediately after the negative but before the lexical verb. In other cases, the aspect shows up as le attached to the end of a V.

(96) Zhangsan piping-le ta.
criticize-ASP he
'Zhangsan criticized him.'

(97) Zhangsan mei-you piping ta.
not-have criticize he
'Zhangsan did not criticize him.'

(98) *Zhangsan you piping ta.
have criticize he

(99) *Zhangsan mei piping-le ta.
not criticize-ASP he

(100) *Zhangsan mei-you piping-le ta.
not-have criticize-ASP he

(96)-(97) show that le is correctly suffixed to a verb in an affirmative sentence but appears preverbally in a negative sentence. (98)-(99) show that the reverse situation is unacceptable, and (100) that the two items you and le are mutually exclusive. As Wang (1965)

shows, the facts shown by (96)-(100) argue for a syntactic constituent for the perfective aspect (ASP) preceding both the negative and the main verb, i.e. before the entire predicate, which undergoes a process similar to Affix Hopping, say in PF, and gets moved to its appropriate surface position.

A similar type of evidence for Affix Hopping can be derived from the well known alternation below (cf. e.g. Lu 1975, Chao 1968):

(101) a. ta neng chiwan neiwan fan.
he can eat-up that rice
'He can eat up that bowl of rice.'

(102) b. ta chi-de-wan neiwan fan.
he eat-can-up that rice
'He can eat up that bowl of rice.'

(102) a. ta bu-neng chiwan neiwan fan.
he cannot eat-up that rice
'He cannot eat up that bowl of rice.'

b. ta chi-bu-wan neiwan fan.
he eat-can't-up that rice
'He cannot eat up that bowl of rice.'

In (101), the potential model neng 'can' alternates with the potential infix -de-. In (102), the negated potential model bu-neng 'can't' alternates with the infix -bu- 'can't'. Note that neng and de cannot co-occur, nor can bu-neng and bu:

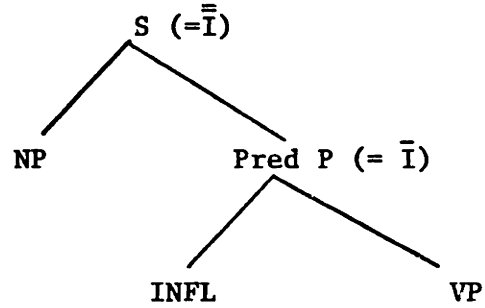
(103) *ta neng chi-de-wan neiwan fan.
he can eat-can-up that rice

(104) *ta bu-neng chi-bu-wan neiwan fan.
he cannot eat-can't-up that rice

There is therefore some motivation for assuming that neng and -de- are allomorphs of the same INFL element, and so are bu-neng and -bu-. A process of Affix Hopping will account for their alternation.

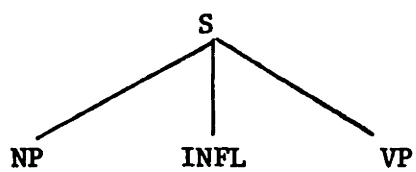
With the evidence for a maximal VP and a syntactic INFL constituent, I will assume that Chinese and English have essentially the same sentential structure, namely the skeletal structure below:

(105)



The predicate phrase is INFL-single bar, and S is INFL-double bar. This structure differs somewhat from that assumed in Chomsky (1981a), etc., where S has the structure (106):

(106)



The structure (105) is more in line with traditional assumptions, as in e.g. Chomsky (1965) and earlier work, including work done in structural linguistics. One argument for preferring (105) over (106) is that, intuitively, INFL (AUX) is more closely associated with the VP. In traditional immediate constituent analysis, the first "IC cut" always splits a sentence into the subject and the predicate phrase. Secondly, the only reason for taking (106) as the

correct structure, it seems to me, is that we want INFL to govern the subject, for purposes of Case assignment and the binding theory, etc. This was necessitated, however, only by the assumption that the relevant notion of government for these purposes is OB-government. If we assume instead that the relevant notion in these cases is AS-government (and there is good reason to believe this to be correct, cf. Aoun and Sportiche 1981, Chomsky 1981a), then the structure (106) is not necessary. In (105), INFL also AS-governs the subject, since INFL is X^0 and the subject occurs within a projection of INFL.

While the existence of INFL and VP movement does not fully support the idea that INFL is the head of S, as in (105), I will assume it to be the case. The following points constitute further partial support, and together, I think, they argue strongly for our assumption.

First, the word order between subject and object is fixed in Chinese. Unlike scrambling languages, Chinese requires the order of SVO. This will follow if VP is maximal. One could say that the fixed order of words in a Chinese sentence may be derived from the assumption that θ-role is assigned in this language under OB-, not AS-government. But recall that peripheral elements within an NP are free in order, and we will want to assume AS-government in this case. It will be good to assume that Chinese employs AS-government for θ-role assignment throughout, but that the fixed order of constituents in S follows from VP being maximal, for which there is already independent evidence.

Secondly, note that in a simple sentence, only the postverbal object and the subject may be NPs. All other preverbal elements must be introduced by a preposition or are themselves of a non-NP category:[22]

(107) Zhangsan zai xuexiao ba Lisi da-le.
at school BA hit-ASP
'Zhangsan hit Lisi at school.'

A natural assumption about the preposition ba in all ba-constructions like (107) is that it exists solely as a Case-marker, in order to save a structure from the Case Filter, which requires every lexical NP to be Case-marked. A postverbal object need not be introduced by a preposition, on the other hand, because it is Case-marked by the verb. Preverbal phrases cannot be Case-marked by the verb since, presumably, they are outside of the first maximal VP node dominating the verb (i.e., they are adjoined to VP). Now, the fact that the subject need not be introduced by a preposition shows that it is already Case-marked. The Case-marker cannot be the verb, as there is no reason why a verb can Case-mark the more distant subject, but not the closer preverbal elements. It is natural to assume that an abstract INFL exists here which governs and Case-marks the subject.

Thirdly, in control structures of the following sort, the embedded subject position cannot be lexically filled:

(108) wo bi Lisi[PRO lai]
I force come
'I forced Lisi to come.'

(109) *wo bi $Lisi_i$ [ta_i lai]
I force he come

The fact that the embedded subject position in (108) cannot be

lexically filled can be plausibly derived from the assumption that this position cannot be Case-marked (see Chomsky 1980a, etc.).

Finally, as we will show in Chapters 6 and 7, extraction of a subject in Chinese does not exhibit ECP effects, but extraction of an adverbial phrase does. To account for this fact, we will want to say that the ECP does apply in Chinese, and for some reason the trace of a subject always satisfies the requirements of the ECP. For various reasons given there, we will want to say that the subject is (properly) governed from within its own clause. Now, if the proper governor were the verb (i.e. if S were a projection of VP), then it would be extremely odd that while the more distant subject is properly governed by the verb, the less distant adverbial phrases are not. If we assume that VP is maximal and that INFL is the head of S, then government of the subject may naturally be assumed to come from the INFL. Since the adverbial clauses are separated from the INFL by a VP node, they will be correctly prevented from being properly governed by the INFL.[23]

Before we end this section, let us consider one further fact of Chinese: that it does not have pleonastic subjects corresponding to _it_, _there_, _il_, etc. Since we assume that VP is a maximal projection, this fact can no longer follow from the account suggested by Hale, as adapted here. Assuming that every position governed by a lexical head is an obligatory thematic position, the VP-is-maximal hypothesis does not require that the subject in Chinese is a thematic position.

Therefore, it allows pleonastic subjects here, in principle, although the language does not have such elements.

But note that nothing in our theory requires that a configurational language must have pleonastic subjects. The fact that there is no pleonastic subject in Chinese is no counterexample to the theory. To account for the fact that English does have pleonastic subjects but Chinese does not, I will assume that English has the special property of requiring a subject for every sentence, while Chinese does not have this special property. In terms of phrase structure rules, this would mean that English has the rule S → NP PredP, while Chinese has S → (NP) PredP. (Alternatively one might assume that the absence of pleonastic it in Chinese follows from the fact that in this language inanimate noun phrases cannot be pronominalized except in the domain of a preposition, i.e. inanimate pronouns cannot be phonetically realized in subject position. But this does not extend to the absence of existential there, if one assumes that existential there is an NP whose existential use is "borrowed" from the locative there. Chinese does allow a locative there to be phonetically realized: nali.)

I think this assumption, i.e., that the lack of pleonastic subjects in Chinese follows from something other than the theory of configurationality adapted here, is reasonable. This is supported by the following observation. If the lack of pleonastic subjects (in Chinese) were a consequence of the theory of configurationality (i.e. the assumption that Chinese has non-configurational sentential structure), then one

also expects that there is no NP movement in this language. But, on the contrary, there is evidence for NP movement in Chinese. For example, it is possible to have sentences of the following sort:

(110) wo_i bei ta ku de [t_i hen shangxin]
I by he cry till very sad
'I was made very sad as a result of his crying (so much).'

We know that ku 'cry' cannot be passivized alone, being intransitive:

(111) *wo bei ta ku-le.
I by he cry-ASP
'*I was cried by him.'

Therefore, it is most natural to assume, as in Hashimoto (1971), etc., that (110) is derived from a DS in which the subject wo 'I' originates as the subject of the resultative clause:

(112) [e] bei ta ku de [wo hen shangxin]
by he cry till I very sad

The process that turns (112) into (110) will be an instance of Move α, which has the effect of both passive and raising. If this is reasonable, then, the subject of a passive sentence like (110) is not a thematic position, and a phonetically full NP occurring there must inherit its thematic role from elsewhere. This situation would be impossible if Chinese were an entirely non-configurational language.

In short, Chinese is a mixed type between configurational and non-configurational languages. It has a maximal VP, and therefore fixed word order for arguments of a sentence. But it employs AS-government for thematic role assignment, and therefore allows free word order among peripheral elements within a noun phrase.

CHAPTER THREE: FOOTNOTES

1. The element dou in (3) is an adverb meaning 'uniformly, all.' It indicates that a certain noun phrase preceding it is to be interpreted as universally quantified and further that the quantified NP has scope over the clause that dou occurs in. Dou is therefore a trigger of universal quantification and a scope marker. The element you in (4), on the other hand, has the force of existential quantification. It occurs before a preverbal or sentence-initial indefinite noun phrase. There are two standard treatments of this element in the literature. It may be treated as forming an existential quantifier together with an indefinite QP; or it may be treated as the verb 'have' or 'exist, there is.' (It may also appear as a variant of the perfective aspect marker, whose other variant is le, glossed as ASP in our examples.) In what follows I will assume it to be an existential quantifier. Under the assumption that it is an existential verb, sentences containing it will be treated as complex sentences. 'One man' and 'every book' in (i) below may then be taken to occur, respectively, in the matrix and the embedded clause:

(i) you yige ren mai-le meiben shu
have one man buy-ASP every book
'There was a man who bought every book.'

The scope order [E A] in (i) might then be taken to be due to the fact that the universal is embedded, though the existential is not. This will make sentences of the sort (i) less clear examples of the claim that scope order corresponds to the surface order, if one assumes

that scope of a quantifier is clause-bounded. The other types of examples given above, as well as the many to be given below, should be enough to establish this claim, however. Furthermore, as we will show in Chapter 4, clause-boundedness is only a tendency of quantifier scope interpretation, not an absolute condition. See Tang (1977) for some discussion of both treatments of you.

2. Actually, the representation given in (5) and (6) is not consistent with the standard first order logic notation. (5), for example, has the entire NPs every student and one book occurring in operator position and treats them as "generalized quantifiers" (cf. Barwise and Cooper, 1981). The standard logic notation for all men are mortal treats only the quantifier all as an operator binding an open sentence containing a conditional: Ax [[x is a man ⟶ [x is mortal]]. We return below to a brief discussion of the appropriateness of the use of "generalized quantifiers."

3. Note that the negative morpheme bu appearing in (7) - (9) and (11) is realized as the variant mei when appearing immediately before you, as shown in (10) and (12). For an account of the bu/mei allomorphy, see Wang (1967).

4. For example, the quantifier each in English tends to have wide scope over other quantifiers, as is well known, as do any and wh words. For discussion of some aspects of wide scope quantification regarding any and wh words in English, see Aoun, Hornstein and Sportiche (1981). S. F. Huang (1981) claims that the inherent

properties of individual quantifiers do not even play a role in Chinese. This must be considered false, however, on several counts. For one thing, Huang has observed himself that numerally quantified NPs tend not to occur in the domain of negation. This is the "positive polarity" property of such NPs. He also makes a distinction between henduo 'many' and xuduo 'a lot of,' saying that the latter is an assertive ("positive polarity") quantifier. On the other hand, note that the adverb conglai 'ever,' unlike yixiang 'always,' is a "negative polarity" item:

(i) a. ta conglai bu suiwujiao
he ever not nap
'He never takes a nap.'

b. *ta conglai dou suiwujiao
he ever all nap
'*He ever takes a nap.'

(ii) a. ta yixiang bu suiwujiao
he always not nap
'He always does not take a nap.'

b. ta yixiang dou suiwujiao
he always all nap
'He always takes a nap.'

In 4.1.2, we will also show that certain quantifiers homophonous with wh words in Chinese are "negative polarity" items when they occur postverbally. Finally, it will be shown in 4.2 that wh quantifiers in Chinese behave on a par with their counterparts in English in taking wider scope than ordinary quantifiers.

5. Actually, May's rule QR is formulated simply as (i):

(i) Adjoin Q (to S).

This rule is subject to a condition of analyzability, reproduced

in (27) below, so that when QR is triggered by a certain Q (quantifier), it will move an entire NP containing the Q.

6. There is, in fact, a reading in which the second quantifier in each of (25) - (26) has scope internal to the NP which immediately contains the first quantifier. Thus, (25b), for example, may mean "Each of the persons who belong to a key congressional committee (or another) voted for the amendment." The PP of a key congressional committee, in other words, is construed as if it were part of a relative clause modifying the head NP each of the members. Similarly, (25a) may have the meaning "some people who (i.e., each of whom) come from every walk of life like jazz", although this reading is hard to get due to pragmatic reasons, since nobody is so versatile as to hold every occupation at the same time. (26) may also mean "some exits which come from every freeway which goes to a large California city or another are badly constructed," although this is pragmatically absurd, again, because there is no exit that can come from more than one freeway at the same time. In each of these readings, the quantificational NP contained in the PP does not have scope over the NP in which the PP is contained. These readings will be referred to as the NP-internal scope readings, following Fiengo and Higginbotham (1981). What is relevant in the present discussion is not the NP-internal reading, but the NP-external reading on the second quantifier in each of (25 - (26). When both some and every in (25a) are construed as having scope over the entire S, only the inverse scope order,

i.e., [A E] is available, but not the order in which some has scope over every.

7. I believe that it is possible to claim that there is no need for a condition on analyzability in the form proposed by May, or any similar analyzability condition, given that it is possible to derive the desired results from other independent principles of grammar. First of all, the formulation (27) has the effect of forcing pied-piping of an NP in the event that a quantifier occurs within a possessive of that NP. While such pied-piping is required of overt wh movement in Syntax, as indicated by (i):

(i) *Whose did you see mother?

there is no evidence, however, that the abstract movement rule of QR is required to perform the same. For it is perfectly natural to regard (iii) as the LF representation of (ii), though QR has apparently moved only a possessive phrase:

(ii) Every student's professor got drunk.

(iii) [Every student x [x's professor got drunk]]

(i.e., every student is such that his professor got drunk). Even if pied-piping is required, there is some reason that a pied-piped structure is subject to a reconstruction process in LF (cf. some discussion below and in Chapter 7), which renders the effect of pied-piping in LF vacuous. What the condition (27) is intended to do, among other things, is to make sure that a sequence like some people in every walk of life is moved in its entirety when QR is triggered by some, whether that sequence has the structure

(28a) or (28b) in the text; the movement cannot affect just some or some people. To prevent QR from moving just some people, one may resort to the principle that when QR affects a quantifier, it must mvoe the minimal maximal NP containing the quantifier. In a structure like (28a), it is reasonable to assume that it is the highest NP node that is the maximal NP node dominating some, i.e., in all adjoined structures the highest node counts as the relevant node. Movement of some people would be a case of moving a head away from its peripheral. If one assumes that no movement may affect non-maximal nodes, specifically, heads, then one gets the desired result. But even here, it is possible to claim that this is not an independent principle. In Chapter 7 we shall suggest an extension of the Empty Category Principle of Chomsky (1981a) and assume that movement of a head, as much as movement of an argument, leaves an empty category subject to the principle ECP. Since the trace of a moved head is not lexically governed, there being no lexical category to govern it, it must be locally controlled. But any movement of a head out of an NP will necessarily leave its trace not locally controlled. Note also that movement of some from the phrase some people from every walk of life is also impossible, if some, not being an argument of people, is not considered lexically governed. If this is correct, then we can eliminate the Condition on Analyzability (27) in its entirety. But for the moment, we will use this condition for expository purposes.

8. If a phrase A is not moved out of a more inclusive phrase B, then of course it cannot c-command B at its landing site. This is

the case with the sentences (25) - (26) when the second quantificational NP is construed to have NP-internal scope. Cf. footnote 6.

9. On the NP-internal scope reading, the Q-NP some people in every walk of life and the less inclusive every walk of life have only the relationship of containment, at LF as well as at SS. They are never in a relation of c-command or precedence, and are not in any relation of relative scope.

10. The only place where the left-to-right order of constituents does not correspond to the relative prominence given by a right-branching structure is in double-object constructions. Observe that in (i) below, 'everyone' in fact has both a distributive and a collective (wide scope and narrow scope) reading with respect to 'two books':

(i) Zhangsan mai-le liangben shu gei meige ren.
buy-ASP two book to every man
a. 'For every man x, Zhangsan bought two books for x.'
b. 'There were two books that Zhangsan bought for everyone.'

This ambiguity follows directly from the c-command account, because in double object constructions the two objects c-command each other as sisters of V (assuming that c-command is relaxed somewhat to allow an NP object of a preposition (the 'to' in (i)) to c-command across a dominating PP node). This ambiguity does not, however, follow from the linear account. In the sentence (ii) below, where the indirect object has been moved leftward, only a distributive reading is available on 'everyone', however:

(ii) Zhangsan mai gei-le meige ren liangben shu le.
buy to-ASP every man two book ASP
'For everyone x, Zhangsan bought two books for x.'

In this case, the non-ambiguity does not follow from the c-command account, and the linear account may be said to play a minor role here, though it is possible to attribute this lack of ambiguity to the effect of dative movement. It has been observed that leftward movement rules have the effect of "promoting" certain constituents into some prominent status (cf. e.g. Langacker 1974), and it is possible that one of the promotion effects is to give wide scope status to a moved constituent over a domain it moves over.

Incidentally, note that neither (i) nor (ii) are the most natural constructions. Many people prefer not to place both the direct and the indirect object postverbally. Instead, they prefer to use constructions in which the indirect object occurs as a preverbal PP:

(iii) Zhangsan gei meige ren mai-le liangben shu.
to every man buy-ASP two book
'For every person x, Zhangsan bought two books for x.'

This preference is naturally interpreted as the tendency to conform to the $\bar{X}$ structure condition of (2.20), thus having the $\bar{X}$ principle take precedence over the idiosyncratic properties of double-object verbs.

11. Apparently Kroch himself is aware of sentences like (60) - (63), whose interpretation cannot follow from the linear account. Therefore, he is forced to limit the application of the linear principle explicitly to simplex sentences (see his general scope rule reproduced in (13)). The superiority of the hierarchical

account, then, is that it can be stated in general terms without this special stipulation.

12. In this case, note that even the stipulation that the linear account applies only within simplex sentences is not adequate. For (65) involves only a simple sentence.

13. For the claim that bu in (65) is part of a lexical category and for discussion of lexical vs. syntactic negation (or contrary vs. contradictory negation) in Chinese, see Teng (1973b). For general discussion of this distinction in English, see Zimmer (1964).

14. Actually, for many speakers an intonation break is not always requried for the [ALWAYS NOT] reading of (66d), though once there is an intonation break, this appears to be the only available reading. We return below to the case where no intonation break occurs.

15. In terms of the notion of "L-contain" in Chomsky (1973), this means that only the lowest VP node that L-contains the verb may branch to the left.

16. Among the well-formedness conditions would be, at least, the $\bar{X}$ principle of endocentricity and some specific $\bar{X}$ principles of particular languages. The Projection Principle on thematic relations of Chomsky (1981a), however, must be relaxed somehow to allow for Restructure α. For some discussion of constraints on restructuring rules, cf. Stowell (1981).

17. Under the assumption that restructuring may take place in LF to give rise to certain inverse scope readings, the hierarchical condition (56) should be revised in such a way that it holds, not of SS and LF, but of the output of restructuring in LF (before QR applies) and the LF level:

> If a quantificational or logical expression A c-commands another quantificational or logical expression B before QR applies, then A also c-commands B at LF.

On the other hand, one might adopt the hypothesis that all sentences allow a dual structural analysis at SS (and possibly at DS and LF), in a fashion similar to that suggested in Zubizaretta (1982). One structure pertains to the interpretation of thematic relations and is subject to the Projection Principle, and the other pertains to interpretation of scope relations and is not subject to the principle. Under this hypothesis, the condition (56) may remain as it is. The structure which pertains only to scope interpretation may, by assumption, have the option of entering the component of PF. This then has the effect that an intonation break is not always requried at a place where it might be expected. I will not try to decide on these two possibilities, but will simply assume that restructuring may take place in LF.

Note, in this connection, that sentences like (i) and (ii) also allow the deeply embedded <u>many children</u> to have wide scope over the negation:

(i) I didn't see pictures of many children.

(ii) I didn't expect to see pictures of many children.

Our hypothesis requires that many children be (vacuously) right-dislocated to position c-commanding didn't before QR applies, e.g.:

(iii) [[I didn't expect to see pictures of t_i] many children$_i$]

This process is in violation of subjacency, and is not allowed in Syntax, but since we assume that Subjacency does not obtain in LF (cf. Chapters 4 and 6), the process may occur in LF.

18. For example, Mamoru Saito (p.c.) has informed me that in Japanese there is no obvious subject/object asymmetry under what is the analogue of wh movement. This shows the lack of standard effects of the Empty Category Principle (ECP), to which we return in more detail in Chapters 6 and 7. It will be shown that Chinese also does not exhibit standard ECP effects, but for reasons given later we do not assume that this fact falls under the same theory that accounts for the lack of ECP effects in non-configurational languages.

19. I am extrapolating somewhat here to illustrate one way Hale's general idea may be executed.

20. Note that our conception of thematic role assignment for non-configurational languages does not capture the fact that objects in a nominative-accusative language are semantically "closer" in relation to their verbs than subjects (and that, in ergatic languages, subjects are "closer" to their verbs). To remedy this inadequacy, one may adopt Marantz's (1981) suggestion that each lexical item

is associated with a (configurational) "thematic (or lexical) structure" in the lexicon. A non-configurational language may "evaluate," under government, the thematic roles of both subjects and objects directly, their relative closeness to the verb being solely expressed in the lexicon.

21. Although OB government is relevant in English for θ-role assignment, it should be noted that it is AS-government that is relevant for the binding theory and the ECP (see Chapters 5 through 7).

22. Time adverbs, as is well known, are apparent exceptions. We assume that they are NPs dominated by PP with an abstract P.

23. We may assume that the VP containing verb and its complement is a maximal node and that adverbial phrases are adjoined to VP, forming further maximal categories. Adverbial phrases, then, are not governed by the INFL, government being blocked by the upper maximal VP node, nor by the verbal head, government being blocked by the lower maximal VP node.

CHAPTER FOUR: SOME MAPPINGS IN LF

4.0. Introduction

In this chapter we discuss a variety of sentence types in Chinese that involve abstract mapping processes in LF. These include sentences containing ordinary quantificational NPs, wh questions, A-not-A questions, and cleft sentences. While all these constructions involve instances of Move α in LF, we assume that quantificational sentences undergo May's QR, which performs adjunction, whereas wh questions, A-not-A questions, and clefts undergo abstract wh movement (to COMP), on a par with the overt wh movement process.

In 4.1, we extend our discussion in Chapter 3 of quantificational sentences and consider sentences in which one Q-NP is properly contained in another. Such constructions give rise generally to two kinds of scope interpretations: the sentential, or NP-external reading (=May's inversely-linked reading), and the NP-internal reading. It is observed that although English sentences involving such constructions are generally ambiguous between the internal and external scope readings, each of the two readings has a unique structural rendering in Chinese. After discussing how NP-internal scope readings are to be derived in an optimal theory of grammar, we propose to generalize the condition proposed in (3.56) above into a more general condition accommodating such constructions. We also propose to explain the typological distinction between certain ambiguous English sentences and their unambiguous counterparts in Chinese by deriving it from the existence

vs. non-existence of the $\bar{X}$ structure condition (2.20) in Chinese and English, respectively. The arguments put forth in Chapter 3, based upon typological considerations and considerations of learnability, also apply here, and the theory proposed there is thus strengthened.

We also consider a number of sentence types that must be treated within a theory of markedness. In particular, constructions explicitly marked by the scope adverb dou tend to violate the general requirement that ordinary quantifiers take the narrowest possible scope. Wh phrases, furthermore, generally disregard the condition (3.56) (or the generalized version given below) and exhibit wide scope properties. These marked cases of quantification must be attributed to inherent properties of individual lexical items.

Although the formation of wh questions in Chinese does not involve an overt movement process as in English, we argue, in 4.2, that a natural assumption can be made that such a process exists as a universal property of language, if not in Syntax then in LF. The typological distinction between English-type languages and Chinese-type languages lies, then, in where the rule may apply. It is also argued, in 4.3, that traditional analyses of conjoined and disjunctive constructions may be plausibly replaced by the use quantificational schemata. The same analysis is extended to a treatment of A-not-A questions and is shown to allow certain generalizations to be stated in a rather desirable way.

Finally, we discuss the formation and interpretation of cleft sentences. We indicate that cleft formation does not involve the

overt dislocation of any constituents, nor any overt quantifier-variable configuration. We propose to analyze the focus marker shi as a copulative adverb, and attempt to justify it in favor of other alternatives. Furthermore, we also observe that clefted constituents are quantificational in some real sense, and indicate that certain facts may be naturally accounted for if they, like other quantificational NPs, are subject to abstract movement in LF.

4.1. Quantificational Sentences

4.1.1. Sentences with Q-NPs Contained in Other Q-NPs

4.1.1.1. Sentential Scope and NP-Internal Scope

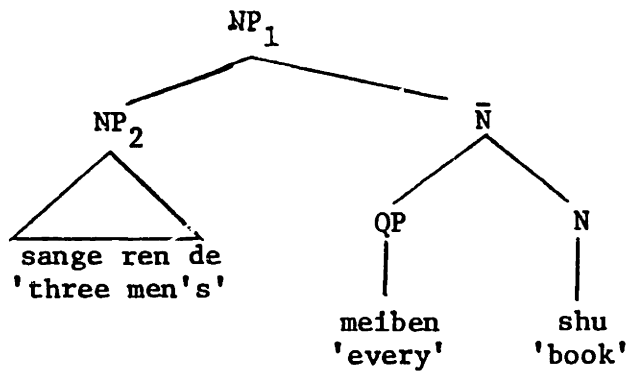
As in English, one of the constructions in Chinese whose LF representations differ non-trivially from their SS representations is one in which a quantificational expression properly contains another. Below are two examples of such a construction:

(1) wo mai-le [$_{np}$ sange ren de meiben shu]
I buy-ASP three man DE every book
'For three men x, I bought every one of x's books.'

(2) wo mai-le [$_{np}$ meige ren de sanben shu
I buy-ASP every man DE three book
'For every man x, I bought three of x's books.'

Each of the bracketed NPs in (1) - (2) contains a quantifier and a possessive NP which in turn contains a quantifier of its own. The structure of (1), for example, is (3):

(3)



In other words, NP_1, whose QP is 'every,' properly contains NP_2, whose QP is 'three.' Therefore, NP_1 and NP_2 are not in a relationship of c-command (or precedence) at SS. The situation is the same with (2), where the NP whose QP is 'three' properly contains the possessive whose QP is 'every.' As indicated in the translation, the two Q-NPs in each of (1) - (2) do hold a relationship of relative scope with each other. In both cases, the less inclusive possessive Q-NP is understood to have wider scope than the more inclusive Q-NP containing the possessive. This fact cannot be derived directly from the general condition given in (3.56), because the condition applies only to Q-NPs which hold a hierarchical relationship with each other at the level of SS, in terms of c-command. This fact can be derived free of any special condition, however, if we assume that SS representations are subject to May's QR, whose application and output are subject to independent conditions: The Condition on Proper Binding (CPB), which disallows free variables; the Condition on Quantifier Binding (CQB), which disallows vacuous quantification; and the Condition on Analyzability, which requires QR to affect the lowest maximal phrase

dominating a QP. Given this conception of LF, the only well-formed LF representation derivable from (1) is (4), and that derivable from (2) is (5):

(4) $[_s$[sange ren]$_i$$[_s$[$t_i$ de meiben shu]$_j$$[_s$ wo mai-le t_j]]]
three men DE every book I buy-ASP

(5) $[_s$[meige ren]$_i$$[_s$[$t_i$ de sanben shu]$_j$$[_s$ wo mai-le t_j]]]
every man DE three book I buy-ASP

(4) can be interpreted as "for three x such that x is a man, for every y such that y is a book of x's, I bought y." (5), on the other hand, means "for every x such that x is a man, for three y such that y is a book of x's, I bought y." Each of the LF representations (4) and (5) is well-formed with every trace (variable) properly bound, and with every quantifier properly binding a trace. QR thus correctly derives the LF representations corresponding to the meanings of the sentences (1) and (2).

Note that the sentences (1) - (2) do not have an interpretation according to which the more inclusive Q-NP in each of them has wider scope than the less inclusive possessive Q-NP. This fact follows directly from the three independent conditions on the output and application of QR just mentioned. For the LF representations of this unavailable reading would each contain a free variable (the trace t_i) and a vacuous quantifier (the quantifier indexed i):

(6) *$[_s$[t_i de meiben shu]$_j$$[_s$[sange ren]$_i$$[_s$ wo mai-le t_j]]]

(7) *$[_s$[t_i de sanben shu]$_j$$[_s$[meige ren]$_i$$[_s$ wo mai-le t_j]]]

The situation with sentences like (1) and (2), then, is entirely on a par with, or rather the Chinese analogue of, what May calls

"inversely-linked" quantification in English, which is associated with sentences like (8) and (9) (=3.25):

(8) [Some people from [every walk of life]] like jazz.

(9) [Every senator on [a key congressional committee]] voted for the amendment.

The difference between (1) - (2) in Chinese and (8) - (9) in English is that in the former the less inclusive Q-NP precedes the head N of the more inclusive NP, while in the latter the less inclusive Q-NP follows the head. The latter constitutes cases of "inversely linked" quantification in May's sense, but the former does not. The term "inversely linked" is therefore not only somewhat misleading (there being nothing inverse in that the order of two Q-NPs at LF is derived from a representation in which they are in a relation of containment); it is also not general enough in that it refers to what is only a special case of a more general phenomenon.

Let us now consider the following sentences, and comapre them to (1) - (2):

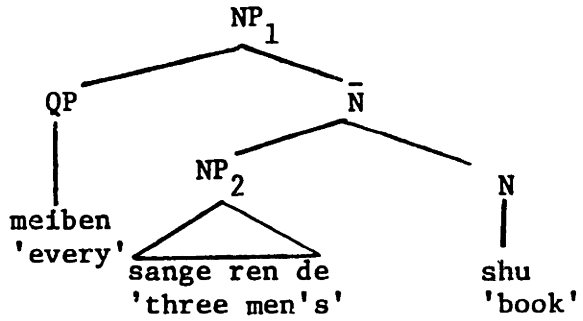
(10) wo mai-le [meiben sange ren de shu]
I buy-ASP every three men DE book
'I bought every book that belongs to three men.'

(11) wo mai-le [sanben meige ren de shu]
I buy-ASP three every man DE book
'I bought three books, each of which belongs to everybody.'

(10) and (11) differ from (1) and (2) in their SS representations in the following way. In (10) and (11), the less inclusive possessive Q-NP occurs to the right of the QP of the more inclusive Q-NP, while in (1) and (2) this situation is reversed. The structure of the

bracketed NP in (10) has the form (12), which is to be compared with (3):

(12)



This difference in structure at SS gives rise to a difference in meaning, as can be seen by comparing the translation of (10) and (11) with that of (1) and (2), respectively. In each of (10)-(11), the possessive Q-NP is construed to have scope not exceeding the NP in which it is properly contained. This is the "NP-internal" scope interpretation on the possessive Q-NP in the sense of Fiengo and Higginbotham (1981), an interpretation also available in (8)-(9). According to this interpretation, (8) means "some people each of whom comes from every walk of life like jazz" (though this reading is hard to get due to pragmatic reasons), and (9) means "every senator who is on a key congressional committee (or another) voted for the amendment". The less inclusive Q-NP is construed as if it has scope over a relative clause internal to the more inclusive Q-NP, even though no such internal clause is present in their respective SS representations.

We have seen that there is a Chinese analogue to the so-called

"inversely linked" cases in English, and that, like the latter, it can be accounted for quite straightforwardly under May's rule of QR, thus providing cross-linguistic support for the conception of LF embodying this rule. We have also seen that there is a Chinese analogue to the "NP-internal scope" situation. Unlike the situation in English, however,structures allowing the internal scope reading in Chinese are quite different from structures having the external scope (i.e. the analogue of "inversely-linked") reading. In other words, while the English (8)-(9) are each ambiguous, neither (1)-(2) nor (10)-(11) in Chinese are ambiguous: (1)-(2) are uniquely understood to have external (or sentential) scope interpretation on the less inclusive Q-NP and (10)-(11) are uniquely understood to have NP-internal scope interpretation. We now seek to answer the following questions: First, what is the proper account for the NP-internal scope interpretations? Second, why is each of the Chinese sentences (1)-(2) and (10)-(11) unambiguous while the English sentences (8)-(9) are ambiguous?

There are two proposals that we want to compare concerning the NP-internal scope readings in sentences like (8) and (9). One of them is made in May (1977) and the other in Fiengo and Higginbotham (1981).

4.1.1.2. Two Theories of NP-internal Quantification

May's account is as follows. Since he assumes that QR adjoins a Q-NP to S but not to any other node, his theory cannot directly

derive the NP-internal scope reading on (8) or (9). Take (9) for example. To obtain the NP internal reading on a key congressional committee, there would have to be an S node internal to the NP headed by senator. May therefore proposes to derive the reading indirectly, in the following manner. First, let QR apply to (9) and adjoin the entire NP headed by senator, giving the following intermediate structure in LF:

(13) $[_S$ [Every senator on a key congressional committee]$_i$ $[_S$ t_i voted for the amendment]]

If QR reapplies to (13) to affect the less inclusive NP a key congressional committee and adjoin it to the higher S, this will give (14), which corresponds to the external scope or the "inversely linked" interpretation:

(14) $[_S$[A key congressional committee]$_i$ $[_S$[every senator on t_j]$_i$ $[_S$ t_i voted for the amendment]]]

However, assuming that QR is optional, one may choose not to apply QR to (13), but leave it as it is at LF. Then, at a post-LF stage, i.e. in LF', (13) is assumed to be turned into (15):

(15) $[_S$ Every x $[_S[_{S_i}$ x is a senator on a key congressional committee]$\rightarrow[_S$x voted for the amendment]]]

In this interpretation, the antecedent clause within the domain of every x contains the Q-NP a key congressional committee. The presence of this newly created clause, S_i, enables QR to reapply and adjoin a key congressional committee to it, giving (16):

(16) $[_S$ Every x $[_S[_{S_i}$ [a key congressional committee]$_y$
$[_{S_i}$ x is a senator on y]]$\rightarrow[_S$ x voted for the amendment]]]

This representation corresponds to the NP-internal reading. The Q-NP a key congressional committee has scope over an S, but the S is in the scope of the quantifier every. We have mentioned in Chapter 3 that logical formulae like (16), which May uses, are not sufficient for all natural language quantifiers, in particular quantifier like most, more than one-third of, etc. Instead, we opted for formulae of the form [[Qx; A(x)][B(x)]], where Qx is a quantifier, A(x) is a prediction clause indicating the restriction or extension of the quantifier, and B(x) is the matrix clause. We may now translate May's account, formulated in terms of "unrestrictive formulae" of quantification, into a formulation in terms of "restrictive" or "generalized" quantifiers. To do so, we will say that at LF, (14) undergoes a rule (or algorithm) of Quantifier Conversion, which converts it, not into (15), but into (17):

(17) $[_S$[Every x; $[_{S_i}$ x is a senator on a key congressional committee]] $[_S$ x voted for the amendment]]

(The semicolon following every x is to be read as "such that".) Now, as in (15), a newly created S (the restrictive relative clause S_i) enables QR to apply to a key congressional committee and adjoin it to this new S, giving (18):[1]

(18) $[_s$ [Every x; $[_{s_i}$ [a key congressional committee]$_y$ $[s_i$ x is a senator on y]]]$[_s$ x voted for the amendment]]

This also corresponds to the NP-internal reading, with the less inclusive Q-NP construed as having scope over a relative clause internal to the more inclusive NP.

Fiengo and Higginbotham (1981) account for the NP-internal readings somewhat differently. They do so by simply allowing QR to take $\overline{N}$ as a possible adjunction site, in addition to S. Assuming that a possible structure of (9) is (19) below, they allow QR to adjoin <u>a key congressional committee</u> to $\overline{N}$, deriving (20):

(19) $[_s[_{np}$ Every $[_{\overline{n}}$ senator $[_{pp}$ on $[_{np}$ a key congressional committee]]]] voted for the amendment]

(20) $[_s[_{np}$ Every $[_{\overline{n}}$ [a key congressional committee]$_i$ $[_{\overline{n}}$ senator on t_i]]] voted for the amendment]

After QR applies to adjoin the entire NP headed by <u>senator</u> to S, we have (21):

(21) $[_s$ [Every $[_{\overline{n}}$ [a key congressional committee]$_i$ $[_{\overline{n}}$ senator on t_i]]]$_j[_s$ t_j voted for the amendment]]

This LF representation may then, by convention, be converted to (22):

(22) $[_s$[Every x;[[a y; y a key congressional committee][x a senator on y]]] $[_s$ x voted for the amendment]]

Namely, for every x such that, for a y such that y is a key congressional committee, x is a senator on y, x voted for the amendment. This is equivalent to the representation (16) or (18).

4.1.1.3. NP-internal Scope and the Syntactic Nature of LF

A difference between May's account and the account proposed by Fiengo and Higginbotham (F&H) is that the former derives the NP-internal readings in LF' while the latter does it in LF. According to May (and apparently many others working in similar frameworks), the unmarked cases of sentence grammar are handled within the LF component, while peripheral, marked cases and aspects of discourse grammar are handled in a post-LF stage, say LF'. His treatment of quantification, then, takes the NP-internal reading to be a marked periphery. There are a number of difficulties with this conception, however. First of all, if his account is correct, it is natural to extend it to the Chinese sentences (10) and (11). However, each of these sentences has only the NP-internal reading. To convey the external scope reading, one must use sentences of the form (1)-(2). In an English sentence like (8), some people from every walk of life like jazz, there might be some ground for the claim that the NP-internal reading is marked, on the basis of the fact that the external reading is preferred. However, since the only reading of (10) and (11) is NP-internal, and both these sentences are perfectly grammatical, it is quite unsatisfactory to call that reading marked. Secondly, there are sentences in English which admit both an internal and external scope reading, but whose internal scope reading comes more readily as a normal interpretation. The sentence below is due to J. Higginbotham (1980 class lectures):

(23) Every owner of two dogs has a lot to worry about.

It should sound strange to regard as marked the more accessible reading, according to which every two-dog owner has a lot to worry about, and as unmarked the less accessible reading, according to which there are two dogs whose every owner has a lot to worry about. Furthermore, most of the examples that May gives to show that an "inversely-linked" reading is preferred over an NP-internal reading are such that the latter is less accessible, not because of grammatical reasons, but because of pragmatics. For example, the sentence (8) does not have a plausible interpretation with the NP every walk of life having NP-internal scope, because it is hard to imagine the existence of a person who comes from every walk of life. It seems that both readings should be regarded as grammatically available, and derivable in LF, and that pragmatic factors may enter in a later part of grammar (possibly LF') to mark either as less acceptable, for example the internal reading of (8) and the external reading of (23).

To remedy this inadequacy within May's account and maintain that QR may use only S as an adjunction site, one will have to somehow allow the NP-internal reading to be derived in LF. One way this can be done is to allow the process of Quantifier Conversion, which turns (14) into (17), to apply in LF, not at or to LF. For example, one may assume that every time QR yields a configuration of the form $[_S$ Q-NP$_i$ $[_S$ ... t_i ...]], Quantifier Conversion immediately turns it into the form $[_S[Qx;\ A(x)][_S B(x)]]$. Suppose

a Q-NP is contained in the restrictive relative clause A(x), we will have structures of the form (17) available in LF, and when QR reapplies, NP internal readings are derivable in the same component. Such readings thus need not be treated as grammatically marked.

A more important difficulty with May's account, however, is that it crucially relies upon the creation of a new S node to enable QR to derive NP-internal readings. In the example (9), an S is created in the form of an antecedent clause of a conditional (the S_i of (15)), or in the form of a restrictive relative clause (the S_i of (17)). May assumes that such a process of conversion applies only to configurations of the form $[_s$ Q-NP$_i$ $[_s$ ... t_i ...]], namely structures that have undergone QR. Therefore, no conversion will take place if a sentence has not undergone QR. In such cases, he predicts that no NP-internal reading is available. But this prediction is wrong. Consider, for example, sentences like the following:

(24) wo kanjian-le $[_{np}$ neiben meige ren de shu]
I see-ASP that every man DE book
'I saw that book of everyone's'

(25) I heard [John's story about two people].

The NP 'everyone' in (24) and two people in (25) each have NP-internal scope, so that (24) refers to a single book which is the common property of everyone's, and (25) refers to a single story which talks about two people. Each of the bracketed NPs is definite, and neither is quantificational. Therefore, neither is subject to QR, as is assumed by May, and no conversion process will

occur on either to create an internal restrictive relative clause to serve as an adjunction site for QR. May's account thus fails to allow an NP-internal scope reading on 'everyone' or 'two people' in (24)-(25). Similarly, the following sentence in English is ambiguous between an internal and an external reading on everybody, as observed in F&H:

(26) I saw [pictures of everybody]

On the external reading, everybody has scope over the entire sentence, so that the sentence means that for everybody x, I saw pictures of x. On the internal reading, the sentence means that I saw pictures each of which is a (group) picture of everybody. Since a bare plural NP like pictures of everybody does not contain a quantifier modifying the head noun pictures, it is generally not subject to QR in LF. To obtain the external reading, QR may raise everybody directly out of the object NP and adjoin it to the S in (26), giving:

(27) $[_S[\text{Everybody}]_i\ [_S$ I saw pictures of $t_i]]$

The problem lies in how to derive the internal reading. Since pictures of everybody is not affected by QR, no conversion occurs on it to create an internal S node. Thus, QR cannot derive the internal reading at all in May's account.

Let us now consider how F&H's account can derive the NP-internal readings on sentences like (24)-(26). Since they take $\bar{N}$ to be a possible adjunction site for QR, the derivation of an LF representation corresponding to an internal reading does not require

Quantifier Conversion to apply in LF, and adjunction to $\bar{N}$ can occur regardless of whether the NP dominating $\bar{N}$ is in operator or in argument position. Thus, for (24) and (25), the following outputs of QR are derivable:

(28) wo kanjian-le $[_{np}$ neiben $[_{\bar{n}}[$meige ren$]_i[_{\bar{n}}$ t_i de shu$]]]$
I see-ASP that every man DE book

(29) I heard $[_{np}$John's$[_{\bar{n}}[$two people$]_i[_{\bar{n}}$ story about $t_i]]]$

These two representations may now undergo conversion into the following representations:

(30) wo kanjian-le [neiben x; $[_s$[meige y; y shi ren]$[_s$ x shi y de shu]]]
I see-ASP that every is man is DE book

(31) I heard [John's x;[[two y; y is a person][x is a story about y]]]

Similarly, (26) may have the LF representation (32):

(32) I saw $[_{np}[_{\bar{n}}[$everybody$]_i[_{\bar{n}}$ pictures of $t_i]]]$

This representation may also undergo conversion into something like (36):

(33) I saw [x's;[[every y; y is a person]
[x is a picture of y]]]

Namely, I saw (a plurality of) things x such that, for every y such that y is a person, x is a picture of y.

It is clear that F&H's approach is empirically more adequate

than May's as far as NP-internal quantification is concerned.

Note that according to May's theory, NP-internal quantification is given a rather "semantic" (not "syntactic") treatment in that it crucially involves a semantic paraphrase rule (i.e. Quantifier Conversion), whose output is required for the reapplication of certain instances of QR. In F&H's theory, on the other hand, one does not need to invoke Quantifier Conversion as a rule. The crucial assumption is that $\overline{N}$ is a possible adjunction. Since this theory refers to such syntactic categories as $\overline{N}$ but does not rely on semantic paraphrases, it is more "syntactic" in nature than May's theory. If we are correct in claiming that F&H's theory of NP-internal quantification is more adequate, then this says something interesting about the nature of Logical Form, in particular, the existence of a linguistic level of representation where syntactic configurations and syntactic labels like $\overline{N}$ figure prominently in determining the applicability of QR and the scope possibilities of certain constructions, a level where semantic paraphrases do not play a role. It is true that a rule like QR must refer to a semantic class, since Q-NPs cannot be identified by configuration (who, what, for example, do not contain a QP node which will identify them as Q-NPs, though three books, many people etc. do). However, it is also fair to observe that the level of LF is a highly syntactic level, one that is considerably remote from, and cannot be identified with, the level of real-object semantics (as construed, say, in model theoretic semantics).

Consider now how F&H's theory may be incorporated for a characterization of NP-internal quantification in Chinese. Adapting a suggestion also made by F&H, I will assume that QR may adjoin a Q-NP to the sister of the syntactic category QP, or to S:[2]

(34) QR

Adjoin Q-NP to S or to sister of QP in NP.

In English, the sister of QP is $\overline{N}$. Since nominal modifiers are fixed in order, we know that, even in the absence of an overt QP, $\overline{N}$ would be still the sister of QP should the latter occur in overt form. Therefore, the instantiation of the term "sister of QP" in English is invariably $\overline{N}$. In Chinese, on the other hand, what is the sister of QP varies from construction to construction. This is because the order of QP and other nominal modifers is free. Thus, in the tree (3), the sister of the QP 'every' is the N 'books'. In (12), the sister of the same QP is the entire $\overline{N}$ 'three men's books'. Furthermore, in the absence of an overt QP, we do not know where the sister of QP would be. A natural assumption we will make is that when there is no overt QP in a noun phrase in Chinese, there is simply no "sister of QP", i.e. no NP-internal adjunction site for QR.[3]

4.1.1.4. An Account of the Chinese/English Contrasts

Now let us try to give an answer to the second question set forth above, namely, why the Chinese sentences (1)-(2) and (10)-(11) are each unambiguous, while the English sentences (8)-(9), (26), etc.,

are each ambiguous. Consider first sentences like (35) and (36):

(35) John bought [everybody's pictures].

(36) Zhangsan mai-le [meige ren de hua].
buy-ASP every man DE picture
'Zhangsan bought everybody's pictures.'

In both (35) and (36), the Q-NP 'everybody' has only sentential, NP-external scope. They mean that for everybody x, John (or Zhangsan) bought x's pictures. Neither sentence can be construed as asserting that John (or Zhangsan) bought group pictures each of which has everybody in it. Neither, in other words, has an NP-internal reading on the Q-NP. This fact follows directly from the assumption just made concerning the "sister of QP" being the NP-internal adjunction site. In English, the adjunction site is $\overline{N}$, regardless of whether a QP is overtly present. In (35), the $\overline{N}$ dominates pictures, but not everybody. If one were to derive an NP-internal reading on (35), the Q-NP 'everybody' would have to be moved downward and adjoined to the $\overline{N}$, giving the following LF representation:

(37) John bought $[_{np} t_i$'s$[_{\overline{n}}$ everybody$_i$ $[_{\overline{n}}$ pictures$]]]$

Here everybody$_i$ does not bind a variable, and t_i is free, in violation of the CQB and the CPB. The unavailability of NP-internal reading on (35) thus follows.

On the other hand, we assume that, in Chinese, the lack of an overt QP also entails the lack of a sister of QP. Therefore, there is no NP-internal adjunction site in (36). The sentence is thus unambiguous in having only a sentential scope reading on 'everybody', as is (35).

The sentences (35) and (36) are to be compared with (36), which is ambiguous:

(26) I saw $[_{np}[_{\bar{n}}$ pictures of everybody]]

Assuming that the object NP has the structure indicated, we see that everybody may be adjoined to $\bar{N}$, or to S. In both cases, the Q-NP will properly bind its trace, and the trace will be properly bound. The ambiguity of (26) thus follows.

Consider now (1) and (2), whose NP has the structure (3). In (3), there is an NP-internal adjunction site, the N dominating 'book' (the sister of 'every'). If the Q-NP 'three men' were to have NP-internal scope, it would have to be lowered by QR to this site. This, again, will result in a free variable and a vacuous quantifier, in violation of the CPB and the CQB. The LF representation for the unavailable internal scope reading on (1), for example, is (38):

(38) *wo mai-le $[_{np}$ t_i de$[_{\bar{n}}$ meiben $[_{n}$ sange ren$_i$
I buy-ASP DE every three man
$[_{n}$ shu]]]]
book

We have accounted for the non-ambiguity of sentences like (1) and (2). The ambiguity of (8)-(9), on the other hand, is due to the fact that there is an $\bar{N}$ (in addition to S) in these sentences, to which the relevant Q-NP may be adjoined without violation of the CPB or the CQB. This is already indicated in (20). Thus the contrast between (1)-(2) in Chinese and (8), (9), (26) in English follows from the fact that there is only one "possible" adjunction

site for the relevant Q-NP in (1)-(2), but two in (8), (9), (26). (A "possible" adjunction site is here taken to mean the site to which a Q-NP may be adjoined without violating the CPB or the CQB. As should be obvious by now, any "possible" adjunction site for a Q-NP must be a node that dominates that Q-NP. For only if the Q-NP is adjoined to such a site will it c-command its own trace).

Let us now consider the unambiguous sentences (10) and (11) in Chinese, which has only the NP-internal reading. As shown in the structure (12), the sister of QP in NP_1 is the $\overline{N}$ dominating 'three men's books'. The Q-NP 'three men' can be adjoined to this site in (1), giving the following representation:

(39) wo mai-le $[_{np}$ meiben $[_{\overline{n}}$ sange ren$_i$
I buy-ASP every three men
$[_{\overline{n}}$ t_i de $[_n$ shu]]]]
DE book

This structure conforms to the CPB and the CQB. The NP-internal reading is thus available. But note that the representation for the sentential scope reading also conforms to the CPB and the CQB:

(40) $[_s[$sange ren$]_i[_s$ wo mai-le $[_{np}$ meiben $[t_i$ de] shu]]]
three man I buy-ASP every DE book

In other words (10) and (11) each have two "possible" adjunction sites for the NP-contained Q-NPs ('three men' in (10) and 'everybody' in (11)), but unlike the English examples (8), (9), (26), they are not ambiguous. The theory of adjunction site just described is sufficient to ensure non-ambiguity of (1) and (2), but still fails to ensure the non-ambiguity of (10)-(11). We must seek explanation elsewhere.

Apparently, the fact that sentences like (10) and (11) have only an NP-internal reading on the possessive Q-NP has to do with the fact that the Q-NP occurs within the c-commanding domain of another QP, and therefore has a closer possible adjunction site, the sister of QP, than the adjunction site S. A plausible account for the absence of the external reading in (10)-(11), therefore, is that QR must obey some appropriate version of a locality condition. A possible statement of such a condition is the following:

(41) The Locality Condition on QR

QR must adjoin a Q-NP to the lowest "possible" adjunction site.

"Possible" is, again, to be understood in the sense just indicated. The condition (41) stipulates that Q-NPs should be interpreted to have the narrowest possible scope. A related formulation of the locality phenomenon is given in May (1977), who proposes that QR is subject to the Subjacency Condition of Chomsky (1973, 1977, etc):

(42) Subjacency

No rule may move an element from the position Y to the position X (or conversely) in the following structure:

$$\ldots X \ldots [_{\alpha} \ldots [_{\beta} \ldots Y \ldots] \ldots] \ldots X \ldots$$

where α and β are bounding nodes.

The Subjacency Condition was originally proposed by Chomsky to tie together a number of the well-known island constraints proposed in Ross (1967), which govern the application of <u>overt</u> movement of NPs over variables. As originally formulated, the bounding nodes for

the condition are assumed to be NP and S, in English at least. Among other things, this condition has the effects of the Complex NP Constraint. It is fairly well-known that, in English, a Q-NP contained within a relative clause may not be construed to have scope external to the NP containing the relative:

(43) I saw a man who everybody liked.

The sentence does not mean that for everybody x, I saw a man who x liked, in which case I could have seen several men. The sentence asserts only that I saw a man such that everybody liked him. To assign everybody a scope external to the complex NP in which it is embedded, QR would have to move it in violation of the CNPC or Subjacency:

(44) $[_S$ Everybody$_i$ $[_S$ I saw a man who t_i liked]]

Since this configuration is on a par with the ill-formed S-structure (45), which is normally excluded under the CNPC or Subjacency:

(45) *Who$_i$ did you see a man who t_i liked?

May proposes to explain the absence of an external reading on everybody in (43) by the assumption that, like the syntactic rule of overt wh movement, QR is constrained by Subjacency.[4] This strategy to tie together (43), which does not involve an overt dislocation of constitutents, with (45), which does, is of course a very reasonable one, if what was just seen here does represent the whole picture. And if Subjacency is indeed the right explanation for (43), it also provides strong evidence for the assumption that quantifier scope interpretation involves an actual abstract movement rule on

a par with overt movement processes like wh movement, and therefore also for the existence of a level of LF where (43) is represented in a quantifier-variable configuration. This idea of tying together syntactic and interpretive processes had, in fact, been proposed much earlier. In his "Repartee", for example, Lakoff (1971a) made the same observation concerning sentences like (43) and (45) and argued that quantificational sentences involve a movement process subject to the CNPC, i.e. his rule of quantifier lowering.

This idea is certainly an attractive one and, if correct, will be a welcome piece of evidence for the existence of a linguistic level of LF. However, after being fascinated by it for a number of years myself, I am now convinced that considerations for an overall optimal theory of grammar will require one to regard this idea as the wrong one, but rather to consider the seeming correspondence between (43) and (45) as an accident resulting from the effects of two independent modules of principles whose factual converages overlap somewhat. In other words, I believe that there is a basic distinction between movement in Syntax and movement in LF with respect to the bounding theory, i.e. Subjacency or the various island constraints, in that only overt movement in Syntax is subject to it. This, if correct, is evidence for the autonomy of Syntax, against the generative semanticist hypothesis that there is no basic distinction between (linguistic) semantics and syntax. (This, in itself, will not provide evidence for our

assumption of LF, of course. Rather, evidence for such a level comes from elsewhere, e.g., inversely-linked quantification, weak crossover, the ECP, the superiority of a more "syntactic" treatment of NP-internal quantification, etc). I will present more extensive arguments to establish the claim on the non-relevance of the bounding theory in LF in Chapter 6. For our present purposes, note that if Subjacency as given in (42) were the relevant constraint on QR, it would wrongly rule out the sentential or NP-external scope readings on all Q-NPs properly contained in other NPs. Because of this, May (1977) is forced to make the ad hoc stipulation that, although both NP and S are bounding nodes on overt syntactic movement processes with respect to Subjacency, only S but not NP is a bounding node on QR.[5] But note that this stipulation will wrongly allow NP external readings on the Chinese sentences (10) and (11), whose lack of such readings is precisely what concerns us at this moment. A somewhat more adequate account, if one insists on Subjacency, may be to assume the following:

(46) The bounding nodes for Subjacency are:

a. S and NP if movement takes place in Syntax.

b. S and the sister of QP in NP if movement takes place in LF.

This formulation claims that overt movement and QR obey "different versions of the same condition". This is, however, just another way of saying that they obey different conditions. One might just as well assume that overt movement is subject to

Subjacency but QR is subject to the locality condition (41), i.e., that it adjoins a Q-NP to the lowest "possible" adjunction site.

I believe that a locality condition on QR like (41) plays a role in LF. I suspect, however, that it is not the crucial or only condition that excludes the external reading on sentences like (10) and (11). This locality condition might be the right account for the fact that, in English, an ordinary Q-NP contained in a relative clause may not have scope external to the complex NP containing it, as (43) shows. This same condition must not, however, be operative in Chinese to prevent NP-external readings on certain Q-NPs occurring in relative clauses. Consider the following:

(47) [$_s$ wo kanguo-le [$_{np}$[$_s$ sange ren xie] de shu]]
I read-ASP three man write DE book
a. 'There are three men x such that I have read books that x wrote.'

b. 'I have read books each of which was written by three men.'

(48) [$_s$ wo xihuan [$_{np}$[$_s$ ta piping meige ren] de wenzhang]]
I like he criticize every man DE article
a. 'For every man x, I like the articles in which he criticizes x.'

b. 'I like the articles in which he criticizes everybody.'

According to the (b) readings, the Q-NP contained in the relative clause in each of (47)-(48) has scope over just the relative, internal to its dominating complex NP node. Thus, (47) refers to books with joint authorship, and (48) refers to articles in which all concerned are criticized, not just any of them. These are the

readings normally available in English sentences corresponding to (47) and (48), like (43), and the only ones. But the Chinese sentences have the additional interpretation according to which the embedded Q-NPs each have matrix scope, external to their dominating complex NPs. Thus, both 'three men' and 'every man' may be interpreted distributively with respect to their head N, 'books' and 'articles' respectively. The LF representation of (47) under the reading (47a), for example, is (49), where 'three men' has been moved across a lower possible adjunction site (the relative clause) in violation of (41):

(49) $[_s$ [sange ren]$_i$ $[_s$ wo kanguo-le $[_{np}[_s$ t_i xie de shu]]]
three man I read-ASP write DE book

Note that sentences of the sort represented by (50) and (51) allow only an internal reading on the embedded Q-NP.

(50) $[_s[_s$ ta xihuan meige ren] Lisi bu xiangxin]
he likes every man not believe
'That he likes everyone, Lisi doesn't believe.'

(51) $[_s[_{np}[_s$ ta pipin_ meige ren] de wenzhang]
he criticize every man DE article
hen youqu.
very interesting
'Articles in which he criticizes everyone are very interesting.'

These sentences indicate that the locality condition (41) may be operative in preventing QR from raising 'every man' across a possible adjunction site, the sentential subject in (50) and the relative clause in (51). If the matrix clause contains the scope adverb dou 'all, uniformly', however, the external reading becomes possible.

Compare the unambiguous (51) with the ambiguous (52):

(52) $[_s[_{np}[_s$ ta piping meige ren] de wenzhang]
he criticize every man DE article
dou hen youqu.
all very interesting

a. 'For everyone x, articles in which he criticizes x are very interesting.'

b. 'Articles in which he criticizes everyone are very interesting.'

Another example of the sort represented by (52) is (53):

(53) $[_s[_{np}[_s$ meige ren mai] de shu] wo dou bu kan]
every man buy DE book I all not read

a. 'For every man x, I don't read books that x buys.'

b. 'Books that everyone buys, I don't read.'

According to the external reading (53a), the only books that I read are those that nobody buys. According to (53b), I only don't read the most popular kinds of books, those that everyone buys. In the LF representations of (52a) and (53a), 'everyone' has been moved across a possible adjunction site in violation of (41).

However we account for the distinction between the unambiguous (50)-(51) on the one hand and the ambiguous (47)-(48) and (52)-(53) on the other,[6] what is clear is that S is not in general an "absolute barrier" on the application of QR, at least not in Chinese. On the other hand, the adjunction site "sister of QP" is, as far as I know, always an absolute barrier. We have seen this to be the case with (10) and (11), where the Q-NP in question is

contained in an object NP. The same is true when the containing NP is in subject position:

(54) [$_{np}$ meipian dajia de wenzhang] dou hen youqu.
every everyone DE article all very interesting
'Every article jointly written by everyone is very interesting.'

'Everyone' in (54) cannot have an external reading in the presence of a c-commanding QP meipian 'every' (and a dominating "sister of QP" as a possible adjunction site). Witness also the contrast between (55) and (56) below, where the Q-NP in question is contained within a relative clause whose head is quantified:

(55) [$_{np}$[$_{s}$ ta piping meige ren] de meipian wenzhang]
he criticize every man DE every article
dou hen youqu.
all very interesting

a. 'For every man x, every article in which he criticized x is very interesting.'

b. 'Every article in which he criticized every man is very interesting.'

(56) [$_{np}$ meipian [$_{s}$ ta piping meige ren] de wenzhang]
every he criticize every man DE article
dou hen youqu.
all very interesting

'Every article in which he criticized every man is very interesting.'

(55) is ambiguous between an external and an internal reading on the Q-NP 'every man' with respect to the bracketed complex NP, but (56) is uniquely interpreted as having only internal scope. Also

(57) is ambiguous, but not (58):

(57) wo mai-le [$_{np}$[$_{s}$ sange ren xie] de meiben shu]
I buy-ASP three man write DE every book

a. 'There are three men x such that every book x wrote I bought.'

b. 'I bought every book that three men wrote.'

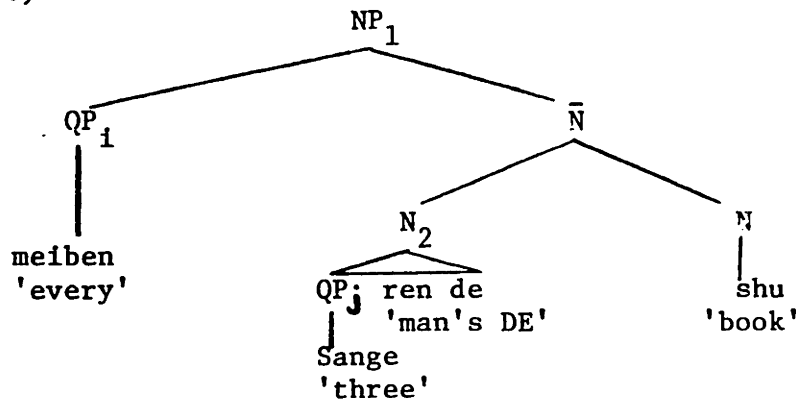
(58) wo mai-le [$_{np}$ meiben [$_{s}$ sange ren xie] de shu]
I buy-ASP every three men write DE book
'I bought every book that three men wrote.'

I would like to suggest that the asymmetry between the two adjunction sites S and "sister of QP" with respect to the locality condition (41) has to do with a separate condition which has the effect of making a "sister of QP" a stronger barrier on QR than an S. This condition may be given as (59):

(59) If a quantifier phrase QP_i c-commands another quantifier phrase QP_j at SS, then QP_i also c-commands QP_j at LF.

Given that QP is a constituent of NP, if QP_i c-commands QP_j, then the two QPs must share at one dominating NP node (although QP_j is also dominated by a less inclusive NP not dominating QP_i). (59), therefore, applies exclusively to configurations in which one Q-NP is properly contained in another, constructions that concern us in this section. The condition says that in the configuration described, the scope of the less inclusive NP (whose QP is QP_j in (59)) must be internal to the more inclusive NP (whose QP is QP_i in (59)). Thus, consider the sentences (10), (11) and (54). The bracketed NP in each of these sentences has the form (60) (=(12)):

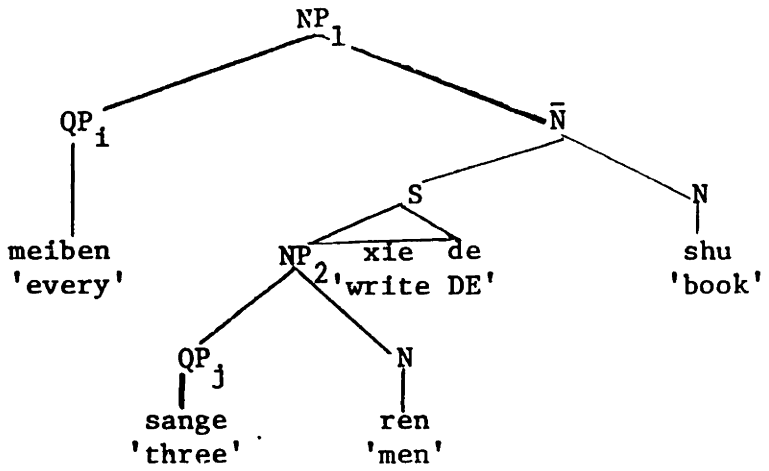
(60)



Since QP_i c-commands QP_j in (60), this structure is subject to the condition (59). If QR adjoins NP_2 to $\bar{N}$ in (60), QP_i still c-commands QP_j in the output representation, in accordance with the condition (59), as is seen in the representation (39). On the other hand, if the possessive NP in each of these sentences is adjoined to the (root) S node, an output representation like (40) will result, representing the external scope reading, in which QP_i no longer c-command QP_j. Since this situation violates the condition (59), the unavailability of the external reading on (10), (11), and (54) follows.

Similarly, we also account for the lack of ambiguity in sentences like (56) and (58). In (56) the QP meipian 'every' c-commands the QP meige 'every' in the relative clause, and in (58) the QP meiben 'every' c-commands the QP sange 'three'. Therefore, in each sentence the embedded Q-NP containing the c-command QP must have scope internal to the NP containing the c-commanding QP. The structure of the bracketed NP in (58), for example, has the form (61):

(61)



There are two "possible" adjunction sites for NP_2: the S node of the relative clause and the $\bar{N}$, sister to QP_i. Two legitimate output representations may be derived by QR, therefore, depending upon whether NP_2 goes to the S or to the $\bar{N}$:

(62) wo mai-le [$_{np}$ meiben [$_{\bar{n}}$[$_s$[sange ren]$_i$[$_s$ t_i xie]]
I buy-ASP every three man write
de shu]]
DE book

(63) wo mai-le [$_{np}$ meiben [$_{\bar{n}}$ [sange ren]$_i$ [$_{\bar{n}}$ [$_s$ t_i xie]
I buy-ASP every three man write
de shu]]]
DE book

The structural difference between (62) and (63) is semantically immaterial, however. They both can be taken as meaning the following:

(64) wo mai-le [$_{np}$ meiben x; [[sange y; y shi ren]
I buy-ASP every three is man
[x shi y xie de shu]]]
is write DE book

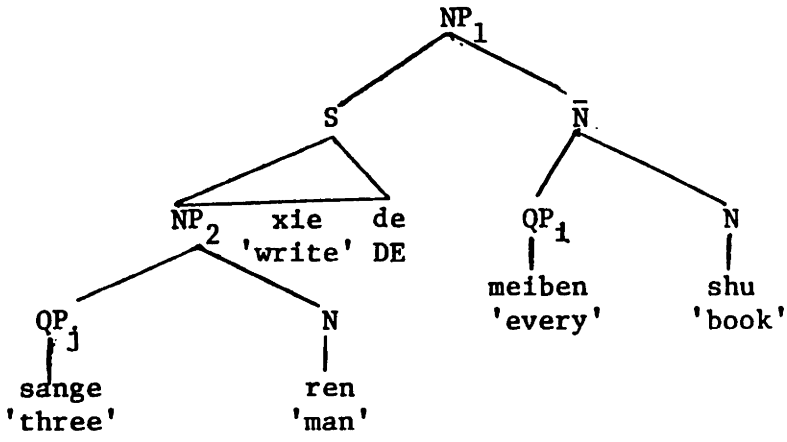
That is, I bought every x such that, for three y such that y is a person, x is a book that y wrote, where the NP "three y; y is a

person" is internal to the NP headed by 'every x'. Therefore, whether QR derives the representation (62) or the representation (63), it derives the internal reading. On the other hand, the external reading is excluded under the condition (59), since the output for such a reading has the embedded QP_j sange 'three' moved out of the c-commanding domain of the QP_i meiben 'every'.

(65) *[$_s$[sange ren]$_i$[$_s$ wo mai-le[$_{np}$ meiben t_i xie de shu]]]
three man I buy-ASP every write DE book

Note that the condition (59) has nothing to say about the sentences (55) and (57). Since neither of the two QPs within the bracketed NP of (55) or of (57) c-commands the other at SS, (59) does not require either to be in the scope of the other at LF. Take (57) for example. The bracketed NP has the structure (66) at SS, in which neither QP_i nor QP_j c-commands the other.

(66)



There are two adjunction sites for NP_2 in (66), the S of the relative clause and the N dominating 'book', which is the sister of QP_i. The latter adjunction site is not a "possible" one, however, with respect to the CPB and the CQB. The S node is a possible one, and adjunction of NP_2 to it will give (57) the following output:

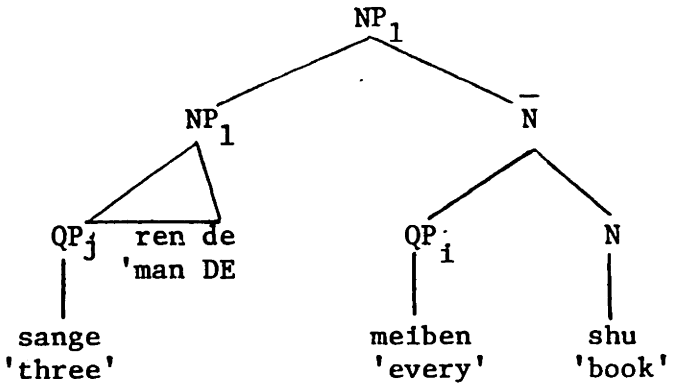
(67) wo mai-le $[_{np}[_s$[sange ren]$_i[_s$ t_i xie]] de meiben shu]
I buy-ASP three man write DE every book

This representation is equivalent to the representations (62) and (63) in what it means. The crucial point here, however, is that (57) may also have an external reading. This possibility can be derived if we assume that the S of the relative clause in (66) is not an absolute barrier to movement by QR (at least not in Chinese). This will allow QR to optionally adjoin the NP 'three men' to the matrix clause S of (57), giving (68):

(68) $[_s$[sange ren]$_i$ $[_s$ wo mai-le $[_{np}$ t_i xie de meiben shu]]]
three men I buy-ASP write DE every book

Since the derivation of this structure does not violate the condition (59), the ambiguity of (55) and (57), as opposed to the lack of it of (56) and (58), follows from this condition. It should also be clear that (1) and (2) are on a par with (55) and (57) in having an external reading each, since in the structure of the NP in (1) below (=3)), neither QP_i nor QP_j c-commands the other:

(69)



(The only difference between (1)-(2) and (78), (80) is that, unlike the latter, (1)-(2) are each unambiguous, having only the external reading. But we have seen already that this is due to the fact that the only NP-internal adjunction site in (69), the N node sister to QP_i, is not a "possible" one.)

We have given an answer to the question as to why sentences like (10), (11), (77), (79) and (81) in Chinese are not ambiguous in having only an internal reading each. This is done in terms of the condition (59). The plausibility of this explanation increases when we observe that this condition is extremely similar in appearance to the condition we proposed in Chapter 3 to account for the general correspondence between SS and LF with respect to the scope interpretation of quantificational expressions in sentences, namely the condition (3.56). A difference between (59) and (3.56) is that (59) concerns NP-internal quantification, while (3.56) concerns sentential quantification. The explanatory value of these

two conditions can be seen when we observe that they are somehow conflatable, thus suggesting the existence of a more general principle. Note that (59) may be seen as a partial "complement" to the condition (3.56). The latter refers to the structural c-command relation between two quantificational NPs or expressions, while the former refers to the structural c-command relation between two quantifier phrases. (59) applies precisely in one case where (3.56) does not apply. When one quantificational NP is properly contained in another, the two Q-NPs are not in a relationship of c-command, so (3.56) is silent. At this point (59) comes into play. Let us now give the following general condition:

(70) The General Condition on Scope Interpretation

> Suppose A and B are both QPs or both Q-NPs or Q-expressions, then if A c-commands B at SS, A also c-commands B at LF.

If the explanation we have offered is reasonable, we are now left with the task of explaining why, unlike the Chinese sentences (1)-(2), (10)-(11), etc., English sentences like (8), (9), (26), etc., are each ambiguous.

One plausible answer, I would like to suggest, lies in the assumption that the NPs contained in (8)-(9), (26) and the like may each have two structural analyses: one comparable to the structure (3) and the other comparable to (12). More specifically, I propose that NPs having the linear structure (Det)-N-PP in English may be analyzed hierarchically either as $[_{np}[_{np}(\text{Det})\ \bar{N}]\text{PP}]$, or as

$[_{np}$(Det)$[_{\bar{n}}$ N PP]], before QR applies. In the first of these two structures, the PP is placed in a modifier position in construction with the entire preceding sequence, while in the second structure the PP is placed in a complement position in construction with the preceding N, but not with the determiner. Thus, the sequence some people from every walk of life has either (71a) or (71b) as its structure, and the sequence pictures of everybody has either (72a) or (72b):

(71) a. $[_{np}[_{np}$ some people$][_{pp}$ from $[_{np}$ every walk of life]]]

b. $[_{np}$ Some $[_{\bar{n}}$ people$[_{pp}$ from $[_{np}$ every walk of life]]]]

(72) a. $[_{np}[_{np}$ pictures$][_{pp}$ of $[_{np}$ everybody]]]

b. $[_{np}[_{\bar{n}}$ pictures$[_{pp}$ of $[_{np}$ everybody]]]]

If this suggestion can be justified, then it is easy to see why English sentences with Q-NPs properly contained within other NPs may have either NP-internal or sentential scope on the less inclusive Q-NPs, while corresponding Chinese sentences may not. In the structure (71a), the Q-NP every walk of life is not dominated by an $\bar{N}$ node. The only $\bar{N}$ outside of this Q-NP is the one dominating people, which is the sister of QP some. But this $\bar{N}$ is not a "possible" adjunction site for every walk of life, since it doesn't dominate it. Therefore, the Q-NP must be adjoined to a node outside the entire NP in (71a), and get interpreted as having NP-external scope, or sentential scope if this NP is contained in a sentence like (8). This situation is exactly like that with the Chinese

sentences (1)-(2), etc. On the other hand, in the structure (71b), every walk of life has a possible NP-internal adjunction site, the $\overline{N}$ that dominates it. Therefore, it may be adjoined to the $\overline{N}$, giving a representation for the internal reading. This situation is like that with the Chinese sentences (10)-(11), etc. If we further assume the universality of the General Condition on Scope Interpretation (70), in particular the subcase equivalent to (59), then the Q-NP every walk of life may have only the internal reading in the structure (71b), in which the QP some c-commands the QP every. On this account, then, Chinese and English do not differ in any major principles of scope assignment. The situation with the sequence pictures of everybody may be similarly treated. Everybody has only external scope in (72a), and only internal scope in (72b).

Of course, the type of explanation we are proposing makes sense only if the claim can be justified that a sequence of the form (Det)-N-PP has two possible structural analyses as indicated in (71) and (72) at some level of representation before QR applies. I will try to establish this claim in two steps. First, I will indicate that both structures as represented in $[_{np}$ NP PP] and $[_{np}$ (Det) $[_{\overline{n}}$ N PP]] are possible, legitimate structures in English. Secondly, I will propose that noun phrases of either of these two forms may optionally undergo Restructure α and take on the other form before QR applies.

The claim that there are two possible positions for PP within

NP is in fact relatively well accepted. In the literature on phrase structures, both positions for PPs have been proposed, each with equally good reasons. For example, the structure $[_{np}$ NP PP] is assumed in Chomsky (1955), Emonds (1976), Reinhart (1976). The structure $[_{np}$(DET) $[_{\bar{n}}$ N PP]] is argued for by Chomsky (1970), and assumed in Jackendoff (1977), among many others. It seems that the truth is not that one or the other gives the only correct or possible position for PP in NP, but that both positons are base-generable. Thus, on the basis, among others, of the following parallelism between verbs and nouns:

(73) a. They destroyed the city.

b. Their destruction of the city.

c. *They destroyed.

d. *Their destruction.

Chomsky (1970) argues that the PP <u>of the city</u> in (73b) has the status of an $\bar{N}$ complement, just as the NP <u>the city</u> in (73a) is a complement in $\bar{V}$. This argues for the structure $[_{np}$(Det)$[_{\bar{n}}$ N PP]]. On the other hand, certain PPs which have the status comparable to relative clauses are not complements in the sense that <u>of the city</u> is in (73b). Just as relative clauses in English are usually represented in the structure $[_{np}$ NP $\bar{S}]$, it is reasonable to represent the PPs in the examples below as modifiers, not as complements, in the structure $[_{np}$ NP PP]:

(74) a. Their books on the table.

b. The men from the city.

It has been suggested by Chomsky (1981a) that the existence of both positions for PP also explains the contrast below:

(75) a. Their discussion of each other's problems.

b. *Their tables in each other's rooms.

Since discussion takes complements, the structure of (75a) may be assumed to be $[_{np}$ their $[_{\bar{n}}$ discussion of each other's problems]]. But since table does not take complements, the structure of (75b) is more likely $[_{np}[_{np}$ their tables] in each other's rooms]. The relevant difference between the two forms is that in (75a) each other is c-commanded by its antecedent their, while in (75b) it is not. In accordance with the Binding Theory (to which we return in Chapter 5), this difference in structure directly leads to their difference in well-formedness. More specifically, since the Binding Theory requires that anaphors like each other must be c-commanded by their antecedents, if (75a-b) are given the structural analyses suggested, with their c-commanding each other in (75a) but not in (75b), then their contrast in well-formedness follows.

If both $[_{np}$ NP PP] and $[_{np}$ (Det)$[_{\bar{n}}$ N PP]] are possible NP structures in English, this enables us to make the following proposal. Each string of the form (Det)-N-PP base-generated in either of the two forms optionally undergoes restructure α and takes on the other form before QR applies. That is, a string base-generated in the form (76a) may end up as (76b) before QR applies, and a string base-generated in the form (77a) may end up as (77b):

(76) a. [The [election of no men]]

b. [[The election] of no men]

(77) a. [[The men] from the city]

b. [The [men from the city]]

As one way to execute this change in structure, we may assume that the PP of no men undergoes extraposition and adjoins itself to the right of the dominating NP in (76a). On the other hand, the determiner the in (77a) may be assumed to move itself up and get adjoined with the dominating NP, followed by appropriate relabelling. In this way, the scope ambiguity of (8), (9), and (26) in English arises from their structural ambiguity.[7] The lack of ambiguity of the Chinese sentences (1)-(2), (10)-(11), etc., on the other hand, is accounted for, not by the assumption that the language has no rule of restructuring, but as a result of the fact that such a process is inapplicable in these cases under the principles of the $\overline{X}$ theory. Recall that a minimum requirement on restructuring (or movement) is that its output must be a possible $\overline{X}$ structure in a given language. Since Chinese noun phrases are strictly head-final, whatever Restructure α may do to a noun phrase, it must always produce a result that is strictly right-branching in hierarchical structure. None of the noun phrases in (1)-(2), (10)-(11), etc., may therefore have more than one structural analysis, nor more than one scope interpretation. The constrast between Chinese and English, in other words, follows from their difference in having or not having the $\overline{X}$

filter proposed in Chapter 2 (2.20). The contrast is on a par with what we saw in Chapter 3 between the unambiguous (78a-c) and the ambiguous (78d):

(78) a. Always John didn't show up.

b. John always didn't show up.

c. John didn't always show up.

d. John didn't show up always.

Recall also that we assumed the ambiguity of (79) in English to be due to the possibility of reanalyzing its base structure (80a) as (80b); whereas the non-ambiguity of the Chinese sentence (81) follows from the $\overline{X}$ filter, which prevents the reanalysis:

(79) I didn't see many students.

(80) a. [I [didn't [see many students]]]

b. [I [[didn't see] many student]]

(81) wo meiyou kanjian henduo xuesheng.
I not see many student
'I saw few students.'

(82) a. [wo [meiyou [kanjian henduo xuesheng]]]
I not see many student

b. *[wo[[meiyou kanjian] henduo xuesheng]]
I not see many student

This contrast in presence vs. absence of ambiguity shows up as a contrast in acceptability when the object NP takes what is called in Linebarger (1980) a "positive polarity item", such as several or the Chinese equivalent haojige.

(83) I didn't see several people.

(84) ?*wo meiyou kanjian haojige ren.
I not see several man

Our theory relies on the assumption that there exists a rule of Restructure α in English. As we have already seen, there is reason to believe that Restructure α does take place in Chinese. Furthermore, a number of plausible proposals have been made in the literature which postulate the existence of such a restructuring process, cf. Rizzi (178b), Weinberg and Hornstein (1981). The so-called "subject-to-object" raising may also be seen as a case of Restructure α (the difference between the two approaches under current debate being in what should be taken to be the correct output structure). Chomsky's (1977) rule of PP extraposition may also be seen as a special case of such a rule, if we consider all vacuous movements to be instances of restructuring. There seems, then, to be not much of a question on the possibility that a process of restructuring may happen with structures like (76) and (77). Although we do not have overt evidence for the assumption that restructuring takes place in the structures discussed, it should be noted that, as is often the case, the real evidence for a theoretical hypothesis lies in its explanatory value. Our theory ties together the following otherwise unrelated phenomena of Chinese and English: first, the existence in Chinese vs. the non-existence in English of an $\bar{X}$ structure filter having the form (2.20); secondly, the ambiguity vs. non-ambiguity of sentences like (78)-(82); and thirdly, the ambiguity vs. non-ambiguity of sentences in which one Q-NP is properly contained in another. We may regard the process of restructuring as one way for speakers to "make mistakes" within certain limits

(minimally, within the limits allowed by $\bar{X}$ principles). In both the kind of structures discussed in Chapter 3 and those discussed here, English speakers can "make mistakes" and derive scope ambiguities in certian constructions, since the language allows a full range of left-branching $\bar{X}$ structures. The Chinese speakers have no way of making similar mistakes, however, since the language has the $\bar{X}$ structure condition (2.20) and does not allow left branching structures. The precise value of our theory, in this regard, is that it enables certain principles of scope interpretation to apply across different language and derives certain typological differences in a principled way.

Furthermore, as we have remarked in Chapter 3, the typological distinction between English and Chinese with respect to scope interpretation of sentences considered there cannot be learned directly, and therefore must be derived from something learnable. Exactly the same point applies to constructions considered in this section. Our theory is thus quite explanatory from the viewpoint of learnability.[8]

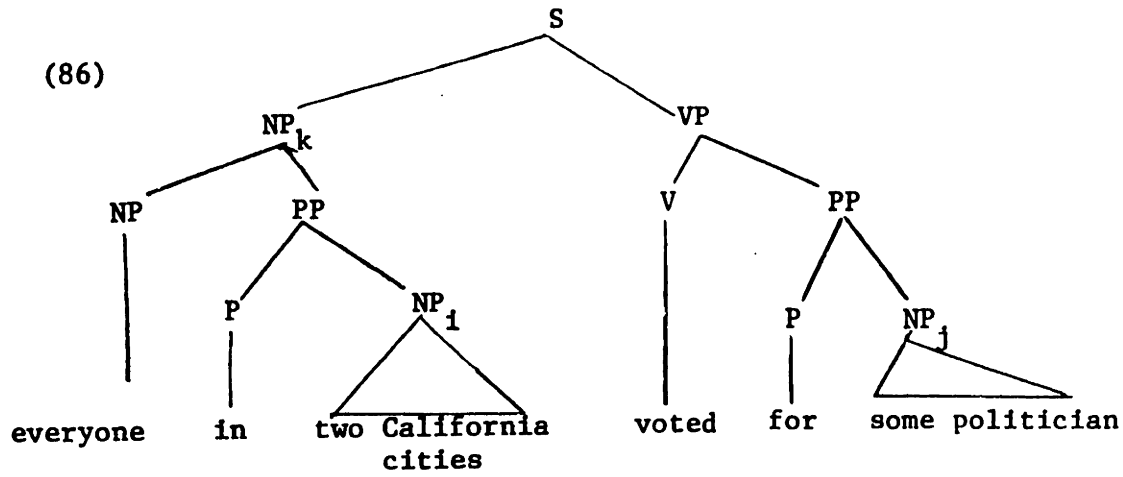
Before we conclude this section, I would like to indicate that there is an interesting piece of additional evidence for the theory defended here over one that does not employ the condition (70). Consider sentences of the sort given in:

(85) a. Everybody in two California cities voted for some politician.

b. All the students of two professors have to solve three problems.

Take (85a) for example. The DS representation of this sentence is (86):

(86)



In this configuration, NP_k c-commands NP_j, NP_k properly contains NP_i, but neither NP_i nor NP_j c-commands or properly contains the other. Let us consider what are the possible readings that the sentence may have. There are two possible readings that we want to exclude from further consideration. These are the ones according to which the NP_i two California cities has scope internal to NP_k. These two possibilities are theoretically allowed, because we assume that NP_k may have the structure given in (86) at SS (if it does not undergo restructuring), or may be represented as $[_{np}[_{\bar{n}}$ everybody $[_{pp}$ in two California cities]]], in which two California cities has a dominating $\bar{N}$ as a "possible" adjunction site. That is, theoretically, we ought to allow both the reading $[[_k i]j]$ and the reading $[j\ [_i\ i]]$:

(87) a. $[[_k$ i] j]: Everybody who is in two California cites voted for a politician or another.

b. $[[_k$ i] j]: There is a politician that everybody who is in two California cities voted for.

The sentence (85a), of course, does not have either of these two readings. But this is clearly due not to any grammatical principle, but to the real world pragmatic reason that nobody can be in two California cities at the same time. In what follows, we will consider only situations where the NP two California cities has sentential, i.e. NP-external scope. There are six logical possibilities: [k i j], [k j i], [j k i], [i k j], [j i k], and [i j k]. The first three possibilities, in which the more inclusive NP_k has scope over the less inclusive NP_i, are ruled out by the two well-formedness conditions CPB and CQB, since the LF representations derived for such readings would contain free variables and vacuous quantifiers. The three unavailable readings are listed below:

(88) a. *[k i j]: Everybody is such that for two California cities in which he is, he voted for some politician.

b. *[k j i]: Everybody x such that, for some politician y, for two California cities z, x voted for y.

c. *[j k i]: For some politician y, everybody is such that for two California cities in which he is, he voted for y.

The other three possibilities, according to which NP_i has scope over NP_k, do satisfy both the CPB and the CQB. Therefore, according to the theory of May (1977), which does not incorporate a condition along the lines of (70), all the three readings are available. However, as far as my informants have been able to determine, only the two readings [i k j] and [j i k] exist for this sentence, not the reading [i j k]. That is, (85a) may mean (89a) or (89b), but not (89c):

(89) a. [i k j]: There are two California cities such that everybody in each of the cities voted for one politician or another.

b. [j i k]: There is a politician who everybody in two California cities voted for.

c. *[i j k]: For two California cities x, for some politician y, everybody in x voted for y.

In other words, suppose the two California cities have one thousand residents each. Then, according to (89a), (85a) means that each of the two thousand residents referred to voted for one politician or another. There could be two thousand politicians voted for, each getting exactly one vote, though this extreme situation is unlikely, and in all likelihood, many residents voted for the same politician. According to (89b), (85a) talks about one politician only, who got two thousand votes. Both these two readings may be asserted with the sentence (85a). However, the sentence cannot be used to assert (89c), according to which there are two California cities such that all the residents of each of the two cities, A and B, voted for one and the same politician, but the politician elected by residents of A need not be the same person as the politician elected by residents of B. In other words, (85a) cannot be used to assert that two politicians were voted for, each getting exactly one thousand votes. There is, of course, nothing odd pragmatically about this last situation, but speakers agree generally that it cannot be the situation that (85a) is intended to describe. Similarly, (85b) can mean either that two professors are such that all of their students have to solve some three problems or other, or that there are three problems each of which all the students of two professors have to solve. But the sentence does not assert that there

are two professors each of whom has three problems for all of his students to solve. Again this last situation is pragmatically no problem; in fact, it represents the most usual situation in which a professor gives the same problems for all of his students.

Note that the unavailable reading is allowed in an account like May's. Consider now how this reading may be ruled out, and the other two may be ruled in, in our theory. Consider the structure (86). If this structure does not undergo restructuring, then before QR applies, NP_k c-commands NP_j. Therefore, (70) requires that NP_k has scope wider than NP_j. Furthermore, given the CPB and the CBQ, NP_i, which is contained in NP_k, must have scope wider than NP_k. This structure, then, gives rise to only one reading, the reading [i k j]. On the other hand, if the structure (86) undergoes restructuring, say if the NP some politician is vacuously moved to the right and gets attached to the S node, then NP_j will c-command NP_k and have scope over NP_k if restructuring takes place before QR applies. Since NP_k contains NP_i, NP_j must also c-command NP_i. Therefore, (70) requires that if NP_j has scope over NP_k, then it must also have scope over NP_i: only [j i k] is possible, but [*i j k] is not. This is precisely what we want.

In the rest of this section, I will turn to a brief discussion of some sentences for which I have not been able to obtain very firm native speaker judgments. I will assume that the subtle differences indicated below are correct and consider their consequences for our theory. What I will say, of course, depends upon the correctness of the subtle judgments. Consider first the following sentences:

(90) [Each report of[two accidents]$_i$]$_k$ has been received by [someone]$_j$.

(91) [Someone]$_j$ has read [each report of [two accidents]$_i$]$_k$.

(92) [John [didn't]$_j$ see [every picture of [five students]$_i$]$_k$.

Sentence (90) has the same form as (85a) and (85b), in which NP_k containing NP_i occurs as the subject and NP_j occurs as the object. In (91) and (92), on the other hand, NP_k containing NP_i occurs in object position, and the Q-expression identified as j occurs preverbally, as subject in (91) and as AUX in (92). Our account of sentences like (95a-b) requires that if j has scope over k and k properly contains i, then j must also have scope over i, whether i has scope internal or external to k. In other words, the scope order [i j k] is not possible, where j intervenes between i and k. This, as we have indicated, is true of the sentences in (85). It is also true of (90): The sentence does not assert that for two accidents, say A and B, A has someone that has received each report concerning A, and B has another person that has received each report concerning B. Besides its internal readings on NP_i, (90) may have the scope order [i k j]: there are two accidents each report of which has reached someone or another; or the order [j i k]: some single person is such that there are two accidents each report of which has reached him. But is seems very hard to get the scope order [i j k]. Is this also true of (91) and (92)?

It turns out, as far as I have been able to determine, that both (91) and (92) do allow the reading [i j k], contrary to our prediction. For example, (92) can mean that there are five students who John didn't see every picture, i.e., many who John only saw some pictures of. (91)

also seems to be capable of asserting that there are two accidents each of which some single person has read all reports of. That this reading is available is evidenced by the fact that (91) can be used as an answer to the question (93), and (92) as an answer to (94):

(93) How many accidents has someone read each report of t?

(94) How many students didn't John see every picture of t?

In (93), how many accidents, which corresponds to NP_i of (91), has the widest scope. Furthermore, someone may have scope wider than the object NP each report of t. It has, in other words, the scope order [i j k]. If (91) can be an answer to (93), then it is natural to conclude that it also is the scope order [i j k]. The situation is similar with (94).

These two counterexamples can be explained away, however, in the manner I am about to describe, and to the extent that this explanation is correct, they in fact constitute further support for our account. The crucial difference between (91) and (90) is that in (91) NP_k is in postverbal position while in (90) it occurs preverbally. Given the principles of $\bar{X}$ theory, then, there is a possibility to restructure (91) in such a way that NP_i occurs outside of NP_k, c-commanding both NP_k and NP_j, while NP_k is c-commanded by NP_j, while no such possibility exists for (90). More specifically, suppose we assume that NP_i of (91), two accidents, and NP_i of (92), five students, each may undergo vacuous extraposition (Restructure α) and get adjoined to the S node, c-commanding everything else in the clause. Thus, (90) - (92) may take on the structure below, after restructuring:

(94) [Someone$_j$ has read [each report of t_i]$_k$] two accidents$_i$.

(95) [John didn't$_j$ see [every picture of t_i]$_k$] five students$_i$.

Since NP_i c-commands NP_j, and NP_j in turn c-commands NP_k, in both (94) and (95), the reading [i j k] is derivable in accordance with (70). The sentences (91) and (92) therefore are not problems for our theory but in fact support it.

4.1.2. Other Quantificational Sentences

I have discussed at considerable length the scope properties of sentences in which one Q-NP is properly contained in another, and tried to justify what I believe to be an optimal theory. With respect to NP-internal quantification, the SS —> LF mapping performed by QR in Chinese is a trivial one in that the c-command relationship between two QPs at SS is preserved at LF, under the condition (70). The mapping that derives NP-internal readings in English is also relatively trivial, although certain sequences may undergo optional restructuring before QR affects them. These are the cases where one could do without QR: one could simply define scope relations in terms of non-quantifier-variable, or quantifier-free, representations at SS (or in some cases at a level following Restructure α). With respect to the external readings, however, the mapping between SS and LF is less trivial. In both languages, structures that give rise to external readings are those in which the condition (70) is irrelevant, since for any two QPs or any two Q-NPs, A and B, neither A nor B c-commands the other. Here QR plays a crucial role by deriving a well-formed configuration in which a less inclusive Q-NP has scope external to, and wider than, its containing Q-NP. In

this section we will briefly look at a few other cases where QR performs a non-trivial mapping.

One such case concerns sentences like the following:

(96) [$_s$[$_{np}$[$_s$ ta piping meige ren de wenzhang] rang xuduo ren
he criticize every man DE article make many man

shengqi]
angry

'Articles in which he criticized everyone made many men angry.'

(97) [$_s$ zhejian shi gen [$_s$ Lisi buneng lai] meiyou guanxi]
this matter with cannot come no relation
'This matter has nothing to do with Lisi's not being able to come.'

(98) [$_s$[$_s$ youwuliuge ren xuan zhemen ke] dui meige ren
5-or-6 elect this course to every man

dou hao]
all good

'That five or six people elect this course will be good to everyone.'

In each of these sentences, there are two Q-expressions, one in the matrix and the other in the embedded clause. Neither Q-expression c-commands the other at SS or at any point prior to the application of QR. The condition (70) is therefore irrelevant. In each of these sentences, the matrix Q-expression has one possible adjunction site: the matrix S; and the embedded Q-expression has two, the matrix and the embedded S. If we assume that these sentences represent the unmarked situation with respect to the locality condition (41), i.e., that an ordinary Q-expression takes the narrowest possible scope, then the correct scope representations of these sentences will be derived by QR, with the matrix Q-expression c-commanding the embedded one at LF,

though not at SS. This is also a case where QR plays a crucial role.

Another case, also mentioned in Chapter 3, concerns sentences like the following:

(99) Lisi hen bu-gaoxing sanjian shiqing.
very not-happy three thing
'Lisi is very unhappy about three matters.'

As mentioned in Chapter 3, the fact that this sentence has the scope order [E NOT] for the Q-expressions bu 'not' and 'three matters' falsifies the linear hypothesis (3.55). The hypothesis (70) embodying c-command is not contradicted, but has nothing to say either. Given the Lexical Integrity hypothesis, however, the desired scope order is immediately derived upon a simple operation of QR.

Consider now sentences like (100):

(100) [meige ren$_i$ de meige pengyou]$_k$ dou mai-le sanben shu$_j$.
every man DE every friend all buy-ASP three book
'For everyone's every friend x, x bought three books.'

This sentence has only the interpretation according to which the possessive NP_i 'everyone' has scope over the object NP_j 'three books.' At SS, neither NP_i nor NP_j c-commands or properly contains the other. Therefore, the direct structural relation between these two NPs does not guarantee the desired result with NP_i having wide scope over NP_j. However, there is an indirect relationship between them which gives the right result, namely the fact that NP_i is properly contained in NP_k and NP_k c-commands NP_j. By May's two well-formedness conditions CPB and CQB, and the fact that there is no adjunction site internal to NP_k for NP_i, NP_i must have wider scope than NP_k. Furthermore, by the condition (70), NP_k must have scope wider than NP_j. Therefore, NP_i has scope over NP_j. In this connection, consider now the following:

(101) [meige ren$_i$ de pengyou]$_k$ dou mai-le sanben shu$_i$.
every man DE friend all buy-ASP three book
'For everyone x, x's friends bought three books.'

The scope relation between NP_i and NP_j in this sentence is the same as that in (100). The only difference between (100) and (101) is that in (100) NP_k is quantificational, while in (101) it is not. "Everyone's friends' is unquantified, on a par with 'John's friends,' or with mass nouns and bare plurals, though it contains a quantified possessive. We have assumed all along that unquantified NPs like bare plurals are not subject to QR in LF. The main reason that such unquantified NPs behave more on a par with definite descriptions and names than with quantificational NPs with respect to certain properties that motivate the rule of QR in LF. For Example, J. Higginbotham (1980 class lectures) has indicated that the sentence (102) is more on a par with those in (103) than with those in (104) under "weak crossover":[9]

(102) ?Their$_i$ teachers love students$_i$.

(103) a. His$_i$ teacher loves John$_i$.

b. His$_i$ teacher loves the student$_i$.

c. Their$_i$ teachers love the students$_i$.

(104) a. *His$_i$ mother loves everyone$_i$.

b. *Who$_i$ does his$_i$ mother love t_i?

It seems that NPs like 'everyone's students' also behave more on a par with non-quantificational NPs:

(105) ?Their$_i$ teachers love everyone's students$_i$.

Judgments concerning the sentences (102) and (105) are, however, quite subtle, and probably one should not base any theory crucially on them. In order to decide on how to account for (101), we will have to consider

both possibilities. Either NPs like the NP_k in (101), 'everyone's friends,' are subject to QR in LF, or they are not. Suppose they are, then there is no problem with (101). Precisely as in (100), NP_k in (101) must have scope wider than NP_j, and NP_i must have scope wider than NP_k. Therefore, NP_i must have scope wider than NP_j at LF, though neither c-commands or properly contains the other at SS. The problem arises when we suppose that such NPs are not moved by QR in LF.

I would like to suggest that this problem can be solved by adopting the view, common among Montague grammarians, that all NPs, quantificational or otherwise, are represented as variables at some level of representation (cf. Partee 1975, Dowty 1978, among much other work). The only crucial assumption made in this study that differs from this view is that only quantificational NPs are moved before the level of LF, other NPs being moved at a later stage, say in LF'. (Therefore, properties that distinguish Q-NPs from names are accounted for at LF, not at LF'.) Thus, if bare plurals are not subject to QR in LF, then they are subject to movement in LF' by an LF' analogue of QR, or lambda conversion. If so, the problem posed by (101) may be solved by assuming that the general condition (70) also applies to bare plurals.

Sentences like (100) and (101) constitute another case of non-trivial mapping in LF (and LF') in that the scope relation between NP_i and NP_j at LF (or LF') corresponds to no c-command relation of these two NPs at SS. As in the other two cases reviewed, what we see is that there are sentences whose scope properties a condition like (70) has nothing to say about.

Note that none of the three cases reviewed so far contradict any principle we have proposed, either the correspondence principle (70) or the locality condition (41) (which requires Q-NPs to take the narrowest possible scope). These are, therefore, unmarked cases of quantification. There are also marked cases of quantification that do contradict the principles we have proposed. One marked case is exemplified by sentences like (52) - (53), which allow a reading in violation of the locality condition (41), as we noted. For example, (53) has the two readings corresponding to the two representations (106a) and (106b):

(53) $[_S[_{NP}[_S$ meige ren mai] de shu] wo dou bu kan]
every man buy DE book I all not buy

a. 'For every man x, I don't read books that x buys.'

b. 'Books that everybody buys, I don't read.'

(106) a. $[_S[$meige ren$]_i[_S[_{NP}[_S t_i$ mai] de shu] wo dou bu kan]]
every man buy DE book I all not read

b. $[_S[_{NP}[_S[$meige ren$]_i[_S t_i$ mai]] de shu] wo dou bu kan]
every man buy DE book I all not read

In the representation (106a), QR has moved the Q-NP meige ren 'every man' across an S node, a possible adjunction site, in violation of the locality condition (41). Compare the sentence (53) with (107), which has only an internal reading on 'every man.'

(107) $[_S[_{NP}[_S$ meige ren mai] de shu] wo bu kan]
every man buy DE book I not read
'Books that every man buys, I don't read.'

The only SS difference between (53) and (107) is that in the former there is a scope marker, dou 'all, uniformly,' that occurs in the matrix clause, while in the latter no such scope marker occurs. The culprit of the violation of the locality condition (41) in (53a), therefore,

is this scope marker. When a sentence is not marked with dou, as in (107), the locality condition is respected. The contrast between (53) and (107) fits rather naturally into a theory of markedness, if we assume as is standard, that the overt presence of a marker (i.e., dou) contributes to the marked property of a string while the absence of a special marker represents what is unmarked with respect to general principles of grammar.

Another form in which the overt presence of dou contributes to the markedness of given constructions involves a violation of the correspondence principle (70). The type of construction I have in mind involves the use of a special class of elements whose properties deserve a brief discussion. These items have two primary uses, as "wh-words" or as quantifiers equivalent to any in English in many ways.[10]

(108)

examples	as question words	as quantifiers
shei	'who'	'anybody'
sheme	'what'	'anything'
nă	'which'	'any'
heshi	'when'	'any time'
nali	'where'	'any place'
zeme	'how'	'any way'
weisheme	'why'	'any reason'
A-not-A (e.g., lai-bu-lai) come-not-come	'whether A or not'	'no matter whether A or not'

All of these items may be used as wh-question words in any environment, except when such a use is excluded by independent principles of grammar.

The use of these items as quantifiers, however, is subject to very strict restrictions. Basically, there are only two contexts where these items may be used as quantifiers. The first is what is commonly called the "affective" context, i.e., an appropriate position in a negative sentence, a yes/no question, an A-not-A question, or a conditional clause. In this case, in other words, they are "negative polarity items" (cf. Klima, 1964). In the standard cases they occur within the c-commanding scope of a negative marker, or within the scope of a verb affected by the use of 'if' or the yes/no, or A-not-A question form (all of which give the verb a less than positive interpretation). For example, (109) and (110) are ambiguous in that the underlined words may be interpreted as either question words or as quantifiers, since they occur within the domain of 'not':

(109) ta bu xiang chi sheme (?)
he not want eat what/anything

a. 'What didn't he want to eat?'

b. 'He didn't want to eat anything.'

(110) Zhangsan bu renwei ni hui xihuan shei (?)
not think you will like who/anyone

a. 'Who didn't Zhangsan think that you will like?'

b. 'Zhangsan didn't think that you will like anyone.'

In the following example, the word sheme occurs within a conditional clause. Like (109) - (110), this sentence can also be interpreted as quantificational or as a question:

(111) ruguo ta xiang chi sheme, ta hui gen ni shuo (?)
if he want eat what/anything he will with you say

a. 'What is the x such that if he wants to eat x, he will let you know?'

b. 'If he wants to eat anything, he will let you know.'

When in the context of a yes/no question involving the particle ma, as in (112), or an A-not-A question, as in (113), each of the words in (108) may be used as quantifiers also:

(112) ni xiang chi sheme ma?
you want eat anything PRT
'Would you like to eat anything?'

(113) ni xiang-bu-xiang chi sheme?
you want-not-want eat anything
'Would you like to eat anything?'

Unlike (109) - (111), however, (112) - (113) cannot be interpreted as wh questions. But this is due obviously to the fact that, if sheme were interpreted as what, (112) - (113) would be each a multiple question on the pairing between a choice of the value of what and a choice between yes and no in the yes/no or disjunctive question. Although multiple questions of the sort exemplified by (114) are perfectly grammatical, those having the form (112)-(113) must be excluded, for entirely separate reasons which have nothing to do with whether a given word like sheme occurs in an affective context. Thus, in contrast to (114), (115) - (116) are also unacceptable even though shei is not in the domain of an affective element:[11]

(114) shei mai-le sheme?
who buy-ASP what
'What bought what?'

(115) *shei xiang chi pingguo ma?
who want eat apple PRT
'*Does who want to eat apples?'

(116) *shei xiang-bu-xiang chi pingguo?
who want-not-want eat apple
'*Do who want to eat apples or not?'

The second context in which the items in (108) may be used as quantifiers is when they occur in a position preceding the scope marker dou, which marks universal quantification: ___ X dou.

(117) shei dou xihuan ta.
anyone all like he
'Everyone likes him.'

(118) [ni sheme shihou] lai dou keyi.
you any time come all o.k.
'It will be all right whenever you come.'

(119) [ni mai-bu-mai neiben shu] dou meiyou guanxi.
you buy-not-buy that book all no matter
'It doesn't matter no matter whether you buy that book or not.'

It is pretty well known that the presence of the scope marker dou in a sentence in Chinese indicates that a certain NP preceding it must be interpreted as universally quantified. In general, a universally quantifiable term is a term whose extension ranges over two or more objects. In (117) and (118), 'anyone' and 'any time' are each universally quantifiable. So is the element mai-bu-mai, which has extension ranging over the two choices mai 'buy' and bu mai 'not buy.' Plural NPs followed by dou are also universally quantifiable:

(120) neixie ren dou hen youqu.
those man all very interesting
'All those men are very interesting.'

(121) [[ta xie] de shu] wo dou kan.
he write DE book I all read
'All books that he wrote, I read.'

A term whose extension ranges over a singleton set, however, is not quantifiable by dou. Thus, a singular NP like 'that book' or a proposition like 'that he arrived' cannot be so quantified:[12]

(122) *neiben shu dou hen gui.
that book all very expensive
'*That book is all very expensive.'

(123) *[ta lai-le] dou hao.
he come-ASP all good
'*That he arrived is all very good.'

This explains why (117) - (119) are each unambiguous. Since there is only one universally quantifiable element preceding dou in each of these sentences, shei, sheme shihou, and mai-bu-mai cannot be used as question words. If there are more than one quantifiable elements before dou, we expect to find ambiguity, as is indeed the case in (124) - (125):

(124) [[shei xie] de shu] ni dou xihuan (?)
who/anyone write DE book you all like

a. 'Who is the x such that all the books that x wrote, you like?'

b. 'For all x, the books that x wrote, you like.'

(125) [shei de meiben shu] ni dou xihuan (?)
who/anyone DE every book you all like

a. 'Whose every book do you like?'

b. 'For all x, you like x's every book.'

shu 'book' is universally quantifiable in both (124) and (125), since in (124) it may be taken to be plural, and in (125) it has its own universal QP. If both universally quantifiable elements preceding dou are of the type given in (108), several possible readings are available. Consider:

(126) [[shei tou-le sheme] dou meiyou guanxi.
who/anyone steal-ASP what/anything all no relation

a. 'No matter who stole what, it doesn't matter.'

b. 'Who is the x such that no matter what x stole, it doesn't matter?'

c. 'What is the x such that no matter who stole x, it doesn't matter?'

The reading most easily obtained is (126a), according to which both shei and sheme are universally quantified. Or, in other words, what is quantified is something whose extension ranges over all possible pairings between 'anyone' and 'anything': i.e., for all pairings <x,y>, x a person and y a thing, it doesn't matter that x stole y. This is a case of "multiple quantification" on a par with multiple interrogation which we have just seen in connection with (114). The two other readings indicated in (126) are also available, although for some reason, they are not so readily obtained. Thus, according to (126b), shei is 'who' and sheme is 'anything'; according to (126c), the situation is reversed. According to (126b), (126) is a question to which (127) may be an appropriate answer; and according to (126c), (128) may be an appropriate answer:

(127) [Zhangsan tou-le sheme] dou meiyou guanxi.
steal-ASP what all no matter
'Whatever Zhangsan stole, it doesn't matter.'

(128) [shei tou-le neiben shu] dou meiyou guanxi.
anyone steal-ASP that book all no matter
'It doesn't matter whoever stole that book.'

In summary, the items listed in (108) may be used as question words unless independent principles prevent them from being so used. Their use as quantifiers, however, is strictly limited to two situations.

When in neither an affective context nor a position followed by dou, all of these items must be used as question words. Compare (113) and (117) with the following, respectively:

(129) ni xiang chi sheme?
you want eat what
'What do you want to eat?'

(130) shei xihuan ta?
who like he
'Who likes him?'

Note that when the items in (108) are used as quantifiers, they behave on a par with any in English. When they occur in an affective context, they may be taken as existential in meaning, i.e., "not anything" = [NOT E], as in (131). When in the position before dou, they are universal, equivalent to what is called a free-choice or non-polarity any, as in (132).

(131) I didn't eat anything.

(132) Anything will do.

It is apparently not an accident that in both English and Chinese, the free-choice universal and the negative polarity existential quantifier are homophonous. It is natural to try to treat these as one single morpheme, thus denying there is anything homophonous here. Since [NOT E] is logically equivalent to [ALL NOT], an easy way to do this is to say that all occurrences of any are universal, and that a negative polarity any takes wide scope over the negative or other affective element that c-commands it at SS. This is the position held by Quine (1960), etc. This amounts to the claim that all negative polarity any's are marked cases of quantification with respect to the correspondence principle (70). Thus, given (133), QR turns it into (134), which is equivalent

to (135):

(133) ta bu xiang chi sheme.
he not want eat anything
'He doesn't want to eat anything.'

(134) $[_s[\text{sheme}]_i[_s$ ta bu xiang chi $t_i]]$
anything he not want eat

(135) [[meige x; x shi dongxi][ta bu xiang chi x]]
every is thing he not want eat

However, a difficulty with this approach is that it cannot be extended to other affective contexts than the context of a c-commanding negative morpheme. For example, this approach would give (136) the representation (137), which may be converted to (138):

(136) ni xiang-bu-xiang chi sheme?
you want-not-want eat anything
'Do you want to eat anything?'

(137) $[_s[\text{sheme}]_i[_s$ ni xiang-bu-xiang chi $t_i]]$
anything you want-not-want eat

(138) [[meige x; x shi dongxi][ni xiang-bu-xiang chi t_i]]
every is thing you want-not-want eat

What (138) says is: "For every x, do you want to eat x or not?" There are two possible appropriate answers to this question, which may be taken to jointly define its meaning (cf. below for more discussion):

(139) Yes, for every x, I want to eat x.

(140) No, for every x, I don't want to eat x.

However, although these two are both appropriate answers to the question "for every x, do you want to eat x or not?," only one of them is an appropriate answer to (136), namely only (140). Thus, saying no to the question (136) is to assert that one wants to eat nothing, which is what (140) says. But saying yes to the question asserts only that one wants to eat <u>something</u>, not necessarily everything. But the answer

(139) does commit one to this latter unintended reading. Therefore, taking the polarity any as a wide scope universal quantifier will fail with sentences like (136).

A number of arguments against taking the polarity any as a wide scope universal quantifier have been produced in Linebarger (1980) and Carlson (1980), and I believe that a correct theory should take it as an existential, having narrow scope with respect to the negative or affective element c-commanding it as SS. This is the view originally suggested in Klima (1964). In other words, negative polarity any, in both Chinese and English, is not a marked case of quantification with respect to principle (70).[13] The LF representation for (136) should be something like (141), with the A-not-A operator c-commanding 'anything' in accordance with (70) (cf. below):

(141) [YES/NO [SOMETHING$_i$[you want to eat t_i]]]

(108) in negative contexts, however. This is exemplified by sentences like (142) and (143):

(142) [[ni bu xiang chi sheme] dou meiyou guanxi],
you not want eat anything all not matter

keshi zhewan fan yiding yao chi.
but this rice sure must eat

'For all x, it doesn't matter that you don't want to eat x; but this bowl of rice, you must eat.'

(143) [[ta shuo ta bu renshi shei] wo dou xiangxin],
he say he not know anyone I all believe

jiushi bu xiangxin ta bu renshi wo.
just not believe he not know I

'For all x, I believe that he said he didn't know x; I just don't believe that he didn't know me.'

At SS, sheme 'anything' and shei 'anyone' occur each in the c-commanding domain of bu 'not' in the embedded clause. According to principle (70), sheme and shei should be in the scope of 'not,' and interpreted existentially. Note, however, that the clause in each of these sentences is followed by dou in the matrix. As just mentioned, the presence of dou requires something preceding it to be interpreted as universally quantified. In each of (142) - (143), there is only one quantifiable element, i.e., sheme and shei, respectively. There is a "clash," so to speak, between the requirement of dou and the requirement of principle (70). As the translation shows, dou wins out. The LF representations of the relevant parts of (142) and (143) are, respectively, (144) - (145):

(144) [[sheme]$_i$[[bu$_j$[ni t$_j$xiang chi t$_i$]]dou meiyou guanxi]],....
anything not you want eat all no matter

(145) [[shei]$_i$[ta shuo [bu$_j$[ta t$_j$renshi t$_i$]]] wo dou xiangxin]],....
anyone he say not he know I all believe

In each representation, the indefinite quantifier c-commands the negative, directly violating (70). The sentences (142) - (143) thus must be regarded as marked cases of quantification. Again, the markedness may be naturally related to the presence of the scope marker dou. Without this marker the principle (70) is fully respected, as can be seen by comparing (142) with (146).

(146) [ni bu xiang chi sheme] meiyou guanxi.
you not want eat anything not matter
'It doesn't matter you don't want to eat anything.'

4.2. Wh Questions

4.2.1. Wh Words as Q-NPs

When we say that a sentence like (147) has the LF representation (148) or (149), what is it that the representation says of the meaning of the sentence?

(147) Everybody arrived.

(148) $[_S[\text{everybody}]_i[_S\ t_j\ \text{arrived}]]$

(149) $[_S[\text{All x; x a person}][_S\ \text{x arrived}]]$

It is common practice to say that a quantificational structure like (148) or (149) represents the truth conditions of the sentence (147). It is a shorthand, in other words, for all the sentences or propositions that satisfy the truth conditions that are related to each other by some logical connective, such as the conjunction or the disjunction. In particular, the structure (149) is a shorthand for the conjunction of all sentences which result from substituting a value for x in the open clause [x arrived], i.e., conjunction of [Bill arrived], [John arrived], [Mary arrived], etc. Likewise, a representation like (151) or (152) says of (150) that what it means is a disjunction of the instances of [x arrived], where x is a person.

(150) Somebody arrived.

(151) $[_S[\text{Somebody}]_i[_S\ t_i\ \text{arrived}]]$

(152) $[_S[\text{Some x; x a person}][_S\ \text{x arrived}]]$

The LF representation for the sentence two men arrived, furthermore, may be said to abbreviate a disjunction of sentences each of which is

a conjunction of exactly two sentences satisfying [x arrived]. A similar semantics may be given for similar quantification structures.

Given this simple conception of the meaning of quantificational sentences, let us now consider the meanings of questions. A natural way to look at a wh question, for example, is to consider that it consists of a presupposition having the form of a quantificational sentence and a focus indicating the speaker's request for a specification on the value of the quantificational element in the presupposition. Thus, the question (153):

(153) Who arrived?

may be decomposed into the presupposition "Somebody arrived" and the request "Give me the identity of somebody." (In early transformational grammar, the DS of a question like (153) is simply "Somebody arrived," with somebody containing the feature [+wh], which distinguishes it from ordinary quantificational sentences.) Since "Somebody arrived" is a disjunction of instances of the schema [x arrived], a wh question may be regarded as just a special type of disjunctive questions. Given a proper semantics, a question like (153) may ge given the LF representation (154), as suggested in Chomsky (1975), etc.

(154) [[Which x; x a person][x arrived]]

Thus, while a quantificational structure like (149) or (155) defines the conditions under which a given sentence is or may be true, an LF representation like (154) may be said to define the conditions under which a given sentence is or may be an appropriate answer. The meaning of a question. then, may be analyzed in terms of the meanings of possible

answers to it.[14] Thus, it is apparent that (155) may be an appropriate answer to (153), since John falls within the extension of a person, and the sentence is an instance of the schema [x arrived].

(155) John arrived.

But neither (156) nor (157) are appropriate answers to (153). In (156), the table does not fall within the extension of a person, and in (157) the sentence is not an instance of the schema [x arrived]:

(156) #The table arrived.

(157) #John found a map yesterday.

Note that the representation (154) is directly obtainable from the S-structure of (153) by a simple algorithm (i.e., Quantifier Conversion), since who has already been moved to COMP, binding its trace.

(158) [Who$_i$ [t$_i$ arrived]]?

As is well known, the formation of a wh question in Chinese does not involve the overt dislocation of a wh word. This is already obvious from the several examples we have seen in 4.1.2. Since we have assumed that quantificational sentences are subject to QR and since wh questions are quantificational in the sense just indicated, there is little reason not to assume that wh questions like (159) also have a similar quantifier-variable representation at LF, as in (160) or (161):

(159) ni kanjian-le shei?
you see-ASP who
'Who did you see?'

(160) [[shei]$_i$[ni kanjian-le t$_i$]]
who you see-ASP

(161) [[Nuige x; x shi ren][ni kanjian-le x]]
which is man you see-ASP

4.2.2. Move Wh in Chinese

A typological view inherent in this way of looking at questions in languages like Chinese is that language families do not differ with respect to whether they have a wh movement rule or not; rather, all languages are assumed to incorporate such a rule as a substantive universal, but may differ in where they use the rule, in Syntax or in LF. A consequence of this conception of linguistic typology is that it allows a simple statement of the fact that all languages have the same semantics of questions, though they may each have a different syntax of such sentences. Thus, while (159) differs vastly in overt form from its English counterpart "Who did you see?," it has an LF representation practically identical to the LF of the latter. Another consequence is that wh words in Chinese (as in English) are created as scope bearing elements, on a par with ordinary Q-NPs. The scope bearing property of wh words may be illustrated as follows. Consider (162) - (164):

(162) [Zhangsan wen wo [shei mai-le shu]]
ask I who buy-ASP book
'Zhangsan asked who bought books.'

(163) [Zhangsan xiangxin [shei mai-le shu]]?
believe who buy-ASP book
'Who does Zhangsan believe bought books?'

(164) [Zhangsan zhidao [shei mai-le shu]] (?)
know who buy-ASP book

a. 'Who does Zhangsan know bought books?'

b. 'Zhangsan knows who bought books.'

The only surface difference among these sentences is in the choice of the matrix verb. In (162), wen 'ask' belongs to a class of verbs that require an interrogative complement. In (163), xiangxin 'believe' does

not permit an interrogative complement. In (164), zhidao may optionally take an interrogative complement. As the translation shows, this single difference in the choice of the verb is responsible for the fact that (162) must be interpreted as a statement taking an indirect question, (163) must be interpreted as a direct question embedding no indirect questions, and (164) may be interpreted as either. It makes good sense to ask how the very different meanings of the virtually identical (162) and (163), as well as the ambiguity of (164), may be represented in an optimal grammar. One natural approach to this question is to look at an indirect question like (162) as a sentence in which the question word has scope over the embedded clause, and a direct question like (163) as one in which the question word has scope over the matrix clause, while in (164) the wh word may take either scope. The scope bearing property of a wh word is a direct consequence of the fact that it corresponds to an indefinite quantificational expression (e.g., somebody) in the presupposition of a wh question. In (162), the matrix subject Zhangsan asked who bought the book. There is a presupposition of the existence of some person who bought the book. This presupposition, in the context of (164), can only be in the mind of the matrix subject, and not in the mind of the speaker of the entire sentence. The sentence does not mean that there is someone who bought the book whose identity Zhangsan sought. This is the same thing as saying that someone (and therefore who, which presupposes it) has scope over the embedded clause in (162), not the matrix clause. The situation is different from an ordinary declarative sentence containing someone. Consider an example of the latter type:

(165) John believes that someone bought the book.

There is an "opaque" reading on someone in this sentence as well as a "transparent" reading, as is well known. In the former case, someone has scope over the embedded clause, and the existence of someone is not asserted by the speaker but is true only in the belief of the matrix subject John. Under the transparent reading, the speaker asserts that there is someone x such that John believes that x bought the book. In This case someone has scope over the entire matrix sentence. A further distinction between the two readings is the following. According to the narrow reading, someone exists in the belief of the matrix subject whose identity the matrix subject has no special idea about. According to the wide scope reading, however, the identity of the existing person is unknown only to the speaker of the entire sentence, but is understood to be definite in the matrix subject's belief. Now, compare the meaning of (165) to that of (163), where shei 'who' occurs in place of someone. There is again a presupposition of the existence of someone in this sentence, but this presupposition is uniquely understood to be in the mind of the speaker, not in the belief of the matrix subject in (163). Rather, the speaker assumes that the identity of the buyer of the book is a definite one in the belief of the matrix subject. In other words, in (163), the presupposed someone (and therefore shei 'who') has matrix, not embedded scope. It is easy to see that in (164) the presupposed someone may be scopally ambiguous.

The scope facts just explained here are well known to anyone dealing with the semantics of wh questions in English. They are readily

given in the surface or S-structure representations of such questions, and require no special movement in LF to derive appropriate scope representations. But precisely the same facts obtain in Chinese, where the wh words are unmoved. A natural, unified description of these facts is available if we postulate the existence of an abstract wh movement rule in Chinese:

(166) [Zhangsan wen wo [[shei]$_i$ [t_i mai-le shu]]]
ask I who buy-ASP book

(167) [[shei]$_i$[Zhangsan xiangxin [t_i mai-le shu]]]
who believe buy-ASP book

(168) a. [[shei]$_i$[Zhangsan zhidao [t_i mai-le shu]]]
who know buy-ASP book

b. [Zhangsan zhidao [[shei]$_i$[t_i mai-le shu]]]
know who buy-ASP book

Independent principles of grammar will ensure that shei 'who' will not be moved out of the embedded clause in (166), must be so moved in (167), and may or may not be so moved in (168). It is apparent that these principles are universal linguistic properties. Verbs of asking, like wen 'ask,' xiang-zhidao 'wonder,' in Chinese or any other language, require the presence of a question quantifier or quasi-quantifier in its (immediate) domain. Non-interrogative verbs like xiangxin 'believe,' renwei 'opine,' tongyi 'agree,' etc., on the other hand, do not allow a question quantifier having sole scope over their complement, and this is apparently also true of their counterparts in other languages. Something universally true may also be said of verbs like zhidao 'know,' jide 'remember,' which permit but do not require a wh-quantified clause as a complement. These universal selectional restrictions may be stated in the following simplest form:[15]

(170) a. Interrogative verbs: [+____[+wh]]

b. Non-interrogative verbs: [+____[-wh]]

c. Optional interrogative verbs: [+____([+wh])]

These restrictions cannot be stated purely in terms of a verb and a question quantifier in its argument position. For in (162) - (164), a wh word occurs in an argument position within a clause following a verb of any of the three kinds. The desired distinction is made once the restrictions are made in terms of a verb and a question quantifier in COMP or operator position, at LF, as in (166) - (168).

It should be noted that ambiguity of sentences like (164) and differences between (162) and (163) alone are no sufficient evidence for the postulation of abstract wh movement. This is also true of the rule QR. It probably does not take more than a few moments' thought for anyone to come up with alternative mechanisms that have approximately the same empirical effects. For example, one might propose abstract devices that coindex a wh word with a c-commanding empty COMP and define scope in terms of results of such coindexing, thus claiming that one has the ability to do without movement. This alternative would be attractive if this coindexing has the same properties as those of other known, independently motivated coindexing devices. Note, however, that it is not always the case that the elements of a coindexed par must hold a c-commanding relation. For example, the relation between a promoninal and its antecedent need not be one of c-command:

(171) a. When I saw him, John was tired.

b. His mother loves John.

c. Everyone's mother loves him.

d. [PRO arriving on time] is expected of every student.

There is no possibility, however, for a wh word to be coindexed with a non-c-commanding COMP, for no wh word may have scope over a domain which does not properly contain it. The coindexing required of wh in situ, in other words, must be distinguished from that involved in pronominal coindexing. There are two kinds of coindexing, then. But this is just another way of saying that there are two kinds of devices involved, coindexing and movement. Furthermore, note also that when a wh word is properly contained in an NP, the more inclusive NP never has scope wider than the wh word.

(172) ni mai-le [[shei de] meiben shu]?
you buy-ASP who DE every book
'Whose every book did you buy?'

As with the case of May's inversely linked quantification, a movement analysis will ensure that shei 'who' has wider scope than the more inclusive NP shei de meiben shu 'who-DE-every-book,' since only (173a), but not (173b), satisfies the well-formedness conditions CPB and CQB.

(173) a. $[[shei]_i[[t_i$ de meiben shu$]_j$[ni mai-le $t_j]]]$
who DE every book you buy-ASP

b. *$[[t_i$ de meiben shu$]_j[[shei]_i$[ni mai-le $t_j]]]$
DE every book who you buy-ASP

On the other hand, a coindexing device in place of QR or abstract wh movement would derive two representations both of which are well-formed with respect to CPB and CQB, though only (174a) represents the available reading:[16]

(174) a. [i [j [ni mai-le $[[shei]_i$ de meiben shu$]_j]]]$
you buy-ASP who DE every book

b. [j [i [ni mai-le [[shei]$_i$ de meiben shu]$_j$]]]
you buy-ASP who DE every book

The point is not that one cannot develop certain conditions to ensure the desired result. But the effect of coindexing plus such conditions would be precisely the effect of movement. But if the device of movement is already available, as is assumed in standard treatments of ordinary wh questions in English, there is then no reason to invoke a coindexing device doing exactly the same thing. Assuming that what is involved is really movement in LF, on the other hand, represents a generalization of the rule Move α, thus resulting in a desirable simplification of the rule by eliminating a restriction on where the rule may apply.

An important consequence of the postulation of movement of a wh word or a Q-NP is that such elements have the status of empty categories at the level of LF, on a par with other empty cateogires that are generated in Syntax. There is extensive evidence that the empty categories created in LF do behave on a par with those created in Syntax with respect to the Empty Category Principle (ECP). In Chapter 6, we discuss some of the properties of the empty categories, and in Chapter 7 we extend the ECP to cover a wide range of data in both Chinese and English, accounting for certain formal similarities in question interpretation in these languages. If the analysis adopted there is correct, then this constitutes important evidence for the existence of a level of LF construed as the output of such abstract movement processes.

The approach we are taking here on wh questions in Chinese (and in all languages without wh movement) is an extension of some recent treatments of multiple questions in English. Consider a question

like (175):

(175) Who bought what?

The situation associated with this question is usually the following. The speaker knows that someone in the domain of discourse bought something in the domain of discourse. Suppose that someone x has extension ranging over the set of three individuals {John, Bill, Mary}, and that something y has extension ranging over the set of three things {the book, the pen, the pencil}. What the speaker knows is that some or each instance of x bought some instance of y, but he does not know the exact pairing between the instances of x and the instances of y and, by uttering (175), he requests information on the exact pairing. In other words, he wants to know, of the nine possible ordered pairs defined by <x,y> which represent the nine possible instances of [x bought y], which pairs represent the true instances of [x bought y]. Thus, an appropriate answer to (175) may be (176):

(176) John bought the book, Bill bought the pencil, and Mary bought the pen.

In other words, the question (175) may be paraphrased as:

(177) For which pairing <x,y>, x a person and y a thing, x bought y.

The wh word what is treated as a quantifier on a par with who, though only the latter occurs in quantifier position in SS. The form (177) may be directly obtained if we assume that in (175) the unmoved what undergoes movement in LF, giving rise to a structure with both who and what occurring in operator position. Such a representation is already hinted at in Chomsky (1973), and is assumed in various other work, e.g., Williams (1977), Hirschbuhler (1978, 1981), etc. We may

assume that the wh movement in LF takes the form of adjunction to $\bar{S}$, as in (178), or that, like the syntactic rule of wh movement, it involves movement into COMP. In this case, it may be Chomsky-adjoined or daughter-adjoined to COMP, as in (179a-b):

(178) $[_{\bar{S}}$ What$_j$ $[_{\bar{S}}$ who$_i$ $[_S$ t_i bought $t_j]]]$?

(179) a. $[_{\bar{S}}]_{comp}$ What$_j$ $[_{comp}$ who$_i]][_S$ t_i bought $t_j]]$?

b. $[_{\bar{S}}[_{comp}$ What$_j$ who$_i][_S$ t_i bought $t_j]]$?

These representations may then be translated into something like (177). A plausible formulation of this procedure is given in Higginbotham and May (1981).[17] (Note that the order of what and who in (178) - (179) is opposite to their order in (177), but this is inconsequential.)[18] The representations (178) and (179) differ in some consequences, but we will ignore them for the moment. Just as the wh words in Chinese, syntactically unmoved wh words in English also show scope ambiguities (though those already syntactically moved do not). This has been shown in Baker's well known work (1970).

(180) Who remembers where we bought what?

The question may be construed as an ordinary direct inquiry on the identity of the matrix subject who. In this case, the embedded complement is an indirect multiple question on the pairing between where and what. The question can also be construed as a direct inquiry on the pairing between who and the embedded unmoved what, in which case the embedded clause is an ordinary indirect question on the value of where. Thus, under the first interpretation, (180) may have (181) as an appropriate answer, while under the second interpretation, (182) may be appropriate:

(181) John does. John remembers where we bought what.

(182) John remembers where we bought the book, Bill remembers where we bought the pencil, etc.

(181) may be naturally seen as an instan e of the LF (183), where what c-commands the embedded clause and (182) an instance of the LF (184) with what c-commanding the entire matrix clause:

(183) $[_{\bar{s}}$ Who$_i$ $[_s$ t_i remembers $[_{\bar{s}}$[what$_j$ where$_k$]
$[_s$ we bought t_j t_k]]]]?

(184) $[_{\bar{s}}$[What$_j$ who$_i$]$[_s$ t_i remembers $[_{\bar{s}}$ where$_k$
$[_s$ we bought t_j t_k]]]]?

It will be obvious from our later discussion that while Chinese questions have somewhat different properties from English questions, due to principles that apply only in the Syntax but not in LF, they share identical properties with the syntactically unmoved wh words in English as involved in multiple questions.

4.2.3. The Wide Scope Property of Wh Words

We have witnessed the scope bearing properties of wh words in Chinese. Let us now discuss their relative scope relations with respect to other scope bearing elements and mong themselves. Consider the sentences below:

(185) meige ren dou mai-le sheme?
every man all buy-ASP what
'What did everybody buy?'

(186) yousange ren mai-le sheme?
three man buy-ASP what
'What did three men buy?'

Each of these sentences contains an ordinary Q-NP and a wh quantifier. At SS, the wh quantifier appears within the c-commanding scope of the subject Q-NP. According to (90), the wh quantifier 'what' should have narrow scope with respect to the subject Q-NP. However, as the translation shows, this turns out not to be the case. In (185), the subject NP meige run 'every man' is interpreted collectively, and not distributively, with respect to the object NP sheme 'what,' exactly as the relation between everybody and what in the English translation. Thus, to (185), (187) may be an appropriate answer, but not (188):

(187) meige ren dou mai-le shu.
every man all buy-ASP book
'Everybody bought books.'

(188) #Zhangsan mai-le shu, Lisi mai-le bi,
buy-ASP book buy-ASP pen

Wangwu mai-le hua.
buy-ASP painting

'Zhangsan bought books, Lisi pens, Wangwu paintings.'

The answer (188) would be appropriate to a question like (189), in which the distributive adverb ge 'respectively, each' occurs in place of dou 'all.' In this case (187) becomes inappropriate as an answer:

(189) meige ren ge mai-le sheme?
every man each buy-ASP what
'What did each man buy?'

Similarly, (186) has the existential 'three men' interpreted collectively with respect to the object 'what' and is more appropriately answered with an indication on something that everybody bought, not with a list of things associated with each person. Sentences (185) - (186) thus constitute counterexamples to the general condition (70),

and must be regarded as marked cases of quantification with respect to this condition.

In the examples below, an embedded wh word has wide scope over a matrix Q-NP, again in violation of (70):

(190) meige ren dou shuo shei zui congming?
every man all say who most clever
'Who does everyone say is the most clever?'

(191) meige ren dou xiwang ni gen shei jiehun?
every man all hope you with who marry
'Who does everyone hope that you will be married to?'

We have seen in 4.1 that Q-NPs like meige ren 'everybody,' liangge ren 'two men,' etc. may violate the locality condition (41), which requires them to take the narrowest possible scope, under certain circumstances, but such Q-NPs were shown to obey the condition (70) more strictly. For example, Q-NPs that occur in the domain of a QP in NP must have NP-internal scope, even though the same NPs may violate the locality condition under certain circumstances. Now note that wh quantifiers need not have scope internal to an NP even if they occur in the surface domain of a QP. In fact, wh words may have only sentential, and therefore NP-external scope:

(192) Zhangsan mai-le sanben shei de shu?
buy-ASP three who DE book
'Who did Zhangsan buy three books of?'

At SS, shei 'who' occurs in the c-commanding domain of sanben 'three' in (192). However, it must be construed as having scope outside of the domain of 'three,' as the sentence is not only grammatical, but means the same thing as (193), whose SS has the wh word occurring outside the c-commanding domain of 'three.'

(193) Zhangsan mei-le shei de sanben shu?
buy-ASP who DE three book
'Whose three books did Zhangsan buy?'

Who in "Whose three books did Zhangsan buy?" has sentential scope, with the sentence meaning for which person x, Zhangsan bought x's three books The shei 'who' in (192) also must be construed to have sentential scope. One might try to maintain that shei in (192) does have internal scope within the NP sanben shei de shu 'three-who-DE-book; and that when wh movement takes place in LF on the basis of 'who,' it obligatorily pied-pipes the whole NP into operator position. This not only creates a problem on what is the meaning of an NP when it contains a wh word having scope internal to it, but also creates a problem on how sentences like the following may be ruled out in principle:

(194) *Zhangsan mai-le neiben shei de shu?
buy-ASP that who DE book
'*Who did Zhangsan buy that book of?'

This sentence may be ruled out under the Specificity Condition proposed in Fiengo and Higginbotham (1981) (or the"Name Constraint" in May (1977), the "Complete Constituent Constraint" in Gueron (1980)), which prohibits specific NPs from containing a free variable, or from containing a Q-NP having scope external to the specific NP. If wh words were allowed to have NP-internal scope, there would be no way to rule out (194). Therefore, wh words must always have sentential scope. The grammaticality of (192) thus constitutes a marked case of quantification with respect to the condition (70).

The marked nature of wh with respect to (70) extends beyond ordinary Q-NPs. They also have wide scope over such other logical elements as frequency adverbs, negation, and modals which c-command them at SS:

(195) Zhangsan changchang mai sheme?
Zhangsan often buy what
'What does Zhangsan often buy?'

(196) Zhangsan bu xiang mai sheme?
Zhangsan not want buy what
'What doesn't Zhangsan want to buy?'

(197) Zhangsan keneng mai sheme?
Zhangsan may buy what
'What might Zhangsan buy?'

Given these wide scope properties of wh words, we must conclude that the condition (70) must be considered a general, but not an inviolable condition governing scope assignment. The condition must allow room for inherent properties of lexical items like wh words as marked cases. Note that these words are exceptional with respect to (70) not only when they interact with with Q-NPs or Q-expressions of other types. They may also disobey (70) when they interact with each other. For example, either of the two embedded wh words below may be construed as having matrix scope, with the other of the two construed as having embedded scope:

(198) ni xiang-zhidao [shei mai-le sheme]?
you wonder who buy-ASP what

a. 'Who is the x such that you wonder what x bought?'

b. 'What is the x such that you wonder who bought x?'

According to (198b), the wh word 'what' has wider scope than 'who,' though it is c-commanded by the latter at SS. That the sentence has at least the two readings indicated is indicated by the fact that either (199) or (200) may be an appropriate answer to it:

(199) wo xiang-zhidao Lisi mai-le sheme.
I wonder Lisi buy-ASP what
'I wonder what Lisi bought.'

(200) wo xiang-zhidao shei mai-le shu.
I wonder who buy-ASP book
'I wonder who bought books.'

Although we have assumed that wh words get moved in Chinese in LF, we have not indicated whether the abstract wh movement is a special case of QR, namely adjunction to S, or is a different rule from QR, one that is an extension of the syntactic rule of wh movement, or some other rule. I would like now to assume, adopting a suggestion made in Aoun, Hornstein, and Sportiche (1981), that the LF movement takes the same form as the syntactic rule of wh movement. That is, it involves movement into COMP. Besides the arguments given in Aoun et al., there are the following advantages to such an assumption. First, if abstract wh movement were to perform adjunction, in a way analogous to QR, one might expect wh words to have NP-internal scope, since QR has the two adjunction sites S and "sister of QP." But, as we have just indicated, wh words cannot have NP-internal scope, but only sentential scope. This can be derived freely from the assumption that, like the syntactic rule of wh movement, the LF rule also involves movement into COMP. Since only Ss have COMPs but not NPs, it automatically follows that wh words may have only sentential scope but no NP-internal scope. The same argument applies to the assumption that the LF movement involves adjunction to $\bar{S}$, as suggested in, say, Williams (1977), Hirschbuhler (1978, 1981), etc. If wh can be adjoined to $\bar{S}$, there is no immediately clear reason why it cannot be adjoined to NP. Secondly, though we may stipulate that wh words have the exceptional property that they do not obey the condition (70), this does not automatically give us the result that they almost always have wider scope than ordinary Q-NPs and other non-nominal

Q-expressions like adverbials, modals, and negation. This is because although wh words may violate (70), nothing is there that requires them to violate the condition in the face of other c-commanding Q-expressions. On the other hand, if movement of wh words is assumed to be into COMP, and movement by QR involves adjunction to S or "sister of QP," then wh words must have wider scope than the other Q-expressions. Thirdly, given the adopted assumption, there is at least the possibility of relating the marked nature of wh words with respect to (70) in a plausible way. It may be, in other words, because wh words may have only COMPs as their landing sites that the condition (70) must be relaxed for them. Within an S-adjunction analysis, there is no clear reason why wh words are more likely to violate (70), or have uniquely wider scope than ordinary Q-expressions. An $\bar{S}$-adjunction analysis, furthermore, is ad hoc in the choice of $\bar{S}$ in order to assign wide scope to wh words, while a movement-into-COMP analysis is a simple extension of the rule that applies in Syntax in deriving relative clauses and non-multiple wh questions in English.

4.3. Conjunction, Disjunction, and A-Not-A Questions

4.3.1. Conjunction

In the beginning of 4.2, we remarked that a quantificational schema is an abbreviation for some appropriate logical connection of sentences which are its instances. Thus [All x; x a person [x arrived]] abbreviates, semantically, the sentence "A arrived, and B arrived, and C arrived, ..." A somewhat shorter version of the sentence is "[A and

B and C ...] arrived," with a conjoined subject NP. Consider now an actual sentence of this type:

(201) [Zhangsan gen Lisi] dou mai-le shiben shu.
and all buy-ASP ten book
'Both Zhangsan and Lisi bought ten books.'

Sentence (201) means that each of Zhangsan and Lisi bought ten books, so that a total of twenty books (at most) were bought. The sentence has the paraphrase below, which consists of two sentential conjuncts:

(202) [$_S$[$_S$ Zhangsan mai-le shiben shu], [$_S$ Lisi (ye) mai-le
buy-ASP ten book (too) buy-ASP

shiben shu]]
ten book

'Zhangsan bought ten books,(and) Lisi bought ten books.'

How might a theory of grammar correctly account for a sentence like (201) having the interpretation (202)? There are two appraoches that we want to consider. The first approach directly takes (202) to be the DS representation of (201). According to this traditional approach, (201) is derived from (202) via the rule of Conjunction Reduction of Ross (1967). This analysis was suggested for Chinese in work as early as Wang (1967). The rule is assumed to delete the VP in the left conjunct of (202), the result of which will be (201) after a series of relabelling and rebracketing takes place. Similarly, the sentence (203) with a conjoined object can be derived from the conjoined S (204) by successively applying Conjunction Reduction. First, the rule deletes the subject of the right conjunct of (204), resulting in (205) with a conjoined VP. Then the rule applies again to delete the right conjunct VP in (205), resulting in (203).

(203) wo kanjian-le [Zhangsan gen Lisi]
I see-ASP and
'I saw Zhangsan and Lisi.'

(204) $[_S[_S$ wo kanjian-le Zhangsan$]$,$[_S$ wo (ye) kanjian-le Lisi$]]$
I see-ASP I (too) see-ASP
'I saw Zhangsan, (and) I saw Lisi.'

(205) $[_S$ wo $[_{VP}[_{VP}$ kanjian-le Zhangsan$][$(ye) kanjian-le Lisi$]]]$
I see-ASP (too) see-ASP
'I saw Zhangsan, and saw Lisi.'

Within the framework of grammar we are assuming, there are several possible ways to instantiate this traditional approach. For example, one might assume that the same rule Conjunction Reduction still exists, but in the PF component. This is what Sjoblom (1980) suggests. In this case, the sentences (201) and (203) exist only in PF, and are represented by the full forms (202) and (204) at DS, SS, and LF. Another way to instantiate the traditional approach is to base-generate empty elements at the "deletion" sites and employ interpretive coindexing devices that have the effects of Conjunction Reduction. Still another way is to postulate an LF analogue of the reduction rule. Thus one may assume that (201) and (203) are base-generated in their surface form, but that a rule of copying, say akin to the derived VP rule of Partee (1975) and Williams (1977), will derive represenations of the form (202) and (204), respectively. The original conditions on the application of Conjunction Reduction may be similarly adapted into the copying analogue.[19]

The second approach to the semantic interpretation of sentences like (201) is to assume that such a sentence is base-generated in its surface form, and the conjoined NP is subject to QR in LF. Thus, for (201) we have (206) after QR applies:

(206) $[_S$[Zhangsan gen Lisi]$_i$$[_S$ t_i dou mai-le shiben shu]]
and all buy-ASP ten book

On the basis of the presence of dou 'all,' the QR-ed NP [Zhangsan and Lisi] will be interpreted as [for both x; x is one of the set {Zhangsan, Lisi}.

(207) $[_S$[meige x; x ε {Zhangsan, Lisi}]$[_S$ x mai-le shiben shu]]
every buy-ASP ten book

It is clear that this schema is equivalent to the conjoined sentence (202).

There are two arguments in favor of the second approach just outlined over the more traditional approach embodying Conjunction Reduction or some equivalent variant thereof. First of all, a QR analysis can do everything that the Conjunction Reduction analysis can do, but there are things that the former analysis can do but that the latter cannot. It is well known that phrasally conjoined NPs must be base-generable, given symmetric predicates like collide, meet, etc. and their counterparts in other languages (cf. Lakoff and Peters, (1969):

(208) Zhangsan gen Lisi huxiang piping.
and mutually criticize
'Zhangsan and Lisi criticize each other.'

(209) *[[Zhangsan huxiang piping] [Lisi huxiang piping]]
mutually criticize mutually criticize

In the example (210), the conjoined subject must also be base-generated since, in contrast to (201), it asserts that only a total of ten books were bought.

(210) [Zhangsan gen Lisi] mai-le shiben shu.
and buy-ASP ten book
'Zhangsan and Lisi bought ten books.'

Given that conjoined NPs must be base-generable, there is no special reason why a structure that is derivable by Conjunction Reduction cannot be generated without the rule. Furthermore, sentences like the following can be interpreted by QR to have the meaning of conjoined sentences, but not generated by Conjunction Reduction, since there is no non-arbitrary conjoined source for 'they':

(211) tamen dou mai-le shiben shu.
they all buy-ASP ten book
'They all bought ten books.'

Secondly, the interpretation of conjoined phrases into conjoined sentences is subject to conditions that are typically related to movement rules but not to deletion rules. In particular, certain conjoined phrases behave on a part with empty categories that are created by rules of movement (either in Syntax or in LF). For example, the Specificity Condition of Fiengo and Higginbotham (1981), to which we return in Chapter 5, requires that a specific NP may not contain a free variable. It is apparent that the contrast below has to do with the specificity and non-specificity of the subject NP of each sentence.

(212) $[_{np}[_{s}[_{np}$ Zhangsan han Lisi] xihuan] de shu] wo dou xihuan.
and like DE book I all like

a. 'I like all the books that Zhangsan and Lisi (both) like.'

b. 'For both x, x is Zhangsan or Lisi, I like books that x likes.'

(213) $[_{np}[_{s}[_{np}$ Zhangsan han Lisi] xihuan] de neixie shu] wo dou xihuan.
and like DE those book I all like

'I like those books that both Zhangsan and Lisi like.'

(212) is ambiguous with the conjoined NP 'Zhangsan and Lisi' interpreted either collectively with respect to the head of the subject NP headed by 'books,' or distributively. In the collective (narrow scope) reading, the entire subject NP headed by 'books' is quantified by dou, and in the distributive reading, the conjoined NP 'Zhangsan and lisi' in the relative clause is quantified by dou. But (213) is not ambiguous; it can only have a collective reading on the conjoined NP. The distributive reading will be ruled out under the QR analysis, since the desired reading requires the creation of an LF representation where the trace of 'Zhangsan and Lisi' is left free in the specific NP headed by 'books':

(214) *[$_s$[Zhangsan gen Lisi]$_i$[$_s$[$_{np}$ t_i xihuan de neixie shu]
and like DE those book

[$_s$ wo dou xihuan]]
I all like

If the definite plural subject in (213) is replaced by a definite singular, the result will be an ungrammatical sentence:

(215) *[$_{np}$[$_s$[$_{np}$ Zhangsan han Lisi] xihuan] de neiben shu]
and like DE that book

wo dou xihuan.
I all like

This is, of course, due to the fact that there is no universally quantifiable NP preceding dou except the embedded conjoined NP, and that quantifying it out of the specific NP domain necessarily violates the Specificity Condition. Note that within a Conjunction Reduction analysis, the conjoined NP 'Zhangsan and Lisi' would be the leftovers of the deletion process, at any rate not an empty element even if what is involved is an LF copying analogue of the deletion rule. The point

is not that one cannot imagine ways to obtain the facts indicated in (212) - (215) under the Conjunction Reduction analysis, but that whatever alternatives are proposed, they will simply duplicate precisely the effects of the already available option involving QR and the Specificity Condition.

4.3.2. Disjunction

What we have said concerning the treatment of conjunction applies also to disjunctive constructions. Thus, (216) may be analyzed either along the lines of Conjunction Reduction to give its interpretation indicated in (217), or it may be analyzed as involving existential quantification, as shown in (218):

(216) [Zhangsan huozhe Lisi] hui lai.
or will come
'Zhangsan or Lisi will come.'

(217) $[_S[_S$ Zhangsan hui lai] huozhe $[_S$ Lisi hui lai]]
will come or will come
'Zhangsan will come, or Lisi will come.'

(218) a. $[_S$[Zhangsan huozhe Lisi]$_i[_S$ t_i hui lai]]
or will come

b. $[_S$[youyige x; x ε {Zhangsan, Lisi}]$[_S$ x hui lai]]
one will come

However, only the QR will derive the meaning representation of (219) straightforwardly, though Conjunction Reduction is irrelevant here:

(219) youren hui lai
someone will come
'Someone will come.'

As we remarked earlier, wh questions may be regarded as a special type of disjunctive questions, with a wh word like who taken as an existential

wh quantifier ranging over individuals. Again, the analysis of wh questions cannot involve Conjunction Reduction, though ordinary disjunctive questions may be analyzed in either way.[20]

(220) [Zhangsan haishi Lisi] hui lai?
or will come
'Will Zhangsan or Lisi come?'

(221) $[_{s}[_{s}$ Zhangsan hui lai] haishi $[_{s}$ Lisi hui lai]]?
will come or will come
'Will Zhangsan come or will Lisi come?'

(222) a. $[_{s}$[Zhangsan haishi Lisi]$_{i}[_{s}$ t_{i} hui lai]]
or will come

b. $[_{\bar{s}}$[neige x; x ε {Zhangsan, Lisi}]$[_{s}$ x hui lai]]
which will come

As in the case of conjoined structures, the interpretation of disjunctive questions is subject to the Specificity Condition. This is easily accounted for under an analysis involving abstract wh movement, taking an interrogative disjunction as a wh-quantifier:

(223) ni zui xihuan [[Zhangsan haishi Lisi] de shu]?
you most like or DE book
'Do you like Zhangsan's books or do you like Lisi's books?'

(224) *ni zui xihuan [[Zhangsan haishi Lisi] de neiben shu]?
you most like or DE that book
'*Do you like that book of Zhangsan's or that book of Lisi's?'

The question (224) is ill-formed because its intended LF representation contains a variable free in a specific NP following wh movement in LF of the disjunction 'Zhangsan or Lisi':

(225) *$[_{\bar{s}}$[Zhangsan haishi Lisi]$_{i}[_{s}$ ni zui xihuan $[_{np}$ t_{i} de
or you most like DE

neiben shu]]
that book

4.3.3. A-Not-A Questions

A special type of disjunctive question in Chinese is what has been called the "A-not-A" question, of which we have seen a number of examples. It is a kind of yes/no question, taking a disjunctive form requesting the addressee to identify either the affirmative or the negative from its two disjuncts. The simplest way of forming an A-not-A question is as follows. Place the negative morpheme bu to the left of a VP, then reduplicate the VP or a leftmost portion thereof and place the copy to the left of the negative. Thus, given the sentence (226), an A-not-A question may take any of the forms given in (227) (phonological facts show that the reduplicated copy forms a constituent with the negated original, i.e., [[A][not A]]):

(226) ta xihuan ni.
he like you
'He likes you.'

(227) a. [$_{S}$ ta [$_{VP}$[$_{VP}$ xihuan ni][$_{VP}$ bu xihuan ni]]]?
he like you not like you
'Does he like you or not like you?'

b. [$_{S}$ ta [$_{VP}$[$_{V}$[$_{V}$ xihuan][$_{V}$ bu xihuan]] ni]]?
he like not like you
'Does he like [you] or does [he] not like you?'

c. [$_{S}$ ta [$_{VP}$[$_{V}$[$_{?}$[$_{?}$ xi-][bu xi]]-huan] ni]]?
he li- not li- -ke you
'Does [he] or doesn't he like you?'

In (227a), we have a coordinate VP consisting of the disjunction 'likes you' and 'doesn't like you'; in (227b) we have a disjunctive V 'likes' or 'doesn't like'; and in (227c) we have a disjunction of the first syllable of the verb xihuan 'like': [[xi-][bu xi-]] 'li-' or 'doesn't li-' (the syllable xi- is meaningless by itself). Again one could derive

each of these A-not-A questions as a result of applying Conjunction Reduction to a full-fledged disjunctive question, as suggested in Wang (1967) for Mandarin Chinese and Lin (1974) for Amoy. Thus, the DS representation of all of (227a-c) might be (228):

(228) $[_S[_S$ ta xihuan ni] (haishi)$[_S$ta bu xihuan ni]]
he like you or he not like you
'Does he like you or doesn't he like you?'

(227a) can be obtained by applying the reduction rule once to (228). (227b) and (227c) can be obtained as a result of iterative application of the same rule to (228) and (227b), respectively. However, in the face of our arguments above, the existence of a rule of Conjunction Reduction seems extremely dubious. And here we have an additional argument against the Conjunction Reduction analysis. It is entirely natural to have an A-not-A form in which the disjuncts are lexical verbs or even mere portions of lexical verbs, but such structures are rarely acceptable in ordinary coordinate structures of the form [[A] and [B]] or [[A] or [B]], where A ≠ B. Thus, although coordinate VPs are very common, as shown in (229) - (230), coordinate Vs are quite unnatural, as shown in (231) - (232):

(229) Zhangsan [zhong gua (ye) mai gua]
grow melon (too) buy melon
'Zhangsan grows melons and sells melons.'

(230) Zhangsan [xie shu (haishi) mai shu]?
write book (or) sell book
'Does Zhangsan write books or sell books?'

(231) *Zhangsan [[zhong (ye) mai gua]
grow (too) sell melons
'Zhangsan grows and sells melons.'

(232) *Zhangsan [[xie (haishi) mai] shu]?
write (or) sell book
'Does Zhangsan write or does he sell books?'

Therefore, even if Conjunction Reduction were involved in the derivation of A-not-A questions like (227a), which has the coordinate VP, it could not be involved in the derivation of (227b) and (227c), which have a coordinate V and even a coordinate node whose constituents are less than a lexical V.

Furthermore, the interpretation of A-not-A questions also appears to be subject to conditions that are typically associated with movement rules and the distribution of empty categories created by such rules. In Chapter 7, in particular, I will argue that the interpretation of A-not-A questions obeys the ECP. The correctness of this will necessarily require an analysis involving abstract movement of some constituent to operator position, ruling out the Conjunction Reduction analysis as implausible.

There are two possible ways to instantiate the idea of LF movement here. On the one hand, one might assume that the [A-not-A] constituent is base-generated, just as other coordinate phrases involving conjunction or disjunction. The base generated A-not-A is then subject to wh movement or QR in LF. This assumption, however, is not satisfying for the reason just noted.

In this connection, consider also the following paradigm, whose relevance to the argument was pointed out to me by Ken Hale:

(233) ta xihuan ni bu xihuan ni? (= 227a)
he like you not like you
'Does he like you or doesn't [he] like you?'

(234) *?ta xihuan ni bu xihuan?
he like you not like

(235) *ta xihuan ni bu xi--?
he likes you not li-

The paradigm (223) - (235) shows that forward deletion (or ellipsis) is possible if what is deleted is the second subject, with the second VP left untouched. Forward deletion is impossible, however, if what is leftover (or deleted) is a lexical item or part of a lexical verb. It seems to be a typical feature of deleting or elliptical rules that they at least do not affect mere portions of lexical categories, in accordance with the Lexical Integrity Hypothesis. The presence of the grammatical (227b) and (227c) therefore suggests that it is extremely unlikely that they involve any deletion or ellipsis.

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There are two possible ways to instantiate the idea of LF movement here. On the other hand, one might assume that the [A-not-A] constituent is base-generated, just as other coordinate phrases involving conjunction or disjunction. The base generated A-not-A is then subject to wh movement or QR in LF. However, this hypothesis is implausible for the

following three reasons. First, if the [[A][Not A]] forms in (227) were all base-generated, then they would be base-generated either in the Syntax (DS) or in the Lexicon(by lexical rules). They cannot be formed in the lexicon, because (227a) shows that they can be constructions larger than lexical categories. They also cannot be formed in the Syntax, because (227c) shows that they can be constructions smaller than lexical categories. Therefore they cannot be base-generated. Secondly, even if one assumes that (227a) involves base-generation in the Syntax, while (227c) (and perhaps also (227b)) is formed by lexical rules, note that they must be generated by context sensitive rules. This is because, as we have shown with examples like (231) and (232), for a coordinate construction having lexical or smaller-than-lexical categories as its conjuncts, the form [[A] [bu B]] with A≠B is not acceptable; the only acceptable coordinate constructions of the type must have two identical conjuncts (except for the negative morpheme). But ordinary base rules (in so far as one assumes that they exist) are usually context-free. Thirdly, if forms like [xi-bu-xi] are formed by lexical rules, the negative morpheme in it should be on a par with negative morphemes involved in "lexical negation," not on a par with "syntactic negation." The former type of negation is often observed to be <u>contrary</u> negation, as in <u>(hen) bu-gaoxing</u> '(very) unhappy.' The latter type is <u>contradictory</u> negation, as in <u>bu (hen) gaoxing</u> 'not (very) happy.' If the A-not-A forms are formed in the lexicon, one might expect to find some instances of contrary negation here. But surely the A-not-A questions are questions on the choice

of yes and its contradictory negation, no. This suggests that the A-not-A forms are not formed in the lexicon.[21]

A more plausible alternative is to assume that the [A-not-A] form is the result of some phonological rule of reduplication applying on the basis of some appropriate feature of modality. Note that the [A-not-A] form occurs exactly where one would find 'not' in an ordinary negative sentence, and furthermore than when the form occurs, no 'not' may appear elsewhere. It is obvious then that the not in [A-not-A] is the same not in negative sentences. Suppose we say that both not and [A-not-A] are realizations of some constituent indicating the affirmative/negative modality, the constituent AFF. If AFF is [+affirmative], then it is spelled out as zero, as in affirmative sentences. If it is [-affirmative], then it is spelled out as bu 'not.' If it is not specified for [±affirmative], it is [+Q], quantificational ranging over [+affirmative] and [-affirmative]. For mnemonic purposes, let us use the feature [+A-not-A] instead of [+Q]. Suppose now that the feature [+A-not-A] triggers a syntactic or phonological rule of reduplication having the following form:

(236) A-not-A Reduplication

$$[+\text{A-not-A}]\ [_{vp}\ X\ Y] \longrightarrow [_{vp}[[X][\underset{not}{bu}\ X]]\ Y]$$

Thus before A-not-A Reduplication applies, we may have a structure like (237);

(237) $[_{s}$ ta $[+\text{A-not-A}][_{vp}$ xihuan ni$]]$
he like you

The result of applying (236) on (237) will be any of (227a-c) depending on whether 'li-,' 'like,' 'like you' is taken to be X in the structural

description of the rule (236). We may assume that the rule takes place in PF, in which case all of (227a-c) have the form (237) at SS, and in LF, the modality constituent containing [+A-not-A] undergoes movement, yielding:

(238) $[[+A\text{-not-}A]_i[\underset{\text{he}}{\text{ta}}\ t_i\ \underset{\text{like}}{\text{xihuan}}\ \underset{\text{you}}{\text{ni}}]]$

The [+A-not-A] constituent may then be interpreted as a quantifier ranging over the two members [A] and [Not A], i.e., [+affirmative] and [-affirmative]. An [+A-not-A] constituent may be [+wh], if used in A-not-A questions, or [-wh], in which cases it will be used as 'any,' in particular the free choice [+universal], as indicated in 4.1.2 (cf. (108)). (238) may be converted into (239):

(239) $[[\text{For which x; x } \varepsilon \{[+A],[-A]\}][_S\ \underset{\text{he}}{\text{ta}}\ \text{x}\ \underset{\text{like}}{\text{xihuan}}\ \underset{\text{you}}{\text{ni}}]]$

If (237) occurs as an embedded subject sentence followed by dou, as in (240), then the A-not-A would undergo QR rather than wh movement and gets interpreted as a universal quantifier as in (241):

(240) $[_S[_S\text{ta}\ [+A\text{-not-}A]\ \underset{\text{like}}{\text{xihuan}}\ \underset{\text{you}}{\text{ni}}]\ \underset{\text{all}}{\text{dou}}\ \underset{\text{no}}{\text{meiyou}}\ \underset{\text{matter}}{\text{guanxi}}]$
'Whether or not he likes you, it doesn't matter.'

(241) a. $[_S[+A\text{-not-}A]_i[_S[_S\ \underset{\text{he}}{\text{ta}}\ t_i\ \underset{\text{like}}{\text{xihuan}}\ \underset{\text{you}}{\text{ni}}]\ \underset{\text{all}}{\text{dou}}\ \underset{\text{no}}{\text{meiyou}}\ \underset{\text{matter}}{\text{guanxi}}]]$

b. $[_X[\text{For both x; x } \varepsilon \{[+A],[-A]\}][_X[_X\ \underset{\text{he}}{\text{ta}}\ \text{x}\ \underset{\text{like}}{\text{xihuan}}\ \underset{\text{you}}{\text{ni}}]$

$\underset{\text{all}}{\text{dou}}\ \underset{\text{no}}{\text{meiyou}}\ \underset{\text{matter}}{\text{guanxi}}]]$

The approach taken here, embodying a phonological rule of reduplication, is particularly appealing for the reason that often meaningless fragments of a lexical category may be incorporated

into an [A-not-A] form. It is well known that phonological reduplication processes typically do not obey the requirements of the Lexical Integrity Hypothesis. They look at the phonological properties of their input structures but do not care if they are meaningful. Therefore, forms like [xi-bu-xi] fit into this theory most naturally.

We assume that the A-not-A constituent undergoes LF movement, leaving a trace (variable) behind. This assumption is supported by the observation just mentioned that interpretation of A-not-A questions obeys the ECP. Another argument for this position is that the assumed movement can go long distance. This is what crucially distinguishes Chinese A-not-A questions from English yes/no questions and embedded questions involving <u>whether (... or not)</u> (direct yes/no questions may be assumed to contain an abstract <u>whether</u> in the matrix COMP). Consider the following examples:

(242) wo xiang-zhidao [Lisi lai-bu-lai].
I wonder come-not-come
'I wonder whether Lisi will come or not.'

(243) ta shuo [Lisi lai-bu-lai]?
he say come-not-come
'Did he say that Lisi will come, or did he say that Lisi won't come?'

(244) ta zhidao [Lisi lai-bu-lai] (?)
he know come-not-come

a. 'He knows whether Lisi will come or not.'

b. 'Does he know that Lisi will come, or does he know that Lisi won't come?'

Exactly as with our earlier examples of <u>wh</u> questions, A-not-A questions exhibit scope properties on a par with the quantifier <u>some</u> inherent in their presuppositions. Thus, [lai-bu-lai] 'come-not-come' has embedded

scope in (242), matrix scope in (243), and is scopally ambiguous in (244). Note that in none of these sentences can the A-not-A operator be construed with the predicate of the matrix clause, whether it has embedded or matrix scope. For example, although in (243) [lai-bu-lai] has matrix scope ((243) being a direct question), the question is not on whether he did or didn't say that Lisi will come, but on whether, according to what he waid, Lisi will come or not. On the contrary, the following question in English is not a question on the yes/no modality of the embedded clause:

(245) Did he say that John will come?

This question asks whether he did or did not say that John will come, not whether he said John will come or he said John will not come. Thus, although saying yes to (245) commits one to the proposition that he did say that John will come, saying no to the same question does not commit one to the proposition that he said that John will not come. He might, in other words, have said nothing at all. On the contrary, saying no to the question (243) in Chinese does commit one to the proposition that he said that Lisi will not come.

The fact in English might be consistent with the assumption that whether does not bind a variable, so that it must always be construed with the predicate of the clause where it occurs. The same assumption cannot be made with the A-not-A operator, however. If the operator is not required to bind a variable, there will be no way to distinguish an LF representation in which the operator originates from the matrix clause from one in which it comes from the embedded clause.

4.3.4. A Note on Non-Objectual Quantification

If the arguments just given for the assumption that A-not-A operators bind variables at LF are correct, then we have an interesting piece of evidence for a theory according to which variables can be of any syntactic category, and that movement of non-NP categories also leaves traces.

It has sometimes been suggested that adjuncts like why, how, etc. do not need to leave traces under their movement. Such categories are often not nominal, and if they are assumed not to leave traces, one might be able to propose a restrictive theory of movement, requiring only NPs to leave traces. Furthermore, a trace theory on adjunct movement is at any rate not a necessary consequence of the Projection Principle. (Cf. Stowell, 1981, for some discussion of this proposal.) This amounts to the proposal that movement of an adjunct is allowed to change its relation with a predicate. Thus, one may start at DS with a structure like (246):

(246) You wonder [he bought what why].

After what is moved to the embedded COMP and why moved to the matrix COMP, we have (247):

(247) Why do you wonder [what$_i$ [he bought t_i]]?

Therefore, although why starts out as an adjunct of the embedded clause, it gets interpreted in (247) as an adjunct of the matrix clause. Since it does not leave a trace of why, this "meaning changing" derivation is allowed. Since transformations are allowed to change meanings in our framework at any rate, this assumption is not implausible. On this account, then, (247) may be derived from a DS like (246), or from a

DS like (248), in which why starts out from the matrix clause:

(248) You wonder [he bought what] why.

Sentences involving when, where, how, etc. might be similarly treated. In the face of our arguments concerning A-not-A questions, however, there is reason to require non-arguments like A-not-A to bind traces in LF. If so, then the proposal that why, etc., do not bind traces becomes less compelling. Furthermore, we have also direct reason for the assumption that these adjunct phrases also bind traces. First of all, note that senctences like (249) and (250) are ambiguous, with why, where being construed with either the embedded clause or the matrix:

(249) Why do you think he left?

(250) Where did you say that he worked?

Moreover, in (251)-(252), on which day and how are even better construed with the embedded clause:

(251) On which day do you say that he will be here?

(252) How do you think he will be able to pay?

If the movement of adjuncts like why and on which day is assumed to leave a trace, then the facts we have seen here may be easily accounted for. The ambiguity of (249)-(250) may be accounted for by the fact that the trace of why or where can be located in the matrix or in the embedded clause. The embedded clause construal on on which day and how in (251)-(252) may be represented by a trace in the embedded clause.

In the Chinese examples below, furthermore, note that weisheme 'why' and nali 'where' must be construed with the embedded clause only, where they occur at SS:

(253) ni renwei [ta weisheme bu lai]?
you think he why not come
'Why$_i$ do you think that [he will not come t_i]?'

(254) ni shuo [Lisi zai nali zuoshi]?
you say at where work
'Where$_i$ do you say [Lisi worked t_i]?'

If movement of 'why' and 'where' does not leave a trace behind, it will be impossible to distinguish LF representations of (253)-(254) from those of (255)-(256):

(255) ni weisheme renwei [ta bu lai]?
you why think he not come
'Why$_i$ do you think that [that he will not come] t_i?'

(256) ni zai nali shuo Lisi zuoshi?
you at where say work
'Where$_i$ did you say [that Lisi worked] t_i?'

Finally, as we will argue in Chapter 7, the impossibility of construing why in (247) with the embedded clause may be attributed to the ECP, which makes crucial reference to the existence of a trace left by why.

The conclusion to draw from here is that there is good evidence for a "strong version" of the condition against vacuous quantification, i.e. May's (1977) CQB, Condition on Quantifier Binding -- "strong version" in the sense that it must be extended to non-nominal quantifiers appearing in linguistic representations.

4.4 Cleft Sentences

4.4.1. The Construction

Another construction in Chinese which may be analyzed as involving a kind of non-objectual quantification is the cleft sentence. An example of such a construction is given below:

(257) Zhangsan shi mingtian dao Niuyue qu.
be tomorrow to N.Y. go
'It is tomorrow that Zhangsan will go to New York.'

In this sentence the time phrase 'tomorrow' is preceded by the copula shi. As the translation shows, what immediately follows the copula is taken as the focus of the sentence, with the rest of ths sentence "backgrounded" (to use a term of Schachter 1972), i.e. taken as the presupposition. In the English translation, the focus and the presupposition are separated in structure, with the focus "it is tomorrow" preceding and asymmetrically c-commanding the presupposition "that Zhangsan will go to New York". It is pretty well agreed that there is a structural dependency between the focus and a position within the presupposed clause. That is, the English counterpart of (257) has the structure (258a) or (258b) at some level of representation:

(258) a. It is tomorrow$_i$ [that John will go to New York t_i].

b. It is tomorrow$_i$ [[OP$_i$ that] [John will go to New York t_i].

(The OP$_i$ in (258b) stands for an abstract operator in COMP binding the trace t_i. It might perhaps be assumed to originate as tomorrow in the position of t_i with the feature [+wh], along the lines of Chomsky (1977).) In either case it is fairly reasonable to assume that there

is some quantifier-variable relationship between the focus and the gap in the presupposition. The situation with the Chinese sentence, however, is quite different. A cleft sentence differs from a non-cleft only in the presence vs. absence of the focus indicator, the copula shi. Once this marker is removed, (257) has the exact appearance of an ordinary non-cleft sentence:

(259) Zhangsan mingtian dao Niuyue qu.
tomorrow to N.Y. go
'Zhangsan will go to New York tomorrow.'

The simplest way of looking at cleft sentence formation, then, is to say that it inserts the marker shi directly in front of the constituent in focus.[22] There has been some controversy over the analysis of clefts in the literature but I think this is the best way of looking at them. That is, they involve no overt dislocation of the focus in Syntax and consequently, unlike their English counterparts, do not exhibit a quantifier-variable configuration at SS. This conception of cleft formation is particularly appealing for the reason that every preverbal maximal phrase as well as the verb phrase itself can be put into focus with an immediately preceding shi while the exact order of constituents in the entire sentence is preserved. Thus, all of the sentences in (260) are well-formed cleft sentences:

(260) a. shi wo mingtian yao mai neiben shu.
be I tomorrow want buy that book
'It is I who want to buy that book tomorrow.'

b. wo shi mingtian yao mai neiben shu.
I be tomorrow want buy that book
'It is tomorrow that I want to buy that book.'

c. wo mingtian shi yao mai neiben shu.
I tomorrow be want buy that book
'It is want to buy that book that I will tomorrow.'

These sentences differ in where the focus marker shi occurs. Once shi is removed, all of (260) are reduced to the non-cleft (261):

(261) wo mingtian yao mai neiben shu.
I tomorrow want buy that book
'I want to buy that book tomorrow.'

On the other hand, note how different the English translations are from each other in their surface form. The only restriction on cleft formation is that no postverbal phrase may be clefted by simply inserting shi, although the English counterpart involving a postverbal gap is apparently well-formed. Thus contrary to the well-formed (262) in English, the Chinese example (263) is not acceptable:

(262) It is that book$_i$ that I want to buy t_i tomorrow.

(263) *wo mingtian yao mai shi neiben shu
I tomorrow want buy be that book

We return to this problem below. Before discussing what an optimal theory of Chinese clefts should be, it should be noted that what we are going to discuss does not include focalizing constructions of the following sort, the so-called pseudo-clefts:

(264) a. [wo mingtian yao mai de] shi [neiben shu]
I tomorrow want buy DE be that book
'What I want to buy tomorrow is that book.'

b. [neiben shu] shi [wo mingtian yao mai de]
that book be I tomorrow want buy DE
'That book is what I want to buy tomorrow.'

(265) a. [mingtian yao mai neiben shu de] shi [wo]
tomorrow want buy that book DE be I
'The person who wants to buy that book tomorrow is me.'

b. [wo] shi [mingtian yao mai neiben shu de]
I be tomorrow want buy that book DE
'I am the person who wants to buy that book tomorrow.'

These psuedo-cleft sentences differ from the clefts that we want to discuss crucially in that they do involve some structural gap in one

position and a structural dependency between the focus and the gap. In (264a) and (265a), what appears after the copula shi is the psuedo-clefted focus, and what appears before it is a free relative whose empty head is coreferential with the focus.[23] There is an overt structural dependency between the focus and the relativized gap in the free relative. Thus, (264a) may be represented as something like (266):

(266) $[_{np}[_{s}$ wo mingtian yao mai t_i] de $[e]_i$] shi [neiben shu]$_i$
I tomorrow want buy DE be that book

The empty head $[e]_i$, or the entire free relative headed by it, stands in an equative relation to the focus 'that book'. The relation between the empty head and the relativized gap (the trace t_i) is a quantifier-variable relation. Since pseudo-clefts are equational sentences, the order of subject and complement of shi can be reversed. Therefore (264b) and (265b) are also well formed pseudo-clefts. The structural properties of pseudo-clefts, then, are on a par with relativized constructions, and since, like the latter, they involve overt quantifier-variable configurations, they do not enter into our discussion of mapping processes in LF, inasmuch as the structural relations present at SS are carried onto LF without significant change.

4.4.2. An LF Account of Clefts

Now, let us consider how cleft sentences in Chinese should be dealt with in an optimal theory of grammar. I will spell out my proposal first, then try to provide arguments in its favor over other alternatives. I will assume that the copula shi is a focus operator (henceforth shi will be glossed as FO), dominated by the element EMP, the emphatic modality. It is therefore treated as an adverb, on a par

with modals, negation, etc. A cleft sentence is a simple sentence that contains EMP, just as a negative sentence is one with AFF containing the feature [-affirmative], and an A-not-A sentence is one with AFF containing [+A-not-A]. There is no overt movement, nor antecedent-gap or quantifier-variable relation involved at the level of SS. In LF, a maximal phrase immediately following the focus operator is incorporated into EMP, and is treated as the focused constituent. Thus, (260b), for example, may have the structure (267) in LF:

(267) $[_{s}$ wo $[_{emp}$ shi maingtian$][_{vp}$ yao mai neiben shu]]
I FO tomorrow want buy that book

It has been observed sometimes (e.g. Paris (1979)) that the entire sequence following shi may also be taken as the focus. In this case the entire sequence is incorporated into EMP. (Alternatively, this incorporation may be carried out by coindexing.) Similarly, the focus in (260b) may be the subject alone, or the entire sentence. In the latter situation we have an emphatic sentence meaning "It is the case that I want to buy the book tomorrow".

I will further assume that in LF the elements dominated by EMP, i.e., the focused constituent and shi, are subject to abstract wh movement. Thus (260b) has the following representation at LF:

(268) $[_{s}$[shi mingtian]$_{i}[_{s}$ wo t_{i} yao mai neiben shu]]
FO tomorrow I want buy that book

The moved category [shi mightian] 'FO-tomorrow' may be converted to the operator "For x=tomorrow", or simply left as it is, on a par with the predicate "it is tomorow such that" in English. Thus we

derive an operator-variable configuration at LF, in analogous form to the cleft sentence "It is tomorrow$_i$ that I want to buy that book t_i" in English. Like the English counterpart and like the pseudo-clefts in both languages, the cleft sentence in Chinese is also structurally dichotomized into the two portions focus and presupposition.

The representation given in (268) is, I think, a fairly reasonable one. A sentence like (260b) does contain the presupposition that I want to buy that book at some time. Like the presupposed someone in a question containing who, this presupposed indefinite noun phrase is quantificational, i.e. existential. Therefore, representing the focus as a variable at LF is just as reasonable as representing who as a variable. Chomsky (1976) has argued that, in English, a constituent bearing focal stress should be treated as a variable at LF. Thus the sentence (269) with focal stress on John has the LF representation (270):

(269) His mother loves JOHN.

(270) [[For x=John] [his mother loves x]]

Chomsky's argument is that focally stressed NPs behave on a par with Q-NPs like someone, everyone, and wh phrases, in contrast to names like (unstressed) John, the student, etc., under "weak crossover":

(271) The woman he$_i$ loved betrayed John$_i$.

(272) a. *Who$_i$ did the woman he$_i$ loved betray t_i?

b. *The woman he$_i$ loved betrayed everyone$_i$.

c. *The woman he$_i$ loved betrayed someone$_i$.

d. *The woman he$_i$ loved betrayed JOHN$_i$.

Chomsky suggests that the contrast between (271) and all of (272) can be accounted for if, like wh phrases, Q-NPs like everyone and someone and focally stressed constituents like JOHN (but not definite terms and names) are subject to movement -- though their movement necessarily takes place in LF. At LF, (272b-d) are represented by quantifier-variable configurations on a par with (272a):

(273) a. [[For which x_i;x a person][the woman he_i loved betrayed x_i]]

b. [[For every x_i; x a person][the woman he_i loved betrayed x_i]]

c. [[For some x_i;x a person][the woman he_i loved betrayed x_i]]

d. [[For x_i=John][the woman he_i loved betrayed x_i]]

The contrast between (271) and all of (272) is then accounted for by the "Leftness Condition", which applies to (273) but not to the LF representation of (271) (Chomsky 1976: 201):

(274) The Leftness Condition

A variable cannot be the antecedent of a pronoun to its left.

One might ask further why focally stressed constituents should behave on a par with Q-NPs and wh phrases. We have seen that wh phrases are a kind of Q-NPs, so the fact that (272a-c) pattern alike in contrast to (271) is perhaps no surprise. But why does a focally stressed definite NP behave on a par with Q-NPs and wh phrases rather than with non-stressed definite NPs? I think that a plausible answer to this question is precisely that focally stressed NPs are really

quantificational in the presuppositions of the sentences in which they occur. That is, (272d) has the presupposition (275), where someone appears in the place of JOHN:

(275) The woman he$_i$ loved betrayed someone$_i$.

The reason why (272d) is ill-formed with the anaphoric relation indicated, then, is precisely the same reason that rules out (272c), as well as (272a-b) as ill-formed.

In this connection it is interesting to note that the focused constituent in a cleft sentence of Chinese also behaves on a par with wh phrases and other Q-NPs, in contrast to names and definite descriptions, in analogous "weak crossover" constructions. In (276), the pronoun ta 'he' in the subordinate clause may take the matrix subject Zhangsan as its antecedent, but in none of (277) may the same anaphoric relation obtain, where the matrix subject is 'who', 'everyone', 'someone', or the clefted 'shi Zhangsan':

(276) [ta$_i$ de mama huilai de shihou], Zhangsan$_i$ yijing sui-le
he$_i$ DE mother return DE time already sleep-ASP
'When his$_i$ mother came back, Zhangsan$_i$ had already gone to bed.'

(277) a. *[ta$_i$ de mama huilai de shihou], shei$_i$ yijing sui-le?
he$_i$ DE mother return DE time who already sleep-ASP
'When his$_i$ mother came back, who$_i$ had already gone to bed?'

b. *[ta$_i$ de mama huilai de shihou], meige ren$_i$ dou sui-le.
he$_i$ DE mother return DE time every man all sleep-ASP
'*When his$_i$ mother came back, everyone$_i$ had already gone to bed.'

c. *[ta$_i$ de mama huilai de shihou], youren$_i$ yijing sui-le
he$_i$ DE mother return DE time someone already sleep-ASP
'*When his$_i$ mother came back, someone$_i$ had already gone to bed.'

d. *[ta$_i$ de mama huilai de shihou], shi Zhangsan$_i$
he$_i$ DE mother return DE time FO
yijing sui-le.
already sleep-ASP
'*When his$_i$ mother came back, ZHANGSAN$_i$ (not anyone else) had already gone to bed.'

One might observe that the sentences in (277) need not really involve any "crossover", since it is possible to claim that each of the matrix subjects there probably does not have scope over the subordinate clause, i.e., that it does not get moved across the preceding pronoun to the root clause. As the English sentence below shows, the wh phrase is not moved across the subordinate clause.

(278) When his mother came in, who$_i$ [t$_i$ was sleeping]?

In other words, one might maintain that the ill-formedness of (277a-d) is not due to the leftness condition, but due to the fact that the pronoun does not occur in the c-commanding domain of the matrix subject at LF, and therefore cannot be interpreted as bound to it. The well-formedness of (276), on the other hand, is due to the fact that names like Zhangsan usually take the widest possible scope in an utterance, and therefore the pronoun does fall within the scope of Zhangsan in (276). The relevant point here, however, is still why a focused definite NP like shi Zhangsan has to take narrow scope on a par with wh phrases and other Q-NPs. This is strong evidence that the focused element following shi is quantificational in a very

real sense, and if other quantificational elements are subject to movement in LF, so should clefted elements be.

There is further evidence that the clefted constituents following shi do not always take wide scope even though they are clefted definite NPs. Thus, exactly as wh phrases, A-not-A phrases, and Q-NPs, the shi-phrase may have either embedded scope or matrix scope in a sentence like (279):

(279) [Zhangsan xiangxin [shi Lisi mingtian lai]]
believe FO tomorrow come

The focus Lisi may be construed as indicating the emphasis given by the speaker of the entire sentence, but it can also be construed as indicating the emphasis in the belief of the matrix subject, i.e, the "speaker", so to speak, of the embedded clause. Thus, (279) corresponds to the two English sentences:

(280) a. It is Lisi$_i$ that Zhangsan believes t_i will come tomorrow.

b. Zhangsan believes that it is Lisi$_i$ that t_i will come tomorrow.

According to the first interpretation, the speaker presupposes the existence of someone who will come tomorrow, and asserts that he is Lisi. According to the second interpretation, the existence of someone is in the belief of the matrix subject. The ambiguity of (279) can be accounted for, therefore, if we simply allow shi Lisi to be moved to either the embedded or the matrix COMP, exactly as in the case of wh words or A-not-A constituents embedded under an optional interrogative matrix verb like 'know' or 'remember'. Thus, corresponding to (280a-b), (279) has the two LF representations:

(281) a. [[shi Lisi]$_i$[Zhangsan xiangxin [t_i mingtian lai]]]
FO believe tomorrow come

b. [Zhangsan xiangxin [[shi Lisi]$_i$[t_i mingtian lai]]]
believe FO tomorrow come

By contrast, note that in a sentence like (282), where Lisi is not focused, there is no scope ambiguity on it; it has only the wide, i.e. matrix scope.

(282) Zhangsan xiangxin [Lisi mingtian lai].
believe tomorrow come
'Zhangsan believes that Lisi will come tomorrow.'

Finally, again, note that the distribution of clefted focuses and their interpretation are subject to restrictions that are typically associated with movement rules and empty categories. Some of these restrictions are indicated in my (1982) paper and they are argued in Chapter 7 below to fall under the ECP. Again the correctness of this hypothesis strongly supports our analysis.

4.4.3. On the Analysis of SHI

It remains now to justify our analysis of the copula shi as a focus operator having the status of an adverb on a par with negation and modals.

Many writers have discussed how the shi in cleft sentences is to be treated, but none has called it an adverbial serving as a focus operator. There are basically two approaches to the analysis of shi. On the one hand, some writers treat shi in clefts as a main verb, on a par with the shi in pseudo-clefts. Thus, a cleft sentence, like a pseduo-cleft, is a copulative sentence. This approach is taken by

Hashimoto (1969, 1971), Ross (to appear), among others. Thus, (260b) has the structure below:

(283) $[_{s}\ \underset{I}{wo}_{i}\ [_{vp}\ [_{v}\ \underset{be}{shi}][_{s}\ PRO_{i}\ \underset{tomorrow}{mingtian}\ \underset{want}{yao}\ \underset{buy}{mai}\ \underset{that}{neiben}\ \underset{book}{shu}]]]$

Such an analysis of clefts is, I think, both semantically implausible and syntactically problematic. It is semantically implausible, because a cleft sentence like (260b) does not have the meaning of an ordinary copulative sentence: it is neither equative, nor does it indicate class-inclusion, as ordinary copulative sentences may do. Since no copula is used in ordinary adjectival sentences like (284) below in Chinese:

(284) wo hen gaoxing.
I very happy
'I am very happy.'

it is also unmotivated to postulate (283) as a copulative structure of predication. Furthermore, there are several syntactic difficulties associated with this analysis, as Teng (1979) has correctly pointed out. To mention just one, consider what the structure of (260a) would be, in which the subject is preceded by shi. Either we have a subjectless sentence like (285), or one with the matrix subject Equi-NP-deleted by the complement subject, like (286):

(285) $[_{s}\emptyset\ [_{vp}[_{v}\ shi][_{s}\ \underset{I}{wo}\ \underset{tomorrow}{mingtian}\ \underset{want}{yao}\ \underset{buy}{mai}\ \underset{that}{neiben}\ \underset{book}{shu}]]]$

(286) $[_{s}\ PRO_{i}\ [_{vp}[_{v}\ \underset{be}{shi}][_{s}\ \underset{I}{wo}_{i}\ \underset{tomorrow}{mingtian}\ \underset{want}{yao}\ \underset{buy}{mai}\ \underset{that}{neiben}\ \underset{book}{shu}]]]$

The structure (285) shows a copulative sentence with the element to the right having nothing on the left to be equated with, to be inclusive of, or to predicate upon. The structure (286) requires a most

implausible type of deletion, or control, theory, by which a c-commanding subject is deleted or controlled by an antecedent in its domain.

Teng (1979) himself suggests a rather attractive alternative to the copulative-sentence approach, though, due to difficulties he noted, he did not adhere to it. According to his suggestion, the underlying structure of a cleft sentence is a simplex sentence having the exact form of a non-cleft, except that the focused constituent contains the diacritic feature [+focus]. The element shi is then treated as a phonetic spellout of this feature, which places it to the left of the focused constitutent. This approach is particularly appealing for the reason that practically every constituent can be put into focus, and it is free from all the difficulties associated with the complex-sentence approach.

There are two important difficulties associated with this simplex sentence analysis also, however. Before pointing out these difficulties, I will discuss a fact which Teng indicates as an "insurmountable difficulty" with this analysis. Teng says that since shi is treated as a focus marker spelled out on the basis of [+focus] contained in a focused constituent, it is not a verb. But shi can enter into scope relations with negation and modals:

(287) a. Zhangsan shi mingtian bu qu.
FO tomorrow not go
'It is tomorrow that Zhangsan will not go.'

b. Zhangsan bu shi mingtian qu.
not FO tomorrow go
'It is not tomorrow that Zhangsan will go.'

(288) a. shi Zhangsan keneng mingtian lai.
possibly tomorrow come
'It is Zhangsan who will possibly come tomorrow.'

b. keneng Zhangsan shi mingtian lai.
possibly FO tomorrow come
'Possibly it is tomorrow that Zhangsan will come.'

Teng assumes, along with work done in generative semantics (cf. Lakoff, 1971a), among others), that the ability to enter into scope relations with other categories is a defining property of predicates. Clearly, under this assumption, the cleft sentences can have no simplex sentence analysis -- his proposal is simply incompatible with his own assumptions. But this assumption is not necessary, and is now believed by most to be ill-motivated. According to this assumption, all quantified NPs are also predicates, since they exhibit scope properties. As we have seen in Chapter 2, scope phenomena happen not only with quantificational NPs, but also among modifiers of NPs. To be consistent, one would have to analyze all nominal modifiers also as higher predicates -- including relative clauses, determiners, possessives, etc., although I believe no one would want to do so. But note that, once we drop the hypothesis that ability of entering into scope relations is necessarily the property of predicates, the "insurmountable difficulty" simply does not arise. As focused constituents are quantificational in the sense we have indicated, they of course, are expected to exhibit scope properties and interact with

other scope bearing elements. The fact that they are scope-bearing elements therefore does not argue against adopting a simplex sentence analysis. The real difficulties with this analysis are the following.

First, as noted above, one important restriction on cleft formation is that no postverbal phrase may be clefted. If shi is simply a phonetic spellout of [+focus], and there is obviously no reason why a postverbal NP cannot contain [+focus], then there is no principled reason why no postverbal element may be clefted.

Secondly, this treatment of shi takes the item to be totally unrelated to the copula used in equative and class-inclusion sentences. Every writer who has made a proposal on cleft sentences certainly will not fail to suspect that clefts and pseudo-clefts involve the same shi, or at least that the two shi's are closely related, and I think there is good reason to believe that this intuition is correct.

Consider now how our treatment of shi as an adverb fares with the two approaches just discussed. First of all, we adopt a simplex sentence analysis, and are therefore free from the difficulties associated with the complex sentence analysis.

Secondly, we explain why a postverbal element cannot be clefted. Since the position of an adverb in Chinese is preverbal, just as negation, modals, time adverbs, etc., are, as we have seen throughout this study, it is of course the case that shi can never occur post-verbally between a verb and its complement. The ill-formedness of (289)(=(263)) is simply on a par with (290), which has a postverbal negative:

(289) *wo mingtian yao mai shi neiben shu.
I tomorrow want buy FO that book

(290) *wo mingtian yao mai bu neiben shu.
I tomorrow want buy not that book

This, I think, is a very strong argument in favor of our hypothesis over the phonetic-spellout approach suggested in Teng (1979).

Thirdly, we also have an explanation for the fact that shi may enter into scope relations with negation and modals, in fact also with other adverbs. We have already seen throughout that adverbial elements like negation, modals, and certain others may occur in free word order and enter into scope relations with each other. Shi is simply another such quantificational adverb which has the property of bearing scope.

Finally, we can also capture the fact that the shi used in clefts is the same as, or closely related to, the shi used in pseudo-clefts and other copulative sentences. Note that in order to relate the two instances of shi, it is not necessary to say that they are both verbs or main predicates. (Taking this to be the necessary condition seems to be the crucial mistake of those who insist on the complex sentence analysis). What we are claiming is that the copula functions as a main verb in pseudo-clefts and other copulative sentences, but as an adverb in clefts. Both are instances of the copula: the copulative verb and the copulative adverb. This is entirely consistent with current views on many other matters. For example, the element gaoxing 'happy, happily' is used as a main predicate (or stative verb) in (291a), as an attributive adjective in (291b), and as an adverb in (291c):

(291) a. wo hen gaoxing.
I very happy
'I am very happy.'

b. hen gaoxing de ren.
very happy DE man
'Very happy men.'

c. ta hen gaoxing de lai-le
he very happily DE come
'He came happily.'

Furthermore, consider the sequence yong li 'use-force'. In (292a) it is a VP, but in (292b) it is apparently adverbial in function and usually described as a PP.

(292) a. ta yong-le li le.
he use-ASP force ASP
'He has used force.'

b. ta yong li da wo.
he use force hit I
'He hit me with force (forcefully).'

It is well known that a lot of prepositions in Chinese are derived historically from verbs. That PPs almost always occur preverbally undoubtedly has to do with the fact that they originate from the first part of a so-called "serial verb construction" having the linear form V-NP-V-NP, in which the second V (as da 'hit' in (292b)) is taken to be the "center of predication" (i.e. main verb) and the first V is taken to be adverbial in function. Indeed, there are sentences which can be anlayzed either way, depending on what they mean. Consider (293):

(293) ta na dao qie cai
he take knife cut vegetable

a. 'He took a knife and cut the vegetable.'

b. 'He took a knife and <u>then</u> cut the vegetable.'

c. 'He took a knife to cut the vegetable.'

d. 'He cut the vegetable with a knife.'

As Li and Thompson (1974) have argued, according to the two readings (293a) and (293b), the two subsequences 'took a knife' and 'cut the vegetable' should be analyzed as two VPs in coordination. According to (293c), they are best analyzed as constituting a structure of complementation, with 'cut the vegetable' taken as a purpose clause. On the other hand, note that, according to (293d), they are best taken to constitute a structure of modification, with 'took a knife' analyzed as an adverbial PP, i.e. 'with a knife'.

In other words, there are many lexical items whose categorial status is not fully specified in the lexicon, but take on specific features only in context. There is, of course, a very natural account in the $\bar{X}$ theory. Thus, <u>yong</u> 'use, with' is [-N], but [$\pm$V] in the lexicon, and takes on [+V] in (292a), but [-V] in (292b). Similarly, <u>na</u> 'take, with' is [-N] in the lexicon, [+V] in (293a-c) but [-V] in (293d). Given this, it is entirely natural to say that <u>shi</u> is [+V] in the lexicon, unspecified for [$\pm$N]. In the context of cleft sentences, it is taken to be [+N], and is an adverb, In the context of a pseudo-cleft or a copulative sentence, it is [-N], i.e. a main verb.

CHAPTER FOUR: FOOTNOTES

1. The NP a senator on y in the clause x is a senator on y is not subject to QR, since it is a predicate nominal, a non-referential expression.

2. F&H's actual suggestion is to have QR adjoin a Q-NP to the "sister of SPEC," where the SPEC of S is COMP and the SPEC of NP is its determiner or QP. As we have seen in Chapter 2, topicalized phrases in Chinese occur to the right of COMP whenever the latter is present. If QR were to adjoin a Q-NP to the sister of COMP, we would force such a Q-NP to hvae scope over topics, though the actual interpretation of sentences seems to be that the Q-NP usually has scope narrower than topics.

3. An equally natural assumption could be that every nominal node could be a possible NP-internal adjunction site, since if an overt QP were present it could be anywhere preceding the head. This assumption, as will become clear easily, will not serve our purpose.

4. In fact, May proposes to construe Subjacency as a condition on output representations at LF. We assume that it is a condition on the application of Move α (in Syntax), for reasons to be noted in Chapter 6.

5. May's reasoning for this assumption is as follows: Since QR adjoins Q-NPs only to S, not to NP, only S but not NP is a bounding

node on QR. This reasoning is not clear to me, since wh movement moves elements only to COMP (as a sister to S), but not to NP either, why are both NP and S bounding nodes for wh movement (in Syntax)?

6. We will suggest later that the presence of dou is one factor contributing to markedness. This accounts for (52) and (53), though not for (47) - (48).

7. Three points to note here: First, as noted above in Chapter 3, the Projection Principle must be somehow relaxed for cases involving restructuring, though one might entertain the alternative to allow dual structures at every level of syntactic representation, one pertaining to thematic relations and subject to the Projection Principle, and one pertaining to scope relations but not subject to the principle.

Secondly, the restructuring hypothesis is also needed in F&H's theory. Considerations of thematic relations require that every senator on some congressional committee has the structure [NP PP], where the $\bar{N}$ dominating senator does not dominate the PP containing some congressional committee. But the existential Q-NP does have NP-internal scope. To derive the internal scope reading, F&H will also need to assume that the string may be analyzed as [Det[$_{\bar{n}}$ N PP]].

Thirdly, in Chapter 3, footnote 17, we mentioned that given the assumption of restructuring, the condition (3.56) should be more precisely formulated as holding, not between SS and LF, but between the output of restructuring (before QR applies) and LF. The same qualification applies here.

8. Ken Hale told me that, when presented with the sentences (1) - (2) and (10) - (11) in Chinese, he already had the feeling that each of them is unambiguous, and that (1) - (2) have external scope, while (10) - (11) have internal scope readings. And he had never "learned" this from others.

9. The term "crossover" is due to Postal (1971), on the basis of the fact that a wh phrase has been moved, crossing over a "coreferential NP":

(i) *Who$_i$ did he$_i$ say I saw t$_i$?

Wasow (1972) distinguishes two kinds of crossover. "Strong crossover" involves the movement of a wh phrase (in our framework, also other quantificational NPs) across a c-commanding coindexed pronoun; "weak crossover" involves movement across a non-commanding pronoun. Strong crossover is exemplified by (i) above, and weak crossover is exemplified by the sentences in (104).

10. For some discussion of other uses of the words listed in (108), see Cheng (1980).

11. In treatments of negative polarity, any in English, it is usually assumed that any must occur, in the usual cases, within the c-commanding domain of an affective element. Linebarger (1980), moreover, shows that any has to occur within the immediate domain of an affective element. The Chinese counterpart of 'ever,' conglai, is also a negative polarity item, but interestingly enough, it is required to have an affective element in its c-commanding domain, but

is itself not required to be in the domain of the latter.

(i) ta conglai bu xiyen.
he ever not smoke

(ii) *ta conglai xiyen.
he ever smoke

(iii) *ta bu conglai xiyen.
he not ever smoke

12. In the following sentence, dou is preceded by singular NPs only:

(i) neiben shu wo dou kan wan le.
that book I all read up ASP
'I have finished reading that entire book.'

What is universally quantified here is not 'that book' as a singleton set, but 'all parts of that book.' (i) thus means that I have read every chapter or page of that book. A similar interpretation on 'that book' in (122) is impossible, however, since one cannot normally say 'every part of that book is very expensive.' Similarly, in (123), one cannot talk about parts of a proposition like 'that he arrived.' This is the reason why (i) is well-informed, but (122) and (123) are not. Similarly, in (ii), the adverbial of time 'always' together with the following dou means 'at all times':

(ii) wo yixiang dou bu xiyen.
I always all not smoke
'I never smoke.'

A special type of construction involving dou that is often noted is the so-called lian...dou... construction:

(iii) lian Zhangsan dou lai-le.
even all come-ASP
'Even Zhangsan came.'

(iv) lian yiben shu ta dou bu yao.
even one book he all not want
'He doesn't want even one book/a single book.'

I think a plausible analysis of these sentences can also treat them as involving universal quantification, thus accounting for the existence of dou here. But what is universally quantified is not the single person Zhangsan in (iii) or the single book in (iv). Rather, what is quantified seems to be a large number of persons or objects implied in the sentences, the least expected of which being Zhangsan, one book, etc. So (iii) means, by implication, that all of a lot of other people came, Zhangsan's coming being less expected than the other people's coming. (iv), similarly, means, by implication, that he does not want any other number of books, not two books, three books, etc. For some discussion of the semantics and syntax of the lian... dou... construction, see Paris (1977), Hou (1979).

13. Since any cannot be one single morpheme as a universal quantifier, a plausible assumption is to regard it as an "archimorpheme," which is specified for [+Q], quantificational, but unspecified for [+universal], or [+existential].

14. For a formal treatment of the semantics of questions and quantifiers see Higginbotham and May (1981).

15. Grimshaw (1979) indicates that there are "concealed questions" of the following sort:

(i) He asked the name of the student.

Although the verb requires an interrogative complement, there is no overt wh in the sentence that satisfies the requirement of (170a). A possible way to maintain the conditions in (170) might be to suppose that at some level of representation (say, LF'), the name of the student is represented as [for which x [the name of the student is x]]. I have no especially appealing solution of this and must leave it as a problem.

16. See van Riemsdijk and Williams (1981) for treatment of quantifier scope in this manner.

17. Higginbotham and May (1981) propose the rule of Absorption, by which a string of n quantifiers is turned into an n-ary quantifier.

18. Since wh words are existential in their presupposition, on a par with something, someone, etc., [SOMETHING SOMEONE] is logically equivalent to [SOMEONE SOMETHING]. Therefore, [WHAT WHO] and [WHO WHAT] are also logically equivalent.

19. For example, Conjunction Reduction must obey the following directionality constraint: If two identical elements branch to the right in the input phrase marker, then the element on the left gets deleted. If they branch to the left, then the one on the right gets deleted.

20. The Chinese rendering of (either...) or is huozhe, and that of (whether...) or is haishi.

21. The same consideration also argues for a syntactic rule of infixation for the potential forms chi-de-wan 'can eat up,' and chi-bu-wan 'cannot eat up,' discussed in 3.3.4.

22. The cleft sentences in Chinese are often described as the shi...de constructions, since they often take the form of (i):

(i) ta shi qunian jiehun de
he be last-year marry de
'It was last year that he got married.'

A fairly plausible treatment of de in (i) is to regard it as the perfective aspect, a variant of le (cf. Dragunov 1958, Teng 1979). As such it can appear as an infix (if Affix Hopping moves it from INFL into the verb jiehun 'marry'):

(ii) ta shi qunian jie-de-hun.
he be last-year mar-ASP-ry
'It was last year that he got married.'

(ii) is on a par with (iii), where le appears in place of de:

(iii) ta shi qunian jie-le-hun.
he be last-year mar-ASP-ry
'It was last year that he got married.'

If qunian 'last year' is replaced by 'next year,' the perfective is inappropriate and both (ii) and (iii) become ill-formed:

(iv) *ta shi mingnian jie-de-hun.
he be next-year mar-ASP-ry
'*It is next year that he got married.'

(v) *ta shi mingnian jie-le-hun.
he be next-year mar-ASP-ry
'*It is next year that he got married.'

Whether or not this treatment of de is correct will not be our concern here, nor will it affect what we have to say below. In what follows

I will stick to cleft sentences containing no de.

23. The term "headless relative" has sometimes been used in the literature to refer to what we call free relatives here, such as the complement clause in I like what you gave me. The term "headless relative" is more generally used to refer to relative clauses of the type observed in Navajo and Imbabura-Quechua (see Platero 1978, Cole 1982), in which there is no overt gap in the argument positions.

LOGICAL RELATIONS IN CHINESE AND THE THEORY OF GRAMMAR

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CHAPTER FIVE: ANAPHORA AND BINDING

5.0. Introduction

In Chapters 3 and 4, we have investigated aspects of the syntax of Logical Form as they pertain to the interpretation of sentences containing scope-bearing elements. Another topic that figures prominently in discussions of the interactions of Syntax and Logical Form is anaphora. Recent advances in the theory of anaphora have greatly improved our understanding of this phenomenon in language. In Chosmky (1981a), the central issues of anaphora are accounted for under the binding theory. This chapter will investigate certain aspects of this theory as an aspect of UG, especially as it applies to Chinese and English. After a brief introduction to how the binding theory works in 5.1, we discuss some outstanding problems of the theory as currently formulated. These concern sentences in which pronouns and anaphors may co-occur. A minimal modification is suggested in 5.3 to reformulate the notion of "governing category" so that the domain for defining anaphor-binding and the domain for defining pronominal disjoint reference are not identical, though they overlap to a great extent.

In 5.4 we examine in some detail the properties of controlled PRO and definite empty pronominals in Chinese. It is indicated that the distribution of PRO in Chinese is consistent with the binding theory and that Chinese is best described as a pro-drop language, which requires some modification of the pro-drop parameter heretofore

conceived.

Section 5.5 contains a discussion of the interpretation of the binding theory as a theory of coreference and suggests, following Evans (1980), that it should be interpreted as a theory of anaphoric dependency. A general principle of anaphoric dependency is that a referential dependent may not c-command its antecedent. With respect to pronoun anaphora, this principle is strengthened to account for certain facts in Chinese which have heretofore been taken to justify a separate principle involving the linear notion of precedence. We argue that the superficial notion of precedence is not the right one for the description of pronoun anaphora in a sentence grammar of Chinese, but that a more strict hierarchical notion than c-command, is involved.

The last section addresses the question on the relation between definite pronoun anaphora and quantificational pronominal binding. The two types of pronouns are seen to be the same in many respects but differ in others. Some discussion of the special properties of pronominal binding is carried out, as well as how an optimal theory should treat of them. It is indicated that they fit rather naturally into a theory of grammar in which both types of pronouns are treated on a par at SS but differently in LF. Finally, we address the question on why quantificationally bound pronouns have the properties discussed. As an attempt to explain why they must occur within the scope of their antecedents at LF and obey the Specificity Condition -

we suggest informally that these need not be the special properties of such pronouns, but that proper names and other referential NPs may be seen to exhibit the same properties if they are assumed to also undergo movement in LF', though not in LF.

5.1. How the Binding Theory Works

The standard formulation of the binding theory provides the conditions in (1) to be satisfied at an appropriate level of grammatical representation (Chomsky 1981a:188):

(1) Binding Theory

a. An anaphor is bound in its governing category.

b. A pronominal is free in its governing category.

c. An R-expression is free.

Here, "bound" means "A-bound", i.e. c-commanded by and co-indexed with an element in argument position, position of a subject, object, etc., and "free" means "A-free", i.e. not A-bound. When α is bound to β, it is interpreted as coreferential with β; when α is free with respect to β, the two elements are interpreted as disjoint in reference. An anaphor is defined as a category that lacks independent reference and thus includes reflexives, reciprocals (the lexical anaphors) by definition and, by assumption, NP traces or traces of "local" movement as involved in passives, etc. A pronominal is a category that may be referentially independent or may depend upon an antecedent for its reference, and it includes the class of pronouns, whose use may be deictic or anaphoric. An R-expression or referential

expression is referentially independent, and it includes all other NP types, e.g. names in the Fregean sense and name-like lexical NPs and, by assumption, wh-traces or traces of so-called "long distance" movement as involved in topicalization, etc. The original core notion of "governing category" is defined as follows:

(2) Governing Category

> α is the governing category for β if and only if α is the minimal category containing β and a governor of β, where α = NP or S.

In the original formulation in Chomsky (1981a), "government" is defined in a way very similar to the formulation given in Chomsky (1980a), i.e. the "OB-government" referred to in 3.3. For the purposes of this review I will assume the formulation given in Aoun and Sportiche (1981), i.e. what we referred to as "AS-Government" earlier:

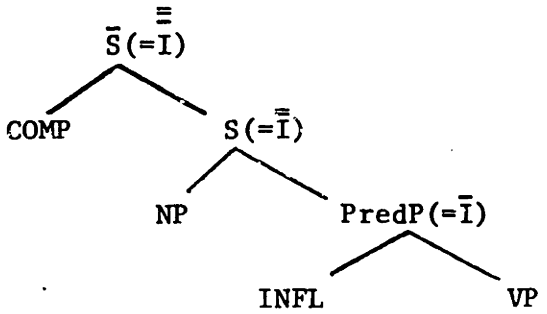
(3) Government (Aoun and Sportiche 1981)

> α governs β if and only if $\alpha = X^o$ and every maximal projection dominating α also dominates β and vice versa.

Adopting this formulation will facilitate our discussion below without going into details that are irrelevant to our concern.[1] According to this definition, a governor may be a lexical category like N^o, V^o, A^o, P^o, but not a phrasal category. INFL, if it contains the feature [+tense] and/or the agreement feature [+AGR], may be assumed to be of the category $[+V]^o$ and/or $[+N]^o$, and be a possible governor. This definition requires that no governor may govern out of or into a maximal category. Thus, a V^o governs its complements, and so does an

N^0, P^0, or A^0. INFL governs the subject of a sentence, as well as the VP. This is the case on the assumption that S (and $\bar{S}$) are projections of INFL:

(4)



Since VP is a maximal projection, a verb, transitive or intransitive, does not govern its subject, nor an adjunct phrase not dominated by VP. On the other hand, since there is no maximal projection internal to an NP, the subject of NP is governed by the head N, though nothing outside of the NP is. Furthermore, although a governor may govern its complement, it cannot govern any element that is properly contained in the complement, in the unmarked cases.

Thus far understood, the binding conditions in (1) account for a fairly wide range of phenomena concerning anaphora in natural language. In English, for example, they account for the following data:

(5) a. [The men_i saw $themselves_i$/$each\ other_i$]

b. [The men_i were seen t_i]

c. *The men_i said that [$themselves_i$/$each\ other_i$ would come]

d. *The men_i were said that [t_i would come]

e. *The men$_i$ said that [I saw themselves$_i$/each other$_i$]

f. *The men$_i$ were said that [I saw t$_i$]

(6) a. *[The men$_i$ saw them$_i$]

b. The men$_i$ said that [they$_i$ would come]

c. The men$_i$ said that [I saw them$_i$]

(7) a. *[He$_i$ saw the man$_i$]

b. *He$_i$ said that [I saw the man$_i$]

c. *The man, [he$_i$ saw t$_i$]

d. *The man, he$_i$ said that [I saw t$_i$]

e. *The man who [he$_i$ saw t$_i$] came

f. *The man who he$_i$ said [I saw t$_i$] came

In (5a) the governor for the lexical anaphor themselves/each other is saw, and in (5b) the governor for the trace is seen; therefore (5a) and (5b) are the governing categories for the anaphors in question. Since they are bound within these categories, the sentences are well-formed in accordance with (1a). In (5c-d) the relevant governor is the embedded INFL and in (5e-f) it is the embedded verb saw. Therefore, in each of these sentences the governing category for the anaphor is the embedded clause. The sentences are ill-formed by (1a) since in each of them an anaphor is not bound in its governing category. Similarly, in (6a) them is disjoint from the men since by (1b) it must be free in (6a), and in (6b-c) no disjoint reference interpretation is required because the pronouns are already free in the embedded clause, their governing category, in accordance with

(1b). Finally, in (7) an R-expression (the NP the man in the wh-trace left by topicalization or relativization in (7c-f) is bound. Since an R-expression must be free (everywhere) by 1c), these sentences are ill-formed whether it is bound in its governing category (7a,c,e) or outside of that category (7b,d,f).

The binding theory illustrated above is supported by the following data in Chinese, and to that extent qualifies as a valid principle of UG. With the exception of (5c-d) and (6b), which will be taken up in the next section, the Chinese counterparts of all the sentences in (5)-(7) show the same properties:[2]

(8) a. [Zhangsan$_i$ kanjian-le ziji$_i$].
see-ASP self
'Zhangsan saw himself.'

b. [Zhangsan$_i$ bei wo kanjian-le t_i].
by I see-ASP
'Zhangsan was seen by me.'

c. *Zhangsan$_i$ shuo [ni kanjian-le ziji].
say you see-ASP self
'*Zhangsan said that you saw himself.'

d. *Zhangsan$_i$ bei wo shuo [ni kanjian-le t_i].
by I say you see-ASP
'*Zhangsan was said that you saw.'

(9) a. *[Zhangsan$_i$ kanjian-le ta$_i$].
see-ASP he
'*Zhangsan$_i$ saw him$_i$.'

b. Zhangsan$_i$ shuo [ni kanjian-le ta$_i$].
say you see-ASP he
'Zhangsan said that you saw him.'

(10) a. *[ta$_i$ kanjian-le Zhangsan$_i$].
he$_i$ see-ASP
'*He$_i$ saw Zhangsan$_i$.'

b. *ta$_i$ shuo [ni kanjian-le Zhangsan$_i$].
he$_i$ say you see-ASP
'*He$_i$ said that you saw Zhangsan$_i$.'

c. *Zhangsan, [ta$_i$ kanjian-le t$_i$].
he$_i$ see-ASP
'*Zhangsan, he$_i$ saw t$_i$.'

d. *Zhangsan, ta$_i$ shuo [ni kanjian-le t$_i$].
he$_i$ say you see-ASP
'*Zhangsan, he$_i$ said you saw t$_i$.'

e. *[[ta$_i$ kanjian t$_i$ de] neige ren] lai-le.
he$_i$ see DE that man come-ASP
'*The man who he$_i$ saw t$_i$ came.'

f. *[ta$_i$ shuo [ni kanjian t$_i$ de] neige ren] lai-le
he$_i$ say you see DE that man come-ASP
'*The man who he$_i$ said that you saw t$_i$ came.'

The examples we have seen above represent cases where the governing category for an NP is S. The binding theory also holds cross-linguistically in the following sentences, where the relevant category is NP:

(11) a. I saw [the men's$_i$ pictures of themselves$_i$/each other$_i$].

b. I saw [the city's$_i$ destruction t$_i$].

c. *The men$_i$ saw [my pictures of themselves$_i$/each other$_i$].

d. *The city$_i$ was seen [our destruction t$_i$].[3]

(12) a. *I saw [the men's$_i$ pictures of them].

b. The men$_i$ saw [my pictures of them].

(13) a. *I saw [his$_i$ pictures of John$_i$].

b. *He$_i$ saw [my pictures of John].

The three sets of sentences (11)-(13) provide evidence for (1a-c) respectively, as do their counterparts in Chinese:

(14) a. wo bu xihuan [Zhangsan$_i$ dui ziji$_i$ de taidu].
I not like to self DE attitude
'I don't like Zhangsan's attitude towards himself.'

b. *Zhangsan$_i$ bu xihuan [wo dui ziji$_i$ de taidu].
not like I to self DE attitude
'*Zhangsan doesn't like my attitude toward himself.'

(15) a. *wo bu xihuan [Zhangsan$_i$ dui ta$_i$ de taidu].
I not like to he DE attitude
'*I don't like Zhangsan's$_i$ attitude toward him$_i$.'

b. Zhangsan$_i$ bu xihuan [wo dui ta$_i$ de taidu].
not like I to he DE attitude
'Zhangsan doesn't like my attitude toward him.'

(16) a. *wo bu xihuan [ta$_i$ dui Zhangsan$_i$ de taidu].
I not like hē to DE attitude
'*I don't like his$_i$ attitude toward Zhangsan$_i$.'

b. *ta$_i$ bu xihuan [wo dui Zhangsan$_i$ de taidu].
he not like I to DE attitude
'*He$_i$ doesn't like my attitude toward Zhangsan$_i$.'

5.2. Some Problems with the Binding Theory

An important claim made by the binding theory illustrated in 5.1. is that the positions in which anaphors are bound are precisely those positions in which pronouns are free. This is apparent from the conjunction of (1a) and (1b), with the notion governing category defined uniformly for anaphors and pronouns as in (2). This prediction is correct in the examples reviewed so far. Thus, whereas (5a-b) are well-formed, (6a) is not; and where (5c-f) are not well-formed, (6b-c)

are. Similarly, in Chinese, (8a-b) are well-formed while (9a) is not, with the situation reversed in (8c-d) and (9b). The same holds true in (11)-(12) in English and (14)-(15) in Chinese, with anaphors and pronouns occurring in mutually exclusive environments.

As has been noted in many places (e.g. Chomsky 1980 and 1981a), however, the theory runs into some difficulty with respect to sentences like the following, where a possessive NP can be an anaphor or a proximate pronoun:

(17) a. The men$_i$ saw [their own/each other's$_i$ pictures].

b. The men$_i$ saw [their$_i$ pictures].

(18) a. The men$_i$ saw [their own/each other's$_i$ pictures of the girl].

b. The men$_i$ saw [their$_i$ pictures of the girl].

Furthermore, although certain speakers find (19a) slightly better than (19b), both these sentences are acceptable and in any case the difference between them has a very different status from the sharp distinction between the grammatical and ungrammatical sentences given above.[4]

(19) a. The men$_i$ saw [the pictures of themselves$_i$/each other$_i$].

b. The men$_i$ saw [the pictures of them$_i$].

The same problem illustrated in (17)-(19) also exists in Chinese, as (20) and (21) show:

(20) a. Zhangsan$_i$ kanjian-le [ziji$_i$ de shu]
see-ASP self$_i$ DE book
'Zhangsan saw his own books.'

b. Zhangsan$_i$ kanjian-le [ta$_i$ de shu]
see-ASP he$_i$ DE book
'Zhangsan saw his books.'

(21) a. Zhangsan$_i$ zhi xihuan [neiben guanyu ziji$_i$ de shu].
only like that about self$_i$ DE book
'Zhangsan likes only that book about himself.'

b. Zhangsan$_i$ zhi xihuan [neiben guanyu ta$_i$ de shu]
only like that about he$_i$ DE book
'Zhangsan likes only that book about him.'

In each of these sentences an anaphor or a pronoun occurs within an NP which, according to (2) and (3), is its governing category. In particular, in (17)-(18) and (20), an anaphor or a pronoun occurs as the possessive of an NP. By the definition of government given in (3), the possessive is governed by the head N. In (19) and (20, an anaphor or a pronoun occurs as the complement of an N or of a preposition in NP. According to (3), the head N or the preposition is the governor. In each of these sentences, then, the bracketed NP is the governing category for the anaphor or pronoun and its governor. Therefore, (1) requires all pronouns to be free and all anaphors to be bound within the NP. However, only half of these sentences are correctly predicted by the theory (1). In particular, the (b) sentences have their pronouns free in the bracketed NPs in accordance with (1b), but the (a) sentences have anaphors occurring in the same position also unbound, in violation of (1a). Therefore, if the binding

theory embodying (1)-(3) is correct, it will be necessary to treat the (a) sentences of (17)-(21) as somewhat marked constructions, to be accommodated in a periphery, not core, grammar.

To overcome the above problem, Chomsky (1981a:211f) proposes to redefine the notion governing category as in (22), along with the two independent principles (23) and (24), as well as the notion of accessibility (25):

(22) Governing Category

> α is a governing category for β if and only if α is the minimal category containing β, a governor of β, and a SUBJECT accessible to β.

(23) AGR is co-indexed with the NP it governs.

(24) *$[_{\gamma}$ ... ζ ...], where γ and ζ bear the same index.

(25) Accessibility

> α is accessible to β if and only if both (a) and (b):
> (a) β is in the c-command domain of α.[5]
> (b) assignment to β of the index of α would not violate the well-formedness condition (24).

The principle (23) is independently motivated as a device for expressing the subject-verb agreement phenomenon, and at least some proper version of (24) may be independently motivated to rule out strings involving "referential circularity" such as:[6]

(26) *[A picture of it/itself$_i$]$_i$

(27) *I saw [her own$_i$ friend]$_i$.

The term SUBJECT is technically defined as the "most prominent nominal element" within an NP or S, and includes AGR of a clause that contains it, and the subject in the ordinary sense (the NP of S or NP of NP).

This formulation has the advantage of reducing the Nominative Island Condition (NIC) and the (Specified) Subject Condition (SSC) of Chomsky (1980) (or their respective predecessors) into one single principle (which could now be called the "Specified SUBJECT Condition"), overcoming certain problems as explained in Chomsky (1981a).

It should be easy to see that the (a) sentences of (17)-(21), which present problems for the binding theory, in particular the condition (1a), now fall under the theory. Thus, in these sentences, the bracketed NP does not qualify as a governing category for the anaphor contained in it because, although it contains the anaphor and its governor, it does not contain a SUBJECT accessible to it. In (19a) and (21a), this is clear because the NP has no SUBJECT. In (17a), (18a) and (20a), it has a SUBJECT, but the SUBJECT is the anaphor itself. Therefore, it does not c-command the anaphor, and by (25a), it is not accessible. The governing category for the anaphor, therefore, is not the bracketed NP. On the other hand, the S dominating the bracketed NP in each of these examples is the governing category for the anaphor in question, since it contains a subject which c-commands the anaphor and could be coindexed with the latter without violating the well-formedness filter $*[_i \ldots i \ldots]$ (24). Since in each case the anaphor is bound in this category, the theory correctly predicts these sentences to be good.

The theory also accounts for all the sentences considered in 5.1. The bracketed S in (5e-f) or (8c-d), or the bracketed NP in (11) and

(14), for example, is each a governing category for the anaphor it contains, since it contains an accessible subject, the subject of the clause of the NP, which c-commands the anaphor and coindexing the subject with the anaphor would not result in an $[_i \ldots i \ldots]$ configuration in violation of (24). Therefore the sentences are good just in case an anaphor is bound in it. In (5c-d), furthermore, the bracketed S is also a governing category since it contains an accessible AGR. The AGR element in the embedded clause of (5c), for example, is accessible to the embedded subject anaphor, because it c-commands the latter (AGR being the head of S, cf. footnote 4), and coindexing the two elements would not violate (24). The structure of (5c), after the agrement rule (23) applies, is (28a). If we were to coinindex AGR with the embedded subject anaphor, what we would get would be (28b), which does not violate (24):

(28) a. The men said that [[themselves/each other]^i AGR^i would come]

b. The men said that [[themselves/each other]^i_i AGR^i_i would come]

Since AGR is accessible to themselves/each other in (28a), the clause of the AGR is a governing category for the anaphor. The condition (1a) requires that the anaphor must be bound in the clause. (5c-d) are ill-formed, therefore, since they each have an anaphor unbound in the governing category.

This formulation of "governing category" has the further advantage that it predicts correctly the possibility of long-distance

binding of an anaphor, as shown below:[7]

(29) They$_i$ expected that [$_{S*}$[$_{NP}$ pictures of <u>each other$_i$</u>] would be on sale].

(30) They$_i$ expected that [$_{S*}$[$_{NP*}$ <u>each other's$_i$</u> pictures] would be on sale].

(31) They$_i$ expected that [$_{S*}$for[$_{S**}$[$_{NP*}$ pictures of <u>each other$_i$</u> to be on sale] would be possible].

(32) They$_i$ expected that [$_{S*}$ for [$_{S**}$[$_{NP*}$ <u>each other's$_i$</u> pictures] to be on sale] would be possible]

(33) They$_i$ expected that [$_{S*}$for [$_{S**}$ <u>each other$_i$</u> to come] would be possible]

(34) They$_i$ expected that [$_{S*}$it would be possible for [$_{S**}$ [$_{NP*}$ pictures of <u>each other$_i$</u> to be on sale]]

(35) They$_i$ expected that [$_{S*}$ it would be possible for [$_{S**}$ [$_{NP*}$ <u>each other's$_i$</u> pictures] to be on sale]]

(36) They$_i$ expected that [$_{S*}$ it would be possible for [$_{S**}$ <u>each other$_i$</u> to come]]

In all these examples, only the matrix clause qualifies as a governing category for <u>each other</u>. None of the NP*s in (29)-(36) is a govering category, as we just saw. The S** of (31)-(36), similarly, is not a governing category, since it contains no AGR and its subject properly contains, but does not c-command, <u>each other</u>. The S* of (29)-(33) does contain an AGR as a SUBJECT, but since this SUBJECT is coindexed with the NP* of (29)-(30) and the S** of (31)-(33) in accordance

with the agreement rule (23), further coindexing the AGR with each other would violate the well-formedness condition (24). The same applies to (34)-(36) under the natural assumption that the subject it of their S*s is coindexed with the S**.

Note that although Chomsky's reformulation succeeds in accounting for a fairly wide range of sentence types involving anaphors, the problem posed by the conjunction of (1a) and (1b) persists. This is true not only in (17)-(21) where the same position may be filled by an anaphor or a proximate pronoun, but also in (29)-(36), since substitution of each other by them in these sentences results in equally grammatical sentences (with the qualification noted in footnote 4).

(37) They$_i$ expected that pictures of them$_i$ would be on sale.

(38) They$_i$ expected that their$_i$ pictures would be on sale.

(39) They$_i$ expected that for pictures of them$_i$ to be on sale would be possible.

(40) They$_i$ expected that for their$_i$ pictures to be on sale would be possible.

(41) They$_i$ expected that for them$_i$ to come would be possible.

(42) They$_i$ expected that it would be possible for pictures of them$_i$ to be on sale.

(43) They$_i$ expected that it would be possible for their$_i$ pictures to be on sale.

(44) They$_i$ expected that it would be possible for them$_i$ to come.

The same problem also exists in the following sentences in Chinese:

(45) a. Zhangsan$_i$ yiwei [$_s$[$_{np}$ ziji$_i$ de xiangpian] zui haokan].
think self^i DE picture most pretty
'Zhangsan thinks that his own pictures are the most beautiful.'

b. Zhangsan$_i$ yiwei [$_s$[$_{np}$ ta$_i$ de xiangpian] zui haokan]
think he^i DE picture most pretty
'Zhangsan thinks that his pictures are the most beautiful.'

(46) a. Zhangsan$_i$ shuo [$_s$[$_s$ ziji$_i$ you mei you qian] mei guanxi].
say self^i have not have money not matter
'*Zhangsan said that whether himself has money or not didn't matter.'

b. Zhangsan$_i$ shuo [$_s$[$_s$ ta$_i$ you mei you quian] mei guanxi].
say he have not have money not matter
'Zhangsan said that whether he has money or not doesn't matter.'

Note that the problem shown by (46) exists only in Chinese, with 'self' and 'he' both acceptable, but not in its English counterparts. As shown by the translation, English allows only 'he' in its counterpart to (46b), but not 'himself' in its counterpart to (46a). This has to do with the fact that the NIC is irrelevant in Chinese. More examples showing this point are given below:

(47) a. Zhangsan$_i$ shuo [ziji$_i$ hui lai].
say self^i will come
'*Zhangsan said that himself will come.'

b. Zhangsan$_i$ shuo [ta$_i$ hui lai].
say he^i will come
'Zhangsan said that he will come.'

(48) a. Zhangsan$_i$ qipian-le [$_{np}$[$_s$ ziji$_i$ zui xihuan] de nuren].
cheat-ASP self^i most like DE woman
'Zhangsan cheated the woman that himself loves most.'

(48) b. Zhangsan$_i$ qipian-le [$_{np}$[$_s$ ta$_i$ zui xihuan] de nuren].
cheat-ASP he most like DE woman
'Zhangsan cheated the woman that he loves most.'

(49) a. Zhangsan$_i$ bei wo faxian [$_s$ t$_i$ tou-le qian le].
by I find steal-ASP money ASP
'*Zhangsan$_i$ was found by me t$_i$ has stolen money.'

b. Zhangsan$_i$ bei wo faxian [$_s$ ta$_i$ tou-le qian le].
by I find steal-ASP money ASP
'Zhangsan had it found out by me that he stole money.'

In (47) both 'self' and 'he' can occur in an embedded finite clause complement. In (48) both can occur in subject position of a relative clause. And in (49) both the NP-trace and 'he' can occur in a finite clause.

It may be observed that the existence of sentences like the (a) members of (46) - (49) presents problems for older versions of the binding theory in particular the NIC of Chomsky (1980a) and its predecessor in Chomsky (1973, 1977), which rules out their counterparts in English. This is, however, not the case in the present formulation of a governing category involving the technical notion of SUBJECT. As George and Kornfilt (1981) have pointed out, it is the presence of agreement in a clause that determines opacity. This idea is already integrated into the formulation by Chomsky. It is pretty well known that there is no subject-verb agreement in Chinese, though the existence of aspect markers like -le may justify a syntactic constituent of INFL (cf. 3.3). This fact fits rather well into the new formulation embodying the George-Kornfilt theory. Whether or not a clause is finite in Chinese, its INFL does not contain [+AGR]. It then follows

that a subject has no accessible SUBJECT in its own clause. Anaphora is therefore possible with an anaphor in subject position of an embedded clause as in (47a) and (49a), and can even go long distance as in (46a) and (48a), completely in line with the theory under consideration. The well-formedness of the (a) sentences of (45) - (49) is therefore not a problem: they all fall under (1a). The problem is, rather, why the (b) sentences, in which an anaphor has been replaced by a pronoun, are not ruled out by (1b).

In short, there is a systematic set of sentences that resist the binding theory one way or the other under either definition of a governing category, as in (2) or as in (22). In the former case, the problem arises with the possibility of long distance anaphor-binding and, in the latter case, it arises with the non-existence of disjointness of reference. In either case, half of the sentences fall under the theory of core grammar and the other half outside of it, treated as marked constructions. As Chomsky notes, comparative study should prove helpful in determining between the marked/unmarked status of certain constructions under investigation. What is properly treated as "marked" in one language, in other words, should not be expected to occur systematically in another, especially typologically remote, language. But the comparative evidence from Chinese and English reveals exactly what one would not expect, as we have seen. The most reasonable conclusion to make is that neither

the constructions excluded by (1a) under the formulation (2) of the notion of a governing category, nor the constructions excluded by (1b) under the formulation (22) are marked. Rather, the binding theory must be somehow reformulated so as to accommodate both construction types in both languages.

Besides the empirical problem we have just seen, there is also a conceptual problem with the binding theory. Although the formulation (22) has a number of desirable properties, there is a question on why the notion of an accessible SUBJECT should be involved in the definition of a governing category for both an anaphor and a pronoun, with accessibility defined in terms of c-command and the well-formedness condition (24). The existence of a SUBJECT for an anaphor generally implies the existence of a potential antecedent for the anaphor (though the reverse is not true in cases where a non-subject is the antecedent).[8] Therefore it makes sense to ask whether that SUBJECT is an accessible potential antecedent in terms of c-command and the well-formedness condition. It is well known, however, that although c-command is a normal requirement on the antecedent of an anaphor, it is not required of the antecedent of a pronoun.

(50) a. *Each other's$_i$ pictures pleased the men$_i$.

b. Their$_i$ pictures pleased the men$_i$.

(51) a. *Pictures of the men$_i$ pleased each other$_i$.

b. Pictures of the men$_i$ pleased them$_i$.

In view of these examples, one may wonder why a SUBJECT accessible to a pronoun has to c-command it at all.

Furthermore, since an anaphor needs to have an antecedent, a theory of anaphors is to provide environments in which coreference is possible. In searching for an antecedent for an anaphor within its governing category, it therefore makes sense to see if the SUBJECT could be coindexed with the anaphor without violating the well-formedness condition *[$_i$ ... i ...], i.e. whether the SUBJECT could be its "possible antecedent". If it is not a possible antecedent, then an anaphor will have to look upward into a more inclusive domain. However, the situation with pronouns is different, since pronouns need no antecedents. As Lasnik (1976) has argued, a theory of pronouns should say nothing about when coreference is possible or how it is to be determined, but only when disjoint reference is required. This is already integrated into the binding condition (1b), which says only that a pronoun has to be free in its governing category, but says nothing about what its antecedent might be outside of the governing category. Therefore, there is no motivation to see if a SUBJECT could be a possible potential antecedent for the pronoun. If one were to coindex a SUBJECT with a pronoun and obtain a [$_i$ ... i ...] configuration in violation of (24), all this would mean would be that the SUBJECT could not be a possible antecedent. But this is perfectly all right since the pronoun needs

no antecedent; in fact (1b) requires the SUBJECT not be its antecedent. So there is no reason to look upwards into a more inclusive domain to see if a higher SUBJECT could be a possible antecedent. Nor is there any need to look for a "disjoint referent" for a pronoun. In the sentence "He is here", he is neither bound nor "anti-bound" by any NP. In short, the conceptual problem with the formulation (22) is that, although there is some good motivation for assuming that a governing category for an anaphor must contain an accessible SUBJECT, there appears to be no similar motivation for making the same assumption about the governing category for a pronoun.

5.3. A Modification

The preceding discussion should make it clear that the older binding theory embodying (2) as the definition of a governing category works well with pronouns, as far as the sentences we have seen are concerned, while the newer theory embodying (22) works well with anaphors. If we juxtapose the empirical and the conceptual problems just noted, a simple idea suggests itself: the domain for defining anaphor binding and the domain for defining pronominal noncoreference are not identical, though they overlap to a large extent. One way to instantiate this idea is to assume that the binding conditions are as follows:

(52) Binding Conditions

a. An anaphor is bound in its lower governing category with an accessible SUBJECT.

b. A pronominal is free in its governing category.

where "governing category" is defined as in (2), with the stipulation that α = NP or S. There are a number of difficulties with this formulation, however. Instead, I would like to propose a different instantiation of the same idea. I will assume that the binding conditions are as they are in (1a) and (1b), but that the notion of a governing category takes the form of (53):

(53) Governing Category

> α is a governing category for β if and only if α is the minimal category containing β, and a SUBJECT which, if β an anaphor, is accessible to β.

I will first indicate how the modification embodying (53) may solve the empirical and conceptual problems we have noted, and then show that this formulation is superior to the alternative indicated in (52).

Consider, first, all the sentences which constitute the paradigm examples of the binding theory, examples (5)-(16). In each of these examples, in the very minimal category α that contains β (β an anaphor or a pronoun), a governor of β, and a SUBJECT, the SUBJECT is accessible to β. Therefore, in these examples, the governing category for an anaphor is also the governing category for a pronoun in the same position. Thus, the bracketed clause in each of (6) is a governing category for the pronoun contained therein, because it contains not only the pronoun, its governor, but also a SUBJECT (the subject of the bracketed clause in (6a) and (6c), and the AGR in the embedded clause of (6b)). Note that this SUBJECT is also

accessible to the pronoun; therefore, the same domain also qualifies as the governing category for an anaphor if the pronoun is replaced by the latter, as in (5). The binding conditions (1a) and (1b) therefore correctly require pronominal disjoint refereence where anaphor binding is possible, and rules out anaphor-binding where pronominal coreference is possible. The same applies to (11) and (12), where each bracketed NP is the governing category for the anaphor or pronoun it contains. It is easy to see that the same applies to Chinese examples, where pronouns and anaphors are mutually exclusive.

This complementary distribution of pronouns and anaphors breaks down when a certain category contains β (β a pronoun or an anaphor), β's governor, and a non-accessible SUBJECT. If β is a pronoun, this category is its governing category, but if β is an anaphor, this category is not, but a more inclusive category is. Therefore, both a pronoun and an anaphor may occur free in this category, satisfying (1b) and (1a) respectively. We claim that this is the situation with all the sentences that we have seen to present problems for the binding theory. Note that the definition (53) requires the governing category for an anaphor to contain an accessible SUBJECT. Therefore, all the sentences that involve long-distance anaphor binding (i.e. the (a) sentences of (17)-(21) and the sentences (29)-(36)) present no problem; they readily fall under (53) as they do under (22). In each case, only the root clause qualifies as the

governing category for the anaphor it contains. Likewise for the (a) sentences of (45)-(49) in Chinese, under the assumption that the INFL in Chinese contains no [+AGR]. What we need to account for now is the (b) sentences of (17)-(22), (45)-(49), and the sentences (37)-(44). According to (53), the governing category of a pronoun must have a SUBJECT. Since the only categories that have SUBJECTs are NP and clause (including "small clauses" of the sort studied in Stowell 1981). Let us consider first the clausal nodes, $\bar{S}$ and S. Suppose that the minimal clause containing a pronoun or an anaphor and its governor is finite, then in English it contains AGR. Consider the following configuration:

(54) $[_{\bar{s}}$ COMP $[_{s}$ NP_1 AGR $[_{vp}$ V $NP_2]]]$

As defined by Chomsky, a SUBJECT of a domain is a nominal element which is most prominent in the domain. "Most prominent in D" here is intended to mean "c-commanding everything else in D". Thus, in the finite S of (54), NP_1 is a SUBJECT, since it c-commands everything else in S. AGR is also a SUBJECT, since it is the head of S and under the notion of c-command mentioned in footnote 5 it also c-commands everything else in S. Thus a finite S always has two SUBJECTs. A finite $\bar{S}$, on the other hand, has only one SUBJECT, which is the head AGR. The subject NP_1 is not a SUBJECT of $\bar{S}$ because it is not the head of $\bar{S}$ and therefore does not c-command the COMP. By the minimality requirement on the definition of a governing category, in a structure like (54), S is always the governing category for NP_1 and NP_2. Now consider the case of an infinitival clause:

(55) $[_{\bar{s}}$ for $[_{s}$ NP_1 to V $NP_2]]$

S in (55) is the governing category for NP_2, because it contains NP_2, its governor (V), and the subject NP_1. However, S is not a governing category for NP_1, whether NP_1 is an anaphor or a pronoun, because it does not contain its governor. $\bar{S}$, furthermore, is also not the governing category for NP_1, because it contains no SUBJECT (the NP_1, though a subject, is not a SUBJECT since it does not c-command the COMP <u>for</u>). Therefore, neither S nor $\bar{S}$ is a governing category for the subject of an infinitival clause. If an infinitival clause is embedded as a complement, the embedding S will be the governing category for the infinitival subject, as in (56):

(56) a. $They_i$ prefer $[_{\bar{S}}$ for $[_S$ each $other_i$ to come]]

b. *$They_i$ prefer $[_{\bar{S}}$ for $[_S$ $them_i$ to come]]

Since the matrix S is the governing category for both the anaphor in (55) and the pronoun in (56b), the contrast between (56a) and (56b) follows. In the following configurations, the situation is different:

(57) They expected that $[_{S*}$[for NP* to come] would be possible]

(58) They expected that $[_{S*}$it would be possible [for NP* to come]]

In both cases, S* contains a SUBJECT, but the SUBJECT is not accessible to NP*. If NP* is a pronoun, S* will be its governing category, as given in (53). This immediately accounts for (41) and (44) above. Similarly, the grammaticality of the (b) sentences of (46)-(49) in Chinese is accounted for. In each of these sentences, the most deeply embedded clause is finite. Although the INFL of this embedded clause does not contain AGR, it is reasonable to assume that its [+V]

feature enables it to govern its subject pronoun. This appears to be independently necessary since otherwise the subject of any finite clause would be ungoverned. The most deeply embedded clause also contains a SUBJECT, the subject pronoun itself, though it is not accessible to itself. Therefore, this embedded clause is the governing category for the pronoun subject, which is free in it in accordance with (1b).

Now, consider the minimal NP node containing a pronoun. Two cases are involved in such a situation:

(59) a. $[_{np}$ pictures of them]

b. $[_{np}$ their pictures]

Although the NP pictures of them does not have an ordinary subject (NP of NP), it does have a SUBJECT, the head noun pictures, which is of course the most prominent nominal element in the whole noun phrase (59a). The pronoun them is governed by of (or by the head pictures). Therefore, the NP (59a) is a governing category for the pronoun them, in which it must be free. This accounts for (19b), (21b), (37), (39), (42), in all of which a pronoun is free in its governing category in accordance with (1b). Finally, consider the structure (59b). Here, both the pronoun subject their and the head pictures are SUBJECTs. The head pictures is the governor of their. Therefore, their pictures is the governing category for their. This accounts for (17b), (18b), (20b), (38), (40), (43), and (45b). We thus account for all the problematic sentences in full.

(Note that the head pictures in their pictures and pictures of them is not accessible to their or them because it is natural to assume that the index of a head noun is percolated to the top of the entire NP, and coindexing the head with their or them would result in a $[_i$ ...i ...] configuration in violation of (24.)

Note that the conceptual problem noted in 5.2 also disappears under the account (53). Since only anaphors need to search for antecedents but not pronouns, it is irrelevant whether a SUBJECT is accessible to a pronoun or is a potential antecedent. This is already what (53) says.

Now let us compare the modification proposed here in (53) with that indicated in (52). It is clear that, as far as the empirical problem posed by the sentences discussed above is concerned, (52) also gives the right results. Thus, long distance binding of an anaphor by the subject of the root clause is possible in (29)-(36) as well as in the (a) sentences of (17)-(21) and (45)-(49), because in each case the root clause is the lowest governing category with an accessible SUBJECT. The sentences (37)-(44) and the (a) sentences of (17)-(21) and (45)-(49) are also acceptable with a pronoun bound to each root subject, because there is already a lower governing category (without an accessible SUBJECT) in which the pronoun is free. Moreover, in the paradigmatic cases (5)-(14), anaphors and pronouns are correctly predicted to be mutually exclusive, because in each of these sentences the first governing category also has an accessible SUBJECT.

The conceptual problem with respect to the relevancy of an accessible SUBJECT also disappears under the account (52), as is evident.

A basic difference between (52) and our (53) is that, according to (52), the sole existence of a SUBJECT is taken to be irrelevant in the domain for pronominal non-coreference, while according to (53), it is only accessibility that is taken to be irrelevant, the existence of a SUBJECT being required of the governing category for both pronouns and anaphors. Since only NPs and clauses may have SUBJECTs, the requirement of a SUBJECT in the definition of a governing category for both pronouns and anaphors, as in (53), makes it unnecessary to stipulate that a governing category must be NP or S. But a definition of governing category that does not require a SUBJECT must make the stipulation, as in (2) and (52). (52), in other words, leaves the question unanswered on why NP and S are possible governing categories and not other categories, while (53) derives this from the fact that only these categories have SUBJECTs.

A related point here is that only under the formulation (53) is there a natural way to tie together the NIC and the SSC of Chomsky (1980). To use the older terminology, with respect to anaphor binding, the NIC and SSC are reduced to the "Specified Accessible SUBJECT Condition" under both (52) and (53). But with respect to disjoint reference of pronouns, the NIC and the SSC are reduced to the "Specified SUBJECT Condition" only under (53), but not under (52). This is another conceptual disadvantage of (52).

Thirdly, and this is most important, the formulation (52) loses an important consequence of the binding theory concerning the distribution of PRO, namely the theorem (60):

(60) PRO is ungoverned.

Chomsky assumes that PRO is a pronominal anaphor for the reason that it is on a par with both a pronoun and an anaphor. In the sentence (61), PRO is like an empty pronoun on a par with the pronoun in (62), where the pronoun may be interpreted as bound to John:

(61) John expects [[PRO to come]]

(62) John expects [that [he will come]]

However, PRO is also like an anaphor in that it must have an antecedent wherever it can.[9] Unlike the pronoun in (62), PRO in (61) must be interpreted as having John as its antecedent. Now, according to (1a) and (1b), if PRO has a governing category, then it must be both bound and free in its governing category, a contradiction. By reductio ad absurdium, then, PRO cannot have a governing category. There are two situations in which PRO may fail to have a governing category: when PRO appears in an ungoverned position, and when PRO is governed but has no accessible SUBJECT. Now consider the following sentences (due to Luigi Rizzi):

(63) a. *Pictures of each other are on sale.

b. *Each other's pictures are on sale.

In (63a) and (63b), neither the subject NP containing each other nor the root sentence is a governing category for each other according to (22), since neither contains a SUBJECT accessible to each other.

The binding theory thus fails to rule out (63), since an anaphor needs to be bound only if it has a governing category. To remedy this inadequacy, then, the following auxiliary definition of a governing category, suggested by Norbert Hornstein, is needed:

(64) The root sentence is a governing category for any element that is governed.

Given this independently needed definition, if a PRO is governed, it must always have a governing category whether it has an accessible SUBJECT or not. Therefore, PRO must be always ungoverned. This theorem, derivable free as a consequence of the binding theory, is a desirable one. Thus, PRO can only appear in the subject position of an infinitival or a gerundive clause:[10]

(65) John tried [[PRO to go]].

(66) John preferred [[PRO going alone]]

The following sentences may be ruled out as a result of PRO being governed in violation of the binding theory:

(67) *John said that I know PRO.

(68) *John saw pictures of PRO.

(69) *John saw PRO's books.

(70) *They said that for PRO to come would be possible.

(71) *John said that books on PRO would be on sale.

(72) *John said that PRO's books would be on sale.

Now, consider the formulation (52). Since it requires an anaphor to be bound in a governing category with an accessible SUBJECT and a pronoun to be free in its governing category (with or without an

accessible SUBJECT), the two conditions (52a) and (52b) jointly rule out (67), but not any of (68)-(72). In (67), the embedded clause is the governing category for PRO as an anaphor since it contains an accessible SUBJECT: it is also the governing category for PRO as a pronominal. Therefore, (67) is ill-formed since PRO in it cannot satisfy both (52a) and (52b). In all of (68)-(72), however, PRO can satisfy both (52a) and (52b). Here, as a pronominal, PRO may have as its governing category (without an accessible SUBJECT), a domain that is smaller than the root sentence. As an anaphor, PRO must take the root sentence as its governing category. In each of (68)-(72), PRO is free in the smaller governing category in accordance with (52b) and bound in the larger governing category in accordance with (52a). These sentences are wrongly admitted by (52). In other words, one cannot derive the theorem that PRO is ungoverned from (52).

One might try to derive the facts indicated in (68)-(72), not by the binding theory under (52), but by a separate requirement that PRO cannot be Case-marked. While it is probably a matter of fact that PRO cannot be Case-marked, note however that this fact can be readily derived from the theorem that PRO is ungoverned, if one assumes that Case is assigned under government (cf. Chomsky 1980a, 1981a). Furthermore, the requirement that PRO is not Case-marked cannot follow free from any other principle in the absence of the theorem that PRO is ungoverned, while the requirement that PRO is ungoverned follows free from the original binding theory. Still more important, although

all ungoverned positions are not Case-marked, not all non-Case-marked positions are ungoverned. For example, the positions of NP traces are not Case-marked, though they are governed, in fact properly governed in the sense of the ECP:

(73) $John_i$ seems $[_s\ t_i$ to be honest]

(74) $John_i$ was ridiculed t_i.

If PRO need only be non-Case-marked, one would expect the following to be well-formed:

(75) *It seems $[_s$ PRO to be honest]

(76) *It was ridiculed PRO.

where PRO is taken to have arbitrary reference on a par with the PRO in (77):

(77) *It is unclear what PRO to do.

It appears, then, that there is a serious drawback to the formulation (52) as a modification of the binding theory. It remains now to show that (53) does not have this drawback and that it still has the desired property from which to derive the theorem that PRO is ungoverned.

It is relatively easy to see that (53) does have this desired property. According to the definition given in (53), the governing category for an anaphor must have an accessible SUBJECT. Since PRO is an anaphor (i.e. a pronominal one), if it has a governing category, then the governing category must always have an accessible SUBJECT. (Conceptually, this is what we would expect. Since PROs

do look for antecedents, accessibility is relevant.) The fact that it is also pronominal does not make it possible for a PRO to have also a governing category without an accessible SUBJECT, since PRO is both anaphoric and pronominal, not either anaphoric or pronominal. Since both the stricter requirement (that it has an accessible SUBJECT) and the looser requirement must be satisfied by PRO, the stricter requirement must always be satisfied. Therefore, if a PRO has a governing category at all, it has one governing category at most. Now the conditions (1a) and (1b) require PRO to be bound and free in this single category. Q.E.D.

5.4. On PRO in Chinese and the Pro-Drop Parameter

5.4.1. The Distribution of PRO: Some Problems

In the preceding section, we saw that there is good reason to adopt a minimal modification of the binding theory from which the theorem continues to follow that PRO is ungoverned. The theorem allows PRO to occur as the subject of an infinitival or a gerundive clause, but prohibits its occurrence as a complement to a V, N, A, P. It also disallows PRO in the subject position of a finite clause:

(78) *PRO will come.

(79) *John told me that PRO will come.

This is because the subject of a finite clause is governed by its INFL. The same theorem also rules out PROs in subject position of an NP:

*PRO's books, etc., since the subject is governed by the head N, $\bar{N}$ (unlike VP) not being a maximal projection.

Let us now consider the distribution of PRO in Chinese. As in English, we also do not allow PRO to occur as the complement of a verb or a preposition:

(80) *Zhangsan$_i$ shuo ni kanjian-le PRO$_i$.
say you see-ASP
'Zhangsan$_i$ said that you saw PRO$_i$.'

(81) *Zhangsan$_i$ gen PRO bu shou.
with not familiar
'Zhangsan is not familiar with PRO.'

The following string must also be considered ill-formed with a PRO following the adjective or stative verb 'happy':

(82) *Zhangsan hen gaoxing PRO.
very happy
'Zhangsan is very happy [over] PRO.'

Although the string 'Zhangsan is very happy' is grammatical, it is not intended to convey the message that there is something or someone over which he is happy (he certainly can be happy just about nothing). Furthermore, the representation (83) must be considered ill-formed, as 'trees' certainly do not need to belong to anyone:

(83) *Zhangsan kanjian-le [PRO (de) shu]
see-ASP DE tree
'*Zhansan saw PRO's trees.'

A possible counterexample to the claim that there can be no PRO subject in NP involves what is called the "inalienable possessive" construction:

(84) Zhangsan zai xi shou.
at wash hand
'Zhangsan is washing hands.'

(85) Zhangsan, baba hen youqian.
father very rich
'Zhangsan, [his] father is very rich.'

Here, the noun phrases shou 'hands' and baba 'father' are uniquely understood to mean Zhangsan's hands and Zhangsan's father respectively. One may plausibly argue that there is a possessive controlled PRO. However, by making this assumption we lose an explanation on why (80)-(83) are ill-formed exactly as their English counterparts are. Furthermore, in sentences like the following the hypothesis of a controlled PRO looks as implausible as that in (82) and (83):

(86) Zhangsan kanjian-le shou le.
see-ASP hand-ASP
'Zhangsan saw hands.'

It appears to be more natural to account for the inalienable possessive constructions in a theory of pragmatics, not a theory of grammar. Thus, due to the real world fact that hands usually have to belong to someone, especially when used in the context 'John is washing hands', speakers usually make inference about whose hands they are, though in a context like 'John saw hands' it becomes unnecessary to make any similar inference. In this way we can still maintain that PRO must be ungoverned.[11]

As regards the subject position of a non-finite clause, the theorem also correctly allows PRO to occur in it in Chinese:

(87) wo zhunbei [PRO mingtian lai]
I prepare tomorrow come
'I expect to come tomorrow.'

(88) wo quan Zhangsan [PRO bu mai zheben shu]
I persuade not buy this book
'I persuaded Zhangsan not to buy this book.'

Although tense in Chinese is not systematically marked, there are still ways to distinguish what is intuitively a finite clause from a non-finite clause. The embedded clauses in (87) and (88) are non-finite because they cannot take modals like hui 'will'. The following sentence is out even though there is, semantically speaking, nothing incompatible in the use of future modality:

(89) *wo zhunbei [PRO mingtian hui lai]
I prepare tomorrow will come

If the verb 'prepare' is replaced by 'predict', hui 'will' is admitted:

(90) wo yuliao [ta mingtian hui lai]
I predict he tomorrow will come
'I predict that he will come tomorrow.'

Furthermore, the embedded clause in (88) cannot take the perfective aspect marker you (a variant of le, cf. 3.3):

(91) *wo quan Zhangsan [PRO mei you mai zheben shu]
I persuade not ASP buy this book
'*I persuaded Zhangsan not to have bought the book.'

The data we have seen in Chinese up to now show that PRO is in complementary distribution with lexical NPs. Compare (87)-(88) with (92)-(93):

(92) *wo zhunbei [wo mingtian lai]
I prepare I tomorrow come
'*I am prepared I to come tomorrow.'

(93) *wo quan Zhangsan [ta bu mai zheben shu]
I persuade he not buy this book
'*I persuaded Zhangsan he not to buy this book.'

This is expected, given the Case theory, according to which an NP is assigned Case by its governor. Since PRO can have no governor, a lexical NP occurring in a position where PRO is permitted will not get

Case. The sentences (92) and (93) are then ruled out by the Case Filter (cf. Chomsky 1980a):

(94) Case Filter

*NP, NP lexical, unless NP has Case.

When we turn to finite clauses in Chinese, however, the complementary distribution of lexical NPs and PRO seems to break down.

(95) a. Zhangsan shuo [ta xiawu hui lai]
say he afternoon will come
'Zhangsan said that he will come this afternoon.'

b. Zhangsan shou [ziji xiawu hui lai]
say self afternoon will come
'Zhangsan said that he will come this afternoon.'

c. Zhangsan shuo [Lisi xiawu hui lai]
say afternoon will come
'Zhangsan said that Lisi will come this afternoon.'

d. Zhangsan shuo [[e] xiawu hui lai]
say afternoon will come
'Zhangsan said that he will come this afternoon.'

(96) a. Zhangsan shuo [[ta you-mei-you qian] meiyou guanxi]
say he have-not-have money no matter
'Zhangsan said it doesn't matter whether he has money or not.'

b. Zhangsan shuo [[ziji you-mei-you qian] meiyou guanxi]
say self have-not-have money no matter
'Zhangsan said it doesn't matter whether he has money or not.'

c. Zhangsan shuo [[Lisi you-mei-you qian] meiyou guanxi]
say have-not-have money no matter
'Zhangsan said it doesn't matter whether Lisi has money or not.'

d. Zhangsan shuo [[[e] you-mei-you qian] meiyou guanxi]
say have-not-have money no matter
'Zhangsan said it doesn't matter whether he has money or not.'

The (a-c) sentences above show that their most deeply embedded clauses each admit a lexical NP, whether an anaphor, a pronoun, or an R-expression. The (d) sentences show that the same position admits an empty category. Since this empty category may be interpreted as taking the matrix subject Zhangsan as its antecedent, and since the antecedent has its own thematic role (agent of the matrix verb), the empty category is not a trace. If we assume that empty categories are either traces or PRO, then the empty category in (95d) and (96d) is a PRO. The existence of lexical NPs in the same position thus contradicts the binding theory, in particular the theorem that PRO must be ungoverned. Observe also the following:

(97) a. Zhangsan$_i$ shuo [[e]$_i$ mingtian buneng lai le]
say tomorrow cannot come ASP
'Zhangsan said that he cannot come tomorrow.'

b. Lisi$_i$, Zhangsan shuo [[e]$_i$ mingtian buneng lai le]
say tomorrow cannot come
'Lisi$_i$, Zhangsan said t$_i$ cannot come tomorrow.'

(98) a. Zhangsan$_i$ ku [de [e]$_i$ hen shangxin]
cry till very sad
'Zhangsan cried so much as to become really sad.'

b. Zhangsan ba wo$_i$ ku [de [e]$_i$ hen shangxin]
BA I cry till very sad
'Zhangsan cried so much as to get me very sad.'

The empty category in (97a) may be interpreted as bound to the matrix subject, and so is that in (98a). So in both cases this category is PRO. In (97b), the empty category is bound to the topic, a non-thematic position. In (98b), the empty category is bound to the ba object. Since the matrix verb 'cry' is intransitive, it assigns only

the role agent to its subject, and the ba object must inherit its thematic role from the empty category it binds. Therefore, in (97b) we have a wh-trace, and in (98b) we have an NP-trace (a case of subject raising). According to the ECP, traces must be properly governed. Again, the possibility of having a PRO here contradicts the binding theory.

One way to get out of this dilemma is to assume that the pronominal empty category we have seen in these examples are not PROs, but pure empty pronouns, i.e. pronominal non-anaphors. This category is what is called the "small pro" in Chomsky (1981b). The existence of such a category is certainly not excluded a priori, if empty categories (and lexical categories) are classified on the basis of the two features [±anaphoric] and (±pronominal]. Chomsky indicates that in the best of all possible worlds, one may assume that all four possibilities exist, the non-existence of certain possibilities being excluded by universal or specific, but independent, principles of grammar:[12]

(99)

	Features	Lexical NPs	Empty NPs
a.	[+anaphoric, -pronominal]	each other, reflexives	NP-trace
b.	[+anaphoric, +pronominal]	-lacking-	PRO
c.	[-anaphoric, +pronominal]	pronouns	pro
d.	[-anaphoric, -pronominal]	other lexical NPs	wh trace and other variables

The category pro under (99c) is then treated on a par with pronouns, and under the binding theory, it can be governed and have a governing

category in which it is free. If this is the case with the sentences we have seen in (95)-(98), then no problem arises.

This idea, I think, is on the right track. But before we see how it may be put to work for us, it is necessary to sort out a few other facts and exclude cases that must not be brought under this idea. First of all, note that the empty category in (95d), (96d), and (97a) need not be construed as bound to its matrix subject. When it is unbound, it has a definite reference, referring to someone outside of the sentence, the reference being determined in pragmatic contexts. This is a property that distinguishes a pro from PRO, which usually has arbitrary (or variable) reference when it has no antecedent (as in "it is unclear what PRO to do"). Furthermore, Chinese allows sentences of the following sort:

(100) [e] lai le.
come ASP
'He came.'

The referent of the empty NP is again definite, determined pragmatically. Also, note that a string phonetically identical to (80) with an empty NP in object position is perfectly natural in a discourse like the following:

(101) a. Q: Lisi$_i$, shei kanjian-le t$_i$?
who see-ASP
'As for Lisi, who saw [him]?'

b. A: Zhangsan shuo [ni kanjian-le [e]]
say you see-ASP
'Zhangsan said that you saw [him]].'

The only difference between (101b) and (80) is that the empty NP in

(101b) is understood to refer to Lisi, the topic in the preceding question (101a), and not to the matrix subject Zhangsan. Again, the reference of the empty category in (101b) is definite, unlike an arbitrary PRO. As is well-known, strings corresponding to (100) and (101b) in English are ill-formed:

(102) *[e] came.

(103) *John said that I saw [e].

The fact that the empty category in (95d), (96d), (97a), and (100), (101b) may have definite reference outside of the sentence might be taken to be evidence that each instance of the empty category is indeed a pro , and to support the claim that pro can occur in Chinese in general. However, there are two basic difficulties with the claim that each empty category in these sentences is a pro. First, it has been observed by Taraldsen (1979) that the so-called pro-drop phenomenon (i.e., the existence of pro) happens only in languages with sufficiently rich inflection. In languages like Italian, there are enough agreement features in INFL that enable one to identify, to some extent, the content (reference) of a subject pronoun after it drops. Subject pronoun drop is thus possible, as the deletion is somewhat recoverable. But object pronouns cannot drop, because the language has no object-verb agreement, and deletion of the object pronoun would leave its content unidentifiable from the context. English, on the other hand, does not have sufficient inflection to license subject pronoun

drop, nor of course object pronoun drop. So the language has no pro. This appears to be a plausible and principled way of looking at the pro drop phenomenon. However, if both the empty NPs in (100), (101b) and those in (95d), (96d), (97a) are pro's, we will lose this explanation. One would have to say that Chinese may have a pro which need not be identifiable from the rest of a sentence in which it occurs, since Chinese is even less inflectional than English. The question that needs to be explained is why English cannot be a language just like Chinese, allowing both subject and object pronouns to occur in the capacity of a pro.

Secondly, note that the sentence (101b) is acceptable only if the empty category refers to something outside of the entire sentence in which it occurs. It cannot, in particular, refer to the matrix subject Zhangsan, as (80) shows. This is extremely strange if the empty category is a pro, a pronominal non-anaphor. As an empty pronoun, it should be expected to be capable of referring to the matrix subject on a par with lexical pronouns. Compare the ungrammatical (80) with the perfectly grammatical (104):

(104) Zhangsan$_i$ shuo [ni kanjian-le ta$_i$]
say you see-ASP he
'Zhangsan said that you saw him.'

These two difficulties cast grave doubt on the assumption that the empty element in (101b) is a pro.

The clue to the status of the empty NP in (101b) is that it refers to a discourse topic, which is introduced in the preceding

sentence (101a). As has been argued by Li and Thompson (1976), the notion of topic is more prominent in Chinese-type languages than in English-type languages. (For the latter, the notion subject is more prominent. As they point out, this explains, among other things, that English but not Chinese requires pleonastic subjects.) Tsao (1977) has further argued that topic is more of a discoursal notion than of a sentential notion, so that Chinese-type languages are more "discourse-oriented" than English-type languages. Now, note that the discourse consisting of the question-answer pair (101a) and (101b) constitutes the domain of a "topic chain". The gap of (101b) refers to the topic of (101a), which is also the topic of the entire discourse. Consider the following discourse, which constitutes an even longer topic chain:[13]

(105) zuotian lai-le yige Xiangsheng. [e] goa-gao-de.
yesterday come-ASP one Mr. tall-tall

[e] dai-le yifu jinbian de jinshi yenjing. wo
wear-ASP one gold-rim DE near-sight glasses I

wen Lisi ren-be-renshi [e]. Lisi shuo ta bu renshi [e].
ask know-not-know say he not know

Zhangsan shuo ta renshi [e]. ta shuo Xiaozhang gaosu ta
say he know he say principal tell he

yihou, cai zhidao [e] shi Xiaozhang de pengyou. [e]
after then know is principal DE friend

xing Li.
surname

> 'Yesterday came a gentleman. [He] was quite tall. [He] wore a pair of near-sighted glasses in gold rims. I asked Lisi if he knew [him]. Lisi said he did not know [him]. Zhangsan said that he knew [him]. He said after the principal told him, he realized that [he] was the principal's friend. [He] is surnamed Li.'

In all the sentences except the first, there is an empty NP which referes to the "Mr." referred to in the topic sentence. This Mr. is the topic of the entire topic chain. (The topic of a discourse may be introduced in the topic position of the first sentence in a topic chain, as in (101a), or it may be introduced by way of a presentative sentence, as in (105).) The fact that the empty category in (101b) cannot be interpreted as A-bound to the matrix subject is strong indication for an analysis in which it is treated as a wh trace $\bar{A}$-bound (non-argument bound) to an abstract NP in a topic position of its own sentence, namely, the topic position of (101b), and the topic position of each of the sentences except the first in (105). The topic in (101b) and in the sentences in (105) is phonetically invisible because it has been, in Tsao's terms, deleted by "identical topic deletion", or in our terms, a PRO. (It is in fact not relevant whether it is a PRO or trace or whatever other empty category, since it occurs in operator ($\bar{A}$) position and does not enter into the definition of a trace as opposed to a PRO or pro, cf. Chomsky 1981a Chapter 6. We may simply designate it as OP, an operator.) Thus, the sentence (101b) may be represented as (106):

(106) [OP_i [Zhangsan shuo [ni kanjian-le t_i]]]
say you see-ASP

Likewise for all the sentences containing [e] in (105). Such sentences are, then, "open" sentences in the sense that their OP is variable in reference though the empty category in argument position is a bound variable. These "open" sentences may then be assumed to undergo a discoursal rule of "predication" akin to the one suggested in Chomsky (1981b), by which the OP is coindexed with a topic in discourse. The difference between the grammatical (101b) in Chinese and the ungrammatical counterpart in English may then be taken to illustrate the parameter that distinguishes so-called discourse-oriented languages from non-discourse-oriented languages. Simply put, a non-discourse-oriented language like English does not allow a free OP within a root sentence, while a discourse-oriented language like Chinese does.[14]

This way of looking at the facts of (101b) and (105) seems to me to be on the right track. If so, then we can even say that the empty category in (100) is also a wh trace bound to a free OP (the real topic of a discourse need not be linguistically present; it may be deictically determined). Also, the empty category in (95d), (96d) and (97a) may be so treated when it is interpreted as referring to something outside of its root sentence. What we are left with that must be accounted for is the empty category in (95d), (96d), (97a) when it refers to the matrix subject, as well as the empty category in (98a), which must refer to the matrix subject.[15]

Let us now concentrate on just this case. For convenience, let us take another example here:

(107) Zhangsan$_i$ shuo [[e]$_i$ xiawu meiyou kong]
say afternoon no leisure
'Zhangsan said that the has no time this afternoon.'

Is the [e]$_i$ a PRO? If yes, we are back to the same position, facing a contradiction presented by the binding theory. There is a possible way to get out of this situation, but it is not very attractive. We may stipulate that the INFL of a finite clause in Chinese is an optional governor, and if we assume the ECP, an optional proper governor. That is, when the subject position of a finite clause in Chinese contains a trace or a lexical NP, the INFL will properly govern it, but when PRO appears there, INFL will not. Besides the obvious stipulative nature of this solution, note that the notion of optionality employed here is a different one from what is usually assumed. Generally, optionality refers to the application of a rule or the optional presence of an element in the structural description of a rule or a condition. However, in our situation we are not talking about the optional presence of a governor, but the "optional" ability of an element to govern or not to govern. Government, in this case, seems to be taken to refer here to a process, not a configuration, but the latter seems to be the usual notion of government. Furthermore, note that if the subject position of a finite clause in Chinese is taken to be optionally governed, then it is possible to obtain the effects of wh movement without actually moving elements, thereby

violating Subjacency, if the typology of an empty category is locally determined as proposed in Chapter 6 of Chomsky (1981a) (cf. also Chapter 6 below). In particular, suppose that, regardless of its derivational history, an empty category is PRO (or pro) if and only if it is free or locally bound to an element with an independent thematic role, and a trace if and only if it is bound to a non-thematic position. Consider the sentence:

(108) Lisi_i, Zhangsan shuo $[[e]_i$ xiawu meiyou kong]
say afternoon no leisure
'Lisi_i, Zhangsan said t_i has no time this afternoon.'

Whether $[e]_i$ is base-generated at DS (a PRO), or originates as Lisi plus [+wh] (cf. Chomsky 1977), at the level where it is coindexed with the topic (or an abstract OP in COMP to be coindexed with the topic), either at SS or LF, it is automatically identified as a wh trace or variable, not a PRO. Consider now (109a) and (109b):

(109) a. Lisi_i, ta_i shuo $[[e]_i$ xiawu meiyou kong]
say afternoon no leisure
'Lisi_i, he_i said he_i has no time this afternoon.'

b. Lisi_i, ta_j shuo $[[e]_i$ xiawu meiyou kong]
say afternoon no leisure
'Lisi_i, he_j said t_i has no time this afternoon.'

In (109a), the empty category is locally A-bound by the matrix subject, which is in turn coindexed with the topic. It is therefore a PRO. In (109b), the empty category is locally bound to the topic; therefore it is a wh trace. If we assume that the subject of a finite clause is a position of optional government, this has the result that the empty category may be generated in any way, with

or without movement. At the time it is identified as PRO it will be ungoverned and if identified as a trace it will be properly governed. Note that if the empty category in (109a) has been generated by movement, it will have involved a case of "strong crossover". The fact that the sentence is grammatical thus may be taken as support for the view that empty categories are functionally and locally determined as well as for the optionality of government in finite clause subject position. By contrast, note that "strong crossover" involving a trace in embedded object position is always ill-formed, as the sentence below shows.

(110) *Lisi$_i$, ta$_i$ shuo wo kanjian-le [e]$_i$.
he say I see-ASP
'*Lisi$_i$, he$_i$ said that I saw t$_i$.'

This is ruled out because, as in English, the object position in Chinese is obligatorily governed.

Having shown that the assumption involving optionality of government has some possible merit, I would like to show now that the merit does not exist. Plainly, if the subject position is optionally governed, then one may expect to find free violations of Subjacency just in case an empty element is base generated in the subject position of a clause within an island but gets co-indexed with an element in non-thematic position. This prediction is false.

(111) *Lisi$_i$, wo xihuan [$_{np}$[$_s$[e]$_i$ mai] de shu]
I like buy DE book
'*Lisi$_i$ I like the book that t$_i$ bought.'

(112) *Lisi$_i$, wo zhidao [$_{np}$[$_s$[e]$_i$ da-le Zhangsan] de shiqing] le.
I know hit-ASP DE matter ASP
'*Lisi$_i$, I have known about the fact that t_i hit Zhangsan.'

If the subject of the relative clause in (111) and the subject of the noun phrase complement clause in (112) are optionally governed only, then the empty category they contain may be generated at DS as PRO, where it is ungoverned, and when it is coindexed with the topic Lisi it will be identified as trace, and gets properly governed. Since no movement is involved, Subjacency cannot rule out (111) and (112) and the like. It would be necessary, then, within the optionality assumption, to envoke a principle that says that an optionally governed position is always governed once it is governed at DS and always ungoverned if ungoverned at DS, or to construe government as a process of, say, assignment of "government indices" which would be preserved throughout derivations. In either case, the ad hocity is obvious.

Another solution that might be suggested to deal with the empty category in (107) and the like is to assume that the [e]$_i$ is actually a lexical pronoun at every level of representation where the binding theory is relevant, at least at SS, but that at PF it is a zero. That is, there is a pronoun deletion rule operating in PF which eliminates the NP node dominating [e]$_i$ in its entirety under appropriate conditions. While such a deletion rule is not a priori impossible, its ad hoc nature is again obvious, especially in view of the fact that certain deletion rules in PF have been

argued to be dispensable in recent works (e.g., Chomsky, 1981a, Aoun 1979) under a notion of "visibility". In the absence of independent motivation, such a deletion process is highly suspect.

5.4.2. The Pro-Drop Principle

I would like to take the position that the empty category in (107), as well as that in (95d), (96d), (97a) and (98a) when interpreted as bound to the matrix subject, is a small pro, and claim, in effect, that Chinese is a pro-drop language. I will assume that the requirement that a pro must be identified in context does not require it to be identified only by INFL in a given language. Rather, I assume that the requirement takes the following form:

(113) The Pro-drop Principle

A pro must be identified by its closest SUBJECT.

SUBJECT, again, is the "most prominent nominal element" of a given domain, as originally defined by Chomsky. That is, it is the subject or AGR of a finite S, the AGR of a finite $\overline{S}$, or the head N of a noun phrase. Since I allow the identifying element for a pro to be either AGR or an ordinary subject, I claim that Taraldsen's generalization that only heavily inflected languages allow pro drop tells only part of the story. Let us first see how the principle gives us the desired results.

Take Italian first. Since the language has subject-verb agreement in a finite clause, the minimal SUBJECT above a subject

is the AGR contained in its INFL. In accordance with (23), the AGR is coindexed with the subject. According to (113), if the subject occurs in the form of a pro, it must be identified by the coindexed AGR. Since the AGR is sufficiently rich in this language to identify its content, pro is allowed.

Consider now English. Again, the minimal SUBJECT above a subject in any finite clause is the AGR of the clause immediately containing the subject. (113) therefore requires the AGR to identify the subject in case the latter is a pro. However, the AGR in English is not sufficiently rich to identify its content. Therefore, no pro may occur in English.

On the other hand, consider now Chinese. Since the INFL of a Chinese finite clause does not contain AGR, the minimal SUBJECT above the subject of an embedded clause is the subject of the immediately superordinate clause. Therefore a pro can occur in the position of the subordinate clause subject just in case it is co-indexed with (and hence identified by) the superordinate clause subject. This immediately gives us (107) and all of (95d), (96d), (97a) and (98a), under the interpretation according to which the [e] is anaphoric to the matrix subject.

Our account thus says that the pro drop phenomenon may happen in one of two types of languages. Either a language with a very rich agreement system, or a language without agreement at all. On

the other hand, a language with a rather meager system of agreement, such as English, does not allow pro drop.[16]

According to this view, we simply assume that the INFL of a Chinese finite clause is an (obligatory) governor, and that its subject is always governed. Thus we are free from the difficulties just noted concerning the optionality of government. In fact, we may even say that INFL in Chinese is a proper governor, since it is in some real sense truly lexical. What is dominated by INFL in Chinese is often true lexical categories, like you 'have' (the perfective aspect), zai 'at' (the progressive), hui 'will', etc. All of these elements occur preverbally as independent lexical categories, not as affixes. Most of the aspect markers in Chinese are also derived historically from lexical categories, though they are now only suffixes. Furthermore, most INFL elements also can occur as independent verbs. For example, the same written word for le can be a verb meaning 'to finish' (pronounced liao). The experiential aspect of guo in laiguo 'to have come' can be a verb meaning 'to pass.' The progressive aspect 'zhe' in zuozhe 'sitting' can be an adjective or stative verb meaning 'attained' (pronounced zhao). By contrast, the suffixes -s, -ed, -ing, etc., cannot be used as independent lexical items. Therefore, the INFL in Chinese has much more lexical content to it than the INFL in English. It is thus natural that INFL in Chinese can be a proper governor but

not the INFL in English. This has the consequence that all subject traces in Chinese are properly governed from within a finite clause. There is then no subject/object asymmetry under movement. In Chapter 6, we show this to be the case. The fact that the lexical nature of a Chinese INFL corresponds to proper government appears to lend some support to the formulation of the ECP, whose definition refers crucially to the notion of "lexical government."

We continue to assume that when an empty NP occurs free in a sentence but with a definite reference fixed outside of the root sentence, it is a wh trace. Such an empty NP cannot be pro because there is nothing with which it is coindexed that can identify it.

As before, the subject of an infinitival clause must be filled by PRO, not pro, since only pro can be governed.

As a pronominal non-anaphor, pro is free in its governing category (the finite clause in which it is the subject) and bound in the next higher clause to the superordinate clause subject. Therefore, all the sentences containing pro we have seen satisfy the binding theory, in particular the condition (1b).

A question may arise now as to why a pro cannot occur in an object position as we have seen. As formulated in (113), the condition on pro does allow it to occur in object position. However, such a pro will be ruled out by the binding theory, in particular

(1b). Since the minimal SUBJECT above an object is its subject, (113) requires that an object pro be identified by the subject of its own clause. But (1b) requires that a pronominal be free in its minimal governing category, which is the clause containing the subject. An object pro will then lead to a contradiction, and, again by reductio ad absurdium, there can be no object pro in Chinese. The same applies to English and Italian. The only language that allows an object pro will be one with object-verb agreement, or with object clitics, in which case the object AGR or clitic will be its SUBJECT and identifier (cf. Chomsky 1981b).

Under our assumption of (113), we also rule out pro's in NPs:

(114) *John saw [pro's trees].

(115) *Zhangsan kanjian-le [pro de shu] le.
see-ASP DE tree ASP
'*Zhangsan saw pro's trees.'

This is because the minimal SUBJECT of such a pro is the head noun of the NP. But the head noun cannot be its identifier, since coindexing the two of them will result in $*[_i \ldots i \ldots]$, a case of referential circularity, on a part with (116):

(116) *I saw $[[\text{her own}]_i \text{ friend}]_i$.

Finally, our theory also makes an interesting prediction concerning the status of an empty subject within a sentential subject. Consider the following examples:[17]

(117) $[_S[_S$[e] xiyan] youhai]
smoke harmful
'Smoking is harmful.'

(118) $[_S[_S$[e]$_i$ xiyan] ba Zhangsan$_i$ hai can le.
smoke BA victimize grevious ASP
'Smoking brought Zhangsan a miserable disaster.'

Our theory predicts that the [e] in each of (117) and (118) is a PRO and not a pro, nor a wh trace. It cannot be a wh trace, since if it were a wh trace it would have to be bound by an abstract OP in the root clause. The movement that results in its status as a wh trace is blocked, however, by Subjacency (cf. footnote 14 and Chapter 6). This prediction is correct:

(119) *Zhangsan$_i$, $[_S[_S$ t$_i$ xiyan] youhai]
smoke harmful
'*Zhangsan$_i$, that t$_i$ smokes is harmful.'

(120) Q: ni ren-bu-renshi Zhangsan$_i$?
you know-not-know
'Do you know Zhangsna?'

A: wo renshi [e]$_i$. *[[e]$_i$ xiyan] youhai.
I know smoke harmful
'I know [him]. That [he] smokes is harmful.'

The relevant point here is that [e] in (117) and (118) also cannot be pro. This is because there is no available identifier for it in these sentences. In particular, if sentential subjects are not considered to be dominated by NP nodes, then a pro in the subject position of a sentential subject in Chinese has no SUBJECT above it. If sentential subjects are considered to be dominated by NP, the only potential identifier of the pro will be this dominating NP. But again this NP cannot be its identifier due to the well-

formedness condition *[$_i$ ... i ...].

Is this prediction borne out? I think it is. First of all, note that the [e] in (116) has arbitrary reference, not definite reference. It is a generic sentence on a par with "Smoking is harmful" in English. Although in (118) the [e] is bound to Zhangsan, this is consistent with its being a PRO, a controlled PRO. Secondly, note that the sentential subjects cannot contain elements that make them finite. The following sentences are ill-formed:

(121) *[[[e] xi-le yan] youhai]
inhale-ASP tobacco harmful
'*That [e] has inhaled tobacco is harmful.'

(122) *[[[e]$_i$ xi-le yan] ba Zhangsan$_i$ hai can le.
inhale-ASP tobacco BA victimize grevious ASP
'*That [e]$_i$ has smoked has brought Zhangsan a miserable disaster.'

One cannot claim that sentential subjects in Chinese cannot be finite at all, for the following sentences, whose sentential subjects contain lexical subjects, are finite:

(123) [[Lisi xiyan] ba wo hai can le.
smoke BA I victimize grevious ASP
'That Lisi smokes/smoked has brought me a miserable disaster.'

(124) [[Lisi xi-le yan] ba wo hai can le.
inhale-ASP tobacco BA I victimize grevious ASP.
'That Lisi has smoked has brought me a miserable disaster.'

The contrast between (122) and (124) clearly shows that a finite

sentential subject is possible, only that it cannot contain an empty subject, if finite. Although there is no overt marker of finiteness in the sentential subject in (123), it is still possible to claim that it is finite here, since there is no special marker for the habitual simple past or simple present:

(125) Lisi (changchang) xiyan.
Lisi (often) smoke
'Lisi (often) smokes/smoked.'

In other words, while a non-finite clause may not be marked for finiteness, a finite clause need not be marked for finiteness. In short, the ill-formedness of (121)-(122) follows from our theory, in the following way. It cannot be a pro, because it has no qualified identifier. It cannot be a wh trace, as (119)-(120) shows. It also cannot be an NP-trace, because it is not locally A-bound, in violation of (1a). Finally, it also cannot be PRO, since its clause is finite, and it is governed. All possibilities are excluded. Again, note that we have another piece of evidence against the hypothesis that the subject position of a finite clause is optionally governed. If this were the case, (121) and (122) would be grammatical with the [e] being ungoverned PRO.

Another piece of evidence for our theory may be derived from an interesting contrast between sentences with sentential subjects and those with adverbial clauses. Consider the following:

(126) Zhangsan$_i$ suiran meiyou kong, [e]$_i$ haishi lai-le.
though no time still come-ASP
'Though Zhangsan$_i$ had no time, [he]$_i$ came nevertheless.'

(127) $[e]_i$ suiran meiyou kong, Zhangsan$_i$ haishi lai-le.
though no time still come-ASP
'Though $[he]_j$ had no time, Zhangsan$_i$ came nevertheless.'

The [e] in each of (126) and (127) is not a trace, since its antecedent Zhangsan occurs in a thematic position. Therefore, it is a pronominal. It is not a PRO, furthermore, because its position can be lexically filled in (127), and conversely.) Furthermore, the perfective -le in both shows the finiteness of the clause in which it occurs. Therefore, the [e] in question is a pro. Consider (127) first. The pro in the adverbial clause is coindexed with the subject of the matrix clause. The matrix subject is the minimal SUBJECT above the [e], although it does not c-command it. Coindexing the [e] and Zhangsan also does not result in an $[_i \ldots i \ldots]$ configuration. This is the crucial difference between (127) and (121). In the latter there is simply no SUBJECT or the only SUBJECT does not qualify as an identifier because of $*[_i \ldots i \ldots]$. It seems that a pro, like a lexical pronoun or a PRO, does not have to be strictly c-commanded by its antecedent or identifier, though unlike a lexical pronoun, it does search for an identifier, a kind of antecedent (though AGR is not an antecedent in the strict sense). Therefore, we can reasonably assume that the identifier of a pro need only "weakly c-command" the pro, where A "weakly c-commands" B if and only if the node immediately dominating A c-commands B. This accounts for the difference between (121) and (127) immediately. The difference between (121)

and (126) also follows, since in (126) the identifier is the subject of the adverbial clause which does c-command the [e] in the matrix subject position. On the other hand, the difference between (122) and (126)-(127) can be assumed to be due to the fact that in (122) the identifier Zhangsan$_i$ is located within the PP ba Zhangsan. It therefore neither c-commands nor weakly c-commands the [e]. That the identifier of a pro needs to be sufficiently close to the pro by at least weakly c-commanding it is supported independently by the following sentences:

(128) suiran Zhangsan$_i$ meiyou kong, ta$_i$ haishi lai-le.
though no time still come-ASP
'Though Zhangsan$_i$ had no time, he came nevertheless.'

(129) *suiran Zhangsan$_i$ meiyou kong, [e]$_i$ haishi lai-le.
though no time still come-ASP
'Though Zhangsan$_i$ had no time, he$_i$ came nevertheless.'

(129) differs from (126) only in that in (129) suiran 'though' occurs to the left of Zhangsan but in (126) the latter precedes the former. In (126) Zhangsan "weakly c-commands" the [e] which it identifies, but in (129) it does not, since it is not immediately dominated by the top node of the adverbial clause. This difference directly gives rise to the ill-formedness of (129). (128), on the other hand, is well-formed because we have a lexical pronoun, not a pro.

Before we end this section, let us make the observation that although the occurrence of a PRO in a non-finite clause is obligatory, the occurrence of pro is often optional. We have seen this to be the case with (95d) and (96d), since the position of pro in each of them

can be replaced by a proximate lexical pronoun, as is shown by (95a) and (96a). The same also applies to (97a), whose pro may be replaced by 'he':

(130) Zhangsan$_i$ shuo [ta$_i$ mingtian buneng lai-le]
say he tomorrow cannot come-ASP
'Zhangsan$_i$ said that he$_i$ cannot come tomorrow.'

The same can be observed with the pro in (126), which may be replaced by 'he':

(131) Zhangsan$_i$ suiran meiyou kong, ta$_i$ haishi lai-le.
though no time he still come-ASP
'Though Zhangsan$_i$ had no time, he$_i$ came nevertheless.'

Notice, however, that the pro in the resultative clause of (98a) may not be replaced by 'he':

(132) *Zhangsan$_i$ ku [de ta$_i$ hen shangxin]
cry DE he very sad
'Zhangsan cried so much as to make himself very sad.'

The sentence (132) is well-formed only if it means that Zhangsan cried so much as to make someone else very sad. This suggests that some principle of "economy," akin to the "Avoid Pronoun" principle of Chomsky (1981a) or the rule of "obviation" proposed in Hale (1978) for Irish or in Jeane (1978) for Hopi, may be involved here. Intuitively, when the antecedent of a pronoun is "too close" to the antecedent, and when pro is a possible alternative to the pronoun, avoid the use of the pronoun. The relevant difference between (95d), (96d), (97a) on the one hand and (98a), (132) on the other, is that the former involve an object complement clause, while the latter involve a resultative clause. The former involves what Mei (1972, 1978) calls a "verb complement" dominated by $\bar{V}$ and the latter involves what he calls a "verb

phrase complement" dominated by $\bar{\bar{V}}$. One might plausibly assume that it is this latter fact that rules out (132), where the 'he' is one step closer to its intended antecedent than the 'he' in (95d), (96d), etc.[18] However, I am not able at this stage to formulate a precise principle that guarantees when the "Avoid Pronoun" principle has to apply. There are other sentences which seem also to suggest the same principle, such as (133) - (134):

(133) *Zhangsan$_i$ yi jin men, ta$_i$ jiu fangsheng da ku.
once enter door he then let-voice big cry
'As soon as Zhangsan$_i$ entered, he$_i$ burst into a loud cry.'

(134) Zhangsan$_i$ yi jin men, pro$_i$ jiu fangsheng da ku.
once enter door then let-voice big cry
'As soon as Zhangsan$_i$ entered, he$_i$ burst into a loud cry.'

Again, (133) is well-formed only if interpreted as saying that when Zhangsan stepped in, someone else started to cry. There is certainly nothing pragmatically implausible about the situation described by (133) with the intended anaphoric relation indicated, as is evidenced by the well-formedness of (134). The contrast between (133) and (134), it seems, involves the same principle of avoiding the use of a lexical pronoun. Note, however, that the sentence (133) is completely on a par with the well-formed (131). (133) involves the correlative yi...jiu 'as soon as...then,' and (131) involves the correlative suiran...haishi 'though...nevertheless.' There seems to be no reason at all to give these two sentences two types of structural analysis. Nor is there any obvious factor that distinguishes between the two. I do not have the slightest idea of what is going on here and must therefore leave the problem, though I suspect that one will have to attribute it to purely

idiosyncratic lexical properties.

In summary, we have seen that the distribution of PRO in Chinese is completely in line with the binding theory assumed and modified here. The existence of an apparent object PRO follows from a parametric difference between discourse-oriented and non-discourse-oriented languages. The occurrence of the "pro-drop phenomenon" is governed by the principle (113) (perhaps with the requirement tha the identifier of a pro (at least) weakly c-commands the pro). There seems to be a principle of economy avoiding the use of lexical pronouns, though the exact formulation of this principle must await further work.[19]

5.5. On the Non-Coreference Rule

5.5.1. Coreference and Referential Dependency

Our discussion of the binding theory has been centered upon anaphor binding and pronominal disjoint reference, which we assume to fall under (1a) and (1b) in conjunction with the definition for a governing category given in (53). Now we turn to the non-coreference rule (1c), repeated below:

(1) c. An R-expression is free.

An R-expression is an NP that is neither pronominal nor anaphoric in nature. Thus lexical noun phrases like John, those women, the boy you saw yesterday, etc., are R-expressions. (1c) says that such expressions cannot be c-commanded by co-indexed NPs occurring in argument position. This has the effect of ruling out (7a) and (7b) in English and (10a) and (10b) in Chinese. In Chomsky (1981a), R-expressions are also assumed

to include wh traces. This allows (1c) to rule out all the other sentences in (7) and (10), each with a wh trace A-bound.

In each of the sentences in (7) and (10), the violating A-binder of an R-expression is a pronoun. As formulated, the principle is also intended to rule out sentences in which an R-expression is A-bound by another R-expression, such as the ones below:

(135) *John likes John.

(136) *John loves John's mother.

(137) *John thinks that I like John.

Or their counterparts in Chinese:

(138) *Zhangsan xihuan Zhangsan.
like
'*Zhangsan likes Zhangsan.'

(139) *Zhangsan xihuan Zhangsan de mama.
like DE mother
'*Zhangsan likes Zhangsan's mother.'

(140) *Zhangsan renwei wo xihuan Zhangsan.
think I like
'*Zhangsan thinks I like Zhangsan.'

On the other hand, the principle is intended to allow sentences like the following, in which neither of two coindexed R-expressions c-command the other:

(141) ?John's$_i$ mother loves John$_i$.

(142) ??Before you met John$_i$, I had known John$_i$ for some time.

(143) ?ruguo Zhangsan$_i$ xian lai, wo jiu ba shu gei Zhangsan$_i$.
if first come I then BA book give
'?If Zhangsan comes first, I will give the book to Zhangsan.'

There are a number of problems associated with the principle (1c), however. For one thing, many speakers do not reject the sentences

(135) - (140) as outright ill-formed on a par with sentences violating (1a) or (1b). See, for example, Evans (1980). Moreover, as a paraphrase to the sentence "Everybody likes himself," one can utter the perfectly grammatical (144):

(144) John likes John, Bill likes Bill, Mary likes Mary.

Or, as a reply to the multiple question "Who loves whose mother," one may say (145):

(145) John loves John's mother, Bill loves Bill's mother, etc.

In both (144) and (145), the first occurrence of John, Bill, Mary c-commands the second occurrence. By contrast, the sentence "*John$_i$ loves him$_i$" is just outright unacceptable. Furthermore, as a way to clarify the reference of he in (146), one can utter (147) in violation of (1c), but not (148) in violation of (1a):

(146) John told Bill that he will come.

(147) John told Bill that John will come.

(148) *John told Bill that himself will come.

It is true that violation of (1c) is fully permitted only in situations of the sort just described, and that emphatic stress is often required on the second occurrence of John, Bill, Mary in (144), (145), and (147). However, it remains true that while violation of (1c) is possible under such circumstances, violation of (1a) and (1b) is never possible.

Secondly, note that even the sentences (141) - (143) are not entirely natural, though they do not violate (1c). Chomsky (1976) has indicated that sentences like (149) are unnatural, not because of any grammatical principle but because of a pragmatic principle that tells one to avoid

repeating a name in a position "too close" to a coreferential name:

(149) ??John is here. Will John shoot?

But the pragmatic principle of avoiding repetition does not apply in situations where clarity is needed:

(150) John and Bill are here. Will John shoot?

It seems that the status of (141) - (143) is on a par with (149). Since, as just mentioned, (135) - (140) are not outright ill-formed for many speakers, they are probably better marked as "?*", namely treated as just one step less natural than (141) - (143). It is plausible to consider that one aspect of the "closeness" of two NPs in a given string has to do with whether or not they hold a relationship of c-command. Suppose we say that when two terms A and B hold a relationship of c-command, they are closer to each other than when they hold no such relationship (cf. Chomsky, 1980a, appendix; Rosenbaum, 1967). Then the relative unnaturalness of (135) - (140) over (141) - (143) may follow from the same principle of avoiding repetition. And again, where clarity is called for, as in (144), (145), and (147), that principle does not apply. Therefore, the difference between (135) - (140) and (144), (145), (147) is completely on a par with the difference between (149) and (150). There is, then, no reason to invoke a principle in the form of (1c) to rule out (135) - (140), but allow (141) - (143) and (149).

But if we dispense with (1c), how does one rule out the sentences in (7) and (10), in particular (7a-b), (10a-b)? One might propose that although R-expressions may be A-bound by other R-expressions,

they cannot be A-bound by pronouns. But even this is not correct. Evans (1980) has given the following example, where the second occurrence of John is c-commanded by the coindexed he:

(150) What do you mean John loves no one? He_i loves $John_i$.

Observations concerning sentences of the sort we have just discussed require I think, a re-interpretation, along the lines argued for in Evans' (1980) paper, of what the binding theory is supposed to mean. The standard interpretation of the binding theory is usually that when two terms are coindexed, they are interpreted as coreferential, or are intended to be coreferential. This interpretation, however, is not adequate to both rule out (7) and (10) and also rule in the sentences we have just discussed, including (151). In (151), he_i and the c-commanded $John_i$ are not only interpreted as coreferential; they are also intended by the speaker to be coreferential. So are the coindexed pairs of R-expressions in the examples (135) - (140), etc. As Evans argues, the relevant notion that a grammatical theory needs is not coreference, but the notion of referential dependency. Although the two occurrences of John, Bill, Mary, in (135) - (140), etc. are coreferential, neither of them is interpreted as necessarily taking the other as its antecedent in the sense that it has to pick up its reference from it. Since John, for example, is referentially independent, it may simply be the case that both occurrences of John refer independently to the same person P in the real world. Similarly, in the sentence (15a) neither he_i nor $John_i$ need to be referentially dependent on the other. $John_i$ in the second sentence is referentially independent, as before, referring to

some P in the real world. $\underline{He}_i$, on the other hand, may be referentially dependent, but not necessarily on the $\underline{John}_i$ that it c-commands; rather, it may pick up its reference from the first occurrence of John in the preceding sentence, which again may independently refer to the same P in the real world. Therefore $\underline{he}_i$ and $\underline{John}_i$ may be coreferential without either being referentially dependent on the other. Now, consider sentences like (7a-b) and (10a-b), or (152), when uttered out of context:

(152) *He_i saw $John_i$.

As is well known, a pronoun may be used deictically, i.e., without a linguistic antecedent. In "He came," the speaker may refer to some person that he points to, for example, whose name need not appear in linguistic contexts. When a name coreferential with the pronoun appears in linguistic context, however, the usual interpretation is that the pronoun picks up its reference from that name. In other words, when a linguistic antecedent is available, one does not go further out of the linguistic context to identify a non-linguistic antecedent to fix its reference. Thus, in both (151) and (152) he is interpreted to have a linguistic antecedent from which it picks up its reference. The only difference is that in (151) he need not pick up its reference from the John that it c-commands, while in(152) it must, since that is the only occurrence of John there is. It appears, then, that the most plausible formulation of the non-coreference rule should take the form (153):

(153) The Principle of Referential Dependency

A referential dependent may not c-command its antecedent.

This is, of course, a generalization of Reinhart's (1976) pronoun rule, which prohibits a pronoun from c-commanding its antecedent. The difference here is that "antecedent" is now understood to mean the term upon which another term referentially depends. Furthermore, we have used the general term "referential dependent" to include not only pronouns, but also other categories which may or must have antecedents: anaphors, PROs, pro's. This more general formulation is clearly desirable though it is vacuous in the case of anaphors:[20]

(154) *Each other$_i$ said that the men$_i$ would come.

(155) *PRO$_i$ to meet the man$_i$ was a pleasure.

(156) *pro$_i$ shuo Zhangsan$_i$ mingtian lai.
say tomorrow come
'*pro$_i$ said Zhangsan$_i$ will come tomorrow.'

The principle (153) is only slightly different from that already given in Evans (1980)[21]. See also Higginbotham (forthcoming) and Bach and Partee (1980). This will then rule out (7a-b), (10a-b), and (152), while admitting all the sentences in (135) - (140), (141) - (143), (144) - (145) and (147), as well as (149) - (151). In the latter sentences no necessary referential dependency is involved; therefore, no rule will rule them out, if we eliminate the condition (1c) from the theory of grammar. This leaves the sentences (7c-f) and (10c-f) still to be accounted for, those sentences that involve what is called strong crossover, each with a pronoun c-commanding a coindexed wh trace. Below are some more examples:

(157) *John$_i$, he$_i$ saw t_i.

(158) *John$_i$, he$_i$ said that I saw t_i.

Chomsky's original formulation of (1c) assumes that wh traces are R-expressions on a par with names, in order to rule out sentences like (157) - (158) on a par with sentences like (152) and (159):

(159) *He$_i$ said that I saw John$_i$.

However, wh-traces are not R-expressions in every true sense, since, unlike true R-expressions, they have to be $\bar{A}$-bound, i.e., bound to COMP positions, though not A-bound. In this sense, they are also a kind of anaphor. Furthermore, since we now re-interpret the binding theory in terms of referential dependency, the assumption that wh traces are R-expressions will no longer serve the purpose that it is intended to serve, i.e., to rule out (7c-f), (10c-f), and (157) - (158). In (158), for example, John$_i$, he$_i$ and t$_i$ are coindexed. The principle (153) prohibits he$_i$ from picking up its reference from t$_i$, which it c-commands. The assumption that t$_i$ is an R-expression will prohibit t$_i$ from picking its reference from he$_i$. As a semi-referential expression, it must be allowed to pick up its reference from its $\bar{A}$-binder, the topic John$_i$. (A true R-expression cannot even be $\bar{A}$-bound.) However, there is nothing that prevents he$_i$ from picking up its reference from the topic John$_i$. Such a situation must clearly be allowed for any constructions using the resumptive pronoun strategy:

(160) John$_i$, I like him$_i$.

Therefore, he$_i$ in (158) need not referentially depend upon t$_i$. No known principle of grammar need be violated by (158). The assumption that wh traces are R-expressions thus fails to rule out sentences involving strong crossover.

There is a natural way to rule out strong crossover without the assumption that wh traces are R-expressions, however. According to Chomsky (1981b) and Chapter 6 of Chomsky (1981a), the typology of empty categories is locally determined. An empty category that is locally bound is a pronominal (PRO or pro) (cf. Chapter 6 below). As observed by D. Sportiche, cases involving strong crossover are, under this conception, simply ruled out by independent principles regarding cases involving illegitimate PROs or pro's. Take (157) and (158) for example, t_i is locally bound to he_i, which has its own thematic role.[22] Therefore, what is indicated as t_i is in fact not a trace, but a pronominal, PRO or pro. It cannot be a PRO, because it is governed. In (158), it also cannot be a pro, since the pro-drop principle (113) requires that a pro be identified with its closest SUBJECT, I in this case, but it is not coindexed with I. In (157) the empty category can be a pro, since it is coindexed with its closest SUBJECT, but (157) is independently ruled out by (1b), with a pro, a pronominal, not free in its governing category. Similarly, the sentence is also ruled out:

(161) *$John_i$, he_i said $[e]_i$ will come tomorrow.

The embedded [e] cannot be a trace, because it is locally θ-bound. Therefore, it must be either PRO or pro. It cannot be PRO, because it is governed, by INFL. Also it cannot be pro, because it is not identified with its closest SUBJECT, the embedded AGR. All possibilities are excluded, hence the ill-formedness of (161). On the other hand, as we have indicated in the above section, Chinese allows some cases of strong crossover. In particular, strong crossover configurations

are acceptable just in case the empty category left by wh movement occurs in the subject position of a finite clause and is coindexed with the immediate superordinate clause subject:

(162) Zhangsan$_i$, ta$_i$ shuo [$_s$[e]$_i$ xiawu meiyou kong]
he$_i$ say afternoon no time
'Zhangsan$_i$, he$_i$ said [he$_i$] had no time this afternoon.'

This is because, although the [e] cannot be a trace (being θ-bound) nor a PRO (being governed), it can be a legitimate pro, since its local binder is its closest SUBJECT, there being no AGR in the embedded clause. In all other situations, strong crossover configurations are ruled out:

(163) *Zhangsan$_i$, ta$_i$ shuo [wo renshi [e]$_i$]
he$_i$ say I know
'*Zhangsan$_i$, he$_i$ said that I know [e]$_i$].'

(164) *Zhangsan$_i$, ta$_i$ yiwei [$_s$ wo shuo [$_s$ [e]$_i$ xiawu meiyou
he$_i$ think I say afternoon no

kong]]
time

'*Zhangsan$_i$, he$_i$ thinks I said [e]$_i$ had no time this afternoon.'

(165) *Zhangsan$_i$, ta$_i$ shuo [$_s$[$_{np}$[$_s$[e]$_i$ renshi t$_j$] de ren$_j$] lai-le].
he$_i$ say know DE man$_j$ come-ASP
'*Zhangsan$_i$, he$_i$ said that the man$_j$ that [e] knows t$_j$ has come.'

(163) is out, as before, since [e]$_i$ is not identified by its closest SUBJECT, I. (164) is also out, because it is identified with the subject of a non-immediately superordinate clause. In (165), the [e]$_i$ occurs in the subject position of a relative clause. As a pro, it has to be identified by its closest SUBJECT, which in this case would be the head of the relative clause, man, the most prominent nominal element within

the relativized construction. Since it is not so identified, the sentence is ruled out.[23]

The view about the binding theory that we have adopted here entails a directionality on the anaphoric relations between two terms. This is reminiscent of the traditional transformational view of pronominalization, as represented in, say, Langacker (1969), Ross (1967, 1969). This directional view is explicitly represented in Higginbotham's (forthcoming) work, where instead of the transformational rule "Pronominalize NP A on the basis of NP B," he proposes the interpretive rule "Link X to Y," whose output has the form (166):

(166) *He saw John.

If X is linked to Y, then X is interpreted as dependent on Y, and Y is the antecedent of X. Therefore, to rule out a sentence like (166), it will be necessary to rule out both directions of referential dependency. In particular, John cannot be linked to he because John is referentially independent and cannot have an antecedent. He cannot be linked to John because of (153). Higginbotham gives further arguments for adopting this linking mechanism on the basis of plural bound pronouns with split quantificational antecedents, and I think that his theory is on the right track, although there are also problems that have yet to be solved that arise under this theory.[24] While accepting this directional view, I will, however, continue to use the standard coindexing mechanism for expository purposes, avoiding the more cumbersome linking representations. Now let us turn to Chinese data and examine the adequacy of (153) as applied to this language.

5.5.2. Pronoun Anaphora in Chinese

Our examples (10a) and (10b) already show that something like (153) is necessary also for Chinese. But is this a sufficient condition? That is, is it always possible that if a pronoun does not c-command an NP, the NP may be taken as the antecedent of the pronoun? In English, this seems to be the case, as argued in Lasnik (1976), Reinhart (1976):

(167) His_i mother saw John_i.

(168) When he_i came in, John_i was very tired.

When we turn to Chinese, it turns out that failure of a pronoun to c-command an NP is no sufficient condition for the latter to be the antecedent of the former. Consider the following sentences:

(169) a. *[ta_i de mama] xihuan Zhangsan_i.
he DE mother like
'His_i mother likes Zhangsan_i.'

b. [Zhangsan_i de mama] xihuan ta_i.
DE mother like he
'Zhangsan's_i mother likes him_i.'

(170) a. *[[da-le ta_i de] neige ren] dui Zhangsan_i hen bu
hit-ASP he DE that man to very not
keqi.
polite
'The man that hit him_i was very impolite to Zhangsan_i.'

b. [[da-le Zhangsan_i de] neige ren] dui ta_i hen bu
hit-ASP DE that man to he_i very not
keqi.
polite
'The man that hit Zhangsan_i was very impolite to him_i.'

(171) a. *[ta$_i$ neng-bu-neng lai] dui Zhangsan$_i$ mei guanxi.
he$_i$ can-not-can come to no matter
'Whether he$_i$ can come or not doesn't matter to Zhangsan$_i$.'

b. [Zhangsan$_i$ neng-bu-neng lai] dui ta$_i$ mei guanxi.
can-not-can come to he$_i$ no matter
'Whether Zhangsan$_i$ can come or not doesn't matter to him$_i$.'

(172) a. *[[wo kanjian ta$_i$ de] shihou], Zhangsan$_i$ zai dazi.
I see he$_i$ DE time at type
'When I saw him$_i$, Zhangsan$_i$ was typing.'

b. [[wo kanjian Zhangsan$_i$ de] shihou], ta$_i$ zai dazi.
I see DE time he$_i$ at type
'When I saw Zhangsan$_i$, he$_i$ was typing.'

(173) a.*[buguan ta$_i$ xi-bu-xihuan], Zhangsan$_i$ dou dei lai.
regardless he$_i$ like-not-like all must come
'Regardless of whether he$_i$ likes it or not, Zhangsan$_i$ has to come.'

b. [buguan Zhangsan$_i$ xi-bu-xihuan], ta$_i$ dou dei lai.
regardless like-not-like he$_i$ all must come
'Regardless of whether Zhangsan$_i$ likes it or not, he$_i$ has to come.'

In each of these sentences, neither the pronoun ta 'he' nor its antecedent Zhangsan c-commands the other. If (153) is to be strengthened to be a biconditional, i.e., if a pronoun may referentially depend upon an NP if and only if it does not c-command the NP, then we should expect all of the sentences to be well-formed. However, each of the (a) sentences is ill-formed, though the (b) sentences are well-formed. On the other hand, note that the English counterparts of these sentences, as indicated in the translations, are all well-formed. This indicates that while failure of a pronoun to c-command an NP may be sufficient for the pronoun to be referentially dependent upon the NP in English, it is not in Chinese.

On their first appearance, the (a) sentences differ from the (b) sentences in that in each of the former the pronoun precedes the antecedent, while in each of the latter the pronoun follows the antecedent. Note also that in the sentences (10a) and (10b), the pronoun also precedes its antecedent. One common analysis of the data, which is similar to the oldest analysis of pronominal anaphora in the generative literature, is to assume that the notion of precedence plays a crucial role here. This idea was proposed in Langacker (1969), Ross (1967, 1969). The idea was to play a crucial role in determining the pronominalizability of an NP in coordinate structures:

(174) a. John$_i$ arrived yesterday, and he$_i$ left today.

b. *He$_i$ arrived yesterday, and John$_i$ left today.

However, other than coordinate sentences, there is little evidence in English that the notion of precedence is important in determining pronominal interpretation. Since conjoined sentences are on a par with two or more independent sentences, the principle that accounts for (174) may be considered a discourse principle, not a principle of sentence grammar. If so, then the only relevant principle of sentence grammar is that of c-command. This is the position of Reinhart (1976). In view of the sentences in Chinese we have just seen, the idea would be to make the notion of precedence a relevant principle in Chinese. The parameter that distinguishes between Chinese and English would then be whether the linear notion of precedence or the hierarchical notion of c-command is relevant. The view that the precedence principle is crucial for Chinese is common among Chinese grammarians, in particular

Tai (1973), for example, and was adopted in my (1979). In Mohanan (1981), it is assumed that the precedence principle is universal, and that some languages, such as English but not Chinese, allow a second possibility involving the hierarchical notion of c-command.

While this view may be correct to a large extent, and is apparently held by many people, there are two basic difficulties with this approach. First, although the (a) sentences of (170) - (173) are ill-formed with a pronoun occurring in a sentential subject or an adverbial clause, they become well-formed if the pronoun is further embedded as the possessive of an NP:

(175) a. [[da-le [ta$_i$ de mama] de] neige ren] dui Zhangsan$_i$
hit-ASP he DE mother DE that man to

hen bu keqi.
very not polite

'The man that hit his$_i$ mother was very impolite to Zhangsan$_i$.'

b. [[ta$_i$ de mama] neng-bu-neng lai] dui Zhangsan$_i$ mei
he DE mother can-not-can come to no

guanxi.
matter

'Whether or not his$_i$ mother can come does not matter to Zhangsan$_i$.'

c. [wo kanjian [ta$_i$ de mama] de shihou], Zhangsan$_i$ zai
I see he DE mother DE time at

dazi.
type

'When I saw his$_i$ mother, Zhangsan$_i$ was typing.'

d. [buguan [ta_i de mama] xi-bu-xihuan], Zhangsan$_i$ dou
regardless he^i DE mother like-not-like all

dei lai.
must come

'Whether his$_i$ mother likes it or not, Zhangsan$_i$ has to come.'

A second set of systematic counterexamples to the precedence hypothesis is offered by relative clauses involving the resumptive pronoun strategy. Since relative clauses precede their heads in Chinese, resumptive pronouns necessarily precede their antecedents.

(176) [[wo sung-le ta_i yiben shu] de neige ren$_i$]
I send-ASP he^i one book DE that man^i
"The man that I gave a book to.'

(177) [[wo ba ta_i da-le yidun de] neige ren$_i$]
I BA he^i hit-ASP once DE that man^i
'The man that I gave a beating to.'

These two problems seem to me to persist also in other languages that superficially do not allow backward pronouns. For example, Mohanan (1981) has indicated that sentences corresponding to those in (175) in Malayalam are also better than those corresponding to (170) - (173). Furthermore, though the superficial ban on backward pronouns is often reported in a lot of SOV languages, the relative clauses of these languages present systematic counterexamples whenever they involve resumptive pronouns. Mamoru Saito (p.c.) has also informed me that in Japanese, the two facts we have just observed in Chinese also obtain. For example, corresponding to the ill-formed (a) sentences in (169) - (173), the following sentences in Japanese are also out:

(178) a. *kare-no hahaoya-ga John-o mita.
he mother saw
'His$_i$ mother saw John$_i$.'

b. *kare-ga kaette kita toki, John-wa tukarete ita.
he returned time was-tired
'When he$_i$ returned, John$_i$ was tired.'

c. *kare-ga okosita ziken-ga John-o noyamaseta.
he caused accident worried
'The accident that he$_i$ caused worried John$_i$.'

However, if the pronoun 'he' in (178b) and (178c) is further embedded as a possessive, the sentences also become well-formed, on a par with (175a-d):

(179) a. kare-no hahaoya-ga kaette kita toki, John-wa tukarete ita.
he mother returned time was-tired
'When his$_i$ mother returned, John$_i$ was tired.'

b. kare-no hahaoya-ga okosita ziken-ga John-o nayamaseta.
he mother caused accident worried
'The accident that his$_i$ mother caused worried John$_i$.'

Furthermore, Japanese also allows resumptive pronouns to occur to the left of their heads:

(180) a. soko kara John-ga yatte kita tokoro.
there from came place
'The place$_i$ that John came from [there$_i$].'

b. kimi-ga watasi-ga kare-o sitte iru to emotta hita.
you I he know know COMP thought person
'The person$_i$ that you thought I know [him$_i$].'

(Sentences like (180a) have been given in Kuno (1973), where it is indicated that 'there' is used as a pronominal form for 'place.' In fact similar constructions also exist in Chinese.)

The contrast between the well-formed sentences in (175) and their counterparts in (170) - (173) shows that the depth of embedding--a hierarchical notion--is relevant. In trying to deal with the contrast,

it will be desirable to have a solution that also accommodates (176) - (177). Suppose we define "cyclic-c-command" in terms of the notions cyclic node and c-command, as follows:

(181) Cyclic-c-command

A cyclic-c-commands B if and only if:

a. A c-commands B, or

b. If C is the minimal cyclic node (NP or $\bar{S}$) that dominates A but is not immediately dominated by another cyclic node, then C c-commands B.

For an illustration of the notion cyclic-c-command, consider the (a) sentences of (169) - (173). In (169a), the pronoun 'he' does not c-command Zhangsan. However, the NP dominating it, i.e., 'his mother' does. Therefore, the pronoun 'he' cyclic-c-commands its antecedent Zhangsan by the definition (181b), with C=NP. Similarly, in (171a) and (173a), the pronoun 'he' does not c-command Zhangsan, but the $\bar{S}$ which dominates the pronoun, i.e., the bracketed sentential subject or adverbial clause, does c-command Zhangsan by (181b), with C=$\bar{S}$. In (170a) and (172a), 'he' also does not c-command Zhangsan. Furthermore, the first $\bar{S}$ dominating 'he' does not c-command Zhangsan either, but since this $\bar{S}$ is immediately dominated by an NP, it does not qualify as the cyclic node C of (181b); rather it is the immediately dominating NP that qualifies. This NP does c-command Zhangsan. Therefore, 'he' also cyclic-c-commands its antecedent in these sentences by (181b), with C=NP.

Consider now the sentences in (175). In all of these sentences, the NP ta de mama 'his mother' is the minimal cyclic node dominating

the pronoun 'he' (in 'his'). This NP is, furthermore, not immediately dominated by another NP node. Therefore, this NP is the node C referred to in (181b). However, neither the NP 'his mother' nor the pronoun 'he' c-commands the antecedent Zhangsan in any of (175). Therefore, 'he' does not cyclic-c-command its antecedent either by the definition (181a) or by (181b).

The solution to the problem posed by (175) that I am suggesting should by now be clear. Instead of making precedence a strict requirement on antecedent-pronoun relations in Chinese, which would be wrong in view of (175), I suggest that Chinese obeys an even stronger hierarchical condition than English. That is, to the general principle (153) we add the language-specific condition on Chinese, though not on English:

(182) Condition on Pronominal Anaphora in Chinese

A pronoun may not cyclic-c-command its antecedent.

The (a) sentences of (169) - (173) are all ill-formed because in each case the antecedent Zhangsan is cyclic-c-commanded by the pronoun 'he' or 'his.' The sentences in (175), on the other hand, are well-formed because in none of them the pronoun either c-commands or cyclic-c-commands its antecedent.

A natural question that arises about the condition (182) is whether it can be generalized into a general condition on all anaphoric relations in Chinese, on a par with the universal condition (153), restricting the position of PRO, pro, etc. with respect to their antecedents. If this is the case, then (182) can be collapsed with (153) into (183), where the parenthesized material is taken as a parameter distinguishing

Chinese-type languages from English-type languages:

(183) A referential dependent may not (cyclic)-c-command its antecedent.

As it turns out, however, this generalization on (182) is not correct. For both PRO and pro must be allowed to cyclic-c-command their antecedents:

(184) [[PRO$_i$ xiyan] hai-le Zhangsan$_i$.
smoke victimize-ASP
'Smoking brought Zhangsan a misfortune.'

(185) [pro$_i$ deng-le sange zhongtou yihou], Zhangsan$_i$ shuizhao-le
wait-ASP three hour after asleep-ASP
'After [he$_i$] had waited for three hours, Zhangsan$_i$ fell asleep.'

In view of this, I will regard (182) as a special requirement solely on the position of lexical pronouns with respect to their antecedents in Chinese.

Incidentally, the well-formedness of (184) and (185) also shows that the position of PRO or pro need not obey any precedence principle.

We have seen that (182) correctly excludes the (a) sentences of (169) - (173). It also correctly admits the (b) sentences. In all of the latter sentences, the pronoun 'he' does not c-command the preceding antecedent Zhangsan. Moreover, the only cyclic node containing the pronoun is the root S, which properly contains, but does not c-command, Zhangsan. Therefore, the pronoun does not cyclic-c-command its antecedent under the provisions of (181b). Neither (153) nor (182) is violated, then, and all of the (b) sentences are well-formed. Thus, according to the view adopted here, the well-formedness of the (b) sentences is not a consequence of the fact that the pronoun happens to follow its antecedent.

Note that, according to (181b), if the cyclic node minimally containing a pronoun is immediately dominated by another cyclic node, it is the latter cyclic node that counts as the relevant node C for the definition of cyclic-c-command. We have seen that this special requirement plays a crucial role in excluding (170a) and (172a). Without this requirement, (170a) and (172a) would be wrongly admitted, since the minimal cyclic node containing the pronoun in each of these sentences does not itself c-command the antecedent of the pronoun.

This special requirement also plays a crucial role in admitting relative clauses with resumptive pronouns, namely constructions of the sort illustrated by (176) - (177). In (176), the minimal cyclic node that contains the resumptive pronoun 'he' is the $\bar{S}$ of the relative clause itself. However, this $\bar{S}$ is immediately dominated by another cyclic node, namely the NP node containing both the relative and the head. Therefore, it is the NP node that is relevant for definition of cyclic-c-command in (181b). But, again, this NP does not c-command the antecedent of the resumptive pronoun (i.e., the head), since it properly contains it. Therefore, the resumptive pronoun does not cyclic-c-command its antecedent. (176) is therefore well-formed. Likewise for (177). The special requirement in (181b) that the relevant cyclic node is not immediately dominated by another cyclic node is crucial here, because without this requirement the relative clause $\bar{S}$ in each of (176) and (177) would be the relevant node. Since the relative clause does c-command its head, (176) and (177) would be wrongly excluded.

The same special requirement in (181b), furthermore, also plays a crucial role in accounting for the following fact. Although the (a) sentences of (170) - (173) are considerably improved once the pronoun in each of them is embedded as a possessive (as shown by the well-formedness of the sentences in (175)), the same strategy of further embedding the pronoun in (169a) does not improve its status:

(186) *[[ta$_i$ de mama] de pengyou] xihuan Zhangsan$_i$.
he$_i$ DE mother DE friend like
'His mother's friend likes Zhangsan.'

In fact, the sentence remains ungrammatical no matter how deeply embedded the pronoun is:[25]

(187) *[[[[ta$_i$ de mama] de pengyou] de didi] de laoshi]
he$_i$ DE mother DE friend DE brother DE teacher

xihuan Zhangsan$_i$.
like

'His$_i$ mother's friend's brother's teacher likes Zhangsan.'

The reason is that in constructions like (186) and (187), only the highest NP containing the pronoun is the relevant cyclic node C for (181b). All intermediate NP nodes do not qualify as C because they are each immediately dominated by another NP. (We assume that the subordinator de is inserted in PF, cf. Chapter 2.)

The formulation (181b) is further supported by the contrast between the well-formed (175) and the ill-formed (188):

(188) *[[[da-le ta$_i$ de] neige ren] de mama] dui Zhangsan$_i$
hit-ASP he$_i$ DE that man DE mother to

hen bu keqi.
very not polite

'The mother of the man who hit him$_i$ was very impolite to Zhangsan$_i$.'

In both (175) and (188), the pronoun is more deeply embedded than in (170) by exactly one pair of brackets. In (175), the added pair of brackets immediately contains the pronoun but is not immediately dominated by another NP; therefore, this added NP node is the C of (181b). In (188), the added pair of brackets are the outermost brackets which immediately contain the NP which immediately dominates the $\bar{S}$ containing the pronoun, so this added node is also the C referred to in (181b). But while the added node in (175) does not c-command Zhangsan, the added node in (188) does. The addition of the node in (188) therefore does not make the sentence better than (170).

While judgments concerning the data here are subtle in some cases, it seems to me that the proposed account, or something like it, is on the right track. I also suspect that the Japanese data may be treated along the same lines. At any rate, it is clear that a principle based solely on the superficial notion of precedence cannot be sufficient for precisely the set of facts we have presented. Furthermore, if our account is correct, the need for a precedence principle may be eliminated for at least these cases. This provides support for the theory of Reinhart (1976), which for the first time eliminates reference to linear word order in a syntactic account of anaphora.

Our discussion in this section, however, is not intended to deny the obvious: precedence does have a role in discourse anaphora in language. Evidently, within a stretch of discourse in any language, the fact that a pronoun does not c-command or cyclic-c-command an NP is no sufficient guarantee nor necessary requirement for the latter

to be its antecedent. Rather, the relevant principle seems to be for a pronoun to follow its antecedent. Any linguist or non-linguist who has gone through data like the coordinate structures in (174) will not fail to make the observation that precedence plays a role here. But it seems that the precedence principle should be restricted to a universal theory of discourse, and need not be assumed in sentence grammar. Rather, what is relevant in sentence grammar is the less obvious, and therefore more interesting, hierarchical notion of c-command or cyclic-c-command.

5.6. Definite Pronoun Anaphora and Pronominal Binding

5.6.1. Some Similarities

Our discussion of the theory of binding has up to now been concerned with anaphoric relations holding between a referential dependent and a definite antecedent, like the man, John, etc. The antecedent is truly referential in the sense that it may denote an object in the real world. In this section we want to discuss a different type of anaphoric phenomenon, in which the antecedent is itself non-referential. i.e., quantificational. Compare the (a) and (b) sentences of (189) and (190).

(189) a. John$_i$ loves his$_i$ mother.

b. Everyone$_i$ loves his$_i$ mother.

(190) a. Zhangsan$_i$ shuo [ta$_i$ mingtian yao lai].
say he tomorrow want come
'Zhangsan$_i$ said that he$_i$ wants to come tomorrow.'

b. shei$_i$ shuo [ta mingtian yao$_i$ lai]?
who say he tomorrow want come
'Who$_i$ said that he$_i$ wants to come tomorrow?'

In the (a) sentences, the pronoun has a name as its antecedent, John in (189a) and Zhangsan in (190a). Since John and Zhangsan each denote some person in the real world, the pronouns he and ta also each have a reference, namely the reference of John and Zhangsan respectively. In the (b) sentences, however, the antecedents everyone and shei 'who' each do not denote any person in the real world, i.e., they each do not have a reference. Therefore, the pronouns which depend on them also do not have a reference. What a Q-NP like everyone or who "denotes" is a set of possible references (i.e., its extension), and a pronoun that is construed as dependent upon the Q-NP is said to "denote" whatever the Q-NP would denote should a value be given from among its possible references. Because of this difference in referentiality, it has been customary to regard the two types of pronouns discussed here as different. Pronouns whose antecedents are names are called "pronouns in coreference," since they refer to the same objects that their antecedents refer to. Pronouns whose antecedents are quantificational, on the other hand, are called bound variables. Thus, (189b) and (190b) have the following interpretations, in which the pronouns are represented as variables, having the same value as their antecedents upon each instantiation of the schemata:

(191) [For every x; x a person] [x loves x's mother]

(192) [neige x; x shi ren] [x shuo [x mingtian yao lai]
which is man say tomorrow want come

While this distinction on the basis of referentiality is reasonable, there is a sense in which it appears to be unnecessary and even misleading. At the least, the alleged distinction should not be overemphasized. There are two ways in which a pronoun may be coreferential with a name. On the one hand, the pronoun may be used deictically, in which case it happens to denote the same object in the real world as the name. On the other hand, the pronoun may be used anaphorically, in which case it picks up its reference from the name, i.e., is referentially dependent upon the name. Our discussion in the preceding section, based to a large extent on Evans' (1980) study, has made it clear that the binding theory, as it pertains to pronouns, should be construed as placing restrictions, not on the coreference possibilities of a pronoun with another NP, but on the possibilities of referential dependency of a pronoun upon that NP. For example, the condition (153) (or the binding condition (1c)) should not be used to exclude (151) on the reading that $\underline{he}_i$ is coreferential with the second occurrence of John, which it c-commands but only the interpretation according to which the pronoun referentially depends upon this occurrence of John. Similarly, in the following example (adapted from Higginbotham, 1981):

(193) John admired him. The only person John admired is John. Therefore, John admired himself.

John and him are referential in the first sentence, though him is used deictically. The condition (1b) must not be used to exclude (193) on the coreferential reading, though it should prevent him from being used anaphorically in this context, picking up its reference

from John. It seems then that grammatical theory should concern itself solely with the second way in which a pronoun comes to be coreferential with a name, namely when it is used as a referential dependent upon the name.

But if the only so-called "pronouns in coreference" that we should be concerned with are the pronouns which referentially depend upon names, then there is little ground to regard them as fundamentally different from those that are called bound variables, those whose antecedents are quantificational. That is, such "pronouns in coreference" are also a kind of bound variable-- they are bound variables whose values are whatever the names denote. If $\underline{\text{his}}_i$ in (189a) is construed as referentially dependent upon $\underline{\text{John}}_i$, then if $\underline{\text{John}}_i$ denotes the person I just talked to three minutes ago, so does $\underline{\text{his}}_i$; and if $\underline{\text{John}}_i$ denotes the person we saw streaking this morning, so does $\underline{\text{his}}_i$; etc. Both types of pronouns are bound variables, either variables bound to referential antecedents or variables bound to non-referential antecedents. The difference between the two types of pronouns with respect to referentiality is a simple consequence of the difference between their antecedents.

We have remarked that both types of bound pronouns are semantically on a par, as bound variables. Syntactically, they also share many properties. For example, conditions on definite pronoun anaphora are also conditions on pronouns as bound variables. (To be more precise, possibilities of binding constitute a proper subset of possibilities of coreference, or overlapping reference.[26]) A pronoun can be construed as bound to a Q-NP only if it can be interpreted

as referentially dependent upon a name in place of that Q-NP. Thus the well-formedness of (189b) and (190b) entails the well-formedness of (189a) and (190a), respectively. On the other hand, the ill-formedness of (194a) also entails the ill-formedness of (194b):

(194) a. *John$_i$ loves him$_i$.

b. *Everyone$_i$ loves him$_i$.

This shows that both kinds of pronouns obey the binding condition (1b). For the intended interpretation in (194), a reflexive must be used; again in both cases:

(195) a. John$_i$ loves himself$_i$.

b. Everyone$_i$ loves himself$_i$.

Similarly, a reflexive pronoun must be bound in its governing category in accordance with (1a), again whether its antecedent is referential or quantificational:

(196) a. *John$_i$ likes Bill's pictures of himself$_i$.

b. *Everyone$_i$ likes Bill's pictures of himself$_i$.

Furthermore, the effect of (153), which we assume in place of (1c), is seen on both types of pronouns:

(197) a. *He$_i$ said John$_i$ would come.

b. *He$_i$ said that everyone$_i$ would come.

The same holds true of (182) on Chinese:

(198) a. *ta$_i$ de mama xihuan Zhangsan$_i$.
he DE mother like
'His$_i$ mother likes John$_i$.'

b. *ta$_i$ de mama xihuan shei$_i$?
he DE mother like who
'*Who$_i$ does his$_i$ mother like?'

(199) a. *wo kanjian ta$_i$ de shihou, Zhangsan$_i$ zai dazi.
I see he$_i$ DE time Zhangsan$_i$ at type
'When I saw him$_i$, Zhangsan$_i$ was typing.'

b. *wo kanjian ta$_i$ de shihou, meige ren$_i$ dou zai dazi.
I see he$_i$ DE time every man$_i$ all at type
'*When I saw him$_i$, everyone$_i$ was typing.'

This demonstration of the shared properties of the two types of pronouns is not intended to obscure the fact that they also differ in a number of ways. Semantically, we have noted their difference with respect to referentiality, which is a consequence of the difference in referentiality between their antecedents. Syntactically, they also exhibit certain differences, which we will turn to directly. Therefore, any adequate theory of anaphora must be capable of capturing the generalization that these two types of pronouns are identical in some respects, but different in others. Ideally, we would like to be able to derive their similarities from the assumption that they are indeed the same elements, at least at some level of grammatical representation. Their differences, on the other hand, would then be derived from one or a small number of principles that pertain to the difference between the different types of antecedents that they depend upon. In Chomsky (1981a), there is a natural way to capture this generalization. The binding theory embodying (1a-c) applies at the level of SS on configurations involving all kinds of anaphoric expressions without regard to whether the antecedent in a given anaphoric configuration is referential or quantificational.[27] With the condition (1c) now replaced by (153) (and (182) for Chinese), the same effect can be achieved, obviously, if we also have (153) (and (182)) applied at this level

without regard to the nature of the antecedent of a given pronoun. On the other hand, the syntactic differences between the two types of pronouns are derived from principles that apply in or at LF. Since the mapping between SS and LF affects, by assumption, only quantificational expressions, sentences containing Q-expressions are turned into representations different in non-trivial ways from sentences containing no such expressions. The syntactic differences between the two types of pronouns can be derived, therefore, if certain principles are assumed that are sensitive to the existence of the LF mapping rules or to the output representations of such mapping rules. We now turn to these syntactic differences in both Chinese and English and discuss their treatment in some detail within this scheme.

5.6.2. Some Properties of Pronominal Binding

One important feature of pronouns construed as bound to quantificational antecedents that has often been observed is that the pronouns must occur within the scope of the quantificational antecedents. See, for example, Chomsky (1976), May (1977), Higginbotham (1980a), and Evans (1980). Consider well known facts of the following sort:

(200) a. If everyone doesn't show up, I will be mad.

b. *If everyone$_i$ doesn't show up, I will be mad at him$_i$.

In (200a) everyone has scope over the embedded if clause, so that the sentence means that if every person x is such that x doesn't show up, I will be mad; not that every person is such that if he doesn't show up I will be mad. In (200b), him cannot be construed as a variable

bound to everyone. The reason is generally agreed to be that him occurs occurs in the matrix clause outside of the scope of everyone. On the other hand, in the following sentence, everyone has scope over the matrix clause, and binding of him to everyone is possible:

(201) Everyone$_i$ thought that I was mad at him$_i$.

In Higginbotham (1980a), it is observed that sentences of the following sort exhibit ambiguity on the relative scope of the two Q-NPs some student and every paper that he writes, but only if he is not construed as a variable bound to some student.

(202) Some student$_i$ enjoys reading every paper that he$_j$ writes.

On one reading, there is some student who enjoys reading every paper that John, say, writes. On the other reading, every paper that John writes has one student or another that enjoys reading it. However, if he is construed as a variable bound to some student, with i=j in (202), only the first reading, [E A], is available. As Higginbotham indicates, within a framework that embodies May's QR, there is a very natural account for this fact. The LF representation for the [A E] reading on (202), after QR applies, is (203):

(203) [Every paper that he$_j$ writes]$_k$[some student] [e$_i$ enjoys reading e$_k$]]]

If he is construed as bound to some student$_i$, he$_j$= e$_i$. It is natural to regard he$_i$ on a par with the empty category e$_i$ leftover by QR, since both of them are bound variables in a real sense, semantically. If so, with he$_j$= e$_i$, (203) may be represented as (204):

(204) [Every x; x a paper that y writes][some y; y a student]
[y enjoys reading x]]]

In (204), the first occurrence of y is a free variable, not being c-commanded by the quantifier some y. This is in violation of May's Condition of Proper Binding (CPB). The unavailable bound variable reading on the [A E] scope order in (202) is thus naturally ruled out without the need for any ad hoc principle.

This account assumes the existence of a rule that turns a pronoun coindexed with a Q-NP into a variable on a par with traces left by wh movement or QR, or a convention that tells one to look upon such pronouns and the traces as "the same" elements. This move apparently also will account for the ill-formedness of (200b). The following contrast is clearly also derivable from the CPB:

(205) a. Application letters from every prospective student$_i$ must be accompanied by his/her$_i$ signature, duly authenticated by a notary public in his/her$_i$ area of residence.

b. *That application letter from every prospective student$_i$ must be accompanied by his/her$_i$ signature, duly authenticated by a notary public in his/her$_i$ area of residence.

Binding of his/her to every prospective student is possible in (205a) because every prospective student may have sentential scope, thus c-commanding his/her at LF. The sequential scope reading is ruled out in (205b), however, since the universal Q-NP is contained within a specific NP and cannot have scope external to that NP, due to the Specificity Condition (mentioned in Chapter 4, cf. below for more discussion). The Q-NP may therefore have only NP-internal scope and

occurs within the subject NP of (205b) where it fails to c-command his/her, now construed as a variable, in violation of the CPB.

The fact that a pronoun as a bound variable must occur within the scope of its quantificational antecedent is apparently true also in Chinese, except perhaps that there is even clearer evidence for it here. The contrast in (206) below is clearly induced by placing the scope adverb dou in the matrix clause in (206a) but in the embedded relative clause in (206b):

(206) a. $[_{np}[_{s}$ meige ren$_i$ shoudao] de xin] shangmian dou you
every man$_i$ receive DE letter top all have

ta$_i$ taitai de mingzi.
he$_i$ wife DE name

'For every person x, letters that x received have x's wife's name on them.'

b. *$[_{np}[_{s}$ meige ren$_i$ dou shoudao] de xin] shangmian
every man$_i$ all receive DE letter top

you ta$_i$ taitai de mingzi.
have he$_i$ wife DE name

'*Letters that everybody$_i$ received have his$_i$ wife's name on them.'

In (206a), the scope adverb dou occurs in the matrix clause and thus indicates that the Q-NP every man may have matrix scope, where the pronoun ta occurs. In (206b) the scope adverb occurs within the relative clause and requires the Q-NP to have embedded scope internal to the subject NP, where it fails to c-command the pronoun. The contrast between (206a) and (206b) is thus very clearly due to the CPB.

Another well known property of pronouns as variables bound to Q-NPs is that they exhibit the "weak crossover" phenomenon. This phenomenon is discussed in Postal (1972), Wasow (1972), Cole (1974), and has been under intensive study in recent years. The most notable recent works on this subject include Higginbotham (1980a, 1980b) and Chomsky (1976) (cf. also Koopman and Sportiche, 1981; Chomsky, 1981b). As we have mentioned in Chapter 4, this phenomenon has to do with asymmetries of the sort illustrated below:

(207) a. The woman he_i loved betrayed $John_i$.

b. *Who_i did the woman he_i loved betray t_i?

c. *The woman he_i loved betrayed $everyone_i$.

d. *The woman he_i loved betrayed $someone_i$.

e. *The woman he_i loved betrayed $JOHN_i$.

(207) shows that failure of a pronoun to c-command its antecedent, in accordance with (153), is sufficient to allow the intended anaphoric relation if the antecedent is a name (207a), but not if the antecedent is quantificational (207b-e). Similarly, in Chinese, failure of a pronoun to cyclic-c-command its antecedent in accordance with (182) is sufficient for definite pronoun anaphora but not for quantificational pronominal binding:

(208) a. $[_{np}$ da-le hit-ASP ta_i he^i de mama DE mother de neige ren] DE that man dui Zhangsan$_i$ to

hen bukequi.
very impolite
'The man that hit his$_i$ mother was very impolite to Zhangsan$_i$.'

b. *[$_{np}$ da-le ta$_i$ de mama de neige ren] dui shei$_i$ hen
hit-ASP he$_i$ DE mother DE that man to who very

bukeqi?
impolite

'*Who$_i$ was the man that hit his$_i$ mother very impolite to t_i?'

c. *[$_{np}$ da-le ta$_i$ de mama de neige ren] dui meige
hit-ASP he$_i$ DE mother DE that man to every

ren$_i$ dou hen bukeqi.
man$_i$ all very impolite

'*The man that hit his$_i$ mother was very impolite to everyone$_i$.'

d. *[$_{np}$ da-le ta$_i$ de mama de neige ren] dui yige ren$_i$
hit-ASP he$_i$ DE mother DE that man to one man$_i$

hen bukeqi.
very impolite

'*The man that hit his$_i$ mother was very impolite to someone$_i$.'

(209) a. [$_s$ ta$_i$ de mama neng-bu-neng lai] dui Zhangsan$_i$
he$_i$ DE mother can-not-can come to

meiyou guanxi.
no matter

'Whether or not his$_i$ mother can come doesn't matter to Zhangsan$_i$.'

b. *[$_s$ ta$_i$ de mama neng-bu-neng lai] dui shei$_i$ meiyou
he$_i$ DE mother can-not-can come to who$_i$ no

guanxi?
matter

'*Whether or not his$_i$ mother can come doesn't matter to who$_i$?

c. *[$_S$ ta$_i$ de mama neng-bu-neng lai] dui meige ren$_i$
he$_i$ DE mother can-not-can come to every man$_i$

dou meiyou guanxi.
all no matter

'*Whether or not his$_i$ mother can come doesn't matter to everyone$_i$.'

d. *[$_S$ ta$_i$ de mama neng-bu-neng lai] dui yige ren$_i$
he$_i$ DE mother can-not-can come to one man$_i$

meiyou guanxi.
no matter

'*Whether or not his$_i$ mother can come doesn't matter to someone$_i$.'

The asymmetry between names and quantificational NPs with respect to their ability to bind pronouns is accounted for in Chomsky (1976) by the Leftness Condition, which prohibits a pronoun from taking a variable on its right as its antecedent, where a variable is a trace that results from overt wh movement, QR, or abstract wh movement. This ties together certain similarities between constructions involving overt movement and constructions involving no such movement, and constitutes important motivation for the LF mapping rules QR and abstract wh movement, and also evidence for the existence of the level of LF.

As we have mentioned, it is natural to regard pronouns interpreted as bound to quantificational NPs as on a par with the moved traces of QR and wh movement, i.e., as both being the same empty categories at LF. This view enables Koopman and Sportiche (1981) to propose the Bijection Principle in place of the Leftness Condition:

(210) Bijection Principle (Koopman and Sportiche, 1981)

Every A-position is locally bound by at most one $\bar{A}$-position.
Every $\bar{A}$-position locally binds at most one A-position.

Given the CPB, which requires every variable to be bound, and the CQB, which requires every quantifier to be non-vacuous, the effect of the Bijection Principle is the requirement that the relation between $\bar{A}$ binders and variables is a one-to-one relation: An operator binds one and only one variable, and a variable is bound to one and only one operator. This represents a strengthening of the CPB and the CQB. It rules out sentences involving weak crossover in the following way. After QR and the rule of FOCUS have applied and the bound pronouns are turned into variables, (207b-e) have the following representations:

(211) a. [For which x; x a person][the woman x loved betrayed x]

b. [For every x; x a person][the woman x loved betrayed x]

c. [For some x; x a person][the woman x loved betrayed x]

d. [For x=John][the woman x loved betrayed x]

In each of these representations, there are two occurrences of the variable x in the open sentence [the woman x loved betrayed x]. Neither of these two occurrences of x c-commands the other. Therefore, both are locally bound to the quantifier [For which x; x a person], etc. The quantifier-variable relationship here is not one-to-one, but one-to-two, in violation of the Bijection Principle. On the other hand, a sentence like (212), which does not involve weak crossover, has the LF representation (213):

(212) Everyone$_i$ thought that he$_i$ was great.

(213) [For every x; x a person][x thought that x was great]

The second occurrence of x in the open sentence [x thought that x was great] is locally bound to the first occurrence of x, which is in turn locally bound to the quantifier. Therefore, the local quantifier-variable relationship obtaining in (213) is one-to-one, in accordance with the Bijection Principle. (The second occurrence of x, though semantically a variable, is syntactically a small pro by definition, since it is locally bound to a thematic position and it is governed. Such a small pro should be allowed in LF, also in English, though not at SS. Aoun (1982) has made the suggestion that as a way of identifying a small pro (in addition to (113)), one may spell it out phonetically. This means that a pro identified this way is simply equivalent to a lexical pronoun at SS or PF. It makes a difference only in LF, depending upon whether a pronoun is turned into an empty category and is locally bound to a thematic position.)

The Bijection Principle appears to be quite plausible and fairly natural. It has a number of very interesting consequences, as indicated in Koopman and Sportiche (1981), and especially in Chomsky (1981b). Among other things it has the advantage of eliminating the peculiar left-to-right asymmetry inherent in the Leftness Condition. Thus, the Bijection Principle also accounts for sentences of the following sort in Chinese, the grammatical status of which is first observed in Higginbotham (1980a):[28]

(214) a. Zhangsan$_i$ de mama hen xihuan ta$_i$.
DE mother very like he
'Zhangsan$_i$ mother likes him$_i$ very much.'

b. *Shei$_i$ de mama hen xihuan ta$_i$?
who$_i$ DE mother very like he$_i$
'Whose$_i$ mother likes him$_i$?'

c. *meige ren$_i$ de mama dou hen xihuan ta$_i$.
every man$_i$ DE mother all very like he$_i$
'Everyone's$_i$ mother likes him$_i$.'

d. *youyige ren$_i$ de mama hen xihuan ta$_i$.
one man$_i$ DE mother very like he$_i$
'Someone's$_i$ mother likes him$_i$.'

e. *shi Lisi$_i$ de mama hen xihuan ta$_i$.
FO Lisi$_i$ DE mother very like he$_i$
'It is Lisi whose$_i$ mother likes him$_i$.'

Take (214b) for example. Neither 'who' nor 'him' c-commands the other. 'Him,' furthermore, does not cyclic-c-command 'who.' So nothing rules out this sentence at SS. At LF, (214b) is turned into (215):

(215) [neige x; x shi ren][x de mama hen xihuan x]
which is man DE mother very like

If the second occurrence of x in the open sentence 'x's mother likes x' still retains its identity as a pronoun, the Leftness Condition cannot rule out the sentence, since the pronoun occurs to the right of the variable. But if it is taken as a variable, as in (215), the Bijection Principle will rule it out on a par with the other sentences that involve genuine crossover, as in (207) - (209).

The Bijection Principle, as it stands, still has a number of problems, though the problems do not appear to be unsolvable. One problem is that it is formulated as a well-formedness condition at LF. As Higginbotham (1980a) points out, the Leftness Condition cannot be construed as an output condition. The same holds true of the Bijection Principle. The relevant examples given by Higginbotham are of the sort illustrated by (202). The relevant LF representation

of (202), with $\underline{he}_j$ construed as bound to $\underline{some\ student}_i$ (i=j), is (216):

(216) [Some student]$_x$ [every paper that x writes]$_y$ [x enjoys reading y]

This is a configuration that violates the Bijection Principle at LF, with some student x locally $\bar{A}$-binding two occurrences of x, but the reading represented in (216) is perfectly available. As Higginbotham (1980a, forthcoming) argues, examples like (202) require that the relevant condition (the Leftness Condition or the Bijection Principle) must be construed as placing restrictions on the application of the rule that identifies the pronoun as a variable (he $\longrightarrow$ x, or the reindexing rule proposed in Higginbotham (1980a)). But this problem with the Bijection Principle can be corrected, say, by requiring that there is at least one possible derivation from SS to LF where the immediate output of this reindexing rule obeys the Bijection Principle.

A second problem with the Bijection Principle is the fact that, in English, sentences of the following sort are fairly acceptable to many speakers:

(217) a. Whose$_i$ mother loves him$_i$?

b. Everyone's$_i$ mother loves him$_i$.

c. Someone's$_i$ mother loves him$_i$.

These are completely on a par with the Chinese examples (214b-d) in structure, although the latter are not acceptable. There is, furthermore, a systematic contrast between the (a) and (b) sentences below:

(218) a. ?Which picture of which student$_i$ pleases him$_i$ most?

b. *Which picture of which student$_i$ does he$_i$ like?

(219) a. ?Which picture of which student of which teacher$_i$ pleases her$_i$?

b. *Which picture of which student of which teacher$_i$ does she$_i$ like?

Sentences like these, especially the relative well-formedness of (219a), (219a), show quite clearly that the Bijection Principle must be weakened somehow, at least for English. (They also show that the condition on possible interpretations on pronouns as bound variables cannot be stated solely in terms of SS: that a Q-NP must c-command the pronoun at this level, as proposed in Reinhart (1979a).) A more adequate theory should, I think, state it along the lines of the notion of accessibility of Higginbotham (1980b) (see also Higginbotham, forthcoming, for an improved version of this notion. According to Higginbotham's theory, a parameterized notion of "weak accessibility" is made available for English, but not for Chinese, thus accounting for the systematic differences between these two languages.

While sentences like (217) - (219) constitute some problems for the Bijection Principle, one can still maintain that it holds of the unmarked cases of language. (It is equivalent to the notion of "strong accessibility" in Higginbotham (1980b).) Sportiche has also observed that French is more on a par with Chinese in that sentences corresponding to (217) - (219) in French are not acceptable to him. This suggests that the Bijection Principle does represent the unmarked cases of pronouns as bound variables. English is marked to some

extent, on the other hand, in that it allows limited violations of the principle under the provisions of "weak accessibility."

The third distinguishing property of quantificationally bound pronouns is that such a pronoun cannot occur within a specific NP with its quantificational antecedent occurring outside of that NP. Compare the following sentences:

(220) a. Some student$_i$ enjoys reading [every paper that he$_i$ wrote].

b. *Some student$_i$ enjoys reading [that paper, which he$_i$ wrote].

(221) a. Every student$_i$ should respect [every professor that he$_i$ has learned things from].

b. *Every student$_i$ should respect [Professor Smith, who he$_i$ has learned things from].

(222) a. Who$_i$ likes [which story about him$_i$]?

b. Who$_i$ likes [every story about him$_i$]?

c. *Who$_i$ likes [this story about him$_i$]?

d. *Who$_i$ likes [that story about him$_i$]?

(223) a. meige ren$_i$ dou mai-le [ta$_i$ xihuan de shu]
every man$_i$ all buy-ASP he$_i$ like DE book
'Everyone$_i$ bought the books that he$_i$ liked.'

b. *meige ren$_i$ dou mai-le [neiben ta$_i$ xihuan de shu]
every man$_i$ all buy-ASP that he$_i$ like DE book
'*Everyone$_i$ bought that book, which he$_i$ liked.'

The distinction between the well-formed and the ill-formed sentences is apparently due to the specificity vs. non-specificity of the bracketed NPs. In each of the ill-formed sentences, the bracketed NP contains something which makes it necessarily specific in reference: the demonstratives this, that, and the proper name Professor Smith, all of which are "rigid designators" (Kripke, 1972). The distinction we see above

should not be obscured by the fact that the following sentences are well-formed even though each of the bracketed NPs contains the definite article the:

(224) a. Every student$_i$ should respect [the professor that he$_i$ has learned things from].

b. Who$_i$ is looking for [the paper that he$_i$ wrote]?

Although the article the is a definite article, and therefore an NP containing it is called a definite NP, it is well known that a definite description is not necessarily specific, or referential. A definite description refers to what it describes, but what it describes may amount to a set of possible references only. This is true when the description contains a variable as in (224). The reference of the definite description varies along with each instantiation of the Q-NP. If a definite description contains no variables, then it has a specific reference:

(225) I saw [the man that you saw at 3:15 p.m. yesterday].

The difference between the ill-formed sentences in (220) - (223) and the ones in (224) is that in the former the bracketed NPs are necessarily specific, though definite descriptions need not be.[29]

The observation we have just made here may remind the reader of the Specificity Condition of Fiengo and Higginbotham (1981) (cf. May, 1977; Gueron, 1980).

(226) The Specificity Condition

A specific NP cannot contain a free variable.

Fiengo and Higginbotham, May, and Gueron have proposed this condition to account for the fact that a Q-NP contained within a specific NP

cannot have scope wider than that NP. We have mentioned some examples in discussing quantification and wh questions in Chapter 4, and again a moment ago in connection with (205). Below are some more systematic contrasts showing the relevance of this condition.

(227) a. [Pictures of everybody] are on sale.

b. [These pictures of everybody] are on sale.

(228) a. Who saw [pictures of who]?

b. *Who saw [these pictures of who]?

In (227a), everybody may have either sentential or NP-internal scope, so that the sentence means either that everybody is such that pictures of him are on sale, or that pictures each of which is a (group) picture with everybody in it are on sale. In (227b), however, everybody has only NP-internal scope, so that the sentence has only the reading according to which the pictures referred to are each a group picture of everybody. The external scope reading is ruled out by the Specificity Condition under the assumption that the sentence would have the following representation, following QR:

(229) *[Everybody]$_i$[[these pictures of e_i] are on sale].

where the subject NP is a specific NP containing a free variable. The ill-formedness of (228b) also follows from the condition, under the assumption that abstract wh movement applies to the wh word in situ. Since wh phrases can have only sentential scope, and no NP-internal scope (as a direct question it has matrix scope; as an indirect question it has scope over an embedded sentence), the only representation derivable from (228b) is (230), but this representation violates the

Specificity Condition:

(230) [For which pairing <x,y>; x a person and y a person]

[x saw these pictures of y]]

The relevance of the Specificity Condition in Chinese is quite easy to demonstrate. Consider the contrast below:

(231) a. [shei mai de shu] zui hoa?
who buy DE book most good
'*The book that who bought is the best?'

b. *[shei mai de neiben shu] zui hoa?
who buy DE that book most good
'*That book that who bought is the best?'

(232) a. [shei de shu] zui gui?
who DE book most expensive
'Whose books are most expensive?'

b. *[neixie shei de shu] zui gui?
those who DE book most expensive
'*Those books of whose are most expensive?'

The only difference between the (a) and (b) sentences here is the existence vs. non-existence of a demonstrative. Thus, the two sentences in each of (231) - (232) differ in specificity of the bracketed NP they contain. The same contrast occurs between a complex NP with a common noun as its head, and one with a proper head noun:

(233) a. [ai kan dianshi de xiaohai] mei chuxi
love see TV DE child no future
'Children that love to watch TV have no future.'

b. [ai kan sheme de xiaohai] mei chuxi?
love see what DE child no future
'*Children who love to watch what have no future?'

(234) a. [ai kan dianshi de Zhangsan] zhen mei chuxi.
love see TV DE real no future
'Zhangsan, who loves to watch TV, really has no future.'

b. *[ai kan sheme de Zhangsan] zhen mei chuxi?
love see what DE real no future
'*Zhangsang, who loves to watch what, really has no future?'

Similarly, the head noun niao 'birds' may be interpreted as generic (=specific, as it refers to a unique kind) only in (235a), but not in (235b):

(235) a. [zai tianshang fei de niao] zhen ziyou.
at sky fly DE bird real free
'Birds, which fly in the sky, are really free.'

b. [zai nali fei de niao] zui ziyou?
at where fly DE bird most free
'*Birds that fly where are most free?'

Furthermore, if Givon (1973) is correct in saying that 'past' and 'factivity' contribute to the specificity of an NP or a preposition while 'future' and 'non-factivity' contribute to non-specificity, the following contrast involving sentential subjects is also related to specificity:

(236) a. [Lisi tao shei] zui heshi?
marry who most appropriate
'*That Lisi should marry who is most appropriate?'

b. *[Lisi tao-le shei] zhen kexi?
marry-ASP who real pity
'*That Lisi had married who was a real pity?'

The contrasts we have just seen regarding wh questions in Chinese might suggest some principle having the form of (237):[30]

(237) No element within a specific NP may be questioned.

But this apparently does not account for all facts concerning question formation in Chinese. For example, it would wrongly exclude the following grammatical sentence, in which an indirect question is formed within a relative clause, even though the head is specific:

(238) zhe jiushi [ni xiang-zhidao [shei xihuan] de neige
this is you wonder who like DE that

nanhaizi].
boy

'?This is the boy who you wondered who liked.'

It will not do to restrict the application of (237) only to direct questions, since the following indirect question is ill-formed, like (231b):

(239) *ta xiang-zhidao [[shei mai de neiben shu] zui hao].
he wonder who buy DE that book most good
'*He wondered the book that who bought was best.'

Putting together (231b), (238), and (239), the correct generalization is clearly that a wh phrase cannot occur within a specific NP and have scope larger than that NP. In a framework that does not look at the facts in terms of the scope properties of a wh phrase, it is difficult to state a simple and general principle that explains all of the facts so far observed, but if wh phrases are subject to movement, leaving variables behind, these facts readily fall under the Specificity Condition.

The effect of the Specificity Condition on QR is also easy to demonstrate. Thus, (240) is ambiguous in that the quantificational NP sange ren 'three men' may have scope over either the relative clause (internal to the relativized NP construction), or over the entire matrix sentence:

(240) wo kanguo [$_{np}$[$_{s}$ sange ren xie] de shu]
I read three man write DE book

a. 'There are three men x such that I read books that x wrote.'

b. 'I have read books that three men wrote (jointly).'

If we insert the advert he 'jointly' into the relative clause, this will force a unique narrow scope reading (as shown in (241)); but if yigong 'altogether' is inserted in the matrix, a unique wide-scope reading will be forced (as shown by (242)):

(241) wo kanguo [sange ren he xie de shu]
I read three man jointly write DE book
'I have read books that three men jointly wrote.'

(242) wo yigong kanguo [sange ren xie de shu]
I altogether read three man write DE book
'Altogether there are three men whose books I have read.'

Predictably, then, the following sentence is ill-formed with both 'altogether' appearing in the matrix and 'jointly' appearing in the relative clause:

(243) *wo yigong kanguo [sange ren he xie de shu]
I altogether read three man jointly write DE book

Now, note that if the head of the relative clause in (240) is made specific by a demonstrative, the sentence can have only the narrow-scope reading even though the adverb 'jointly' does not appear in the relative, and becomes uninterpretable if the matrix contains the adverb 'altogether':

(244) wo kanguo [sange ren xie de neiben shu]
I read three man write DE that book
'I have read the book that three men wrote.'

(245) *wo yigong kanguo [sange ren xie de neiben shu]
I altogether read three man write DE that book

Since the presence of 'altogether' in the matrix clause forces a wide-scope interpretation of the quantificational NP 'three men," QR must move this NP to a position c-commanding the matrix S. But in doing so, the trace left behind will be free within a specific NP, in violation of the Specificity Condition.

One of the arguments that support the idea that quantifier scope interpretation and wh phrases in situ involve abstract movement in LF is the fact that the traces left by the abstract movement behave on a par with traces left by overt movement under the Specificity Condition. This fact is a natural consequence of the assumption that they are indeed the same elements, i.e., empty categories, at some relevant level. The relevant evidence for the claim that traces left by overt movement rules also obey the Specificity Condition comes from contrasts of the following sort:

(246) a. Who did you see a picture of t?

b. *Who did you see that picture of t?

The well-formedness of (246a) shows that extraction from an object NP should be allowed, whether or not such extraction involves a (vacuous) PP extraposition rule of the sort proposed in Chomsky (1977). (246b), therefore, should not be ruled out by Subjacency, since it would otherwise wrongly rule out the well-formed (246a). The ill-formedness of (246b) does follow from the Specificity Condition, however.

To the extent that the Specificity Condition motivates a theory which represents Q-NPs as empty categories at LF, there is also good reason to represent pronouns bound to Q-NPs as empty categories. The reason is that such pronouns behave on a par with the empty categories left over by overt movement in Syntax and abstract movement in LF under the Specificity Condition.

5.6.3. Why the Properties of Pronominal Binding

We have remarked that there are three distinctive properties of quantificationally bound pronouns: (a) they must be c-commanded by their quantificational antecedents occurring in $\bar{A}$ positions at LF; (b) they exhibit weak crossover phenomena; and (c) their distribution is governed by the Specificity Condition. By contrast, pronouns whose antecedents are not quantificational are usually observed not to exhibit these properties. First of all, under the assumption that only quantificational NPs undergo abstract movement in LF, pronouns whose antecedents are names must apparently be allowed even though their antecedents do not c-command them at LF. This is already a well known fact, and needs no exemplification. As regards weak crossover, we have already seen that pronouns bound to proper names and other specific NPs do not exhibit weak crossover effects. (See, for example, (207a), (208a), (209a).) Finally, a pronoun can apparently occur within a specific NP bound to an antecedent outside of that NP as long as the antecedent is not quantificational. Compare the ill-formed (220b), (221b), and (222c-d) with the following well-formed sentences:

(247) John$_i$ enjoys reading that paper, which he$_i$ wrote.

(248) John$_i$ should respect Professor Smith, who he$_i$ has learned a lot from.

(249) John$_i$ likes this story about him$_i$.

(250) Zhangsan$_i$ xihuan neiben ta$_i$ de shu
like that he DE book
'Zhangsan$_i$ likes that book of his$_i$.'

It is natural to ask at this point why quantificationally bound pronouns should exhibit these three special properties, and whether

it is possible to reduce these properties to more fundamental principles.

It seems that the second property, that of exhibiting weak crossover effects, is a genuine distinguishing property of such pronouns. It is this property, among others, that motivates the linguistic level of Logical Form that we assume here, where quantificational and referential NPs are treated differently. Weak crossover effects occur on quantificational NPs and pronouns bound to them only, because the Bijection Principle or Higginbotham's condition of accessibility applies to LF mapping rules only and because LF mapping rules, by assumption, affect only quantificational NPs and quantificationally bound pronouns. At this stage, there does not seem to be any obvious way to reduce the Bijection Principle or the condition of accessibility to any more fundamental principles.

As for the other two properties, I would like to suggest, quite informally, that they are not genuine distinguishing properties of quantificationally bound pronouns. It is possible to claim, in other words, that even referential NPs and referentially bound pronouns also exhibit the same properties. Referentially bound pronouns, in particular, may also be seen to obey the Condition of Proper Binding (CPB), i.e. to occur within the scope of their referential antecedents, and also satisfy the Specificity Condition, at some relevant level of representation. This can be seen to be the case if we assume that referential NPs also undergo movement in some interpretive component. In order to allow for the differences between the two types of pronouns under weak crossover, the movement of

NPs cannot take place in LF. But it is possible to move such NPs at a post-LF stage, say in LF'. This is the level where the two types of pronouns may be seen to obey both the CPB and the Specificity Condition, their superficial differences being reducible to more fundamental differences between their antecedents.

The assumption that referential NPs like proper nouns and definite noun phrases undergo movement is a common assumption among Montague grammarians. It is a familiar insight that proper names and definite descriptions, like quantified phrases, also behave like variables in some sense. This insight is captured in Montague grammar by the familiar operation of lambda-conversion. Thus, the sentence (251) has the representation (252) after John is lambda-converted:

(251) John arrived yesterday.

(252) [λ x [x arrived yesterday]][John]

The relation between the lambda operator (λ x) and the variable x in the main clause [x arrived yesterday] is on a par with typical quantifier-variable relations, and the process by which (251) is turned into (252) is an instance of movement, which we may take to be an extended version of QR.

As we have mentioned, pronouns taking referential NPs as their antecedents are also bound variables on a par with quantificationally bound pronouns, since they denote whatever their antecedents denote. Therefore, semantically, it is not unreasonable to represent referentially bound pronouns also as variables at some appropriate level of representation. There are reasons for not moving proper

names and referential descriptions in LF, but there does not seem to be any compelling reason, as far as I know, against moving them in a component other than LF. The same applies to the process of turning a lexical pronoun into a variable. Let us see now how the two conditions, the CPB and the Specificity Condition, can be seen to apply to both referential and quantificational NPs and their bound pronouns.

It is a commonplace observation that proper names and definite NPs generally take the widest scope within a given utterance. This might seem paradoxical in view of the statement often made that only quantificational NPs bear scopes but proper names or definite NPs do not. When one says that quantificational NPs are scope bearing elements, this, I think, should be taken to mean that they can enter into scope relations with other NPs, having either wide or narrow scope with respect to the latter. On the other hand, proper names and definite NPs always have wide scope, in some sense. They may be said to be non-scope bearing elements in the sense that they are incapable of interacting with other scope bearing elements in ways that quantificational NPs can.

The view that proper names and other referential NPs have widest scope in a given utterance has to do with the fact that the relative scope that an NP has with respect to another corresponds to the relative referentiality or specificity of the two NPs. If A has wider scope than B, then A is "more referential" or "more specific" than B, since the reference of B cannot be determined before the reference of A is determined. Thus, in "few men saw many women", if

few has wide scope with respect to many, then the potential reference of many women is determined on the basis of each instantiation of few men; the situation is reversed, if many women is taken to have wide scope with respect to few men. We might, therefore, say that "relative specificity" is synonymous with "relative scope". This does not mean that any quantificational NP having the widest scope within an utterance is specific or referential; it is only more specific than the NPs that occur within its scope. However, this does mean that an NP that is fully referential, such as a proper name or a specific NP, necessarily takes the widest scope in any utterance in which it occurs.

Before we consider the CPB and the Specificity Condition again, observe also that when two NPs A and B are of "the same kind", the scope orders [A B] and [B A] are logically equivalent:

(253) Every man loves every woman.

(254) a. [Every man x [every woman y [x loves y]]]

b. [Every woman y [every man x [x loves y]]]

Similarly, the relative scope representations (256a) and (256b) are logically equivalent for the sentence (255):

(255) John likes this man.

(256) a. [x=John [y=this man [x likes y]]]

b. [y=this man [x=John [x likes y]]]

Therefore, two specific NPs may take either scope with respect to the other, as far as both of them take the entire sentence in their scope and neither falls within the scope of a non-specific NP.

Let us now turn to the two conditions under consideration: the CPB and the Specificity Condition. First, although a pronoun whose antecedent is a specific NP may not c-command the pronoun at DS, SS, or LF, it will always c-command the pronoun at LF', if we assume that specific NPs undergo movement and that they take the widest scope within an utterance, i.e. over the entire root sentence. Thus, the sentence (257) has the representation (258) at LF', in which the variable corresponding to him at SS is properly bound by John:

(257) If John$_i$ doesn't show up, I will be mad at him$_i$.

(258) [x=John$_i$][if x doesn't show up, I will be mad at x]

The descriptive difference under the CPB between the two types of pronouns under consideration is therefore a simple consequence of the fact that specific NPs take wider scope than quantificational NPs. They differ with respect to the CPB at LF, but are quite on a par at the level of LF'. Their difference at LF is a simple consequence of our own assumption that only Q-NPs undergo movement in LF. But this is not a real difference between the two types of bound pronouns. This is consistent with the view that all anaphoric pronouns are bound variables semantically, and as bound variables, it is natural to assume that both are syntactically bound.

Consider now the Specificity Condition. This condition rules out the sentential scope reading on everybody in (259) and the bound variable interpretation on the pronoun he in (260):

(259) I like that picture of everybody.

(250) *Everybody$_i$ respects Professor Smith, who he$_i$ has learned a lot from.

Under the sentential scope reading on everybody, (259) has the representation (261). Under the bound variable interpretation of he, (260) has the representation (262). In both cases, we have a variable free within a specific NP in violation of the Specificity Condition.

(261) [[For every x; x a person][I like [$_{np}$ that picture of x]]]

(262) [[For every x; x a person][x respects [$_{np}$ Professor Smith, who x has learned a lot from]]

Note that under the proposal that specific NPs undergo movement in LF', there is no need to invoke the Specificity Condition at all. Such representations as (261)-(262) may be allowed at LF in the absence of this condition, but when each of the specific NPs containing the variables is moved in LF', it must take the widest scope. (261) and (262) would have the following representations at LF':

(263) [[y=that picture of x][for every x; x a person][I like y]]]

(264) [[y=Professor Smith, who x has learned a lot from][for every x; x a person][x respects y]]]

In (263), the variable x lies outside the domain of the quantifier [For every x; x a person]. Furthermore, the quantifier does not c-command any variable. This representation therefore violates both the CPB and the CQB, since we have a free variable and a vacuous quantifier here. The Specificity Condition is therefore reduced to the two independently motivated conditions CPB and CQB, now construed as applying at the LF' level. The case of (259) represents a case of required inversely-linked quantification that cannot be fulfilled. In (259), the Q-NP everybody is properly

contained in the NP that picture of everybody. Therefore, if everybody is construed as having sentential scope, it must have scope over the NP that dominates it in accordance with the CPB and the CQB. But this requirement cannot be fulfilled due to the fact that the more inclusive NP, that picture of everybody, is specific and must have wider scope than everybody.

Similarly, (264) is ruled out for the reason that the first occurrence of the variable x is free in it. The effects of the Specificity Condition in this case are subsumed under the CPB. There is no possible LF' representation for (260) which satisfies the CPB, because the NP properly containing the pronoun he is specific and must have wide scope with respect to its quantificational antecedent of everybody.

On the other hand, note that in (265) the name John obviously can have sentential scope, in contrast to (259), and the sentence (266) is well-formed, in contrast to (260):

(265) I like that picture of John.

(266) $John_i$ respects Professor Smith, who he_i has learned a lot from.

Recall that for two specific NPs A and B, the relative scope orders [A B] and [B A] are logically equivalent. Therefore, (265) may be represented as either (267a) or (267b):

(267) a. $[John_i\ [[\text{that picture of } e_i]_j [\text{I like } e_j]]]$

b. $[[\text{That picture of } e_i]_j [John_i\ [\text{I like } e_j]]]$

Although (267b) is ruled out jointly by the CPB and the CQB, (267a) satisfies both these conditions. Therefore, (265) is correctly

allowed with John interpreted as having sentential scope. Similarly, one of the two logically possible representations for (266) is ruled out by the CPB, but not the other:

(268) a. [John$_i$ [[Professor Smith, who e_i has learned a lot from]$_j$[e_i respects e_j]]]

b. [[Professor Smith, who e_i has learned a lot from]$_j$ [John$_i$ [e_i respects e_j]]]

The analysis suggested here has the following advantages. First, it eliminates the need for the Specificity Condition as proposed in Fiengo and Higginbotham (1981) (or the Name Constraint of May 1977 and of Gueron 1980), and derives it from the independently needed conditions CPB and CQB. Secondly, the question disappears as to why only quantificationally bound pronouns have to occur in the scope of their antecedents. In our conception, both referentially and quantificationally bound pronouns have to be bound (at LF'). Thirdly, the question also disappears regarding why only quantifier scope interpretation and interpretation of quantificationally bound pronouns must obey the Specificity Condition. In our conception, scope interpretation of both type of NPs and the interpretation of both types of pronouns as bound variables do obey the Specificity Condition; they differ only in that, because of their referential nature, specific NPs and referentially bound pronouns always will satisfy this condition, though quantificational NPs and quantificationally bound pronouns may not.

An important exception to the theory of pronoun interpretation adopted here includes sentences of the following sort:

(269) Every woman who kissed the man who she loved married him.

In this sentence, the pronoun him can be interpreted as bound to the NP the man who she loved, where she is bound to the head woman. That is, (269) is well-formed on the following construal:

(270) [Every woman who kissed [the man who she$_i$ loved]$_j$]$_i$ married him$_j$.

If we require that him must be c-commanded by its antecedent, the man who she loved, then the latter must be moved in LF or LF' to a position c-commanding him. In order to c-command him$_j$, NP$_j$ must have scope over the entire matrix sentence. Since NP$_j$ is properly contained in NP$_i$ (every woman who kissed the man who she loved), in order to satisfy the CPB and the CQB, NP$_j$ must have wide scope with respect to NP$_i$. The representation with NP$_j$ having wide scope over NP$_i$ is as follows:

(271) [[The man who she$_i$ loved]$_j$[[every woman who kissed e$_j$]$_i$ [e$_i$ married him$_j$]]]

In this representation, him$_j$ (to be turned into a variable) is properly c-commanded by NP$_j$ in operator position. However, she$_i$ (also to be turned into a variable) fails to be c-commanded by NP$_i$. Thus, in (270) the antecedent j fails to c-command the pronoun j, in violation of the CPB. In (271), the antecedent i fails to c-command the pronoun i, also in violation of the CPB. Thus there is no way for this sentence to satisfy the CPB, either before NP$_j$ is moved to operator position or after.

Note that although NP$_j$ in (270) is a definite description, it is not specific, but rather quantificational, since its reference varies along with the value of the pronoun she which it properly

contains. The pronoun she, in turn, is bound to the subject of kissed, i.e. who, which is coindexed with the head every woman.

Constructions of the type exemplified by (270) are, in fact, quite common, and they illustrate the existence of what Geach (1962) calls "pronouns of laziness". In Evans (1980), such pronouns are called E-type pronouns. A "pronoun of laziness" is used as a "lazy" way to refer to a non-specific antecedent which may not be totally identifiable as a syntactic constituent but whose reference is determined by other materials in a sentence in which it occurs. Well known constructions of the sort include (272) and the "donkey" sentence (273):

(272) If someone comes in, please tell him to be quiet.

(273) Everyone who owns a donkey beats it.

In (273), the pronoun it is not bound directly to the existentially quantified a donkey. It is not intended to refer to whatever donkey there is that exists. Rather, it is intended to refer to the donkey that he owns (where he is an instance of everyone). Therefore, the correct representation of (273) should not treat it as a variable bound directly to donkey. It is a bound variable, but bound to something that is not syntactically present as a constituent that c-commands it, but to something whose reference can be computed from the construction in which a donkey occurs. Similarly, him in (272) is a variable, but not a variable directly bound to someone, for the sentence does not mean that there exists someone x such that if x comes in, please tell x to be quiet. Rather it means that if there is someone that comes in, please tell the one that comes in to be

quiet. The sentence (270), therefore, is simply another sentence containing "a pronoun of laziness". The pronoun him is bound to something whose reference has to be determined from the construction in which it occurs. Such "donkey sentences", it seems, require a special treatment in the grammar by which an antecedent, though not always syntactically identifiable as something that c-commands the "pronoun of laziness", can be identified by some appropriate interpretive computational procedures. (We might assume that at the level where the antecedent is identified by such computational procedures, it does c-command the pronoun. For some exploration along such lines, see Haik 1982.)

The suggestion that sentences like (270) should be treated on a par with "donkey sentences" has already been made by Cooper (1979). Cooper suggests extending the analysis also to sentences of the following sort, in which the antecedent of a pronoun is fully specified:

(274) Every woman who kissed John$_i$ wanted to marry him$_i$.

(275) Every woman who kissed that man$_i$ wanted to marry him$_i$.

However, treating sentences like (274) and (275) on a par with "donkey sentences" seems to be entirely unnecessary. The antecedents of him in (274) and (275) are both inherently referential and do not rely on the context for their reference. Furthermore, they certainly can have scope over the entire root sentences, thus properly binding the pronouns. The antecedents in these sentences are very different in nature from the antecedents of "pronouns of laziness". Cooper has to adopt the "pronoun of laziness" analysis

only because he assumes that the process of quantifying in that affects John and that man cannot violate Subjacency, in particular the CNPC. However, there is already enough evidence, I believe, that Subjacency is not operative in LF. It is entirely natural to assume that it also does not apply in LF'.

CHAPTER FIVE: FOOTNOTES

1. See Aoun and Sportiche (1981) for arguments that their notion of government better serves the purposes of the binding theory.

2. Reciprocity is usually expressed in Chinese by the adverb huxiang or bici 'mutually.' Another common way to express reciprocity is by way of sentences like (i), where the pronouns 'I' and 'you' are used as variables bound to the topic 'they':

(i) tamen, wo kan ni, ni kan wo.
they I look you you look i
'They look at each other.'

The morpheme bici can sometimes be used as an NP equivalent to each other, but its use is very limited and rather marginal. In what follows, I will use only the reflexive ziji 'self' in our examples for discussion.

3. Note that there is an additional reason for the ill-formedness of (11d). Since the passive verb seen does not assign Case, the sentence can be ruled out by the Case filter, which requries every lexical NP to bear Case. The NP our destruction t_i is lexical, but cannot receive Case from seen.

4. The reason why there should be a slight preference for the anaphor to the pronoun probably has to do with the tendency to avoid ambiguity wherever possible. Thus, given that the grammar already allows the use of an anaphor to express the proximate reading as

in (19a), a speaker may have the tendency to avoid using a pronoun as in (19b) for the same proximate reading, since (19b) is ambiguous between a proximate and a non-proximate reading. On the other hand, note that sentences of the following sort differ from those of (19) in essential ways:

(i) a. $John_i$ took a picture of $himself_i$.

b. *$John_i$ took a picture of him_i.

(ii) a. $They_i$ told stories about $each\ other_i$.

b. *$They_i$ told stories about $them_i$.

In these sentences a pronoun must be interpreted as disjoint from the subject. Apparently, individual lexical verbs are responsible for the difference between (i) - (ii) and those sentences in (19). The former type of sentences are associated with verbs like take, tell, etc., while the latter type are associated with verbs like hear, receive, relate, see, etc.:

(iii) a. $John_i$ heard a story about $himself_i$.

b. $John_i$ heard a story about him_i.

We propose to consider sentences represented by (19) and (iii) here as constituting the central facts of the language, assuming that sentences of such forms generally admit both pronouns and anaphors. Sentences of the form represented by (ib) and (iib), however, are excluded for pragmatic reasons. For example, consider (ib). Since John took a picture, he is the subject of the picture. The picture, in other words, is John's picture. (i) is excluded, therefore, on analogy to '*$John's_i$ picture of him_i,' which violates (1b).

5. We shall also have to adopt Aoun and Sportiche's notion of c-command: A c-commands B if the first maximal projection dominating A also dominates B. This allows the INFL to c-command the subject, in their sense, and be accessible to it.

6. Note, however, that the following is well-formed:

(i) John_i is [his own_i cook]$_i$.

Although his own is coindexed with his own cook, there need not be referential circularity involved here. His own can pick up its reference from outside, in particular from John, which is independently referential, and his own cook can depend upon his own without the latter also depending upon the former. His own cook can also pick up its reference directly from John by the meaning of the equative sentence. Therefore, the well-formedness condition (24) must be somehow reformulated or qualified to accommodate (i). For further discussion of referential circularity, see Higginbotham and May (1979), Brody (1981).

7. For some speakers, the sentences (30), (32), and (33) are somewhat less natural.

8. For example, there is no accessible SUBJECT in (i) for the anaphor, yet it may be bound to a non-SUBJECT antecedent:

(i) It pleased them_i that pictures of each other_i were on sale.

9. When there is no antecedent around, PRO takes on arbitrary reference, as if it were a free variable:

(i) It is unclear what PRO to do.

10. Consider the following sentences:

(i) *They witnessed [each other's destroying the city].

(ii) ?They witnessed [each other's destroying of the city].

(iii) They witnessed [each other's destruction of the city].

The ill-formedness of (i) is not accounted for in Chomsky (1981a), nor does it immediately fall under the modification suggested in this section. I would like to suggest that gerundives have the structure more or less on a par with that of a sentence: [each other's ING destroy the city], with ING being in the position of INFL. ING then governs the subject each other in (i). It is also plausible to assume that ING is the accessible SUBJECT of each other, since gerundives are somewhat nominal in nature. The ill-formedness of (i) then follows from the binding condition (1a), since the gerundive phrase is the governing category for each other. This analysis is quite consistent with the fact that the city is assigned Case by the verb. If the structure of (i) is as suggested, then destroying starts out as the verb destroy at DS. After affix-hopping, we may assume destroying still retains its Case-assigning ability. Hence the city is Case-marked. On the other hand, if destroying is formed in the lexicon (as an option), it will start out as a noun, which is not a Case assigner. This requires of-insertion, and we have (ii). Precisely here, we do not have an INFL, and each other does not have an accessible SUBJECT in the bracketed phrase. Therefore it may be bound outside of the bracketed phrase. (ii) is thus more on a par with (iii).

Compare (i) and (ii) also with (iv) and (v) below:

(iv) They avoided [PRO destroying the city].

(v) *They avoided [PRO destroying of the city].

Our assumption that the gerund in (ii) is formed by lexical rules extends to (v). Since PRO is governed by the N destroying here, (v) is ill-formed on a par with *John saw PRO books. Since we assume that INF can govern each other in (i), however, it is a problem why PRO can occur in place of each other in (iv). Adapting the idea proposed in Chomsky (1981a) for pro-drop phenomena, I would like to suggest that affix-hopping, which involves postposing INF to the right of the verb destroy, may occur in the Syntax. If it occurs in the syntax, the subject position is ungoverned, and we have a PRO, as in (iv). If it occurs in PF, the subject position is governed, and we have a lexical subject, as in (vi) below:

(vi) They preferred [their destroying the city].

(i) and (vi) differ precisely in that each other is free in its governing category in (i) in violation of (1a), whereas their is free in its governing category in (vi) in accordance with (1b).

11. Cf. also footnote 4 concerning sentences like John took a picture of himself/*him.

12. For example, Chomsky (1981b) suggests that the lack of lexical pronomial anaphors (the lexical counterpart of PRO) is explained by the assumption that a pronominal anaphor is ungoverned, but Case is assigned under government. Since lexical phrases must have Case,

and ungoverned lexical phrases cannot be assigned Case in the normal situations, no lexical pronominal anaphors exist.

13. For more examples of the sort illustrated in (105), see Li and Thompson (1979), Tsao (1977).

14. We will assume that the trace in (106) involves movement to the position of OP in Syntax (rather than in LF). The reason is that the distribution of this discoursally interpreted trace appears to be subject to island constraints:

(i) *zuotian lai-le yige Xiansheng$_i$ wo zhidao [Zhangsan
yesterday come-ASP one I know

da-le [e]$_i$ de shiqing]
hit-ASP DE matter

'*Yesterday came a Mr. I know the fact that Zhangsan hit [him].'

15. Thus, the following sentence is unacceptable:

(i) *Zhangsan, Lisi ku [de [[e] hen shangxin]].
cry till very sad

The empty subject of the resultative clause must refer to the subject. But then the sentence is meaningless, with a topic followed by a clause that can hardly be said to make a comment about it. We shall assume that Subjacency is responsible for the fact that the empty subject cannot be a wh trace referring to the topic in (i). The resultative COMP de lexically fills the COMP node, thereby precluding a COMP-to-COMP escape hatch.

16. This probably does not represent the whole picture concerning the pro drop phenomenon. There are languages, Japanese for example, that do not seem to fit readily into this scheme, and suggest that something in addition may be involved in a more comprehensive theory of pro drop.

17. The relevance of this fact for our argument was pointed out to me by Jim Higginbotham (p.c.).

18. Consider the following sentence:

(i) Zhangsan qi ma qi [de [[e] hen lei]]
ride horse ride till very tired
'Zhangsan rode a horse until he got very tired.'

In (i), the empty category must be bound to the matrix subject, not to the object 'horse.' Pragmatically, there is no reason why a horse can not become tired as a result of Zhangsan's riding it. There is little hope in a theory that attempts to explain (i) and the like in terms of speaker's inference (cf. Li and Thompson, 1981). When ma 'horse' is subjectivalized under passivization, or preposed by ba-transformation, it becomes the controller of the resultative clause subject:

(ii) ma bei Zhangsan qi [de [[e] hen lei]]
horse by ride till very tired
'The horse was made very tired as a result of Zhangsan's riding it.'

(iii) Zhangsan ba ma qi [de [[e] hen lei]]
BA horse ride till very tired
'Zhangsan rode a horse until it (the horse) got very tired.'

19. Note that, unlike English, Chinese requries a reflexive to be bound to a subject (in its governing category).

(i) Zhangsan$_i$ gaosu Lisi$_j$ shuo [ziji$_{i/*j}$ yao lai]
tell say self will come
'Zhangsan told Lisi that he [Zhangsan] will come.'

It is therefore necessary to somehow strengthen (1a). We suggest that (1a) may be parameterized as follows:

(1a) An anaphor is bound (to a subject in its governing catetory).

20. The only case where the fact that A c-commands B does not entail that B does not c-command A is when A and B c-command each other, as in (i) but not (ii):

(i) ??I gave Mary herself.

(ii) I gave Mary to herself.

But the status of (i) is so unclear as to suggest no reliable evidence either for or against our formulation, so I will adopt (153) for its generality.

21. Evans' principle is given as follows:

(i) A term can be referentially dependent upon an NP if it does not precede and c-command that NP.

We assume that precedence is irrelevant here, following Reinhart (1976) and on the basis of the discussion below.

22. Intermediate traces in COMP must not count as local $\bar{A}$-binders for the definition of a variable. Rather, it is the actual operator that counts. Thus, in (i) below, the empty category is locally A-bound to the matrix subject, not locally $\bar{A}$-bound to the intermediate trace

in COMP:

(i) Who$_i$ did he$_i$ say [t$_i$ [I saw e$_i$]]?

23. See Higginbotham (forthcoming) for alternative ways to account for strong crossover.

24. For example, there is an analytic problem, discussed in Jackendoff (1972), which arises under this directional approach:

(i) The woman he loved told him John was a jerk.

We cannot have he=him=John. In the directional theory, there is no immediate solution to this problem, since he may pick up its reference from John, and him may pick up its reference from he. In both cases, no known grammatical principle is violated, yet the coreference possibility is excluded. Within the theory embodying a non-directional view under coindexing, this automatically falls under (1c). See Higginbotham (forthcoming) for some discussion of this and other problems.

25. The same point applies in Japanese. Thus, (i) is as bad as (178a):

(i) *kare-no hahaoya-no tomodati-ga John-o mita.
he mother friend see
'His$_i$ mother's friend saw John$_i$.'

26. In sentences of the following sort, the pronoun is not coreferential with John, but may include John as its antecedent. This is a case of overlapping reference:

(i) John said that they will come tomorrow.

27. A relevant piece of evidence for the assumption that the binding theory applies at SS rather than LF is the contrast below (due to R. Kayne and M. Brody):

(i) Which picture that John$_i$ took does he$_i$ like?

(ii) *He$_i$ likes every picture that John$_i$ took.

(i) and (ii) have about the same structure at LF, after QR applies to (ii). The binding theory cannot distinguish between the two at LF, though the difference is readily accounted for at SS. Other evidence is discussed in Chomsky (1981a, 1981b). Aoun (1982) argues that the binding theory must be allowed to apply both at SS and at LF.

28. Note that if the bound pronoun is further embedded as in (206), binding appears to be more easily acceptable. This appears to be an analogue of the condition of cyclic-c-command proposed earlier, though it cannot be reduced to the latter.

29. The demonstrative can also be used anaphorically, not deictically. For example, in the following sentence, <u>that</u> is not deictic, and the sentence is fine with a variable free in the NP containing <u>that</u>:

(i) Everyone$_i$ reads that part of the book that he$_i$ understands.

30. This is, in fact, one of the conditions on question formation in Chinese that has been proposed in Chen (1974), who proposes also (a) that no definite NP may be questioned and (b) that no element contained within a non-restrictive modifier may be questioned. Neither

of these two additional conditions are necessary, however, The first one may follow from the fact that a wh phrase is indefinite. The second one is necessitated only by Chen's conception of the referentiality of generic NPs. She considers generic NPs as non-specific and therefore is required to propose the second additional condition to account for the fact that non-restrictuve modifiers to generic NPs cannot have their constituents questioned. But it is perfectly legitimate to look at generics as definite and specific, since they refer to specific kinds. The second condition is therefore unnecessary, given the Specificity Condition.

CHAPTER SIX: MOVE α, SUBJACENCY, AND THE ECP

6.0 Introduction

Perhaps the most important feature of the framework of grammar we are assuming, the trace theory, is the assumption (derived from the Projection Principle) that there exist various empty categories at various levels of mental representation. An important consequence of this assumption is that it allows the statement of certain generalizations concerning dependencies across constructions involving movement and/or deletion processes and constructions involving no such processes. For example, in discussing the binding theory in Chapter 5, we saw that certain empty elements share properties with overt lexical anaphors, others with names or referential expressions, and still others with pronouns, or jointly with anaphors and pronouns. These are, respectively, NP-trace, wh-trace, pro, and PRO. The assumption that such categories exist also enables one to ask interesting questions about their nature, the investigation of which has not only produced substantial improvement in recent linguistic theory, but continues to offer promise for the most interesting kinds of insights concerning the nature of the human language faculty. Chomsky (1981a:55) says:

> The question of the nature of empty categories is a particularly interesting one for a number of reasons. In the first place, the study of such elements, along with the related investigation of anaphors and pronouns, has proven to be an excellent probe for determining properties of syntactic and semantic representations and the rules that form them. But apart from this, there is an intrinsic fascination in the study of properties of empty elements. These properties can hardly be determined inductively from observed overt

> phenomena, and therefore presumably reflect inner resources of the mind. If our goal is to discover the nature of human language faculty, abstracting from the effects of experience, then these elements offer particularly valuable insights.

In this chapter we will be concerned with the special properties of empty categories. This subject is interesting not only for the general reason just noted, but also because it pertains specifically to our investigation of the interactions between Syntax and Logical Form. As we saw in Chapters 3 and 4, there is motivation for assuming that certain scope bearing elements, in particular, quantificational expressions, wh phrases, and the focus marker and the A-not-A operator in Chinese, are naturally analyzed as occupying operator or quantifier positions at LF, c-commanding open sentences over which they have scope. Furthermore, in discussing pronouns as bound variables, we noted that such pronouns may be naturally represented as empty categories at the LF level. Empty categories, in other words, may be generated in "overt" form (although all empty categories are somewhat abstract), as by lexical insertion or by the rule of Move α in Syntax, or they may be created in "abstract" form, i.e. by abstract mapping processes in LF. An interesting question that arises is what the relation is between the "overt" and the "abstract" empty categories. Are they of the same nature and do they share the same properties? An answer in either the affirmative or the negative is of course of important consequence for the theory of grammar. If the two kinds of empty categories have exactly the same properties or share some essential properties, especially properties that are not shared by non-empty categories, then this will provide evidence of a very

strong kind for the assumption that the "abstract" kind of empty categories do exist, to the extent that the "overt" kind of empty categories do. On the other hand, if the two kinds of empty categories do not appear to share any properties, there will be much less motivation for the assumption that empty categories may be created in LF. If, for example, someone were to show that a certain principle must apply exactly at the output level of LF and that it must apply solely to the "overt" kind of empty categories, the correctness of such a claim would immediately cast serious doubt on our assumption that empty categories may be created by mapping processes in LF. We will try to sort out the properties of both of these types of empty categories and attempt to give at least a partial answer to the question concerning their relationship, or the relationship between the syntax of Syntax and the syntax of Logical Form.

We have been assuming all along that an empty category may be a wh trace, an NP trace, a PRO, or a pro, or more precisely, that there are four "allomorphs" of the Empty Category whose "allomorphy", following Chomsky (1981a, 1981b), is locally determined on the basis of the following criteria:

(1) a. An [$_{np}$ e] is pronominal (=PRO or pro) if and only if it is free or locally bound by an element with an independent thematic role, and non-pronominal (=trace) if and only if it is locally bound by an element without an independent thematic role.

b. A pronominal [$_{np}$e] is PRO if and only if it is ungoverned (and un-Case-marked), and pro only if it is governed (and Case-marked).

c. A non-pronominal $[_{np}e]$ is NP-trace if and only if it is locally A-bound, i.e. bound to an argument, and wh trace (variable) if and only if it is locally $\overline{A}$-bound.

Since we assume that empty categories may be created both in Syntax and in LF, one may ask if the inventory of "allomorphs" of the empty category that is created in one component is identical to that in the other. In principle, one would expect that the answer is yes, and that any deviation from this expected answer should be derivable from other independent principles of grammar. Let us consider the inventory of the empty categories in Syntax. We have assumed that all four types of empty categories exist in Syntax: wh-trace, NP-trace, PRO, and pro. Let us consider what types of empty category may be created in LF.

In LF, the application of QR or the movement of a wh phrase in-situ will create an empty category which, by the criteria in (1), will be identified as a wh trace or a variable. Since any wh phrase or quantificational NP that is A-bound at SS (either θ-bound or non-θ-bound) will be ruled out by the Binding Theory at that level, the result of applying QR or wh movement in LF is always a wh trace. It cannot be a PRO, nor an NP trace, nor a pro. Another process that creates empty categories in LF is the interpretation procedure that turns a pronoun coindexed with a quantificational NP or wh phrase into a variable. There are two possible results from such a process. If the pronoun is c-commanded by the trace of the quantificational NP or wh phrase, as in (2a), the resulting empty category will be identified as a pro. If not, as in (3a), the

empty category will be identified as a variable:

(2) a. [Everyone$_i$ [t_i expects you to respect him$_i$]].

b. For every person x, x expects you to respect x.

(3) a. [Everyone$_i$ [t_i's mother loves him$_i$]]

b. For every person x, x's mother loves x.

Thus two types of empty categories may be created in LF. Again, neither PRO nor NP-trace may be created. There is, of course, an independent reason why no PRO nor NP-trace may be created in LF. Since the creation of an empty category in LF requires a lexical category at SS and PF, and since NP-trace and PRO are not Case-marked but lexical categories are, empty categories that are created by Case-marked (and governed) lexical categories cannot be PRO or NP-trace.

Given independent reasons for the difference in the "allomorphs" that an empty category may have in Syntax and LF, it is natural to consider that the empty categories created in Syntax and those created in LF are all variants of the same entity, the Empty Category.

We have discussed properties of pronominals in Chapter 5, including the empty pronomials PRO and pro. We will now discuss the properties of non-pronominals, i.e. traces. Two subsystems of principles that enter into the discussion of traces are the bounding theory and the theory of government. In 6.1, we will review the Subjacency condition and illustrate its relevance to Chinese. In 6.2 we will discuss the Empty Category Principle (ECP) and show that the standard effects of this principle are apparently lacking

in Chinese. A suggestion is made on how to deal with this fact. In 6.3, we examine certain extensions of the ECP made in Kayne (1981), noting the insights his theory offers and some apparent problems. And in 6.4, a suggestion is made to set up an independent principle, which is free from the problems associated with Kayne's theory but still captures his essential insights.

6.1 Subjacency

The Subjacency condition places locality requirements on possible dependencies expressed by Move α. In its original form as proposed in Chomsky (1973), Subjacency says that in the configuration in (4) below, no rule may move an element from the position Y to either position of X or conversely:

(4) $\ldots X \ldots [_{\alpha} \ldots [_{\beta} \ldots Y \ldots] \ldots] \ldots X \ldots$

where α and β are bounding nodes.

The bounding nodes defined in the configuration (4) are taken to be the two cyclic nodes, NP and S, in English, and according to certain recent formulations, the choice of a bounding node for Subjacency may be a parameter fixed on a language-specific basis.[1] As formulated in (4), the Subjacency condition has the effect of tying together a number of island constraints formerly proposed by Ross (1967), including the Complex NP Constraint and the wh Island Condition. Moreover, given appropriate assumptions, the Sentential Subject Constraint of Ross (1967) and the Subject Condition of Chomsky (1973) may be analyzed also as subcases of this condition. Thus, for example, the sentences in (5)-(8), which illustrate

violation of these constraints, may fall under Subjacency:

(5) *[$_{\bar{s}}$ Who$_i$ [$_s$ do you like [$_{np}$ the books [$_{\bar{s}}$ that [$_s$ describe t_i]]]]]?

(6) *[$_{\bar{s}}$ What$_i$ [$_s$ do you wonder [$_{\bar{s}}$ who$_j$ [$_s$ t_j bought t_i]]]]?

(7) *[$_{\bar{s}}$ Who$_i$ [$_s$did [$_{np}$ [$_{\bar{s}}$ that [$_s$ she married t_i]]] surprise you]]?

(8) *[$_{\bar{s}}$ Who$_i$ [$_s$ did [$_{np}$ the pictures of t_i] please you]]?

In (5), an element is wh-moved from within a complex NP to the matrix COMP position. The movement crosses two S nodes and one NP node, in violation of Subjacency. Therefore, the effects of the Complex NP Constraint may be subsumed under Subjacency. Similarly, the movement of what in (6) crosses two bounding nodes (Ss); thus, any violation of the wh island constraint will also be ruled out by Subjacency. In (7), extraction from a sentential subject crosses two S nodes and one NP node (if the structure of (7) is as indicated), and in (8), extraction from a non-sentential subject crosses one S and one NP node. In both cases, Subjacency is violated; the formulation in (4) thus may take over the effects of the Sentential Subject Constraint and the Subject Condition.

There is little doubt that some sort of locality condition is required in the grammar of Chinese, as of any other language. For example, it is easy to demonstrate that Chinese has to obey the Complex NP Constraint. In (9) and (10) below, the subject of a relative clause is construed as bound to an NP (neige ren 'that man') outside of the complex NP containing the relative clause. As indicated, neither (9) nor (10) is well-formed:

(9) *[$_s$[$_{np}$[$_s$ t_i kanjian t_j] de xuesheng$_j$] lai-le]
see DE student come-ASP

de neige ren$_i$
DE that man
'*The man$_i$ that the student$_j$ who t_i saw t_j came.'

(10) *neige ren$_i$, [$_s$[$_{np}$[$_s$ t_i kanjian t_j] de xuesheng$_j$] lai-le]
that man see DE student come-ASP
'*That man$_i$, the student$_j$ who t_i saw t_j came.'

Neither is it possible to construe the object of the relative clause as bound by something outside of the complex NP, as both (9) and (10) are equally ill-formed even with the two traces t_i and t_j switched in position. In (9), an element is relativized from within a complex NP, and in (10) an element is topicalized out of the same domain. In both these examples, the relation between the trace t_i and its antecedent neige ren 'that man' crosses two S nodes and one NP node, exactly as the relation between who$_i$ and its trace t_i in (5). It is not difficult to analyze these structures as involving some movement operation that violates the CNPC, or Subjacency, as given in (1). Take topicalization for example. One can assume that a topic that binds an argument position is moved to its $\bar{A}$-position directly from the position of the trace it binds, either by movement into a base-generated empty TOP or by Chomsky adjunction to a clause. Or one may assume that the topic is base-generated in its surface position and that topicalization involves the movement of an abstract element from argument position to a position immediately adjacent to the topic, along the lines of the suggestion made in Chomsky (1977). The abstract moved element may be a lexical element at DS which gets deleted in PF or at SS, or it may take

the form of an empty NP, as suggested in Jaeggli (1980). According to the latter suggestion, the surface sentence (11) has the representation (12) at the level of SS:[2]

(11) neige ren, wo hen xihuan.
that man I very like
'That man, I like very much.'

(12) [neige ren [OP_i [wo hen xihuan t_i]]]
that man I very like

According to this analysis, therefore, (10) involves a violation of Subjacency, as the abstract operator (OP) in (13) has been moved across more than one bounding node:

(13) *neige ren, [OP_i [$_s$[$_{np}$[$_s$ t_i kanjian t_j] de
that man see DE

$xuesheng_j$] lai-le]]
student come-ASP

Similarly, relativization may be analyzed as involving some form of movement. One may suggest, for example, that it takes the form of "head-raising", so that the underlying structure of a headed relative clause structure is a "headless" (or empty-headed) one, a form that some languages may take.[3] On this account the relativization process is one that turns a structure like (14) into (15):

(14) [$_{np}$[$_s$ wo xihuan neige ren] de [$_{np}$e]]
I like that man DE

(15) [$_{np}$[$_s$ wo xihuan t_i] de [$_{np}$ $\underline{\text{neige}}$ $\underline{\text{ren}}_i$]]
I like DE that man
'The man that I like.'

Or, one may assume that the relativization process also involves the movement of an abstract OP, the same process that is involved in

topicalization. In either case, it is clear that it is possible to rule out sentences like (9) by the CNPC or Subjacency.

The examples (9) and (10) illustrate the effects of Subjacency in blocking movement from a complex NP containing a relative clause. The same point can be made with complex NPs that contain so-called "noun-phrase complements":

(16) *[$_s$ wo bu xiangxin [$_{np}$[$_s$ Lisi kanjian t_i]
I not believe see
'*The man$_i$ that I don't believe the statement

zheju hua]] de ren$_i$
this saying DE man
that Lisi saw t_i.'

(17) *neige ren$_i$, [$_s$ wo bu xiangxin [$_{np}$[$_s$ Lisi kanjian t_i]
that man I not believe see
'*That man$_i$, I don't believe the statement that

zheju hua]]
this saying
Lisi saw t_i.'

The effects of the Sentential Subject Constraint can also be demonstrated for Chinese.

(18) *wo mai-le [$_{np}$[$_s$[$_{np}$[$_s$ Lisi mei kan t_i] zhen qiguai]]
I buy-ASP not read real strange
'*I bought the book$_i$ that Lisi didn't read t_i is

de neiben shu$_i$]
DE that book
really strange.'

(19) ??neiben shu$_i$, [$_s$[$_{np}$[$_s$ Lisi mei kan t_i]] zhen qiguai]
that book not read real strange
'*That book$_i$, that Lisi didn't read t_i is really strange.'

Both (15) and (16) are not acceptable, with an element relativized or topicalized from within a sentential subject. Although the sentence (19) sounds better than (15), their difference clearly cannot be settled by Subjacency, since both involve exactly the

same configuration as far as Subjacency is concerned. A possible reason why (19) is better is that, since Chinese does not use an overt COMP for sentential subjects, sentences like (19) may be alternatively construed as something like (20), in which the topic 'that book' occurs within the sentential subject, violating no known constraint of grammar (recall that topics may occur embedded in Chinese, as pointed out in Chapter 2):

(20) $[_S[_S$ neiben shu_i, Lisi mei kan $t_i]$ zhen qiguai]
that book not read real strange
'*[The fact] that that book, he did not read, is really strange.'

Since (19) can be analyzed as (20), the sequence is always acceptable if uttered with the appropriate intonation breaks. In order to have the construal indicated in (19), it is necessary to have a heavy pause right after 'that book' and no puase after the sentential subject. But even with the required intonation it is not always necessary to have the construal in (19). The relative well-formedness of (19) may be attributed to the possibility of its being construed as in (20), although the type of intonation used along with it will make it sound rather unnatural, hence the grammaticality judgment given in (19). If this reasoning is correct, we may then consider (18) as evidence that the Sentential Subject Constraint is relevant also in Chinese.

As for extraction from a non-sentential subject, note that since NPs in Chinese are head-final, any such extraction will violate the Left Branch Condition of Ross (1967), whether the NP from which such extraction takes place is in subject or object

position:[4]

(21) *Zhangsan$_i$, [$_{np}$ t_i gou] si-le.
dog die-ASP
'*Zhangsan, the dog died.'

(22) *Zhangsan$_i$, wo kanjian [$_{np}$ t_i gou] le.
I see dog ASP
'*Zhangsan, I saw the dog.'

Given this, the effect of the Subject Condition cannot be directly seen in Chinese, nor is there any evidence suggesting its irrelevance in this language.

Finally, consider the Wh Island Constraint. Note that relativization or topicalization out of an indirect question is entirely free:

(23) [$_{np}$[$_s$ ni xiang-zhidao [$_s$ wo xiang shei mai t_i] de
you wonder I from who buy DE
shu$_i$] zai zher.
book at here
'?The book$_i$ that you wonder from whom I bought is here.'

(24) neiben shu$_i$ [$_s$ wo xiang-zhidao [$_s$ ni shemeshihou yao t_i]]
that book I wonder you when want
'That book, I wonder when you want.'

Up to now we have seen that Chinese does not present problems for Subjacency as far as the CNPC, the Sentential Subject Constraint, and the Subject Condition subcases are concerned. The Wh Island Constraint, however, does not seem to obtain in Chinese under relativization or topicalization. Although many languages are known to allow Move α to move elements out of an indirect question (e.g. Italian, French, Spanish, etc.), it is generally impossible for the rule to cross two wh islands at any one time. However, in Chinese the situation seems to be quite different. It is fairly easy to construct examples in which an NP is relativized or

topicalized across two or even more wh islands:

(25) zhe jiushi [$_{np}$[$_{s}$ wo xiang-zhidao [$_{s}$ ni weisheme bu
this is I wonder you why not
'*This is the book that I wonder why you wouldn't tell

gaosu wo [$_{s}$ shi shei xie t_i]]] de neiben shu$_i$]
tell I FO who write DE that book
me who wrote.'

(26) neige ren$_i$, [$_{s}$ qing wen ni [$_{s}$ shei xiang-zhidao [$_{s}$ wo
that man please ask you who wonder I
'*That man, please tell me who was wondering whether I

you-mei-you wen ni [$_{s}$ Lisi renshi-bu-renshi t_i]]]]
have-not-have ask you know-not-know
asked you if Lisi knew.'

In Rizzi (1978a), it is pointed out that in Italian, although relativization can cross one wh island, it cannot cross two or more than two. This fact is argued to be best accounted for by the assumption that instead of the category S, Italian chooses the category $\bar{S}$ as a bounding node for Subjacency (along with NP). Since a process that crosses over two or more than two wh islands will necessarily cross over at least two $\bar{S}$s, Rizzi's approach correctly rules out illegtimate violations of the Wh Island Constraint in this language. His approach is further supported by Sportiche's (1979) study in French, and Torrego's (1982) study in Spanish. If the Rizzi type theory is correct, then the fact that (25) and (26) are well-formed in Chinese cannot be accounted for by sole reference to the S/$\bar{S}$ parameter. Rather, it seems that wh questions in Chinese do not have any island effects on the application of relativization and topicalization. However, it is not true that wh questions do not have island effects on any other processes. As we will show in Chapter 7, wh questions do have island effects on the application of movement processes that affect the A-not-A operator or the

focus of a cleft sentence ("Move A-not-A" and "Move Focus"). We are thus in a situation where it is difficult to determine the relevance of the Wh Island Constraint in Chinese, and what the wh island facts would mean to a theory according to which the condition is subsumed as a subcase of Subjacency.

Before we look for a possible answer, note that there is a well-known class of examples that involve apparent unbounded movement both in English and in Chinese. This is when an element is moved out of an embedded declarative complement:

(27) This is the man that I said that you thought that she liked.

(28) neige ren$_i$, wo xiangxin ni renwei dajia dou shuo
that man$_i$ I believe you think everyone all say
'That man, I believe you think everyone said no one

meiyouren xihuan t_i.
no-one like
liked.'

According to Chomsky (1973), such apparent cases of unbounded movement as (27) are explained by the assumption that movement may go successive- cyclically through an intermediate COMP not lexically filled with a wh phrase. Thus, for example, (27) may be derived by moving the relativized NP in the position following the most deeply embedded verb liked, first to the lowest COMP, then to the second lowest COMP, then to the COMP immediately following the head noun phrase. In each step only one S node is crossed, and no violation of Subjacency ever occurs.

The Chinese example (28) can be similarly treated. Thus, if we assume that there is a COMP position clause-initially in every clause within (28), successive-cyclic movement is also possible, and

Subjacency need not be violated under the assumption that the highest clausal node, the node that immediately dominates COMP, is not a bounding node for Subjacency in Chinese.

Now, if we return to the problem posed by (23)-(26), an interesting solution concerning the Wh Island Constraint in Chinese is available, I think, which lies in the fact that wh questions are formed without overt movement in Syntax. Since wh words do not move in Syntax, wh questions are not islands at the time when relativization or topicalization applies, but once they undergo the LF movement of the wh phrases in-situ, wh islands are formed, giving configurations of the sort [wh-phrase$_i$ [... t_i ...]], which may then have the effect of blocking certain processes applying in LF, such as Move A-not-A, etc. In other words, if we assume, as we have, that Subjacency is a condition on the application of Move α, the fact that sentences like (23)-(26) are well formed will be an automatic consequence. We may, therefore, assume that Subjacency obtains in Chinese as it does in English, though some of its effects are vacuous in the former.

An important question that figures prominently in recent discussions of Subjacency is whether it should be properly construed as a condition on the application of Move α, or taken as a well-formedness condition on output representations. This is, of course, a question of important conceptual and empirical consequence. The traditional view of Subjacency takes it as a condition on movement. There is considerable conceptual advantage for taking it as a condition on representations, on the other hand, as has been argued,

most notably by Freidin (1978), Koster (1978) and others. But empirically, as far as I know, no argument has been produced for preferring the latter conception to the more traditional one. On the other hand, there is some empirical support for taking the more traditional view. In Chomsky (1981b), it is indicated that certain wh traces or variables in the sense of (1) may be base-generated in violation of Subjacency so long as they are each "licensed" by a wh trace that is derived by movement:

(29) This is the book which I bought t without reading e.

(30) This is the book that everyone who has read e will recommend t to you.

In each of (29) and (30), the gap marked by e (the "parasitic gap") is base-generated since it occurs in a position inaccessible to movement. At SS, both the base-generated parasitic gap and the real gap that is created by movement are identified as variables by (1). Therefore, they are indistinguishable at this level of output representation and at all later levels. Therefore, a parasitic gap that is subjected to Subjaceny at SS will be incorrectly ruled out by Subjacency. On the other hand, if Subjacency is construed as a condition on Move α, it will have bounding effects only on the creation of the real gap but not of the parasitic gap. Such sentences as (29) and (30), in which a parasitic gap is base-generated without regard to the bounding theory and a real gap is created by Move α in accordance with Subjacency, are correctly allowed as well-formed. There is, then, empirical reason for formulating Subjacency as a condition on movement, an assumption

that also solves the problem posed by wh questions with respect to the relevance of the Wh Island Constraint in Chinese.[5]

Besides the constructions we have examined, certain other constructions also offer independent support for the adoption of something like Subjacency for Chinese. For example, no extraction of an element is possible from within an $\bar{S}$ whose COMP is lexically filled with a preposition like gen 'with', lian 'even', yinwei 'because', etc.:

(31) *Zhangsan$_i$, [$_S$ wo [$_{\bar{S}}$ lian [$_S$ Lisi bu renshi t_i]]
I even not know
'*Zhangsan, I have forgotten even Lisi's not

dou wang le]
all forget ASP
knowing t_i.'

(32) *Zhangsan$_i$, [$_S$ zhejian shi [$_{\bar{S}}$ gen [$_S$ Lisi bu xihuan
this matter with not like
'*Zhangsan$_i$, this matter has nothing to do with Lisi's

t_i]] wu guan]
no relation
not liking t_i.'

(33) *Zhangsan$_i$, [$_S$ Lisi [$_{\bar{S}}$ yinwei [$_S$ wo meiyou qing t_i]]
because I not invite
'*Zhangsan$_i$, Lisi was very unhappy because I did

hen bugaoxing]
very unhappy
not invite t_i.'

Another construction that may show the relevance of Subjacency is the multiple topic construction. In Chapter 2, we indicated that constructions of the type illustrated below are common in Chinese:

(34) [$_S$ na sanben shu, [$_S$ meiyiben$_i$ [$_S$ wo dou kanguo t_i le]]]
that three book every-one I all read-ASP^i ASP
'Of the three books, I have read every one.'

(35) $[_s$ Zhangsan, $[_s$ neixie ren, $[_s$ lian yige$_i$ $[_s$ ta dou bu
those man even one he all not
renshi t_i]]]]
know
'Zhangsan, of those men, not even one he knows.'

Note that in such constructions, the trace in the lowest clause is invariably construed as bound by the lowest topic, not by any higher one. The same may be observed in the following sentence:

(36) $[_s$ Zhangsan$_i$, $[_s$ zhege ren$_j$, $[_s$ ta$_i$ hen xihuan t_j]]]
this man$_j$ he$_i$ very like
'(As for)Zhangsan$_i$, this man$_j$, he likes t_j very much.'

The pronoun in the lowest clause must be construed as bound to Zhangsan, the higher topic, so that the trace t_j may be construed as bound to the lower topic. The sentence, in other words, does not have the interpretation indicated below:

(37) *$[_s$ Zhangsan$_i$, $[_s$ zhege ren$_j$ $[_s$ ta$_j$ hen xihuan t_i]]]
this man$_j$ he$_j$ very like

Furthermore, note that the following sentence is unacceptable with the two traces interpreted as indicated:[6]

(38) *$[_s$ Zhangsan$_i$, $[_s$ zhege ren$_j$ $[_s$ t_i hen xihuan t_j]]]
this man$_j$ very like
'*Zhangsan$_i$, this man$_j$, t_i likes t_j very much.'

The constructions given in (31)-(33) can be easily excluded by Subjacency, under the assumption that successive-cyclic movement through COMP is possible only if the COMP is empty. In (31)-(33), the COMP which the required movement must go through in order to avoid the effects of Subjacency is lexically filled with a preposition. Since this escape hatch is not available, movement has to go one step, in violation of Subjacency, hence the ill-formedness of these sentences.

The facts about multiple topic constructions that we have just seen can also be accounted for by Subjacency in the following way. Note first of all that when a topic occurs with a COMP, it always occurs to the right of the latter:

(39) zhejian shi [$_{\bar{S}}$ gen [$_{S}$ neiben shu$_i$ [$_{S}$ ta bu kan
this matter with that book he not read
'This matter has nothing to do with (the fact) that

t_i]]] wu guan.
no relation
that book, he wouldn't read.'

(40) [$_{\bar{S}}$ yinwei [$_{S}$ neixie shu [$_{S}$ meiyiben$_i$ [$_{S}$ ta dou bu kan
because those books everyone he all not read
'Because, of those books, every one, he wouldn't read,

t_i]]]], ...

....'

If we consider the COMP or preposition in these sentences as dominated by $\bar{S}$, then it is natural to assume that topics are Chomsky-adjoined to Ss, as indicated throughout (34)-(40). Assuming that S is a bounding node in Chinese, the ill-formed sentences (37) and (38) are out, as expected, in violation of Subjacency. Alternatively, the clausal node dominating COMP may be assumed to be $\bar{\bar{S}}$ or even $\bar{\bar{\bar{S}}}$, etc. To rule out (37) and (38) under Subjacency, we may stipulate that all clausal nodes except those immediately dominating COMP are bounding nodes. The exceptional nature of the node dominating COMP is perhaps not unreasonable, since in some sense such clausal nodes are non-clausal, i.e. $\bar{\bar{\bar{COMP}}}$=PPs.

The fact that topics always occur to the right of overt COMPs in sentences like (39)-(40) shows that the topics in these sentences may not have been moved into the COMPs to their left. This raises a

question on whether it is possible to maintain that apparent unbounded movement of the sort exemplified by (27)-(28) really involves successive-cyclic movement through COMP. It should be pointed out, however, that the fact that topics do not move into the COMP of the cluase where they occur at SS does not entail that they cannot move through a COMP embedded under them. To maintain that apparent unbounded movement may be analyzed as successive-cyclic movement, one need only make the following hypothesis, in fact a null hypothesis: operator movement (i.e. wh movement) moves an element into any $\bar{A}$ position in any way it can, subject to other independent principles of grammar. This means that movement as involved in topicalization or relativization may be carried out at any time by Chomsky-adjunction to S, by movement into a base-generated topic position, by raising an element into a head position (of a relative clause), or by movement into an empty COMP, if one or more of these options are available. The fact that the topics in (39) and (40) do not occur in COMP is a simple consequence of the fact that movement in COMP in this case happens to be unavailable. But in long distance movement from embedded declaratives, that option need not be eliminated. Therefore, sentences (27) and (28) and the like need not be considered counterexamples to the formulation of Subjacency as given in (4).

This section has shown that a number of restrictions on antecedent-gap relations in Chinese can be conveniently brought under the Subjacency Condition. Although our discussion has not provided any significant evidence for the exact formulation of this condition,

we have shown that what might be considered counterexamples to the formulation given in (4) do not present real problems. This being the case, I will continue to assume the general applicability of this condition, until a better formulation is available, on possible dependencies expressed by the syntactic rule of Move α, in both Chinese and English. We will consider later whether Subjecency should also have any effects on the LF rules of interpretation, first in 6.3 and then again in Chapter 7. But first we turn in the next section to an initial discussion of the Empty Category Principle.

6.2. The Empty Category Principle

The Empty Category Principle (ECP) as proposed in Chomsky (1981a) originally grew out of several recent attempts to account for the well-known subject/object asymmetry under wh-movement, generally known as the "that-trace" or "COMP-trace" phenomenon, such as those exhibited in (41) and (42) below:

(41) a. *[$_{\bar{s}}$Who$_i$ [$_s$ do you think [$_{\bar{s}}$ that [$_s$ t_i saw John]]]]?

b. [$_{\bar{s}}$Who$_i$ [$_s$ do you think [$_{\bar{s}}$ that [$_s$ John saw t_i]]]]?

(42) a. *[$_{\bar{s}}$Who$_i$ [$_s$ did you wonder [$_{\bar{s}}$ how$_j$ [$_s$ t_i bought the book t_j]]]]?

b. ??[$_{\bar{s}}$What$_i$ [$_s$ did you wonder [$_{\bar{s}}$ how$_j$ [$_s$ he bought t_i t_j]]]]?

It is clear that Subjacency has nothing to say about this asymmetry, since it applies indiscriminately to positions within a bounding category. Recent literature has further shown that the results of wh-movement are not subject to the Opacity Conditions of Chomsky

(1980a), the predecessors of the binding condition (1a) on anaphors that we reviewed in Chapter 5. What is needed is a theory that distinguishes between subject and object positions in a principled way and a principle that makes crucial reference to such distinctions. To this need Chomsky (1981a) introduces the ECP:

(43) The ECP

An empty category must be properly governed.

An empty category here is, more precisely, a [-pronominal] empty category; thus it is either an anaphor or a variable, but not a PRO or pro. Government will be understood here as AS-government, as formulated in Aoun and Sportiche (1981). Proper government is defined in terms of government:

(44) Proper government

A properly governs B if and only if A governs B and

(a) A is a lexical category, or

(b) A is co-indexed with B.

According to this definition, a proper governor must be N°, V°, A°, or P°, but not INFL (or AGR), or it must be the antecedent of the empty category itself. Thus, (41b) is well-formed with respect to the ECP, because the object trace t_i is governed by the verb saw, a proper governor of the category V°. The subject trace t_i in (41a), however, is not governed by the verb saw because the verb occurs in a maximal projection (VP) which does not contain the subject. Although it is governed by the INFL of its clause, the INFL is, by (44), not a proper governor. Therefore the ECP is not satisfied with respect to the definition of proper government in (44a).

Furthermore, t_i in (41a) is not governed by its antecedent $\underline{who}_i$, which occurs in the matrix COMP, outside of a maximal projection (the embedded $\bar{S}$) which properly contains the trace. Although the embedded COMP may contain an intermediate trace in (41a) (as in (41b)) as a result of successive-cyclic movement, so that (41a) may have (45) as its representation at SS, that intermediate trace also fails to govern the subject trace because it is properly contained in a maximal projection (the COMP) that does not contain the subject trace:

(45) *$[_{\bar{s}}$ Who_i $[_s$ do you think $[_{\bar{s}}$ $[_{comp}$ t_i that$][_s$ t_i saw John$]]]]$?

The contrast between (42a) and (42b) can be obtained likewise. On the other hand, if the COMP that in (45) is absent, the entire COMP may be identified with t_i, which it exclusively dominates. In this case, the intermediate trace properly governs the subject trace, satisfying the ECP with respect to the definition (44b), and we have the well-formed (46):

(46) $[_{\bar{s}}$ Who $[_s$ do you think $[_{\bar{s}}$ t_i $[_s$ t_i saw John$]]]]$?

One of the explanatory values of the ECP is that it has a much wider range of application than the that-trace phenomenon, which led to its discovery. For example, among other things, Kayne (1979, 1981) has shown that, if the ECP is made to apply at LF, in particular, to the output of May's QR, it can account for the subject/object asymmetry with respect to the possibility of wide scope interpretation of personne in the French sentences below, since adjunction of personne under QR to the matrix S will convert (47a) and (47b) into configurations essentially identical to (41a) and (41b), or (42a) and (42b), respectively.

(47) a. *Je n'ai exigé que personne soit arrête.
'I didn't require that anybody arrested.'

b. Je n'ai exigé que la police arrête personne.
'I didn't require that the police arrest anybody.'

The outputs of QR on (47a) and (47b) are shown in (48):

(48) a. *[$_s$ personne$_i$ [$_s$ je n'ai exigé [$_{\bar{s}}$ que [$_s$ t_i soit arrête]]]]

b. [$_s$ personne$_i$ [$_s$ je n'ai exigé [$_{\bar{s}}$ que [$_s$ la police arrête t_i]]]]

with the trace of personne properly governed in (48b), but not in (48a). Similarly, Chomsky (1981a) and others have indicated that what was attributed to the Superiority Condition in Chomsky (1973) can be seen as exhibiting the same subject/object asymmetry under the abstract rule of Move WH in LF that raises wh words in-situ.[7] For example, (49b) below can be construed as a direct question on the pairing of values between the matrix who and the embedded wh-in-situ what, but (49a) is ill-formed as a question on the pairing of the matrix and the embedded unmoved who. The contrast may be attributed to the ECP, because only the intended LF representation of (49b) but not of (49a) satisfies the ECP, as in (50):[8]

(49) a. *Who remembers why who bought the book?

b. Who remembers why we bought what?

(50) a. *[$_{\bar{s}}$ Who$_j$ who$_i$ [$_s$ t_i remembers [$_{\bar{s}}$ why$_k$[$_s$ t_j bought the book t_k]]]]

b. [$_{\bar{s}}$ What$_j$ who$_i$ [$_s$ t_i remembers [$_{\bar{s}}$ why$_k$ [$_s$ we bought t_j t_k]]]]

Another case that has been brought under the ECP is the contrast between (51a) and (51b) under NP movement:

(51) a. *John$_i$ is probable [$_{\bar{S}}$[$_S$ t_i to win]]

b. John$_i$ is likely [$_S$ t_i to win]

Since the predicate probable is, semantically, almost identical to likely, the difference between (51a) and (51b) cannot be due to a semantic reason. On the other hand, if it is assumed that likely, but not probable, has the syntactic property of deleting the $\bar{S}$ node of its complement, the difference between (51a) and (51b) follows from the ECP. Since $\bar{S}$ is a maximal projection, but not S, deletion of the $\bar{S}$ will allow likely to govern the NP trace t_i in (51b). Since probable does not have the property of deleting the $\bar{S}$, the NP trace in (51a) remains ungoverned in violation of the ECP.

Still another case that has been brought under the ECP is what was originally attributed to the Left Branch Condition in Ross (1967):

(52) a. [$_{\bar{S}}$ Whose mother$_i$ [$_S$ did John see t_i]]?

b. *[$_{\bar{S}}$ Whose$_i$ [$_S$ did John see [$_{NP}$ t_i mother]]]?

In Chomsky (1981a) it is suggested that if the notion of government is formulated in such a way that a noun may not properly govern its subject or possessor (though it may govern it, only not properly), obligatory pied-piping of a possessive noun phrase can be accounted for by the ECP.[9]

Finally, Kayne (1981) suggests reformulating the ECP in such a way that it has the effect of subsuming parts of Subjacency and Weinberg and Hornstein's theory of preposition stranding in general. His formulation, to which we shall return in some detail below,

treats the asymmetry between the possibility of extracting from an embedded sentential complement and the impossibility of extracting from a sentential subject as the same type of subject/object asymmetry exhibited by the that-trace phenomenon, etc. and renders certain subcases of Subjacency unnecessary (e.g., the Sentential Subject Constraint). It stipulates, furthermore, that prepositions are in general non-proper governors; thus the result of stranding a preposition will leave a trace improperly governed in violation of the ECP (more discussion on this in the next section):

(53) *Which class$_i$ did John fall asleep during t_i?

Having reviewed the ECP thus far, let us now turn to Chinese and examine its status against the relevant Chinese data. First of all, since we have shown above that certain locality requirements in Chinese can be conveniently assumed to confirm the relevance of Subjacency, if this condition is to be subsumed under the ECP, then the ECP clearly must be made available to Chinese also. Furthermore, preposition stranding is prohibited in this language, as is the extraction of a possessive of NP, as the following examples show:

(54) a. Zhangsan$_i$, wo gen ta$_i$ bu shou.
I with he$_i$ not familiar
'Zhangsan, I am not familiar with him.'

b. *Zhangsan$_i$, wo gen t_i bu shou.
I with t_i not familiar
'Zhangsan, I am not familiar with.'

(55) a. Zhangsan$_i$, wo kanjian-le tade$_i$ shu.
I see-ASP his$_i$ book
'Zhangsan, I saw his books.'

b. *Zhangsan$_i$, wo kanjian-le t_i shu.
I see-ASP t_i book
'*Zhangsan, I saw books.'

If preposition stranding facts and the Left Branch Condition should fall under the ECP, then again the ECP must apply also in Chinese. When we turn to other cases examined above, namely the cases showing subject/object asymmetry under overt wh-movement, QR, abstract wh-movement, and NP-movement, the situation is quite different, or at least not so straightforward. Note, first of all, that because Chinese does not use an overt COMP to introduce sentential complements to verbs, sentences involving such complements cannot offer any evidence either for or against the ECP. For example, consider (56):

(56) a. [$_{s}$Zhangsan$_{i}$, [$_{s}$ wo renwei [$_{\bar{s}}$ t_{i} [$_{s}$ t_{i} hen congming]]]]
I think very clever
'Zhangsan, I think is very clever.'

b. [$_{s}$Zhangsan$_{i}$, [$_{s}$ wo zhidao [$_{\bar{s}}$ t_{i} [$_{s}$ ni hen xihuan t_{i}]]]]
I know you very like
'Zhangsan, I know you like very much.'

Since both (56a) and (56b) are acceptable, no subject/object asymmetry is observed.[10] This is, of course, compatible with the ECP, since under successive cyclic movement the intermrdiate trace in COMP may properly govern the subject trace in (56a), exactly as in (46), but it also does not offer any evidence for the relevance of the ECP in Chinese. Similarly, cases involving QR in sentences like (59) say nothing about the ECP either:

(57) a. wo yigong tingshou [$_{\bar{s}}$ [$_{s}$ you sange ren yao lai]]
I altogether hear HAVE three man will come
'Altogether there are three men that I have heard will come.'

b. wo yigong tingshuo [$_{\bar{s}}$ [$_{s}$ ta kanjian-le sange ren]]
I altogether hear he see-ASP three man
'Altogether there are three men that I heard he has seen.'

There are speakers who find both (57a) and (57b) unacceptable with the adverb 'altogether' occurring in the matrix indicating the scope of an embedded existential quantifier, but for some, both are acceptable with the interpretations indicated. The LF representations of (57a) and (57b), after QR has applied, are:

(58) a. $[_s$[you sange ren]$_i$ $[_s$ wo yigong tingshuo
HAVE three man I altogether hear

$[\bar{}_s[_s$ t_i yao lai]]]]
will come

b. $[_s$[sange ren]$_i$ $[_s$ wo yigong tingshuo
three man altogether hear

$[\bar{}_s[_s$ ta kanjian-le t_i]]]]
he see-ASP

But, again, the well-formedness of (57a) could be attributed to the presence of an empty COMP in it, which could allow an intermediate trace of the raised quantified NP in it to govern the subject trace. Crucial evidence concerning the ECP comes from sentences with a lexically filled COMP, however. Note that no subject/object asymmetry is observed in such cases either. For example, both sentences in (59) are well-formed:

(59) a. zhejian shi $[\bar{}_s$ gen $[_s$ sheme ren lai]] dou meiyou
this matter with which man come all no

guanxi.
relation

'This matter has nothing to do with whoever will come.'

b. zhejian shi $[\bar{}_s$ gen $[_s$ ni xihuan sheme ren]] dou
this matter with you like which man all

meiyou guanxi.
no relation

'This matter has nothing to do with whoever you like.'

The presence of the scope marker dou 'all' in the matrix of each sentence here indicates that the wh word 'which' is to be interpreted as a wide scope universal quantifier like 'any' in English (cf. Chapter 4). The LF representations of (59a-b) are (60a-b):

(60) a. $[_{s}$[sheme ren]$_i$ $[_{s}$ zhejian shi $[_{\bar{s}}$ gen $[_{s}$ t_i lai]]
any man this matter with come

dou meiyou guanxi]]
all no relation

b. $[_{s}$[sheme ren]$_i$ $[_{s}$ zhejian shi $[_{\bar{s}}$ gen $[_{s}$ ni
any man this matter with you

xihuan t_i]] dou meiyou guanxi]]
like all no relation

That is, according to (60a), (59a) means "for any person x, this matter has nothing to do with x's coming", and (60b) interprets (59b) as "for any person x, this matter has nothing to do with your not liking x". Since the embedded COMP is already filled with the preposition 'with', no intermediate trace can be left there under QR, an assumption that accounts for the fact that overt movement out of such $\bar{S}$ under topicalization is impossible without violating subjacency as we saw in the preceding section. The well-formedness of (60a) thus crucially shows that the ECP is violated, at least apparently.

Exactly the same point can be made in the case of traces left by abstract Move WH in LF, as both sentences in (61) are perfectly well-formed:

(61) a. zhejian shi [$_{\bar{s}}$ gen [$_{s}$ shei lai]] zui you
this matter with who come most have
'Who is the person x such that this matter has most

guanxi?
relation
to do with x's coming?'

b. zhejian shi [$_{\bar{s}}$ gen [$_{s}$ ni xihuan shei]] zui
this matter with you like who most
'Who is the person x such that this matter has most

you guanxi?
have relation
to do with your liking x?'

It is easy to see that the trace of 'who' in (61a) would be ruled out if the ECP applied here. The lack of asymmetry between (61a) and (61b) shows that the language does not exhibit superiority effects. This is further confirmed by the fact that (62) is well-formed on at least the two readings indicated in the translation:[11]

(62) ni xiang-zhidao [$_{\bar{s}}$[$_{s}$ shei mai-le sheme]]
you wonder who buy-ASP what

a. 'Who is the person x such that you wonder what x bought?'

b. 'What is the thing x such that you wonder who bought x?'

That (62) has the two meanings indicated is evidenced by the fact that it can be used as a direct question to which either (63a) or (63b) can be an acceptable answer:

(63) a. wo xiang-zhidao Lisi mai-le sheme.
I wonder buy-ASP what
'I wonder what Lisi bought.'

b. wo xiang-zhidao shei mai-le shu.
I wonder who buy-ASP book
'I wonder who bought books.'

The two LF representations of (62) corresponding to (62a) and (62b) are:

(64) a. $[_{\bar{S}}$ shei$_i$ $[_S$ ni xiang-zhidao $[_{\bar{S}}$ sheme$_j$ $[_S$ t_i
who you wonder what

mai-le t_j]]]]
buy-ASP

b. $[_{\bar{S}}$ sheme$_j$ $[_S$ ni xiang-zhidao $[_{\bar{S}}$ shei$_i$ $[_S$ t_i
what you wonder who

mai-le t_j]]]]
buy-ASP

Finally, note that NP-movement also apparently violates the ECP as the following examples show:

(65) a. ta ba shoupa$_i$ ku $[_{\bar{S}}$ de $[_S$ t_i dou
he BA handkerchief cry COMP even

shi-tou le
wet-through ASP
'He cried until he got the handkerchief entirely wet.'

b. shoupa$_i$ bei ta ku $[_{\bar{S}}$ de $[_S$ t_i dou shi-tou
handkerchief by he cry COMP even wet-through

le]]
ASP

'The handkerchief was made all wet by his crying.'

Since the embedded COMP is lexically filled with de, $\bar{S}$ deletion cannot have taken place. Therefore, the structure of (65a) and (65b) is essentially the same as (51a), with the subject trace not governed by the matrix verb. In other words, (65a) and (65b) are cases of "raising" without $\bar{S}$-deletion.

In summary, Chinese does not exhibit that-trace, superiority, or "ne-personne" effects, nor does it require $\bar{S}$-deletion under raising.[12] On the other hand, it appears to obey Subjacency, and does not allow preposition stranding nor extraction of a

possessive NP. A natural question that arises is why Chinese should differ from the languages that exhibit a full range of ECP effects in precisely this way. One could conclude that languages may simply differ in whether they require their non-pronominal empty categories to be properly governed, thus taking the relevance of the ECP as a parameter rather than as a principle of UG. This would be implausible, however, if Subjacency and the ban on preposition stranding and extraction of possessive NPs are special cases of the ECP, or are to be related by some proper formulation of the theory of government. On the other hand, one might conclude that it is improper to bring all the seven phenomena reviewed here under the ECP, and that while facts having to do with Subjacency, preposition stranding and extraction of possessives may follow from some independent principle(s), the ECP is indeed a parameter.

Any assumption that treats the ECP as a parameter, however, is implausible for the important reason that whether a language obeys the ECP or not cannot be learned. As indicated in the quote from Chomsky in 6.0, properties of empty elements, such as those related to the ECP, "can hardly be determined inductively from observed overt phenomena, and therefore presumably reflect inner resources of the mind." A more plausible approach is to regard the ECP as a universal, and derive the apparent absence of certain or all of its effects in certain languages from some independent properties of these languages, or some other more directly learnable parameter(s). This is the approach I will

take. Besides the argument from learnability, there are two reasons that support this approach.

First, in 5.4 we already indicated that the INFL in Chinese has much more lexical content to it than the INFL in English. This observation was supported by the fact that aspect markers in Chinese are derived from lexical categories and may be used as independent lexical items. This being the case, it is plausible to assume that the INFL is a proper governor, on a par with other lexical governors. This has the immediate result that subjects are properly governed as much as objects.

Secondly, as we will argue in Chapter 7, although there is no subject/object asymmetry in Chinese, there is an asymmetry between extraction of arguments and extraction of adjuncts. Extraction of adjuncts, in particular, is more restricted than that of arguments. We will show that this asymmetry can follow from the ECP. The correctness of this assumption will, of course, support the idea that the ECP should be taken as a principle of UG.

6.3. On Kayne's ECP Extensions

6.3.1. Kayne's Reformulation

It is well known that in English long distance extraction from a post-verbal complement is possible but not from a sentential subject:

(66) a. $John_i$, [$_s$ I think [$_{\bar{s}}$ that [$_s$ you like t_i]]]

b. *$John_i$, [$_s$[$_{\bar{s}}$ that [$_s$ you like t_i]] was a surprise]

In the EST literature, the Sentential Subject Constraint of Ross (1967), whose effect is illustrated in (66), is usually taken to be a subcase of the Subjacency condition. Since (65a) is allowed by Subjacency under the assumption that movement may go successive-cyclically through COMP, in order to rule out (66b) one may assume that sentential subjects are dominated by NP, though not sentential objects. Since NP does not have a COMP, no successive cyclic movement will be possible without violating Subjacency. Or alternatively, one may follow Koster (1978) and assume that sentential subjects are in fact topics binding empty subjects, and stipulate that the node dominating topic, $\bar{\bar{S}}$, is an absolute barrier to extraction. On the other hand, note that there is a striking resemblance between the asymmetry we see in (66) and the asymmetry exhibited by the that-trace, "ne-personne", and superiority phenomena. In both cases, the asymmetry is one between subject and object. Kayne (1981) argues, in effect, that the two similar types of asymmetry are in fact of the same type, and should be treated likewise in a theory of grammar. His version of the ECP is thus formulated in such a way as to take over some of the effects of Subjacency, as we are now to see.

(67) ECP (Kayne 1981:105)

An empty category β must have an antecedent α such that
(a) α governs β, or
(b) α c-commands β and there exists a lexical category X such that X governs β and α is contained in some percolation projection of X.

The case (67a) is exactly the same as Chomsky's ECP under the definition of proper government (44), i.e. government by an antecedent. The case (67b) includes the case of lexical government in Chomsky's definition (44a). In addition to government by a lexical category X^0, (67b) further requires that the antecedent of the empty category must occur within some "percolation projection" of its lexical governor X^0. The notion of percolation projection is defined in (68):

(68) Percolation Projection (Kayne 1981:104)

A is a percolation projection of B if and only if
(a) A is a projection of B, or
(b) A is a projection of C, where C bears the same superscript is B and governs a projection of B, or a percolation projection of B.

Kayne assumes that $\bar{S}$ is a maximal projection of V. Therefore, by the definition (68a), (67b) requires that the antecedent of a lexically governed empty category must occur within the first $\bar{S}$, NP, PP, or AP dominating the lexical governor. To allow for long distance extraction from sentential object complements, the definition for "percolation projection" in (68b) plays the crucial role. Adopting a co-superscripting device (from Vergnaud and Rouvert 1980) as a way of expressing the dependency between the strict subcategorization feature of a lexical category and the complement that satisfies the subcategorization, Kayne provides the following convention:

(69) A V^0 assigns its superscript to a subcategorized $\bar{S}$ complement, followed by downward superscript percolation on the part of the $\bar{S}$ (to its head V).

To illustrate, take the sentence (70), both of whose embedded clauses are sumcategorized complements of their respective superordinate verbs:

(70) $[_{-}{}_{S_1}$ Who$_i$ $[_{S_1}$ did John say $[_{-}{}_{S_2}$ that $[_{S_2}$ I thought

$[_{-}{}_{S_3}$ that $[_{S_3}$ Mary liked $t_i]]]]]]$

Suppose that the matrix verb say has the superscript k. Then every node dominating say in (70) is also k. By (69), say assigns $\bar{S}_2$ the superscript k, which then percolates down to the verb thought. The same rule (69) co-superscripts thought and $\bar{S}_3$ with the index k, which again percolates down, to the most deeply embedded verb liked. By the definition (68b), the embedded $\bar{S}_2$ is a percolation projection of the verb liked, since it is a projection of thought, which bears the same superscript k and governs $\bar{S}_3$, a projection of liked. Furthermore, the matrix $\bar{S}_1$ is also a percolation projection of liked, because it is a projection of say, which bears the same superscript as liked and governs $\bar{S}_2$, a percolation projection of liked. Therefore, the relation who$_i$ and t_i in (70) satisfies the ECP (67b) because t_i is lexically governed by liked and who$_i$ c-commands t_i and is contained in $\bar{S}_1$, a percolation projection of liked.

On the other hand, on the assumption that subjects are not subcategorized by their verbs (though they may be θ-marked by them), (69) will not co-superscript a verb and its subject. Therefore, extraction from a sentential subject is prohibited, as in (66b), because the matrix clause is not a percolation projection of the

verb within a sentential subject. The sentential subject constraint thus follows from Kayne's ECP (67).

Furthermore, Kayne stipulates that N^0 never assigns its superscript to anything. This has the consequence that the highest $\bar{S}$ contained within a complex NP cannot be co-superscripted with its head, and therefore the clause which contains a complex NP cannot be a percolation projection of the verb of the embedded (relative or noun phrase complement) clause. This has, of course, the effect of the Complex NP Constraint.

In the same spirit, the Subject Condition of Chomsky (1973) may be seen as a subcase of the ECP:

(71) a. $[_{\bar{S}}$ Who$_i$ $[_S$ did you see $[_{NP}$ pictures $[_{PP}$ of $t_i]]]]]$?

b. *$[_{\bar{S}}$ Who$_i$ $[_S$ did $[_{NP}$ pictures $[_{PP}$ of $t_i]]$ please you]]?

Although Kayne's exact formulation does not permit us to explain the contrast in (71) readily, a slight modification of his stipulation that nouns do not assign superscripts will suffice. Suppose we say that nouns do not assign superscripts to $\bar{S}$s, but say do so to NPs that they govern.[13] This will still preserve the effect of the CNPC, while at the same time allow one to derive the effects of the Subject Condition.

A general requirement that Kayne makes of superscript assignment is that the co-superscripted pairs must be related to each other by sub-categorization. Therefore, a lexical verb may co-superscript only a subcategorized complement, but not other non-subcategorized constituents. Among other things, this accounts for the bridge vs. non-bridge distinction in the sense

of Erteschik (1973). Thus, whisper does not subcategorize for an $\bar{S}$ complement, though say does. The $\bar{S}$ complement is co-superscripted with the matrix verb in (72b), but not in (72a). The contrast between (72a) and (72b) may follow from ECP:

(72) a. ?Who$_i$ did John whisper that he saw t_i?

b. Who$_i$ did John say that he saw t_i?

For the same reason, no element within an adjunct $\bar{S}$ may be extracted, regardless of whether the COMP is lexically filled. Note that the ill-formedness of (73b) as well as that of (72a), falls outside of the reach of Subjacency, though they fall under Kayne's ECP:

(73) a. John arrived yesterday, sad about the news.

b. *What did John arrive yesterday, sad about t?

(74) a. John came back, before I had a chance to talk to Bill.

b. *Who did John come back, before I had a chance to talk to t ?

Finally, adapting a proposal made in Weinberg and Hornstein (1981), Kayne stipulates that as a general rule of UG, PPs do not receive superscripts. English, on the other hand, is somewhat marked in that it allows a verb to co-superscript a PP if and only if that PP corresponds to a subcategorization feature of the verb. This latter requirement accounts for the contrast in (75):[14]

(75) a. Which table$_i$ did you put the book on t_i?

b. *Which class$_i$ did you fall asleep during t_i?

And, again, if we allow Ns to co-superscript their complement NPs and PPs (but not $\bar{S}$s or non-complements),exactly the same contrast

will follow.[15]

(76) a. I witnessed the destruction of Rome.

b. Which city$_i$ did you witness the destruction of t_i?

(77) a. I like the books on that table.

b. *Which table$_i$ do you like the books on t_i?

Finally, since most languages of the world do not allow preposition stranding (whether the PP is subcategorized or not, cf. van Riemsdijk 1978), Kayne stipulates that as an unmarked case, prepositions do not get co-superscripted with the verbs that they are in construction with (in effect, that prepositions are not proper governors). (English is exceptional in this regard in that co-superscripting can happen to a preposition, subject to the subcategorization requirement just mentioned.)

Kayne's reformulation of the ECP thus ties together quite a number of otherwise unrelated phenomena under the notion of proper government. It not only accounts for the "standard" ECP effects (the that-trace, superiority, and "ne personne" phenomena) but also relates certain subcases of Subjacency and a systematic distinction between a full range of subcategorized and non-subcategorized constructions.

6.3.2. Some Problems with Kayne's ECP

Although Kayne's ECP has the advantage of tying together a number of otherwise unrelated phenomena, it also has its own problems. Conceptually, it should be noted that his attempt to derive the CNPC and the general ban on preposition stranding

(whether a PP is subcategorized or not) is not entirely attractive. He achieved his purpose, basically, by the stipulation that N and P are not proper governors. But saying that the CNPC and preposition stranding facts fall under the ECP with special stipulations is just another way of saying that they fall under separate principles (without the stipulations). Empirically, his formulation of the ECP, in particular his attempt to derive Subjacency from the ECP, is also problematic in several respects. For one thing, Kayne himself has noticed that his ECP is not sufficient to account for facts generally attributed to the Wh Island Condition. It is generally agreed that interrogative complements are subcategorized and properly governed in Kayne's sense, yet this is no sufficient condition for extraction from such a complement:

(78) *?What$_i$ do you wonder where I bought t_i?

Especially problematic is the fact that the ECP would provide no principled basis to account for wh island facts in languages like Italian, as reported in Rizzi (1978), where one, but not two, wh islands may be crossed at any one time. According to Rizzi, the Italian fact may be conveniently accounted for by Subjacency if one assumes that $\bar{S}$, but not S, is a bounding node in this language and that the only way for movement to go long distance is by way of escape hatches provided by empty COMPs. If this is correct, then there is independent need for the Subjacency condition.

In Chinese, elimination of Subjacency in favor of the ECP

also appears to be difficult. We have seen in passing that NP-movement is possible from the subject position of a resultative clause:

(79) $[_S$ ta ba Lisi$_i$ ku $[_{\bar{S}}$ de $[_S$ t_i momingqimiao]]]
he BA cry till confused
'He cried so much as to make Lisi confused.'

(80) $[_S$ Lisi$_i$ bei ta ku $[_{\bar{S}}$ de $[_S$ t_i momingqimiao]]]
by he cry till confused
'Lisi was made confused by his crying so much.'

Since the matrix verb 'cry' is intransitive, it cannot assign a thematic role to an object. Therefore, the ba-object in (79) and the passive subject in (80) are, in the standard traditional analyses (e.g. Hashimoto 1971, Thompson 1973), taken to be raised from the embedded subject position. Note, however, that although NP-movement is possible, wh movement from such a position is out:

(81) *$[_S$ Lisi$_i$, $[_S$ ta ku $[_{\bar{S}}$ de $[_S$ t_i momingqimiao]]]]
he cry till confused

(82) *$[_{NP}[_S$ ta ku $[_{\bar{S}}$ de $[_S$ t_i momingqimiao]]]
he cry till confused

de neige ren$_i$] lai-le.
DE that man come-ASP

There appears to be no relevant structural difference between (79)-(80) and (81)-(82) except that in the former the NP-trace is separated from its antecedent by only one S node, while in the latter the wh-trace is separated from its antecedent by two S nodes. This difference may be attributed to Subjacency, though clearly not to the ECP.

Another case where Subjacency is at work but the ECP is not is the multiple topic construction in Chinese. We saw in 6.1 that

sentences like (83) below are ill-formed with a gap bound to the higher of two topics in a multiple topic construction. On the other hand, if the gap is interpreted as bound to the lower topic, the sentence becomes acceptable:

(83) *[$_s$ Zhangsan$_i$ [$_s$ Lisi$_j$ [$_s$ ta$_j$ hen xihuan t$_i$]]]
he very like

(84) [$_s$ Zhangsan$_i$ [$_s$ Lisi$_j$ [$_s$ ta$_i$ hen xihuan t$_j$]]]
he very like
'Lisi, Zhangsan likes.'

There appears to be no reason to stipulate that only the lower topic is within a percolation projection of the verb 'like', but not the higher topic. Thus, without some ad hoc stipulation the ECP is silent with respect to the contrast between (83) and (84), but such contrasts readily fall under Subjacency. There are reasons, then, to continue to assume the independent status of Subjacency.

Still another case where Subjacency is at work but the ECP is not concerns sentences like the following:

(85) *John$_i$ seems that [it is certain [t$_i$ to win]].

The trace is properly governed by the verb in the superordinate clause, yet the sentence is ill-formed. On the other hand, since the movement involved is NP-movement, no COMP-to-COMP movement is possible (cf. May 1979). The movement has to cross two S nodes, and can be ruled out by Subjacency.

There are a number of other empirical problems associated with Kayne's approach which we will not discuss.[16] A fundamental difficulty that we want to point out, though, is the following. The "ne personne" and superiority facts require the ECP to apply

at the level of LF. If Subjacency, the ban on preposition stranding, and the ban on extraction from non-subcategorized phrases or clauses are subsumed under the same principle, then these latter restrictions must also apply at LF. However, the fact appears to run counter to this prediction. For example, as contrasts of the following kind (due originally to Hankamer 1975) show, although overt wh movement may not violate the CNPC, the LF rule of movement is quite free:

(86) a. *In order to foil this plot, we must find out which senator$_i$ the agent has bats that are trained to kill t_i.

b. In order to foil this plot, we must find out which agent has bats that are trained to kill which senator.

Also, the contrast below seems to me to be quite clear:

(87) a. *Who$_i$ do you like books that criticize t_i?

b. Who likes books that criticize who?

In Chinese, the contrast in behavior between overt movement and movement in LF is even clearer. In the examples of (88) and (89), an NP is either topicalized (the a-sentences), relativized (the b-sentences), or wh-questioned (the c-sentences) from within a complex NP:

(88) a. *Zhangsan$_i$, [$_s$ wo mai-le [$_{np}$[$_s$ t_i xie] de shu]]
I buy-ASP write DE book
'*Zhangsan$_i$, I bought books that t_i wrote.'

b. *[$_s$ wo mai-le [$_{np}$[$_s$ t_i xie] de shu]] de
I buy-ASP write DE book DE
'*The man$_i$ that I bought the books that t_i wrote

neige ren lai-le.
that man come-ASP
came.'

c. [$_s$ ni mai-le [$_{np}$[$_s$ shei xie] de shu]]?
you buy-ASP who write DE book
'Who is the x such that you bought books that x wrote?'

(89) a. *Zhangsan$_i$, [$_s$ wo xihuan [$_{np}$[$_s$ ni piping t_i]
I like you criticize
'*Zhangsan$_i$, I like the articles in which you

de wenzhang]]
DE article
criticize t_i.'

b. *[$_s$ wo xihuan [$_{np}$[$_s$ ni piping t_i] de wenzhang]]
I like you criticize DE article
'*The man that I like the articles in which you

de neige ren lai-le.
DE that man come-ASP
criticize came.'

c. [$_s$ ni xihuan [$_{np}$[$_s$ wo piping shei] de wenzhang]]?
you like I criticize who DE article
'Who is the x such that you like the articles
in which I criticize x?'

As indicated, topicalization and relativization, which involve an overt antecedent-gap relation, are impossible in these examples, while question formation, which leaves the questioned constituent in its base position, is fine. This distinction can be made at a time when topicalization and relativization have taken place but the process that interprets base-generated wh words has not, i.e. if the CNPC is applied only in Syntax but not in LF. For after the LF movement of the wh words in (88c) and (89c), there is no more relevant distinction in configurational structure between the (a-b) and the (c) sentences. The LF representation of (88c), for example, is as follows, which constitutes a violation of the CNPC exactly as (88a) and (88b) do:

(90) [$_{s}$ shei$_{i}$ [$_{s}$ ni mai-le [$_{np}$[$_{s}$ t_{i} xie] de shu]]]?
who you buy-ASP write DE book
'For which x, you bought the books that x bought.'

The rule that interprets quantifier scope, QR, also may apparently violate the CNPC in Chinese. In Chapter 4, we already saw examples of the following sort. The quantifier that violates the CNPC in Chinese may be either universal or existential:

(91) [$_{np}$[$_{s}$ meige ren xie] de shu] dou hen youqu.
every man write DE book all very interesting
a. 'For all man x, the books that x wrote are interesting.'
b. 'Books that everyone wrote (jointly) are all interesting.'

(92) wo nian-le [$_{np}$[$_{s}$ ershige ren xie] de shu].
I read-ASP twenty man write DE book
a. 'There are twenty people whose books I have read.'
b. 'I have read books that are written (jointly) by twenty people.'

Each of (91) and (92) is ambiguous as indicated. According to the first reading indicated in (a) of each sentence, a quantifier occurring within a relative clause is interpreted as having scope over the entire root sentence. It should be noted that in order to obtain well-formed sentences like (88c) and (89c), and allow wide-scope interpretations on the Q-NPs in (91) and (92), it is important that the head of the relative clause not be preceded by a demonstrative. Once the head 'book' in (88c), (91)-(92), and the head 'article' in (89c) are preceded by a demonstrative, (88c) and (89c) become ill-formed, and (91)-(92) become unambiguous, each allowing only one (narrow scope) reading on the Q-NP in question. This is due to the Specificity Condition discussed in Chapter 5, and cannot be taken to indicate the relevance of the CNPC.

A clearer contrast between overt movement and movement in LF is available from well-known facts like the following (see Baker 1970, etc.), which show the irrelevance of the Wh Island Constraint in LF:

(93) a. *What did you remember where I bought?

b. Who remembered where we bought what?

The following sentence (=62) shows that abstract Move WH need not obey the Wh Island Constraint in Chinese either. The sentence can be construed as a direct question on the value of either of the two embedded wh words.

(94) ni xiang-zhidao [[shei mai-le sheme]]
you wonder who buy-ASP what
a. 'Who is the person x such that you wonder what x bought?'
b. 'What is the thing x such that you wonder who bought x?

As in (64) above, the LF representations of the two readings both show that the LF movement of the wh phrases violates the Wh Island Constraint.

Consider now the Sentential Subject Constraint. Although there appears to be no significant difference between (95a) and (95b):

(95) a. *Who$_i$ did that Bill married t_i surprise you?

b. *Who said that that Bill married who surprised you?

the ill-formedness of (95b) and (95a) may be due independently to the internal clause constraint of Ross (1967) (cf. also Kuno 1973), since (96) is also ill-formed:

(96) *He said that that Bill married Ann was a surprise.

If the embedded sentential subject takes infinitival form, the sentence is fine:

(97) He said that for Bill to have married Ann was a surprise.

If Ann in (97) is replaced by a wh-in-situ, as for a multiple question like (98a), it seems the sentence remains pretty acceptable, although overt movement of the wh word results in ill-formedness:

(98) a. ?Who said that for Bill to marry who was a surprise?

b. *Who did he say that for Bill to marry t was a surprise?

In Chinese, wh-questioning an NP within a sentential subject is perfectly grammatical in examples like (99c), although its topicalized and relativized counterparts (99a-b) are ill-formed:

(99) a. ??neige ren$_i$, [$_s$[$_s$ Lisi da-le t$_i$] shi wo hen bugaoxing]
that man$_i$ hit-ASP make I very unhappy
'*That man$_i$, that Lisi hit t$_i$ made me very unhappy.'

b. ??[$_{np}$[$_s$[$_s$ Lisi da-le t$_i$] shi wo hen bugaoxing] de neige ren$_i$]
hit-ASP make I very unhappy DE that man$_i$
'*The man$_i$ that that Lisi hit t$_i$ made me very unhappy.'

c. [$_s$[$_s$ Lisi da-le shei] shi ni hen bugaoxing]?
hit-ASP who make you very unhappy
'Who is the x such that the fact that Lisi hit x made you very unhappy?'

A quantifier occuring in a sentential subject may also be interpreted as having matrix scope by QR, as the following shows:

(100) [$_S$[$_S$ Lisi da-le shei] dou buhui shi wo bugaoxing]
Lisi hit-ASP any all won't make I unhappy
'For every person x, the fact that Lisi hit x won't make me unhappy.'

The word shei is used as a universal quantifier equivalent to 'anyone, whoever'. The sentence means "whoever Lisi hits, it won't make me unhappy", with 'whoever' having scope over the entire root sentence.

Like the CNPC and the Sentential Subject Constraint, the Subject Condition also does not have effects on interpretive movement in LF. Compare the sentences in (101):

(101) a. *Who$_i$ do you think pictures of t_i would please John?

b. Who thinks that pictures of who would please John?

The following sentences also show that QR need not obey the Subject Condition, since the quantifier contained in the subject of each sentence may have scope over the entire sentence:

(102) Pictures of everybody were put on sale.

(103) Somebody in every city must own a Porsche.

The bridge vs. non-bridge distinction under overt extraction also disappears under movement in LF. Thus we have the contrast:

(104) a. ??Who did John whisper that he saw?

b. Who whispered that he saw who?

Extraction from adjunct clauses is also possible so long as it happens in LF:

(105) a. *Who did John come back before I had a chance to talk to?

b. Who came back before I had a chance to talk to whom?

Note also the same contrast in Chinese below. Topicalization and relativization are ruled out, yet wh movement in LF is possible, and so is QR:

(106) a. *neige ren$_i$, [$_s$ zhejian shi [$_{\bar{s}}$ gen [$_s$ t_i mei
that man$_i$ this matter with not
'*That man, this matter has nothing to do with

lai]] wu guan]
come no relation
t didn't come.'

b. *[$_{np}$[$_s$ zhejian shi [$_{\bar{s}}$ gen [$_s$ t_i mei lai]] wu
this matter with not come no
'*The man who this matter has nothing to do t

guan] de neige ren$_i$]
relation DE that man$_i$
did not come.'

c. [$_s$ zhejian shi [$_{\bar{s}}$ gen [$_s$ shei mei lai]]
this matter with who not come
'Who is the x such that this matter has something

you guan]?
have relation
to do x's not coming?'

d. [$_s$ zhejian shi [$_{\bar{s}}$ gen [$_s$ meige ren mei lai]]
this matter with every man not come
'For all x, this matter has nothing to do x's

dou wu guan]
all no relation
not coming.'

Finally, note that although at least certain cases of preposition stranding must be ruled out if it occurs in overt form, there is no evidence that any extraction process in LF cannot strand a preposition. Consider the contrasts, both in English and Chinese:

(107) a. *Which class did you fall asleep during?

b. Who fell asleep during which class?

c. John fell asleep in every class.

(108) a. *Which table did you like [$_{np}$ the books on t]?

b. Who likes the books on which table?

c. John likes the books on every table.

In the (b) sentences, the wh-in-siut which class or which table may be paired with the subject who. In the (c) sentences, every class and every table are both capable of having the entire sentence as their scope. The same thing happends below in Chinese:

(109) a. *Zhangsan$_i$, wo gen t_i bu shou.
I with t_i not familiar
'Zhangsan, I am not familiar with.'

b. *[$_s$ wo gen t_i bu shou] de neige ren$_i$
I with t_i not familiar DE that man
'The man I am not familiar with.'

c. ni gen shei bu shou?
you with who not familiar
'Who are you unfamiliar with?'

d. wo gen sange ren bu shou.
I with three man not familiar
'I am unfamiliar with three men.'

The situation with preposition stranding is mirrored by the situation with extraction of possessives:

(110) a. *Whose did you see mother?

b. Who saw whose mother?

c. He has read only three men's books.

(111) a. *Zhangsan$_i$, wo renshi t$_i$ muqin.
I know mother
'Zhangsan, I know [his] mother.'

b. *[$_S$ wo renshi t$_i$ muqin] de neige ren$_i$
I know mother DE that man
'The man that I know [his] mother.'

c. ni renshi shei de muqin?
you know who 's mother
'Whose mother do you know?'

d. wo renshi meige ren de muqin.
I know every man 's mother
'I know everyone's mother.'

One could maintain that the contrasts just seen need not require one to assume that the ban on preposition stranding or the Left Branch Condition has to be relaxed in LF, but that movement in LF has the option of pied-piping certain materials, and that the grammatical sentences above are grammatical because the LF movement that they involve has actually pied-piped, exactly as an overt movement process does. This assumption, of course, is not in itself implausible, since there is no reason in principle why only overt movement may pied-pipe but not movement in LF. However, there is also good reason to assume that results of pied-piping processes (either in Syntax or in LF) will undergo a process of reconstruction by which the pied-piped material is put back into its original place before reaching the output level of LF. As Chomsky (1976) has proposed, such a process turns an SS representation of the form (110a) into an LF representation like (112):

(112) For which person x, did you see x's mother.

Such a process allows constructions involving strong crossover to be treated under the binding theory. More specifically, there is no special principle that directly explains the ill-formedness of (113) at SS, since the pronoun he does not c-command its antecedent:

(113) *Whose$_i$ mother did you say that he$_i$ saw t$_i$?

(The trace in (113) is the trace of whose mother, therefore not the antecedent of he.) But if (113) is reconstructed as (114), its ill-formedness is an automatic consequence of the binding theory.

(114) *For which person x$_i$, did you say that x$_i$ saw x$_i$'s mother.

According to the local definition of the empty category, the x in x's mother must be a pronominal, since it is locally θ-bound. It cannot be a PRO, since it is governed. It also cannot be a pro, since it is not identified in the proper way. It is not identified by the closest SUBJECT (the head mother), nor is it spelled out as a pronoun. (Cf. Aoun 1982 and the discussion in 5.6.) Exactly the same motivation argues for reconstruction to account for the ill-formedness of sentences like (115):

(115) *Near who$_i$ did you say that he$_i$ worked?

If it is correct to bring sentences like (113) and (115) under the binding theory with reconstruction, then reconstruction must be an obligatory process. A sentence involving pied-piping of a PP or of a possessive construction, therefore, must be allowed with stranded prepositions and possessive traces,

In short, it has been shown that the following principles do not obtain in LF, though they do in Syntax: the CNPC, the Wh Island Condition, the Sentential Subject Constraint, the Subject Condition, the general ban on preposition stranding, the ban on extraction from an adjunct clause or phrase (in NP or in S; the special ban on stranding a non-subcategorized preposition in English falls under the last category), as well as the Left Branch Condition. It is clear that these principles cannot be subsumed under the ECP, which, in order to accommodate standard that-trace, "ne personne" and superiority effects, must apply at LF. One could try to maintain part of Kayne's theory by, say, assuming that reconstruction is a process that applies to LF (after LF), not in LF, and that the ECP is relevant only at LF. Under this assumption, one might insist on obligatorily pied-piping prepositional phrases in LF. In the next chapter I will argue, however, that traces left by movement of PPs are also subject to the ECP. If pied-piping is required on the PP during which class in (107b), for example, one will not be able to derive a well-formed representation for the sentence at LF before reconstruction applies. Furthermore, note that any such assumption to keep the preposition stranding facts under the ECP will not be general enough to take care of the other facts we have seen, since these facts exist quite independently of whether or not there is a process of reconstruction.

6.4. The Condition on Extraction Domain

What we saw in 6.3 is that there is some good reason to believe that Kayne's idea is right in that certain heretofore unrelated island phenomena should be tied together somehow with the ECP under the theory of government. In particular, the existence of the Sentential Subject Constraint and the Subject Condition, as opposed to the non-existence of a "Sentential Object Constraint" or an "Object Condition" should be tied together with the standard cases of the ECP as special cases of a more general subject/object asymmetry. Furthermore, the ban on extraction from an adverbial clause or an adjunct PP, as opposed to the non-existence of a ban on extraction from a complement clause or a subcategorized PP (in English), can be naturally tied together with the ECP if the subject/object asymmetry is taken as a special case of an even more general asymmetry between complements on the one hand and non-complements (subjects and adjuncts) on the other.

However, the assumption that these otherwise unrelated phenomena are genuine subcases of a generalized version of the ECP leads to an internal contradiction of the theory. Why this is so can be briefly summed up as follows. First, if the contrast below is seen as a subcase of the ECP, then the ECP must apply at SS, not at LF:

(116) a. *Who$_i$ did Mary cry after John hit t_i?

b. Who cried after John hit who?

At SS, t_i of (116a) is an empty category, therefore the sentence may be ruled out by (Kayne's version of) the ECP. The second occurrence of who in (116b) must be regarded as a lexical category at SS, so that (116b) will not be ruled out by the ECP. After the second occurrence of who is wh-moved in LF, the ECP must not apply at LF, or (116b) would be wrongly ruled out. Secondly, if the contrast below is also a subcase of the ECP, then the ECP must apply at LF:

(117) a. Who bought what?

b. *What did who buy?

The ECP cannot apply at SS because the violating wh in situ who in (117b) is not an empty category yet. One cannot redefine the notion of an empty category in such a way that the who in (117b) is somehow regarded as an empty category at SS, because such a redefinition would allow one to regard the second occurrence of who in (116b) also as an empty category at SS, making it impossible to distinguish between (116a) and (116b). The conclusion drawn from (116) directly contradicts that the one drawn from (117).

How can one get out of the present dilemma? It seems to me that although Kayne's intuition is right in that several otherwise unrelated phenomena should be tied together with the ECP, there is still a distinction that must be, and can be, made between these phenomena and the standard ECP effects. Two related, yet disingvishable separate phenomena may be involved. One of them has to do with the position of the trace itself, regardless of the position of the domain from which extraction takes place. The other, however,

concerns the position of the construction from which extraction takes place, regardless of the position of the resulting trace within that construction. These two phenomena may be related via the fact that they crucially involve the notion of proper government, but they need not be identified as one single phenomenon. More specifically, suppose we leave the ECP in the form (43) as it is originally proposed by Chomsky, with the notion of proper government defined as in (44). This would account for the standard ECP effects including the COMP-trace, superiority, and "ne personne" phenomena, as well as illegitimate cases of raising without $\bar{S}$-deletion in English, provided that the ECP is made to apply at LF. Moreover, making use of the same notion of proper government, we may add the following condition on extraction:

(118) Condition on Extraction Domain[17]
A phrase A may be extracted out of a domain B only if B is properly governed.

This condition will be assumed to apply only in the Syntactic component, but not in LF. As for whether the condition should be construed as a well-formedness condition on output representations or as a condition on the application of Move α, this is not an easy question to answer. If an output condition, it will apply only at SS, if a condition on Move α, it will apply only to the application of Move α in Syntax (as does Subjacency).

There is some reason to assume that (118) is a condition on rule application, as suggested by the contrast below:

(119) a. *Which book$_i$ did you go to college without reading t_i?

b. Which book$_i$ did you buy t_i without reading e_i?

The trace t_i in (119a) may be correctly ruled out by (118) if the latter is construed as a condition on movement. The parasitic gap e_i in (119b), however, may be base-generated at DS, and interpreted as a variable at SS without violating (118). (Cf. Chomsky 1981b , Taraldsen 1979).

On the other hand, the contrasts below (due to Kayne 1982) suggest that (118) should apply as a condition on representations, at SS:

(120) a. The person that John described t without examining any pictures of e.

b. *The person that John described t without any pictures of e being on file.

(121) a. The books you should read t before it becomes difficult to talk about e.

b. *The books you should read t before talking about e becomes difficult.

The parasitic gap e in both the (a) and (b) sentences above must be base-generated, since movement of it would violate (118). The gap e in the (b) sentences is contained in a subject (non-properly governed domain), but the gap e in the (a) sentences is not. To distinguish between the (a) and (b) sentences, a proper version of (118) would have to apply at SS, where the without and before-clauses are somehow taken as properly governed in a looser sense of the term, though the subjects are still taken to be non-properly governed.

To solve the problem jointly posed by (119) and (120)-(121), we will make the following tentative proposal.[18] We can construe (118) as a condition on movement, and also on representations at SS. We will assume that adverbials may or may not be adjoined to VPs. Furthermore, the notion of AS-government will be understood in

two ways. According to the definition of AS-government, both the governor and the governee occur in the same maximal projection. In VP-adjoined structures, we may understand the lowest VP node to be "maximal", or the top adjoined VP node. As a condition on movement, (118) will make use of the stricter notion of AS-government, taking the lowest VP as maximal. This will correctly account for (119). As a condition at SS, (118) will employ the looser notion, taking the highest VP as maximal. This will allow parasitic gaps in adverbials, but not in subjects, thus accounting for (120)-(121). While this approach does not look very attractive, at least we do not have an internal contradiction.

It should be easy to see that the Conditon on Extraction Domain has the desired results of Kayne (1981). Thus, it rules out the possibility of extraction from a subject (sentential or otherwise) in English. It also accounts for the distinction between allowed and disallowed preposition stranding in English. It also prohibits the extraction of an element out of an $\bar{S}$ adjunct. The distinction between bridge verbs like <u>say</u> and non-bridge verbs like <u>whisper</u> with respect to extraction can be made if we assume that the complements of bridge verbs are properly governed whereas those of non-bridge verbs, for some reason, are not. But since for most speakers the distinction between (72a) and (72b) is not a sharp one, and one might seek explanation elsewhere, perhaps along lines originally suggested by Ertechik (1973) (cf. Stowell 1981).

On the other hand, since (118) does not apply at or in LF, none of these effects are seen on the empty categories created in LF.

Note that, on this account, although (118) is not taken to be a subcase of the ECP, it is related to it in a natural way by the theory of government: both the ECP and (118) make crucial use of the notion of proper government.

As indicated already, the CNPC does not readily fall under the ECP without peculiar stipulations. The same applies to any attempt to reduce it to (118). Wh island facts continue to fall outside of (118), and so does the case of multiple topic constructions in Chinese. Furthermore, we assume that standard ECP effects do not exist in Chinese because INFL is a proper governor. (118) therefore cannot rule out violations of the Sentential Subject Constraint in Chinese. But we have seen that Chinese does obey this constraint. In short, we must continue to assume Subjacency as an independent condition on syntactic move α.

Note that on this account, the Left Branch Condition of Ross (1967) cannot fall under (118), since the NP from which the possessive whose is extracted is a properly governed domain in (122) and (123):

(122) *Whose$_i$ did you see [$_{np}$ t_i mother]?

(123) *Who$_i$ was seen [$_{np}$ t_i mother]?

The NP [t_i mother] is properly governed by the verb see in (122) and the passive participle seen in (123). Therefore, extraction of the possessive should be allowed by (118). The ill-formedness of (122)-(123), therefore, must come from something else. Note that (123) may be independently ruled out by the Case theory on the assumption that the passive morphology in English has the function of absorbing the Case-marking property of an active verb. On this assumption, the NP

whose head is phonetically realized as mother cannot receive Case from seen in (123). The sentence is therefore ruled out by the Case filter. However, the Case theory cannot extend to wh movement to rule out sentences like (122), since the active verb see there does assign Case. Although (122) can be ruled out by Subjacency, this cannot be in general the relevant principle, since sentences corresponding to (122) in Italian are also ill-formed even though Subjacency is not expected to have any effects in such cases, assuming Rizzi (1978) is right in that $\bar{S}$ but not S is a bounding node in this language. It is clear, then, that the Left Branch Condition cannot be reduced to either the condition (118) or Subjacency. Can it be reduced to the ECP? This would require an ad hoc stipulation that the head of an NP does not properly govern its subject, even within its own maximal projection, and this does not look entirely attractive. On the other hand, there is a plausible account, as indicated by Chomsky, within the theory of thematic-role assignment. Chomsky (1981a) proposes that θ-role is assigned to an A-chain (containing no $\bar{A}$-element) which is either Case-marked or headed by PRO. In (122), the trace t_i is the only member of its A-chain. It is not a PRO. Nor is it Case-marked, since the Case is already moved away with whose and the N mother is not a Case-assignor. There t_i cannot receive a thematic role. The sentence (122) is ruled out by the thematic theory. Note that the following sentence is ruled out, not by the θ theory, but by morphological considerations, the 's being inseparable from a lexical stem:

(124) *who$_i$ did you see t_i's mother?

We have said that the facts in English concerning preposition stranding also fall under the condition (118), following Weinberg and Hornstein (1981), but cf. Rothstein (1981). The situation about preposition stranding in Chinese is, however, quite different. Whereas English allows the stranding of a preposition if the PP dominating it is subcategorized (and properly governed) and disallows it otherwise, Chinese (and most other languages) does not allow either kind of preposition stranding. To bring out this difference, one might, again, adopt Kayne's idea to stipulate that PPs in general are not proper governees (i.e. that they never receive superscripts), though English and a small number of Germanic languages (cf. van Riemsdijk 1978) exceptionally do allow certain PPs to be properly governed. However, since this is purely a stipulation, given an otherwise simpler and more general definition of proper government, one is not worse off even if the stipulation takes the form of a separate principle having nothing to do with the ECP. For example, one might maintain that there is a general filter in PF in most languages (including Chinese but not English) that disallows an oblique trace (following Weinberg and Hornstein 1981, but cf. Stowell 1981 for some discussions), or simply disallows the configuration [p trace]. Whatever the precise formulation, there is some evidence from Chinese that it is more appropriate to consider this to be a property of PF. In Chinese passive sentences and ba-constructions, the main verb may not be followed by a "resumptive" pronoun coindexed with the passive subject or the ba-phrase:

(125) *Zhangsan$_i$ bei wo da-le ta$_i$.
by I hit-ASP he
'*Zhangsan was hit him by me.'

(126) *wo ba Zhangsan$_i$ da-le ta$_i$.
I BA hit-ASP he
'I hit Zhangsan.'

It is not enough to appeal to the Case theory to rule out (125)-(126) on the assumption that a passive verb phrase or a verb phrase containing a ba-object cannot assign Case to an overt NP following it. Consider sentences like (127) and (128), where the verb is followed by a lexical NP.

(127) ta$_i$ bei tufei [$_{\bar{V}}$ dasi-le baba] t$_i$.
he by bandit kill-ASP father
' He had his father killed by the bandits.'

(128) fayuan ba ta$_i$ [$_{\bar{V}}$ fa-le wubaikuai] t$_i$.
court BA he fine-ASP 500-dollar
'The court punished him with a fine of 500 dollars.'

The sentences (127)-(128) need not be considered counterexamples to the Case theory if they are analyzed as indicated (cf. Chapter 2). In this case, we assume the passive subject and the ba object ta 'he' starts out as a complement of $\bar{v}$, not v. (The $\bar{v}$ is "passive", but v is still active). The NP-trace t$_i$ is Caseless in accordance with the Case theory. On the other hand, the "inner" objects 'father' and '500 dollars' are still assigned Case by the V° that they complement. Given this as a possible analysis for (127) and (128), (125) and (126) cannot be ruled out if they are analyzed as (129) and (130), with the pronoun he occurring internal to a $\bar{V}$ and an NP-trace occurring outside of it:

(129) *Zhangsan$_i$ bei wo[$_{\bar{V}}$ da-le ta$_i$] t$_i$.
by hit-ASP he

(130) *wo ba Zhangsan$_i$ [$_{\bar{V}}$ da-le ta$_i$] t$_i$.
I BA hit-ASP he

In order to rule out (125) and (126), therefore, something else is needed. Since (125) and (126) clearly violate the binding condition (1b), which requires pronouns to be free in their governing categories, we may assume that it is the binding theory that rules them out. This is very likely correct, since (125) and (126) are interpretable if the pronoun is construed as disjoint in reference from the passive subject or the ba-object. Now, consider the following sentence, which is well-formed:

(131) Zhangsan$_i$ bei wo ba ta$_i$ dasi-le t$_i$.
by I BA he kill-ASP
'Zhangsan was killed by me.'

How can one allow this sentence as well-formed? If the pronoun 'he' in the ba-phrase is present at SS, the sentence should be ruled out by the binding theory. Therefore, it is natural to assume that the pronoun is in fact an NP trace. That is, the passive subject Zhangsan may be assumed to originate in the sentence-final position, as in (132), moved to preverbal position under ba-transformation, as in (133), then finally moved to subject position, as in (134):

(132) [e] bei wo ba [e] dasi-le Zhangsan.
by I BA kill-ASP

(133) [e] bei wo ba Zhangsan$_i$ dasi-le t$_i$.
by I BA kill-ASP

(134) Zhangsan$_i$ bei wo ba t$_i$ dasi-le t$_i$.
by I BA kill-ASP

(134), then, is well-formed at SS with respect to the binding theory. If we assume that the preposition ba is a proper governor (a null assumption, given that all other lexical categories are proper governors), then (134) is also well-formed with respect to

the ECP at LF. The fact that (134) is, phonetically, ill-formed, but (131) is well-formed, can then be explained by the natural assumption that the trace following ba in (134) gets spelled out as the pronoun ta as in (131), whose function is to avoid the stranding of ba in PF. The conclusion is that the general ban on preposition stranding is a property of PF, not SS or LF, and therefore not related to the theory of proper government.[19]

Note that we do not have to assume subcategorization to be a necessary or sufficient condition of proper government. (Rather, we assume subcategorization to depend upon some proper version of government.) Thus both raising with $\bar{S}$ deletion and raising without $\bar{S}$ deletion in English obey the Condition on Extraction Domain (118), but the latter violates the ECP because $\bar{S}$ blocks government of the NP-trace by a matrix verb. In Chinese, we have seen examples of raising without $\bar{S}$ deletion from resultative clauses (whose COMP de is not deleted), as in (65a-b). These examples are well-formed because the NP-traces are properly governed from within their own clauses (by INFL). Since resultative clauses are not subcategorized, the well-formedness of (65) indicates that subcategorization cannot be a necessary condition for proper government. (Since such clauses, being in postverbal position, must be dominated by $\bar{V}$ or $\bar{\bar{V}}$, it is natural to assume that they are not outside the maximal VP node.) The raising cases constitute support for the theory we follow, but argue against Kayne's hypothesis.

Since the condition on Extraction Domain (118) is assumed to apply only in Syntax, this crucially enables one to distinguish

illegitimate overt extraction in Syntax from free abstract extraction in LF, thus avoiding the internal contradiction noted above for a theory that tries to collapse the effects of the ECP and (118) at LF. As the condition is irrelevant in LF, no movement in LF needs to perform pied-piping, and the result of any pied-piping operation in Syntax may freely undergo reconstruction. In this way there is no need to stipulate, for example, that in English certain kinds of prepositions are proper governors and certain others are not proper governors depending upon where their dominating PP nodes occur (in argument or adjunct positions). Since lexical government is purely a local relationship between a lexical category and its object, any lexical category is, in the simplest possible way, a proper governor for its object. For example, a verb is always a proper governor for its object regardless of where its dominating VP occurs. Similarly a preposition should be a proper governor for its object regardless of where its dominating PP occurs. This is the simplest type of formulation on the notion of proper government that one would like to have, and is possible only if the type of illegitimate preposition stranding that we want to exclude in English is excluded by some other principle than the ECP, such as our condition (118), and in a component of grammar other than LF. I take this also to be an advantage of setting up the condition (118) as a condition in Syntax, independent of, though related to, the ECP.

CHAPTER SIX: FOOTNOTES

1. For example, Rizzi (1978a) claims that $\bar{S}$ rather than S is a bounding node for Italian. For a similar claim on French and Spanish, see Sportiche (1981) and Torrego (1982).

2. The representation in (12) may then be assumed to undergo a rule of "predication," which may take the form of identifying the topic 'that man' with the index of the OP_i. See Chomsky (1981b) for some discussion. Note that we assume that movement of the abstract OP takes place in Syntax, rather than in LF. This means that the gap marked by t_i in (12) must be treated as a trace at SS, rather than as a PRO. This assumption is at variance with Jaeggli's (1980) assumption, which takes the movement of the empty OP (his "PRO movement") to be a process in LF. Clearly, if the Binding Theory applies at SS, then Jaeggli's assumption cannot be correct, since before movement takes place the abstract OP in object position will be a governed PRO, according to (1). But the Binding Theory requires that PRO must be ungoverned. Another indication that Jaeggli's assumption is incorrect is that movement in LF is not restricted by Subjacency, as we will see later, but that topicalization is.

3. Navajo and Imbabura-Quechua are two such languages. For some discussion of headless relatives, see Platero (1978) and Cole (1982).

4. Under certain circumstances, in particular when the head of an NP is an inalienable possession, apparent extraction appears to be possible from a subject, though still impossible from an object:

(i) Zhangsan, baba hen youqian
father very rich
'Zhangsan, his father is very rich.'

(ii) *Zhangsan, wo kanjian baba le.
I see father ASP
'Zhangsan, I saw his father.'

Note that the comment clause in (ii), when taken alone without the topic, is well-formed:

(iii) wo kanjian baba le.
I see father ASP
'I saw my father.'

But it must mean that I saw my father, not somebody else's. In other words, (ii) is ill-formed not because 'father' cannot occur without a possessor in object position, but because its possessor must be interpreted as the subject 'I,' but not the topic Zhangsan. The sentence is nonsensical in that the comment 'I saw my father' cannot be interpreted as saying anything about the topic. It seems that (i) and (ii) may be accounted for in the following way. Since an inalienable possession must in general have a possessor, in the absence of an overt possessor the speaker must make inference on what the possessor is. A plausible principle for determining the possessor is that the "closest NP around" is interpreted as the possessor. In this way, the possessor of 'father' in (ii) is 'I,' and that in (i) is Zhangsan. Since the comment in (i) does say something about the topic, but the comment in (ii) does not, (i)

is well-formed but not (ii). To implement this idea, one may formulate a pragmatic principle of inference concerning inalienable possessive constructions. Cf. also our discussion in 5.3 of sentences involving apparent cases of PRO in inalienable possessive constructions.

5. There is an additional theory-internal argument for taking Subjacency as a condition on movement. If raising constructions are analyzed as involving $\bar{S}$ deletion as in Chomsky (1981a), then it is natural to assume that an intermediate trace immediately dominated by $\bar{S}$ will also be deleted following the deletion of $\bar{S}$, or otherwise there would be no appropriate place for the "floating" intermediate trace to be in. If so, the result of $\bar{S}$-deletion will violate Subjacency, as (i) shows:

(i) Who_i [$_s$ did John believe[$_s$ t_i to have come]]?

There is some reason to believe that the trace t_i in (i) must be governed as SS (in order to satisfy the Case filter at PF and the ECP at LF). Therefore, $\bar{S}$ deletion must apply at SS. This means that if Subjacency is construed as a condition on output representations, then it must be ordered to precede $\bar{S}$ deletion. But this is just a different way of saying that Subjacency is a condition of the rule of Move α, which may apply throughout any stage in Syntax up to, but excluding, SS. (This point has been separately made by Howard Lasnik.)

6. If the traces t_i and t_j have their indices switched in (38), however, the sentence has a grammatical status:

(i) Zhangsan$_i$, [$_s$ zhege ren$_j$ [$_s$ t_j hen xihuan t_i]]]
this man very like

As far as Subjacency is concerned, (i) is not different from (38) in any way. In (38), the embedded subject trace is separated from the higher topic by two S nodes. In (i), the object trace is separated from the same topic by also two S nodes. There is, however, an independent reason that allows (i) to be "felt" as well-formed. Since the lower topic is immediately adjacent to its trace in the embedded subject position in (i), the sentence may be analyzed as (ii), in which the lower topic binding a subject trace in (i) is now taken as the subject itself binding no trace:

(ii) Zhangsan$_i$, neige ren hen xihuan t_i.
that man very like

(ii), of course, does not violate Subjacency, since only one S node intervenes between Zhangsan and its trace.

It is tempting to suggest that the difference between (38) and (i) is due to the ECP. That is, in (38) the embedded subject trace is not minimally c-commanded by its antecedent (the higher topic), but in (i) it is minimally c-commanded by its antecedent (the lower topic). While this difference may be conveniently brought out by an appropriate version of the ECP, there is, however, no independent evidence that such subject/object assymetry ever exists in Chinese. Below, we will see that all the standard cases of subject/object assymetry that are attributed to the ECP do not exist in Chinese, suggesting that the subject of a clause is always governed. At any rate, attributing the ill-formedness of (38)

to the ECP is not sufficient to rule out (37), in which the embedded subject is not a trace, but a pronoun.

7. See also Aoun, Hornstein, and Sportiche (1981).

8. A similar contrast also obtains when the embedded wh-in-situ is construed as being paired with the embedded why. For an account of this contrast, also under the ECP, see Aoun, Hornstein, and Sportiche (1981). Also, see Chapter 7.

9. Note that if proper government is defined in terms of AS-government as we assume here, the LBC does not readily fall under the ECP. The subject of an NP is lexically, hence properly, governed by the head N.

10. For some speakers, there is a slight preference to use a resumptive pronoun instead of the trace in (56a). The difference between (56a) and (56b) may be taken to be a subject/object assymetry indicative of the possible relevance of the ECP. However, the difference between the two sentences is slight, and the status of (56a) is certainly much better than sentences involving typical violations of the ECP, such as the that-trace filter. Furthermore, there are speakers who do not consider (56a) in any way less acceptable than (56b). At any rate, even if (56a) should be treated as somehow less acceptable than (56b), it is not clear how it can be brought under the ECP under usual assumptions. Since the embedded COMP is empty in (56a), the subject trace in it should be properly governed by

its intermediate antecedent, just as in (46), which is perfectly grammatical.

11. The sentence has also the reading in which both the embedded wh words are construed as having scope over the embedded clause. In this case, it may be a statement containing an indirect multiple question meaning (i), or a yes/no question containing an indirect multiple question meaning (ii):

(i) You wonder who saw what.

(ii) Do you wonder who saw what?

12. Rizzi (1979) and Chomsky (1981a) have shown that the apparent lack of the overt COMP-trace effects in certain pro-drop languages is directly related to the free inversion phenomenon. That is, what appears to be an extraction from a subject position is in fact extraction of an inverted subject from a postverbal, governed position. An important piece of evidence for this theory of the "Pro drop" phenomenon, as it is called in Chomsky (1981a), is that superiority effects (as well as counterparts of the "ne personne" effects) still obtain in LF. Since no "free-inversion" story can be told about these cases, this is exactly what one would expect. Note that in Chinese even the superiority and (the counterparts of) the "ne-personne" effects are absent. It is impossible, therefore, to account for the Chinese facts by making reference to the "pro drop parameter."

13. There is some independent ground for making this stipulation, as Stowell (1981) has observed. In (i), the NP-trace is properly governed, but in (ii) it is not:

(i) Rome's$_i$ destriction t_i.

(ii) *John's$_i$ certainty [$_s$ t_i to go].

If we assume that the noun <u>certainty</u>, like its adjectival counterpart <u>certain</u>, deletes $\bar{S}$s, then there is no special reason why there is a contrast between (i) and (ii). But if one assumes that nouns cannot co-superscript any clauses, but may do other categories, then the contrast can be made. Of course, this is a purely theory-internal argument. One could, for example, stipulate that while there are exceptional Case marking verbs (i.e., $\bar{S}$-deletion verbs), there are no exceptional Case marking nouns, because Case-marking is more typical of [-N] categories (i.e., verbs and prepositions).

14. This characterization, while correct to some extent, is not without problems. See Rothstein (1981) for an opposing view and some discussion.

15. The contrast between (76) and (77) is due to Baltin (1981). Baltin takes this contrast to argue that Ns can assign superscripts in general, and suggests that the CNPC can be subsumed under the ECP by making reference to the notion of "L-contain" of Chomsky (1973). Such an approach requries an insufficiently motivated distinction between what counts as "lexical" in the notion of "L-contain" and what doesn't, in my opinion. One can simply require that Ns do not assign

superscripts to clauses and achieve the same result. However, as we will see directly, there are fundamental difficulties with any attempt to reduce the CNPC to the ECP.

16. For example, extraposition from a subject violates his version of the ECP, though it is usually (though not universally) agreed that the rule obeys Subjacency.

17. A similar idea has been proposed in Belleti and Rizzi (1981). See also Marantz (1979), Cattel (1976).

18. I will have to leave for future research the task of substantiating and fully justifying this proposal.

19. There is another interesting fact in this connection. In Chinese, inanimate NPs usually do not appear in overt pronomial form. Compare:

(i) neige ren, wo hen xihuan t.
that man I very like
'That man, I like very much.'

(ii) neige ren, wo hen xihuan ta.
that man I very like he
'That man, I like him very much.'

(iii) neiben shu, wo hen xihuan t.
that book I very like
'That book, I like very much.'

(iv) *neiben shu, wo hen xihuan ta.
that book I very like it
'That book, I like it very much.'

While the animate 'that man' may be topicalized or left-dislocated, the inanimate 'that book' may only be topicalized. This is a consequence

of the fact that pronouns in Chinese are not used to substitute inanimate NPs. An exception occurs, however, in the position immediately following a preposition:

(v) neiben shu, wo ba ta song gei bieren le.
that book I BA it give to others ASP
'That book, I gave it someone else.'

(vi) *neiben shu, wo ba t song gei bieren le.
that book I BA give to others ASP

The exceptional case (v) happens, apparently, because a trace in the same position will strand a preposition, as in (vi). One of the plausible ways in which this fact may be accounted for is to assume that there are no inanimate pronouns in general, and that only as a device to save preposition-stranded structure, a trace may be spelled out in PF.

CHAPTER SEVEN: FURTHER EXTENSIONS OF THE ECP

7.0. Introduction

In 6.3 we observed that Chinese lacks a full range of standard ECP effects showing subject/object asymmetry under movement. Based on learnability considerations we indicated that one cannot conclude that ECP is a language-specific principle. Rather, we assumed that the lack of subject/object asymmetry may be derived from the fact that the INFL in Chinese is considerably "lexical". In this chapter we will provide some support for this assumption by showing that although Chinese does not exhibit subject/object asymmetries, it does exhibit certain systematic argument/adjunct asymmetries along with other languages. It is indicated that these asymmetries readily fall under a natural conception of the ECP. In particular, if adjuncts in Chinese are adjoined to VPs, then they are neither governed by the verb (government blocked by the lower VP node) nor governed by INFL (government blocked by the higher adjoined VP node). Therefore, although subjects are properly governed in Chinese by the (lexical) INFL, adjuncts are not. The effect of ECP is therefore visible on movement of adjuncts.

We first indicate some island effects in LF and consider a Subjacency account of them in 7.1-7.3. In 7.4, we propose to account for the observed facts in terms of the ECP. We show that well known subject/object asymmetries should be seen as constituting a special case of a more general complement/non-complement asymmetry. It is also pointed out that the ECP should be allowed to apply both at LF

and at SS (and by null hypothesis, also at DS). We will indicate some consequences of the proposed account and raise some problems yet to be solved.

7.1. Some Islands Effects in LF

In Chapter 6, we saw that LF mapping rules may violate a full range of island conditions. For example, a sentence like (1) may be uttered as a direct question on either of the two embedded unmoved wh words:

(1) [ni xiang-zhidao [shei mai-le sheme]]
you wonder who buy-ASP what

a. 'What is the thing x such that you wonder who bought x?'

b. 'Who is the person x such that you wonder what x bought?'

The LF representations of the two possible readings of (1) are (2) and (3), each showing that one of the two wh words has crossed the island headed by the other:

(2) $[_{\bar{s}}$ sheme$_j$ $[_s$ ni xiang-zhidao $[_{\bar{s}}$ shei$_i$ $[_s$ t_i mai-le $t_j]]]]$
what you wonder who buy-ASP

(3) $[_{\bar{s}}$ shei$_i$ $[_s$ ni xiang-zhidao $[_{\bar{s}}$ sheme$_j$ $[_s$ t_i mai-le $t_j]]]]$
who you wonder what buy-ASP

The availability of the reading represented by (2) means that the LF movement of sheme 'what' may violate the Wh Island Constraint by crossing the wh island headed by shei 'who'. The availability of the reading represented by (3) shows that 'who' may cross a wh island headed by 'what'. Now, compare (1) with (4) and (5):

(4) [ni xiang-zhidao [shei weisheme mai-le shu]]?
you wonder who why buy-ASP book
'Who is the person x such that you wonder why x bought books?'

(5) [ni xiang-zhidao [shei zeme mai-le shu]]?
you wonder who how buy-ASP
'Who is the person x such that you wonder how x bought books?'

Unlike (1) neither of these two sentences are ambiguous. Each allows the interpretation according to which the wh word 'who' has wide scope over the matrix clause, with the other wh word, weisheme 'why' in (4) and zeme 'how' in (5), interpreted as having narrow scope over the clause embedded under 'wonder'. The process by which 'who' is interpreted as having wide scope again violates Subjacency, as is expected. But neither (4) nor (5) allows a wide scope interpretation on the other wh word 'why' or 'how'. So (4)can be a direct question on 'who' but not on 'why'; it cannot mean "what is the reason x such that you wonder who bought books for x?" Similarly, (5) cannot be interpreted as "what is the manner x such that you wonder who bought books in x?" In both cases, 'who' "wins out" in having wide scope when it occurs with 'why' or 'how' in the same embedded clause. Similarly, observe that 'what' also wins out in such a situation:

(6) [ni xiang-zhidao [Lisi weisheme mai-le sheme]]?
you wonder why buy-ASP what
'What is the thing x such that you wonder why Lisi bought x?'

(7) [ni xiang-zhidao [Lisi zeme mai-le sheme]]?
you wonder how buy-ASP what
'What is the thing x such that you wonder how Lisi bought x?'

In light of these examples, compare also (8)-(9) with (10)-(11):

(8) $[_{np}[_{s}$ shei xie] de shu] zui youqu?
who write DE book most interesting
'Books that who wrote are the most interesting?'

(9) $[_{np}[_{s}$ ta taolun sheme] de shu] zui youqu?
he discuss what DE book most interesting

'Books in which he discusses what are most interesting?'

(10) *[$_{np}$[$_{s}$ ta weisheme xie] de shu] zui youqu?
he why write DE book most interesting
'Books that he wrote why are most interesting?'

(11) *[$_{np}$[$_{s}$ ta zeme xie] de shu] zui youqu?
he how write DE book most interesting
'Books that he wrote how are most interesting?"

The sentences (8)-(11) show that a direct question can be asked to obtain an answer on the value of a wh word embedded within a complex NP if the wh word is 'who' or 'what', but not if the wh word is 'why' or 'how'.

What is it that makes the difference between wh operators like 'who' and 'what' and those like 'why' and 'how' in these sentences? It does not seem that the answer can be a purely semantic one. Since 'why' can be paraphrased as 'for what reason' and 'how' as 'in what manner' or 'by what means', etc., the questions (10) and (11) can be rephrased as in (12)-(13) below. If the ill-formedness of (10)-(11) were a semantic one, one would expect that both (12) and (13) are also ill-formed:

(12) [$_{np}$[$_{s}$ ta wei-le sheme yuanyin xie] de shu] zui youqu?
he for what reason write DE book most interesting
'Books that he wrote for what reason are most interesting?'

(13) [$_{np}$[$_{s}$ ta yong sheme xie] de shu] zui youqu?
he with what write DE book most interesting
'Books that he wrote with what are most interesting?'

But the two sentences are well-formed. That is, (12) may be uttered to obtain an answer like (14) and (13) may be answered with something like (15):

(14) ta wei-le qian xie de shu zui youqu.
he for money write DE book most interesting
'Books that he wrote because of money are most interesting.'

(15) ta yong maobi xie de shu zui youqu.
he with brush write DE book most interesting
'Books that he wrote with a brush are most interesting.'

A distinction between 'who' and 'what' on the one hand and 'why' and 'how' on the other that may be relevant to the difference in extraction possibilities illustrated here is that one type of operators is "objectual",i.e. of the category NP, and the other type is non-objectual. shei 'who' and sheme 'what' are, clearly, dominated by NP. Weisheme 'why' and zeme 'how', on the other hand, are non-nominal in category. Assuming that the meaning of a question defines the range of possible answers to it, then 'why' may be analyzed as a lexicalized phrasal category of the type PP or $\overline{S}$, since an answer to 'why' may take the form of a PP, as in 'for this reason', or the form of an $\overline{S}$, such as an adverbial clause of reason or purpose. "How', on the other hand, may be represented as a lexicalized PP meaning 'by what means' or 'in what manner'; or it may be an AP, to which 'happily' might be an answer. At any rate, neither 'why' nor 'how' appears to be an NP.

Another distinction that may be relevant to the facts being considered is that 'who' and 'what' are arguments of predicates, while 'why' and 'how' are adjuncts to predicates or are themselves predicates.

The distinction between NP and non-NP and the distinction between arguments and adjuncts do not, of course, always coincide, but as far as the wh words we have considered up to now are concerned, they do. Therefore, they do not offer much for one to decide which of the two distinctions drawn is relevant. Also, wh words corres-

ponding to 'when' and 'where' do not offer any clue. Note that these phrases in Chinese pattern on a par with 'who' and 'what' rather than 'why' and 'how' in their extraction possibility in LF:

(16) [ni xiang-zhidao [Lisi zai nali mai-le sheme]]?
you wonder at where buy-ASP what

a. 'What is the thing x such that you wonder where Lisi bought x?'

b. 'Where is the place x such that you wonder what Lisi bought at x?'

(17) [ni xiang-zhidao [Lisi (zai) shemeshihou mai-le sheme]]?
you wonder (at) when buy-ASP what

a. 'What is the thing x such that you wonder whe Lise bought x?'

b. 'When is the time x such that you wonder what Lisi bought at x?'

Unlike the unambiguous (4) and (5), (16)-(17) are ambiguous. (16) can be a direct question on nali 'where' and (17) can be a direct question on shemeshihou 'when', so that (18) may be an appropriate answer for (16), and (19) for (17):

(18) wo xiang-zhidao Lisi zai Niuyue mai-le sheme.
I wonder at N.Y. buy-ASP what.
'I wonder what Lisi bought in New York.'

(19) wo xiang-zhidao Lisi zuotian mai-le sheme.
I wonder yesterday buy-ASP what
'I wonder what Lisi bought yesterday.'

Furthermore, 'where' and 'when' can also be embedded within a complex NP, as shown below, in contrast to 'why' and 'how':

(20) $[_{np}[_{s}$ ta zai nali pai] de dianying] zui hao?
he at where film DE movie most good
'Movies that he filmed where are the best?'

(21) $[_{np}[_{s}$ ta (zai) shemeshihou pai] de dianying] zui hao?
he (at) when film DE movie most good

'Movies that he filmed when are the best?'

There is good reason to believe that both 'where' and 'when' are NPs in Chinese, since nali 'where' is always preceded by the preposition zai 'at', and 'when' is rendered as 'what time' as in shemeshihou, with sheme 'what' modifying shihou 'time'. Furthermore, 'when' may be optionally preceded by the preposition 'at', too, as shown above. We may, then, assume that 'where' and 'when' are dominated by NP in the position $[_{pp}P\ [_{np}_____]]$, where the P may or may not be phonetically realized. 'Where' and 'when', then, are complements of prepositions, and are on a par with 'who' and 'what' in being NPs and arguments. Again, the relevant distinction between 'where', 'when' and'why', 'how' may be that between NP and non-NP, or that between argument and adjunct.

What we have observed is that an NP or argument may freely move across a wh island or a complex NP in LF, but that a non-NP or adjunct may not. There is further support for the correctness of this observation. For example, the interpretation of A-not-A questions may not cross a wh island or a complex NP, as we can see.

(22) [ni xiang-zhidao [shei xi-bu-xihuan ni]]?
you wonder who like-not-like you
'Who is the person x such that you wonder whether x likes you or not?'

(22) may be answered by something like (23), where a value is given for 'who', but not by (24), where a value is given for the A-not-A operator, i.e. a choice is made between 'likes' and 'doesn't like':

(23) [wo xiang-zhidao [Lisi xi-bu-xihuan wo]]
I wonder like-not-like I
'I wonder whether Lisi likes me.'

(24) #[wo xiang-zhidao [shei bu-xihuan wo]]
I wonder who not-like I
'#I wonder who doesn't like me.'

In other words, while an LF representation like (25), in which 'who' has crossed an "A-not-A island" must be allowed, an LF representation like (26) must be excluded, in which the A-not-A operator has crossed a wh island headed by 'who':

(25) $[_{\bar{S}}$ shei$_i$ $[_S$ ni xiang-zhidao $[_{\bar{S}}$ A-not-A$_j$ $[_S$ t_i t_j
who you wonder

xihuan ni]]]]
like you

(26) *$[_{\bar{S}}$ A-not-A$_j$ $[_S$ ni xiang-zhidao $[_{\bar{S}}$ shei$_i$ $[_S$ t_i t_j
you wonder who

xihuan ni]]]]
like you

An A-not-A operator is, of course, non-NP in category, and it obviously also does not enter into predicate-argument relation with the verb it occurs in construction with. On this account, note that (27) and (28) are predictably ill-formed, each with an A-not-A operator and 'why' or 'how' embedded under 'wonder':

(27) *[ni xiang-zhidao [Lisi weisheme xi-bu-xihuan ni]]?
you wonder why like-not-like you

(28) *[ni xiang-zhidao [Lisi zeme xi-bu-xihuan ni]]?
you wonder how like-not-like you

In order for (27) to be a direct question, either of the two embedded question operators must be moved across an island headed by the other. Since neither can cross such an island, the sentence is starred. Likewise for (28). The A-not-A operator, also, cannot

cross a complex NP:

(29) *[$_{np}$[$_{s}$ ni xi-bu-xihuan] de shu] bijiao hao?
you like-not-like DE book more good

In order for (29) to be interpreted, the A-not-A operator has to be moved into the matrix COMP, giving the representation (30), which would mean "are the books that you like better, or the ones you don't like?"

(30) [$_{\bar{s}}$ A-not-A$_i$ [$_s$[$_{np}$[$_s$ ni t_i xihuan] de shu] bijiao hao]]
you like DE book more good

Since (29) is unacceptable, this may be reasonably attributed to the inability of the non-objectual A-not-A operator to cross a complex NP.

Another operator that must obey a stricter locality requirement than operators like 'who' and 'what', or quantificational NPs like 'everyone', is the focus operator. We have assumed that the focus marker shi is adverbial in function; this explains why it never occurs postverbally before the object to mark the postverbal object as focus (cf. Chapter 4). As an adverbial it must always occur preverbally, like all other adverbials. Furthermore, shi is evidently not an argument of anything. It is more like a predicate, analogous to the predicate "it is X that" in English cleft sentences. Therefore, it should be expected that when this focus operator is moved, it must obey a stricter locality requirement than objectual, argument-binding operators. This is indeed true. That the focus operator may not cross an island is illustrated below:

(31) *[$_s$ ta xiang-zhidao [$_s$ shi Zhangsan da-le shei]]
he wonder FO hit-ASP who
'*It is Zhangsan that he wonders who hit.'

(32) *[$_{np}$[$_{s}$ Zhangsan shi zuotian mai] de shu] hen hao.
FO yesterday buy DE book very good
'*The book that it was yesterday that Zhangsan bought is very good.'

(33) *wo xihuan [$_{np}$[$_{s}$ shi Zhangsan mai] de shu]
I like FO buy DE book
'*I like the book that it is Zhangsan that bought.'

In (31), the embedded 'who' must have the embedded clause as its scope, as required by the matrix verb 'wonder'. The focus operator must have scope over either the entire root sentence, indicating the emphasis of the speaker, or the embedded clause, indicating the emphasis of the matrix subject (the "speaker" of the embedded clause). If the focus operator (together with the focused constituent) is interpreted as having matrix scope, its movement in LF will violate the Wh Island Constraint, assuming that shei 'who' is moved to the embedded COMP before the focus operator is moved, in accordance with the principle of strict cyclicity.

(34) [$_{\bar{s}}$ shi Zhangsan$_i$ [$_s$ ta xiang-zhidao [$_{\bar{s}}$ shei$_j$ [$_s$
FO he wonder who

t_i da-le t_j]]]]
hit-ASP

Since (31) is ill-formed, it may not have the reading represented by (34). This will follow, if we assume that the non-objectual focus operator may not cross a wh island. We delay discussion of the fact that (31) is also ill-formed on the interpretation that the focus has embedded scope.[1]

Consider now (32) and (33). Since a focus may not have a relative clause as its entire scope,[2] it must have the entire sentence as its scope. This would require movement of the operator in LF to violate the CNPC, giving a representation like (35) for (32),

for example:

(35) $[_{\bar{s}}$ shi zuotian$_i$ $[_s[_{np}[_s$ Zhangsan $t_i$mai] de shu] hen hao]]
FO yesterday buy DE book very good

The ill-formedness of (32) and (33) is therefore expected, given that the focus operator is non-objectual and is not an argument.

7.2. A Subjacency Account

Up to now we have indicated that although movement of an NP category or of an argument may be quite free if it occurs in LF, movement of other categories must still observe a strict locality requirement. The former type of moved elements includes wh operators like 'who', 'what', 'what time', etc., and quantificational NPs like 'every man', and other NPs that are subject to QR. The latter type includes wh operators like 'why' and 'how', the A-not-A operator, as well as the focus operator shi. The difference between the different operators with respect to extraction possibilities appears to be systematic, and calls for an explanation. In order to account for this difference, I proposed in Huang (1982) to add the stipulation to UG that the second type of operators, i.e. non-objectual or non-argument operators, must obey Subjacency both in Syntax and in LF, although objectual operators may freely violate Subjacency if they are moved in LF. This stipulation is fairly plausible, given the facts so far. Note that all of the non-objectual operators may go long distance as long as they do not cross any islands:

(36) [ni renwei [ta weisheme meiyou lai]]?
you think he why not come
'Why$_i$ do you think that [he didn't come t_i]?'

(37) [ni renwei [ta yinggai zeme lai]]?
you think he should how come
'How$_i$ do you think that [he should come t$_i$]?'

(38) [ni renwei [ta hui-bu-hui lai]]?
you think he will-not-will come
'Do you think that he will come, or do you think that he won't?'

(39) [ta renwei [Zhangsan shi mingtian lai]]
he think FO tomorrow come
'It is tomorrow$_i$ that he thinks that [Zhangsan will come t$_i$].'

This stipulation, furthermore, has some possibility of being a universal and thus, if correct, need not pose a problem in learning. Observe, for example, the contrast below, which clearly mirrors the Chinese examples we have seen.

(40) a. Who remembers where we bought what?

b. Who remembers where we met who?

c. Who remembers what we bought where?

d. Who remembers what we bought when?

e. *Who remembers what we bought why?

f. *Who remembers what we bought how?

Consider these sentences with respect to the possibility of interpreting the unmoved wh phrase as having scope over the root sentence.[3] Most speakers agree that there is a contrast between (40a-d) and (40e-f). That is, while it is possible to construe (40a-d) as questions on the pairing between the matrix who and the embedded unmoved what, who, where, when, respectively, it is not possible to construe (40e-f) as questions on the pairing between the matrix who and the embedded why or how.[4] This seems related to the fact that while who, what, when, where may be

dominated by NP, why and how can not be. The category of who and what is clearly NP. There is also some evidence on the categorial distinction between when, where and why, how. Consider the following:

(41) a. From where did he come?

b. Since when have you been here?

c. *For why did he come?

d. *By how did he come?

Whereas where and when can be complements of prepositions, why and how cannot. Given this contrast, it is reasonable to assume that, as in Chinese, English where and when may also be inserted under NP in the structure $[_{pp}\ P\ [_{np}\ ____]]$, where P may or may not be lexical, but why and how must be lexicalized non-NPs, which must be directly inserted under AP, PP, etc. If so, then (40c) and (40d) are well-formed, because the movement of where and when in LF to the matrix clause need only affect the NP node in $[_{pp}\ P\ NP]$. (The P, empty or otherwise, may be stranded in LF since the Condition on Extraction Domain (6.118) does not apply here.) The status of (40c-d) is thus on a par with (40a-b). On the other hand, movement of why and how in (40e-f) must affect a non-NP node. Therefore these sentences are ill-formed if we assume that a non-NP operator must obey Subjacency even in LF.

The distinction in behavior between NP and non-NP operators that we observe in LF can also be seen in Syntax. Note, for example, that for most speakers of English there is a systematic difference in the degree of acceptability between the questions

in (42) and those in (43):

(42) a. ??What$_i$ did you wonder [why$_j$ I bought t_i t_j]?

b. ??What$_i$ did you wonder [how$_j$ I bought t_i t_j]?

c. ??What$_i$ did you wonder [where$_j$ I bought t_i t_j]?

d. ??What$_i$ did you wonder [when$_j$ I bought t_i t_j]?

(43) a. *Why$_j$ did you wonder [what$_i$ I bought t_i t_j]?

b. *How$_j$ did you wonder [what$_i$ I bought t_i t_j]?

c. *Where$_j$ did you wonder [what$_i$ I bought t_i t_j]?

d. *When$_i$ did you wonder [what$_i$ I bought t_i t_j]?

A clearer contrast is seen in relativization:

(44) a. ?This is the book which$_i$ I wondered [why$_j$ you bought t_i t_j].

b. ?This is the book which$_i$ I wondered [how$_i$ you bought t_i t_j].

c. ?This is the book which$_i$ I wondered [where$_j$ you bought t_i t_j]?

d. ?This is the book which$_i$ I wondered [when$_j$ you bought t_i t_j].

(45) a. *This is the reason why$_j$ I wondered [what$_i$ you bought t_i t_j].

b. *This is the way in which$_i$ I wondered [what$_i$ you bought t_i t_j].

c. *This is the place where$_j$ I wondered [what$_i$ you bought t_i t_j].

d. *This was the day when$_j$ I wondered [who$_i$ you met t_i t_j].

These data on overt extraction do not, at first glance, parallel the data on abstract extraction in LF we have just seen. In particular, we saw earlier that the operators <u>where</u> and <u>when</u> pattern with <u>who</u> and <u>what</u>, rather than with <u>why</u> and <u>how</u>, in being

quite freely extractable in LF, but now we see in (42)-(45) that where and when pattern with why and how in being subject to a more strict locality requirement than who, what (and which). Recall, however, that we assume that where and when may be inserted in the environment $[_{pp}\ P\ [_{np}\ ____]]$, and that the sole reason why they may be freely extracted in LF is because their movement may affect only the NP in PP in violation of the Condition on Extraction Domain (6.118), which does not apply in LF. Now, in Syntax, if extraction of where and when affects only an NP node, it will be ruled out because the condition (6.118) does apply in Syntax. Therefore, extraction of where and when in Syntax must affect the entire PP node that dominates them. Therefore, the fact that where and when pattern with why and how in Syntax, though they pattern with who and what in LF, is entirely expected. Abstracting away from the effects of the condition (6.118), then, the data shown in (42)-(45) with respect to overt movement in Syntax do indeed parallel the data we saw with respect to abstract movement in LF.

The contrast between (44) and (45) is mirrored by the Chinese data below, indicating the universality of the distinction being illustrated. Note that the contrast in Chinese between (46) and (47) is even clearer than that between (44)-(45) in English, since the sentences in (46) are fully acceptable, and those in (47) entirely hopeless:

(46) a. zhe jiushi [$_{np}$ [$_{s}$ wo xiang-zhidao [$_{s}$ ni weisheme
this is I wonder you why

mai t_i]] de shu_i]
buy DE book
'?This is the book I wondered why you bought.'

b. zhe jiushi [$_{np}$[$_{s}$ wo xiang-zhidao [$_{s}$ ni zeme mai
this is I wonder you how buy

t_i]] de shu_i]
DE book
'?This is the book that I wondered how you bought.'

c. zhe jiushi [$_{np}$[$_{s}$ wo xiang-zhidao [$_{s}$ ni zai nali
this is I wonder you at where

mai t_i]] de shu_i]
buy DE book
'?This is the book that I wondered where you bought.'

d. zhe jiushi [$_{np}$[$_{s}$ wo xiang-zhidao [$_{s}$ ni shemeshihou
this is I wonder you when

mai t_i]] de shu_i]
buy DE book
'?This is the book that I wondered when you bought.'

(47) a. *zhe jiushi [$_{np}$[$_{s}$ wo xiang-zhidao [$_{s}$ shei t_i mai-le
this is I wonder who buy-ASP

shu]] de $yuanyin_i$]
book DE reason
'*This is the reason why_i I wondered [who bought the book t_i].'

b. *zhe jiushi [$_{np}$[$_{s}$ wo xiang-zhidao [$_{s}$ shei t_i
this is I wonder who

mai-le shu]] de $fangfa_i$]
buy-ASP book DE method
'*This is the way in $which_i$ I wondered [who bought the book t_i].'

c. *zhe jiushi [$_{np}$[$_{s}$ wo xiang-zhidao [$_{s}$ shei t_i mai-le
this is I wonder who buy-ASP

shu]] de difang$_i$]
book DE place
'*This is the place where$_i$ I wondered [who bought the book t_i].'

d. *zhe jiushi [$_{np}$[$_{s}$ wo xiang-zhidao [$_{s}$ shei t_i mai-le
this is I wonder who buy-ASP

shu]] de shihou$_i$]
book DE time
'*This was the time when$_i$ I wondered [who bought the book t_i].'

Similarly, in Italian, although it is possible to relativize an NP within an indirect question (with the movement crossing exactly one wh island, as shown in Rizzi 1978a), this process is impossible if what is relativized is an adverbial corresponding to where, when, why, how, etc. The following data (supplied by Rita Manzini) parallel the Chinese and English data above point by point:[5]

(48) a. Questo è il libro che mi chiedo perchè ho comprato.
'This is the book that I wonder why I bought.'

b. Questo è il libro che mi chiedo come ho comprato.
'This is the book that I wonder how I bought.'

c. Questo è il libro che mi chiedo dove ho comprato.
'This is the book that I wonder where I bought.'

d. Questo è il libro che mi chiedo quando ho comprato.
'This is the book that I wonder when I bought.'

(49) a. *Questo è la ragione per la quale mi chiedo che
'*This is the reason for which$_i$ I wonder [what I

cosa ho comprato.
bought$_i$].'

b. *Questo è il modo nel quale mi chiedo che cosa
'*This is the way in which$_i$ I wonder [what I

ho comprato.
bought t_i].'

c. *Questo è il posto dove mi chiedo che cosa ho
'*This is the place where$_i$ I wonder [what I

comprato.
bought t_i].'

d. *Questo è il giorno nel quale mi chiedo chi hai
'*This is the day on which$_i$ I wonder [who you met

incontrato.
t_i].'

What we have seen up to now is that there is a systematic distinction between two types of operators: (a) operators of the category NP or those whose traces occupy argument positions, and (b) operators of a non-NP category or those which do not bind traces in argument positions, and that it is the latter type of operators whose movement is subject to a more strict locality requirement. Up to now we have not determined whether the relevant distinction between the two types of operators is that between NP and non-NP or that between arguments and non-arguments. It is not difficult, in fact, to decide on this problem. First of all, consider the following sentences in Italian (from Rizzi 1978):

(50) Tuo fratello, a cui mi domando che storie abbiano
'Your brother, to whom I wonder which stories they told,

raccontato, era molto preoccupato.
was very troubled.'

(51) La nuova idea di Giorgio, di cui immagino che cosa pensi,
'Giorgios's new idea, of which I imagine what you think,

diverra presto di pubblico dominio.
will soon become known to everyone.'

In these sentences, a prepositional phrase (a cui 'to whom' in (50) and di cui 'of which' in (51)) has been moved across a wh island, and the sentences are indicated as grammatical. Compare these to the ungrammatical sentences in (49). Since in both cases the moved element is a PP, the relevant distinction between (49) and (50)-(51) cannot be one in categorial type. Since the moved PP in (50)-(51) is an argument and that in (49) is an adjunct, the relevant distinction should be argument vs. non-argument. This conclusion is also supported by the following contrast in English:

(52) Of which city$_i$ did you witness [$_{np}$ the destruction t_i]?

(53) *On which table$_i$ did you like [$_{np}$ the books t_i]?

Conceptually, there is also reason to consider the argument vs. non-argument distinction the relevant one. If it is the non-nominal operators rather than the non-argument-binding operators that must obey a stricter locality requirement, it is difficult to imagine why this should be the case, and why the situation could not happen to be the reverse. On the other hand, there is some plausibility in assuming that operators that bind non-argument traces must obey a stricter locality condition than those that bind argument traces. Every reader who has gone through our examples (42)-(49) will no doubt have noticed that the sentences in (43), (45), (47) and (49) are not ungrammatical in their surface form, but are so only on the indicated construal, i.e. only if the matrix operator of each sentence is construed as binding a non-argument trace located in the embedded clause, across a wh island. It is easy to observe that the distinction between (42)

and (43), (44) and (45), (46) and (47) or between (48) and (49) very probably has to do with the fact that it is very tempting to construe each of the matrix operators in (43), (45), (47), (49) with its matrix clause. The reason this construal is possible is, undoubtedly, that all of the operators are adjuncts; none of them are required of the embedded clause by any principle of grammar, neither the θ-criterion nor the Projection Principle. That is, there is a closer dependency relation between the matrix wh operator and the embedded verb in each of (42), for example, than in each of (43). Since the dependency between a verb and an adjunct is looser than that between a verb and its argument, it is natural to assume that, in order for the looser dependency to be established, the two terms of the dependency must be sufficiently close to each other in distance, more so than the two terms of a closer type of dependency. This is where the assumption that non-argument-binding operators must obey a stricter locality condition starts to make sense.

7.3. Inadequacies of the Subjacency Account

We have seen that the distinction between argument and non-argument operators with respect to their extraction possibilities obtains quite universally, and both in Syntax and in LF, and appears general enough to provide at least some support for the assumption made in my (1982) paper that although argument-binding operators may freely violate Subjacency in LF, non-argument-binding operators must still obey the condition, in LF as well as in Syntax.[6] This

assumption, however, suffers from a number of defects which, as I see them now, cast doubt on the correctness of the original account. I will now indicate these problems and, as an effort to overcome them, suggest that all the data we have examined should not be derived from Subjacency, but are best treated as special cases of a properly construed version of the ECP.

The first problem in the assumption that subjacency is involved is its entirely stipulative nature, since an otherwise much simpler statement of the bounding theory would be available, namely that Subjacency applies only in Syntax and not in LF, without reference to the categorial type of the moved element. As a consequence of the stipulation, we are left with a pretty ugly picture:

(54) In Syntax: both movement of an argument and movement of an adjunct obeys Subjacency.
In LF: only movement of an adjunct obeys Subjacency.

While this picture is not entirely implausible, on the assumption that looser dependencies require stricter locality, it makes good sense to ask if the inelegance can be eliminated by reinterpreting our data in some other way.

Another problem with (54) has to do with the contrast between (48) and (49) in Italian. According to Rizzi's (1978a) account, the sentences in (48) are well-formed because $\bar{S}$, but not S, is a bounding node for Italian. The same theory, however, wrongly predicts that all of (49) are also well-formed. If all of (49) are to be excluded by Subjacency, it will be necessary to stipulate that while $\bar{S}$ is a bounding node in Italian for movement that affects arguments, S but not $\bar{S}$ must be a bounding node even

for this language (as well as other languages) for movement that affects non-arguments. This again results in some degree of inelegance, and one has reason to wonder if the ungrammaticality of sentences like those in (49) is not of a different nature than that of ordinary bounding theory violations, and if it cannot be accounted for by some other principle than Subjacency.

A third problem is that Subjacency is not in general sufficient to account for all the data we have seen with respect to the movement of non-arguments. Note, for example, that the sentence (31) is ungrammatical not only on the interpretation that the focus operator shi has scope over the matrix sentence; it is also ungrammatical with the focus operator interpreted as having embedded scope. On this latter reading, the ungrammaticality of (31) is on a par with (55):

(55) *shi Zhangsan da-le shei?
FO hit-ASP who

Other examples that show the same point include:

(56) *shei xi-bu-xihuan Lisi?
who like-not-like

(57) *shei weisheme bu lai?
who why not come

That these sentences cannot be ruled out by Subjacency is easy to see. Take (56) for example. Assuming that both 'who' and the A-not-A operator are moved into COMP in LF, the LF representation of (56) is either (58), or one in which 'who' and 'A-not-A' take the opposite linear order:

(58) $[_{\bar{s}}\ [_{comp}\ \underset{who}{shei_i}\ A\text{-not-}A_j][_s\ t_i\ t_j\ \underset{like}{xihuan}\ Lisi]]$

Since no more than one S is crossed by the movement that turns (56) into (58), Subjacency must be irrelevant. Furthermore, this problem cannot be resolved by assuming that movement of 'who' and 'A-not-A' is carried out by Chomsky-adjoining each of the operators to S. For, given such an assumption, even though the LF representation (59a) may be blocked by Subjacency, where the A-not-A operator is separated from its trace by two S nodes, the derivation of (59b) cannot be blocked by the same condition:

(59) a. $*[_s\ A\text{-not-}A_j\ [_s\ \underset{who}{shei_i}\ [_s\ t_i\ t_j\ \underset{like}{xihuan}\ Lisi]]]$

b. $*[_s\ \underset{who}{shei_i}\ [_s\ A\text{-not-}A_j[_s\ t_i\ t_j\ \underset{like}{xihuan}\ Lisi]]]$

(59b) cannot be blocked by Subjacency in LF because the non-argument operator A-not-A does not cross more than one S node, and the operator 'who', whose trace occurs in argument position, need not obey Subjacency. Given that Subjacency is not sufficient to rule out sentences like (55)-(57), it is natural to wonder whether a more general account is available.

Finally, a problem also arises from the contrast between sentences like (46) and (47) above in Chinese in conjunction with the formulation of Subjacency as a condition on the application of Move α. It is standard practice to regard the marginality of the English sentences in (42) and (44) as a consequence of their violation of the Wh Island Constraint or Subjacency. Sentences corresponding to (44) in Chinese and Italian, however, are entirely

well-formed, as indicated in (46) and (48). Furthermore, the Chinese sentences in (46) cannot be explained by a Rizzi-type S/$\bar{S}$ assumption, because it is possible to relativize an NP embedded under more than one wh island in Chinese. As far as I can see, the sentence (60) is as good as the ones in (46), although at the level of LF the relation between the relativized NP and its trace crosses two wh islands. Compare the well-formed (60) in Chinese with the ill-formed (61) in Italian (from Rizzi 1978a):

(60) zhe jiushi [$_{np}$[$_{s}$ wo xiang-zhidao [$_{s}$ ni weisheme bu
this is I wonder you why not
'*?This is the book that I wonder why you did not tell

gaosu wo [$_{s}$ shi shei xie t_i]]] de neiben shu]
tell I FO who write$_i$ DE that book
me who wrote.'

(61) *Questo argomento, di cui mi sto domandando a chi potrei
'*?This topic, of which I am wondering whom I could ask

chiedere quando dovro parlare, mi sembra sempre pin
when I will have to talk, seems to me more and more

complicato.
complicated.'

Also it is not difficult to construct examples in Chinese with a dependency crossing three or even more wh islands. It seems to me that such overt antecedent-gap relations as exhibited under relativization (and topicalization) are in general free of any wh island effects.[7] This may be related naturally to the fact that wh words occur in their base-generated position in surface structure, and as such they do not form any island to block relativization or topicalization. Note, however, that this does not mean that questions do not have any island effects on other processes. As we

saw in connection with (24) and (31), an indirect wh question does form an island which prevents an A-not-A or focus operator from crossing it in LF. The sentences (55)-(57) also illustrate the island effects of wh questions. What appears to be the case is that wh questions do not form islands to block overt rules in Syntax such as relativization and topicalization, but may have island effects on abstract movement rules in LF. This is, of course, entirely compatible with our assumption that wh words get moved in this language in LF, and consequently that wh islands, as defined by the configuration $[wh_i[...t_i...]]$, do not exist until some point in LF. The fact that wh questions do not block relativization nor topicalization, but do block certain movement processes in LF, can be brought out quite nicely if Subjacency is construed as a condition on Move α rather than one on output representations at LF. In particular, since no wh islands exist in Syntax, relativization and topicalization may apply unimpeded by indirect questions. When a wh island is formed in LF, both relativization and topicalization will have passed free of its effect, though a later rule that applies in LF, such as movement of A-not-A, may be blocked by its presence, as we saw in connection with (24). Since there is some independent reason for taking Subjacency as a condition on movement, provided for example by parasitic gap constructions (cf. Chomsky 1981b), nothing special needs to be said about the island effects of wh questions that we have seen.

Note, now, that if this conception of Subjacency is correct,

then it is necessary to conclude that the ill-formedness of (47) has nothing to do with Subjacency. Since no wh island exists at the time relativization takes place, the sentences in (47) should be as easily derivable as those in (46), as well as the following, which has an NP relativized within an embedded declarative:

(62) ta de nyuer zai [$_{np}$[$_{s}$ wo cai [$_{s}$ ta hui chusheng
he 's daughter at I guess she will born
'His daughter was born on the day on which$_i$ I guessed

t_i]] de nei tian] chusheng-le.
DE that day born-ASP
[she would be born t_i].'

In other words, if subjacency is considered to be the relevant principle that rules out the sentences in (47), it will be necessary to have them subject to the condition at a time after the LF rule of wh movement has created wh islands, in particular at the output level of LF. This is in direct contradiction to the conclusion just arrived at in regard to the well-formedness of (46) and the like.

Of course, one could take (47) as evidence for the hypothesis that Subjacency is indeed a condition on representation at LF. As noted, this would require a stipulation on the distinction between argument and non-argument at LF. In trying to settle the paradox caused by (46) and (47), it will be worthwhile to see if a solution is available which will be free from such stipulations.

7.4. An ECP Account

Having indicated the difficulties associated with the attempt to account for the behavior of non-argument-binding operators by Subjacency, I would like now to suggest that the relevant principle should be the ECP. In particular, I suggest that the strict locality requirement on non-argument-binding operators whose movement takes place in LF follows, free, from the ECP, which we already saw must apply at LF. Furthermore, the relative strictness of this requirement on such operators that are overtly moved in Syntax may also follow if the ECP is assumed to apply not only at LF, but also at SS.

The idea that underlies the suggestion is as follows. Recall that a plausible reason why non-argument-binding operators must obey a strict locality condition more than argument-binding operators is that there is a looser dependency between a non-argument and a verb. The definition of proper govnerment, furthermore, says of a trace that either it must be lexically governed, or it must be locally controlled, i.e. governed by its antecedent. Why does a trace that is not lexically governed have to be locally controlled, and if a trace is lexically governed, no local control is necessary? The reason, I think, is that there is a closer dependency between a lexically governed element and its governor (i.e. the dependency of subcategorization), and a looser one between two elements not related by lexical government. It is generally agreed that an

adjunct PP indicating time, manner, reason, place, etc. lies outside the maximal projection that dominates a verb. Therefore, the trace of an adjunct PP is not lexically governed. Or, if we adopt Kayne's idea of proper government, such a trace is not lexically governed because it does not have a superscript. If we say that such PP traces, like all NP traces, are subject to the ECP, then they must be locally controlled by their own antecedents. In order for an antecedent to locally control, i.e. govern, its trace, it must occur within the same maximal phrase, i.e. the same $\bar{S}$ or NP where the trace occurs, or there must be an intermediate trace in COMP within the same $\bar{S}$ where the original trace occurs. This, I claim, is exactly the strict locality that characterizes movement of non-argument-binding operators. To illustrate how this idea may work, let us consider first the cases involving the movement of such operators in LF.

First, we saw that movement of weisheme 'why', zeme 'how', the A-not-A operator, or the focus operator shi cannot violate either the CNPC or the Wh Island Constraint in LF. Since these operators do not bind traces that occur in argument positions, it is natural to assume that their traces are not lexically governed under the proper notion of government. Therefore, the traces must be locally controlled. Suppose now that a non-argument, say an A-not-A operator, is raised out of a wh island. Such a process will turn a sentence like (63)(=24) into (64) or (65), depending upon whether the A-not-A operator has moved in one step or successive-cyclically:

(63) #[ni xiang-zhidao [shei xi-bu-xihuan ni]]?
you wonder who like-not-like you

(64) [$_{\bar{S}}$ A-not-A$_j$ [$_S$ ni xiang-zhidao [$_{\bar{S}}$ shei$_i$ [$_S$ t_i t_j
you wonder who

xihuan ni]]]]
like you

(65) [$_{\bar{S}}$ A-not-A$_j$ [$_S$ ni xiang-zhidao [$_{\bar{S}}$ [$_{comp}$ t_j shei$_i$]
you wonder who

[$_S$ t_i t_j xihuan ni]]]]
like you

Clearly, in neither (64) nor (65) does the A-not-A operator directly govern or locally control its trace t_j. In (64), government is blocked by the intervening embedded $\bar{S}$ node. In (65), the same node prevents the operator from directly governing the trace. Furthermore, government of the original trace by the intermediate trace in COMP is blocked by the branching COMP, which is also a maximal node. Therefore, both (64) and (65) are ill-formed representations at LF with respect to the ECP.

Suppose now that an A-not-A operator is raised out of an embedded declarative. Such a process will turn a sentence like (66) (=38) into (67) or (68), again depending upon whether the movement is done in one step or successive-cyclically:

(66) [ni renwei [ta hui-bu-hui lai]]?
you think he will-not-will come
'Do you think he will come, or do you think he won't?'

(67) [$_{\bar{S}}$ A-not-A$_i$ [$_S$ ni renwei [$_{\bar{S}}$ [$_S$ ta t_i hui lai]]]]
you think he will come

(68) [$_{\bar{S}}$ A-not-A$_i$ [$_S$ ni renwei [$_{\bar{S}}$ t_i [$_S$ ta t_i hui lai]]]]
you think he will come

In (67), the A-not-A operator again does not govern its own

trace, due to the intervening embedded $\bar{S}$. Although direct government of the trace by the operator is also blocked in (68), government is possible from the intermediate trace in the embedded $\bar{S}$ to the original trace. Since the intermediate trace is the sole daughter of the embedded COMP, it is identified with the COMP and governs the original trace.[8] Therefore, (68) is well-formed with respect to the ECP at LF, although (67) is not.

Now, consider the situation where an A-not-A operator is to be raised out of a complex NP. Such a process will turn a sentence like (69)(=29) into an LF representation like (70)(=30):

(69) *[$_{s}$[$_{np}$[$_{s}$ ni xi-bu-xihuan] de shu] bijiao hao]?
you like-not-like DE book more good

(70) [$_{\bar{s}}$ A-not-A [$_{s}$[$_{np}$[$_{s}$ ni t_i xihuan] de shu] bijiao hao]]
like DE book more good

In (70), again, the A-not-A operator does not directly govern its own trace t_i, with government blocked by the maximal node NP. Since NP lacks a COMP node, furthermore, the option of having the trace t_i locally controlled by an intermediate trace is not available. Therefore, (70), the only possible output of Move A-not-A on (69), is ill-formed with respect to the ECP at LF.

We have seen that if an A-not-A operator violates Subjacency, it will also violate the ECP at LF because its trace, not being lexically governed, has to be locally controlled. It should be easy to see that the same applies to the other non-argument-binding operators we have examined in Chinese. The assumption that the trace of such an operator is subject to the ECP may also extend to English to rule out sentences containing unmoved

why and how, like (40e) and (40f). As a matter of execution, let us continue to assume that the LF movement of a syntactically unmoved wh phrase in English is carried out by placing the wh phrase within a COMP already filled with a wh phrase in Syntax (either as a result of lexical insertion or as a result of the syntactic Move α) and, following Aoun, Hornstein, and Sportiche (1981), that there is a rule that identifies, by way of index percolation, a COMP node with the wh phrase it solely dominates, which applies at the level of SS.[9] Such a process enables one to account for the standard superiority effects under the ECP:

(70) $[_{\bar{s}}[_{comp}\ who_i][_s\ t_i$ bought what]]?

(71) *$[_{\bar{s}}[_{comp}\ what_j][_s$ did who buy $t_j]]$?

At SS, the COMP in (70) is identified with who_i and carries the index i, whereas the COMP in (71) is identified with $what_j$ and carries the index j. At LF, (70)-(71) have the form of (72)-(73) respectively:

(72) $[_{\bar{s}}[_{comp_i}\ what_j\ who_i][_s\ t_i$ bought $t_j]]$

(73) $[_{\bar{s}}[_{comp_j}\ who_i\ what_j][_s\ t_i$ bought $t_j]]$

In both (72) and (73) t_j is properly (lexically) governed. In (72), t_i is not lexically governed, but it is governed by $COMP_i$, which is identified with who_i, the antecedent of t_i. Therefore, t_i in (72) is also properly governed. In (73), on the other hand, t_i is not governed by its antecedent who_i, since government is blocked by the maximal node of the branching COMP. Although the $COMP_j$ governs t_i, it is not its antecedent. Since t_i is not lexically governed either, it is not properly governed. (73)

therefore violates the ECP while (72) does not. Note that the index-percolation procedure, which applies at SS when only one wh phrase is dominated by COMP, crucially enables one to distinguish between (70) and (71). If the two COMPs were not indexed differently in (72) and (73), there would be no clear ground for saying that $\underline{\text{who}}_i$ governs t_i in (72) but not in (73).

It is easy to see that the following also follows as a standard case of superiority:

(74) Who remembers where we bought what?

(75) *Who remembers where who bought the books?

After COMP identification at SS and wh movement in LF, (74) and (75) have the LF representations (76) and (77):

(76) $[_{\bar{S}}[_{\text{comp}_i}\ \text{what}_j\ \text{who}_i][_S\ t_i\ \text{remembers}\ [_{\bar{S}}\ \text{where}_k\ [_S\ \text{we bought}\ t_j\ t_k]]]]$

(77) $[_{\bar{S}}[_{\text{comp}_i}\ \text{who}_j\ \text{who}_i][_S\ t_i\ \text{remembers}\ [_{\bar{S}}\ \text{where}_k\ [_S\ t_j\ \text{bought the books}\ t_k]]]]$

Since the trace t_i and the trace t_k have exactly the same status in both (76) and (77), the contrast between (74) and (75) must be a consequence of the difference in status of the trace t_j. In (76), t_j is lexically governed, and therefore properly governed. In (77), however, t_j is not lexically governed (as a subject), so it must be governed by its own antecedent, $\underline{\text{who}}_j$. But $\underline{\text{who}}_j$ cannot govern t_j due to the intervening embedded $\bar{S}$. Therefore (77) violates the ECP. Even if $\underline{\text{who}}_j$ has been moved through the embedded COMP, the ECP will still be violated:

(78) $[_{\bar{S}}[_{comp_i}$ who_j $who_i][_S$ t_i remembers $[_{\bar{S}}[_{comp_k}$ t_j $where_k]$
$[_S$ t_j bought the books $t_k]]]]$

The intermediate trace t_j in the embedded COMP also fails to govern the original trace t_j, because of the intervening maximal $COMP_k$. Thus (78) violates the ECP exactly as does (73).

Now, let us consider the ill-formed sentences (40e) and (40f):

(40) e. *Who remembers what we bought why?

f. *Who remembers what we bought how?

Consider first the interpretation according to which (40e-f) are questions on the pairing between the matrix <u>who</u> and the embedded <u>why</u> or <u>how</u>. For (40e), depending upon whether <u>why</u> has moved in one step or successive-cyclically, the LF representation is either (79) or (80):

(79) $[_{\bar{S}}[_{comp_i}$ why_k $who_i][_S$ t_i remembers $[_{\bar{S}}[_{comp_j}$ $what_j]$
$[_S$ we bought t_j $t_k]]]]$

(80) $[_{\bar{S}}[_{comp_i}$ why_k $who_i][_S$ t_i remembers $[_{\bar{S}}[_{comp_j}$ t_k $what_j]$
$[_S$ we bought t_j $t_k]]]]$

In neither (79) nor (80) is the trace of <u>why</u>, t_k, properly governed. Since t_k is in adjunct position, it is not lexically governed by the verb <u>bought</u>. In order to be properly governed, therefore, t_k must be governed by its own antecedent. In both (79) and (80), however, government of the original t_k by the antecedent $\underline{why}_k$ is blocked by the embedded $\bar{S}$ node. Furthermore, the intermediate trace t_k in $COMP_j$ of (80) is prevented by the latter from governing the original trace. In both (79) and (80),

then, the ECP is volated, hence the ill-formedness of (40e). The same obtains for (40f).

The sentences (40e-f) are also ill-formed on the construal that the unmoved why and how are each paired with the moved what in the embedded COMP. On this narrow scope reading, the situation of (40e-f) is on a par with (81) and (82):

(81) a *Tell me what you bought why.

b *What did you buy why?

(82) a. *Tell me what you bought how.

b. *What did you buy how?

The LF representation of (81a), for example, has the form (83):

(83) Tell me $[_{\bar{S}}[_{comp_i}\ why_j\ what_i][_S$ you bought $t_i\ t_j]]$

The trace t_j, again, is neither lexically governed nor locally controlled by its own antecedent. (81a) is thus ruled out by the ECP at LF, as are the other sentences in (81)-(82), and (40e-f) on the narrow-scope construal of why and how.

The ill-formed sentences we have gone through are in contrast to well-formed sentences like the following:[10]

(84) Who remembers why we bought what?

(85) Tell me why you bought what.

(86) ?Why did you buy what? [11]

The well-formedness of these sentences can be conveniently derived from the fact that the traces of all the wh phrases in them are properly governed at LF, in particular the trace of why. In these sentences, the operator why has been moved in Syntax to the embedded COMP, where it locally governs its own lexically

ungoverned trace. This relationship of local control is preserved in LF, after COMP identification, regardless of whether any wh phrase is moved into the COMP already occupied by why. The well-formed LF representations of (84)-(86) are given below (the sentence (84) is ambiguous and has the two representations in (87)).

(87). a. $[_{\bar{s}}[_{comp_i}\ what_k\ who_i][_s t_i$ remembers $[_{\bar{s}}[_{comp_j}\ why_j][_s$ we bought $t_k\ t_j\ ]]]]$

b. $[_{\bar{s}}[_{comp_i}\ who_i][_s\ t_i$ remembers $[_{\bar{s}}[_{comp_j}\ what_k\ why_j][_s$ we bought $t_k t_j]]]]$

(88) Tell me $[_{\bar{s}}[_{comp_j}\ what_k\ why_j][_s$ you bought $t_k\ t_j]]$

(89) $[_{\bar{s}}[_{comp_j}\ what_k\ why_j][_s$ did you buy $t_k\ t_j]]$

What we are claiming, as should be clear by now, is that such contrasts as we observe between (81a) and (85) exhibit exactly the same type of asymmetry as does the contrast between (70) and (71), namely the superiority phenomenon. This is, in fact, what Chomsky's (1973) definition of superiority already gives us. According to his definition, roughly, A is superior to B if and only if A asymmetrically c-commands B. Since the subject asymmetrically c-commands the object, and so does an adverbial adjunct, it follows that both the subject and the adjuncts are superior to the object. If it is correct to subsume the subject/object superiority phenomenon under the ECP, as it does appear to be, then there is no reason not to also subsume the adjunct/complement superiority phenomenon under the same principle. There is,

furthermore, some evidence that the Superiority Condition of Chomsky (1973) has no independent status in the presence of the ECP. Consider the following:

(90) a. What did you give to whom?

b. To whom did you give what?

(91) a. John knows what books to give to whom (From Chomsky 1973)

b. John knows to whom to give what books.

(92) a. *Who bought the books why?

b. *Why did who buy the books?

(93) a. *John knows who bought the books why.

b. *John knows why who bought the books.

In (90)-(91), since what books and to whom both complement the verb give and they c-command each other, neither is superior to the other. The fact that both of the (a) and (b) sentences in (90) and (91) are well-formed is, therefore, what one would expect. Consider now (92)-(93). Is the subject who superior to the adjunct why, or the latter superior to the former? An answer in the affirmative on either choice of the disjunction would predict that there is a contrast between (a) and (b) of these sentences, contrary to fact. Therefore, neither the subject nor the adjunct are superior to the other. This accords with the usual assumption, in fact, since subjects and adjuncts may be both immediately dominated by S nodes, and hold a mutual c-command relationship (in English). But if neither who nor why in each of (92) and (93) is superior to the other, then the Superiority Condition is silent with respect to these sentences, and one would expect all of these sentences, like (90)-(91), to be equally well-formed. The fact that they are all

ill-formed shows, then, that the Superiority Condition is too weak. On the other hand, the ECP accounts for all of (90)-(93) straight-forwardly. In (90) and (91), since both what books and to whom are complements to give, their traces are properly (lexically) governed in LF. In (92) and (93), neither the trace of why nor that of who is lexically governed at LF. So both must be governed by their own antecendents. But this is clearly impossible, as in any instance a COMP may be identified with the index of either one of why and who, but not of both. All of (92) and (93) are therefore ill-formed with respect to the ECP.

Turning now to sentences like (42)-(49), which show an asymmetry between the overt movement of an argument and that of a non-argument, I will show that this asymmetry again follows if we assume that the ECP applies not only at LF but also at SS, or that it applies as a well-formedness condition at every level of syntactic representation (DS, SS, and LF). Thus, all of the following sentences are well-formed at SS with respect to the ECP:

(94) a. On which day$_i$ did he get married t_i?

b. Why$_i$ did he get married t_i?

(95) a. On which day$_i$ do you think [$_S$ t_i [$_S$ he will get married t_i]]?

b. Why$_i$ do you guess [$_S$ t_i [$_S$ he suddenly decided to get married t_i]]?

The trace at the end of each sentence above is not lexically governed, but in accordance with the ECP, it is locally controlled. In (94), each t_i is directly governed by its antecedent. In (95), the original trace is governed by the intermediate trace. Similarly, in the

sentences in (42), (44), and the Italian sentences in (48), the trace t_j of why, how, where, and when (or their counterparts in Italian) is not lexically governed. (The trace of when and where must be a PP trace in these sentences, since if it were an NP trace, a P would be stranded in violation of the Condition on Extraction Domain, which is relevant in Syntax). Therefore, t_j in all these sentences must be locally controlled. Since in each case the antecendent of t_j occurs within the embedded $\bar{S}$, this condition is met, and the sentences are well-formed.

On the other hand, all of the sentences in (43), (54), and (49) are ill-formed with respect to the ECP at SS. As before, t_j is not lexically governed in each sentence. Furthermore, in none of these sentences is t_j governed by its own antecedent, which occurs in the matrix COMP. If the antecendent has moved in one step, government of the trace by the antecedent is blocked by the embedded $\bar{S}$. If it has moved successive-cyclically, the embedded COMP will be doubly filled at SS. Since the COMP indexing rule of Aoun, Hornstein, and Sportiche (1981) applies only if a COMP is not branching (i.e. when COMP dominates two phrases each with a distinct index neither of which is the head of the other, there is no basis to identify the COMP with either of them), the intermediate trace again cannot govern the original trace. Therefore, (43), (45) and (49) are all excluded by the ECP at SS.

We have indicated that the situation with sentences containing syntactically unmoved why and how is on a par with standard viola-

tions of the Superiority Condition, now a special case of the ECP at LF. We now further claim that the situation with (43), (45), and (49) is on a par with standard cases of the "COMP-trace" phenomenon. These sentences are excluded on a par with those in (96):

(96) a. *Who$_i$ did you wonder why$_j$ t_i came t_j?

b. *Who$_i$ did you wonder how$_j$ t_i came t_j?

c. *Who$_i$ did you wonder where t_i worked t_j?

d. *Who$_i$ did you wonder when t_i will come t_j?

In both (96) and (43), (45), (49), we have a trace that is not lexically governed that needs to be governed by its antecedent. In both cases the antecedent fails to govern it because the embedded COMP cannot be identified as an intermediate antecedent. These are, in other words, all special cases of the same COMP-trace phenomenon, the only difference being that the subject trace is string-adjacent to the COMP, while an adjunct trace is not. If our approach is correct, this has the consequence of further supporting the correctness of the direction that recent research has taken us, i.e. the direction that has led to the discovery of the ECP in Chomsky (1981a) as a more explanatory principle than a COMP-trace filter of the sort suggested in Chomsky and Lasnik (1977). The filter, as proposed by them, rules out only linear COMP-trace sequences and is evidently too weak to do anything about (43), (45), and (49).

A point of clarification is in order before we go any further. In order to rule out (43), (45), (49) by the ECP we assume that the ECP has to apply at SS (in addition to LF). The reason is that PP -

operators that properly contain NPs are subject to reconstruction in LF. If the ECP applied only at LF, it would be difficult to rule out sentences like the following:

(97) a. *This was the day [$_{\bar{s}}$ on which$_i$ [I wondered [$_{\bar{s}}$ what$_j$ [$_s$ he finally decided to buy t_j t_i]]]]

b. *This was the reason [$_{\bar{s}}$ for which$_i$ [I wondered [$_{\bar{s}}$ whether [$_s$ he suddenly decided to get married t_i]]]]

Suppose the ECP applied only at LF. Then the sentences in (97) may be derived in Syntax by moving the PPs on which and for which to the highest COMP of the relative clause. Since pied-piping takes place, it satisfies the Condition on Extraction Domain (6.118). So up to SS, (97a) and (97b) would only violate Subjacency (and their counterparts in Italian would be completely well-formed). In LF, reconstruction would turn (97a-b) into (98):

(98) a. This was the day x such that I wondered what [he finally decided to buy on x].

b. This was the reason x such that I wondered whether [he suddenly decided to get married for x].

Both these sentences satisfy ECP with the variable x lexically governed by a preposition. Furthermore, since the condition (6.118) does not apply in LF, the only condition that (97a-b) would have violated would be Subjacency (and their counterparts in Italian would be entirely well-formed). Clearly the status of (97) is much worse that what this predicts. The conclusion is that the ECP must be assumed to apply at SS also.

We have shown that the observed asymmetry between arguments and adjuncts in sentences can be naturally accounted for by the ECP. The same account may be extended to account for the argument/adjunct asymmetry in NPs that we will show below. Each of (99) and (100) is well-formed, because the PP trace it contains is the trace of a complement of an N which properly (lexically) governs it.

(99) Of which city$_i$ did you witness [the destruction t_i]?

(100) Of whom$_i$ did you buy [the pictures t_i]?

However, if the wh-moved PPs are adjuncts rather than complements, as in (101)-(102) below, the sentences are ill-formed:

(101) *On which table$_i$ did you buy [the books t_i]?

(102) *From which city$_i$ did you meet [the men t_i]?

(101)-(102) are well-formed only if the wh moved PPs are construed with the verbs buy, meet, but not if construed as indicated. This is because the PP trace is not lexically governed (being adjoined to maximal NP node, by usual assumption), nor locally controlled (the antecedent occurs outside of the adjoined maximal NP node dominating the trace), and therefore not properly governed. Note that (101)-(102) show again that the ECP must be required to apply at SS (in addition to LF). For after reconstruction takes place in LF, what we have in (101) and (102) would be an NP trace lexically governed by a P, in accordance with the ECP.

There are some speakers who do not fully accept (99)-(100) but prefer not to pied-pipe the preposition of in each of them. For these speakers the contast between (99)-(100) and (101)-(102) is not so clear. In a language where no preposition of any kind may be

stranded, counterparts to (99)-(100) are clearly well-formed (in fact the only possible forms) though counterparts to (101)-(102) are still entirely ill-formed, as the following examples from French illustrates:

(103) De qui$_i$ as-tu vu [$_{np}$les photos t_i]?
'Of whom$_i$ did you see [the pictures t_i]?

(104) *De quelle ville$_i$ as-tu vu [$_{np}$ les hommes t_i]?
'*From which city$_i$ did you see [the men t_i]?'

7.5.Problems Solved

We are now in a position to see that the problems associated with the subjacency account noted above now all cease to be problems within the ECP account. First of all, the conceptual inelegance caused by the stipulation that Subjacency applies to certain but not all types of operators in LF is now eliminated once we assume that what is involved is actually the ECP. Note that the ECP is already independently motivated as a well-formedness principle at LF, and that the assumption that it also applies at SS (or at every level of syntactic representation, namely DS, SS, LF) represents a generalization, or simplification, of the statement of the principle. Furthermore, there is now a natural explanation on why non-argument-binding operators are subject to a more strict locality requirement. Since the trace of an adjunct is not lexically governed, according to the ECP it must be locally controlled. On the other hand, a complement is lexically governed by its head, and need not be locally controlled. The distinction between adjuncts and complements therefore comes, free of cost, from the theory of government. Since

Subjacency is not related to government (except for those subcases that we have now suggested as falling also under the Condition on Extraction Domain), there is good reason to believe that what is involved here is not Subjacency, but the ECP.

Secondly, the problem posed by the Italian examples in (48) and (49) also disappears. As indicated earlier, Rizzi's assumption that $\bar{S}$ but not S is a bounding node for Subjacency in Italian will correctly allow the sentences in (48), but will be insufficient to block the ungrammatical (49). For the sentences in (49), it would be necessary to stipulate, again, that for the movement of adjuncts, S but not $\bar{S}$ is a bounding node. Now, if the sentences in (49) are excluded by the ECP (at SS, as shown above), the assumption that $\bar{S}$ is a bounding node for Subjacency in this language can be maintained in its simplest possible form.

Thirdly, we noted that sentences like (56) remain unaccounted for under a Subjacency account:

(56) *shei xi-bu-xihuan Lisi?
who like-not-like

The same problem may be illustrated with English sentences like (81a):

(81a) *Tell me what you bought why.

As we saw, the sentence (81a) is excluded by the ECP since the embedded COMP cannot be identified with the index of the syntactically unmoved why, and therefore the trace of why will be neither lexically governed nor locally controlled at LF. Similarly, the LF representation (58) of (56) cannot be ruled out by Subjacency:

(58) $[_{\bar{s}}]_{comp}$ $shei_i$ A-not-A_j $][_s t_i$ t_j xihuan Lisi]]
who like

It is possible, however, to rule this out by the ECP. Since the COMP in (58) is doubly filled, and neither of its members is moved into it by the SS level where the rule of COMP-identification applies, it is natural to assume that the COMP cannot be identified with either the index i or the index j (even if COMP-identification applies at LF). This configuration, then, may be conveniently excluded by the ECP at LF.

Finally, we noted that the data in (46) and (47) in Chinese present a problem with respect to the formulation of Subjacency. In particular, the well-formed sentences in (46) and others show that relativization (and other overt movement processes) may be quite free from the effects of the Wh Island Constraint, and they favor a conception of Subjacency as a condition on the movement process, yet the same conception of Subjacency would wrongly allow the ungrammatical sentences in (47) if these were not ruled out by some other principle. Consider now how the ECP may exclude these sentences in a fairly straightforward way. Suppose we follow Chomsky and Lasnik (1977) and make the assumption that COMPs are [+wh] or [-wh], and that, as part of the requirements of subcategorization, complement clause must have its COMP agree in the $[\overset{+}{-}wh]$ feature with the matrix verb. Given this, note that an intermediate trace must not be considered to contain the [+wh] feature, or (106) would be wrongly excluded, and (107) wrongly admitted:

(105) Who did you say $[_{\bar{s}}$ t_i $[_s$you like t_i most]]?

(106) *Who did you wonder [$_{\bar{s}}$ t_i [$_s$ he liked t_i most]]?

If the intermediate trace in the embedded COMP were [+wh], this would disagree with the [-wh] feature of say in (106) and agree with the [+wh] feature of wonder in (107). If this assumption is reasonable, then no COMP embedded under verbs like 'wonder' may be identified with the index of an intermediate trace. This must be true at least at LF, and possibly also at SS. Now consider the Chinese sentences in (47). These are sentences in which an adjunct is relativized from within an indirect question. At SS, when relativization has taken place but wh movement has not, the re resentation of (47a), for example, is as follows:

(107) zhe jiushi [$_{np}$[$_{\bar{s}}$ OP_i [$_s$ wo xiang-zhidao [$_{\bar{s}}$[$_{comp}$ t_i]
that is I wonder
[$_s$ shei t_i mai-le shu]]] de] $yuanyin_i$]
who buy-ASP book DE reason

'*This is the reason why_i I wondered [who bought the books t_i].'

The adjunct operator may be moved from within the embedded question to the position of the embedded COMP, then to the position marked as OP_i, where it may be interpreted as predicative of the head 'reason'. This mode of movement does not violate any constraint, since the embedded COMP is not filled with the wh phrase 'who' of the embedded clause yet. Buf if the embedded COMP containing t_i is identified with the index i, the output of this identification would not meet the requirement of the matrix verb, which requires the COMP to be [+wh]. Therefore, COMP $\neq$ i. But this COMP, as a maximal node, blocks government

of the original trace by the intermediate trace. Since the original trace is not lexically governed either, the ECP will exclude (108) at SS, on the assumption that the [±wh] agreement must obtain at SS. Even if agreement is required only at LF, (47a) still must be excluded by the ECP. The LF representation of (47a), after the LF movement of shei 'who' has applied, is:

(108) zhe jiushi $[_{np}[_{s}$ $OP_i[_{s}$ wo xiang-zhidao $[_{s}[_{comp}$ $shei_j$ $t_i]$
this is I wonder who
$[_{s}$ t_j t_i mai-le shu]]] de] $yuanyin_i]$
buy-ASP book DE reason

At LF, the verb 'wonder' requires the most deeply embedded COMP to be identified by the index j of $shei_j$ 'who', not the index i of the [-wh] intermediate trace t_i. Therefore, the trace t_i in the most deeply embedded open clause cannot be locally controlled, nor lexically governed. (108) is out by the ECP at LF. The same applies to all the other sentences in (47). Therefore, (47) does not present problems for the formulation of Subjacency as a condition on movement, for which there is some independent evidence, as already noted.

7.6. Some Consequences

In short, we have argued that well known subject/object asymmetries should be taken as constituting a special case of a more general complement/non-complement asymmetry. The traces of adjuncts are like the traces of subjects. They are not lexically governed, so they must be governed directly by their own antecedents. Our account solves the problems associated with Subjacency concerning a fairly wide range of

cross-linguistic data. If correct, it also provides interesting support for the formulation of the ECP which has the effect of subsuming both the Superiority Condition of Chomsky (1973) and the COMP-trace filter of Chomsky and Lasnik (1977). One can already argue on conceptual grounds that the ECP should be preferred as a more general principle than the Superiority Condition and the COMP-trace filter. But our discussion of adjunct traces also provides direct empirical support for the ECP. The Superiority Condition refers to terms one of which is superior to the other and fails to rule out sentences in which both terms are non-complements neither of which may be superior to the other. The COMP-trace filter refers crucially to configurations in which a trace is adjacent to a COMP, and fails to rule out sentences with an adjunct trace not adjacent to a COMP.

Our theory, if correct, has a number of interesting consequences. First, it supports a strong version of the principle of non-vacuous quantification, according to which all operators, whether NP in category or not, and whether they start out as arguments or adjuncts, must each bind a variable.

Secondly, it also supports a strong version of the ECP, according to which traces of all kinds must be properly governed. This is in direct contrast to certain proposals for a weaker version of the principle and against any accounts that crucially depend upon this latter version. More specifically, based on the fact that the PP trace in such sentences as (109) is not lexically governed by the verb:

(109) On which day$_i$ did you see John t_i?

it has recently been suggested by some that such traces should be made execmpt from the ECP. For example, Jaeggli (1980) formulated the ECP in such a way as to restrict the distribution of empty NPs only. This is apparently inadequate in view of contrasts of the following kind (due to Joan Bresnan), which show that traces of non-NPs like in this house also obey the ECP:

(110) It is in this house$_i$ that they said [t_i lived many people].

(111) *It is in this house$_i$ that they said that [t_i lived many people].

Similarly, Safir (1981) suggested that the ECP should be a condition on all and only those nodes required by the Projection Principle. The traces of adjuncts, in other words, are not subject to the ECP. While it might be possible to argue that this suggestion can account for the contrast in (110)-(111) (assuming that in this house is an argument rather than an adjunct of lived), the point is that any such suggestion remains a stipulation. Furthermore, if the traces of moved adjuncts are not subject to the ECP, one should expect the movement of adjuncts to be freer than that of complements. We have seen that the fact is just the opposite, and that it falls naturally under the ECP: Since adjuncts are not lexically governed, their traces must be locally controlled; on the other hand, complements are lexically governed, so their traces need not be locally controlled. This, I think, is strong support for the account proposed here.

A third consequence of the approach taken here is the following. We noted earlier the contrast between (112) and (113) and claimed that

prepositons are in general strandable in LF:

(112) *Which class did you fall asleep during?

(113) a. Who fell asleep during which class?

b. John fell asleep during three professor's lectures.

As a possible argument against that claim, we also noted that one might suggest to pied-pipe the preposition on in LF under both LF wh movement and QR, and order the rule of reconstruction after the LF level. Although we rejected this possibility as a way of preserving Kayne's theory in the face of its other problems, we did not really argue that prepositions may not be pied-piped and that the preposition stranding facts cannot fail under the ECP at LF. Now, the needed argument is available. Consider the sentence (114):

(114) Who remembers what we bought on which day?

The sentence is well-formed on the interpretation according to which the unmoved wh phrase which day is paired with the matrix who. If the preposition on cannot be stranded at LF as a consequence of Kayne's version of the ECP, then it will be necessary to move the entire PP on which day across a wh island to the matrix COMP, and furthermore, the moved PP must not undergo reconstruction until after the LF level. But in that case the LF representation of (114) would be also excluded by the ECP, since the trace of on which day would be neither lexically governed nor locally controlled, and (114) would be wrongly ruled ungrammatical. We have, thus, an additional piece of evidence for considering the preposition stranding facts (in English) to fall

under a separate principle than the ECP, namely the Condition on Extraction Domain (6.118).

Another consequence is the following. We noted earlier that Chinese does not exhibit the "standard" ECP effects, i.e. the that-trace, the standard superiority, and the "ne-personne" phenomena, although it does have to obey Subjacency, and cannot violate the condition (6.118) by moving an element out of an adjunct clause or a prepositional phrase. In trying to determine what it is in the theory of grammar that brings about the different clusterings of properties in Chinese and English, it was indicated that one could either say that the ECP is itself a parameter, i.e. that it obtains in English but not in Chinese, or that the ECP is a principle, the superficial differences between the languages being derived from other parameters. Although we opted for the second alternative on learnability grounds and on grounds of the observation that the INFL in Chinese has much lexical content, we did not show that there is evidence for the ECP in Chinese. Given that the ECP does apply in Chinese, both at LF and at SS, to rule out traces occurring in adjunct positions that are not locally controlled, the conclusion is that the ECP should be taken as a principle.

Of course, if our theory is correct, it also provides important cross-linguistic support for the existence of a linguistic level of LF where empty categories created by LF mapping rules are treated on a par with those created by movement in Syntax -- a level that is considerably remote from the level of interpretation as construed in, say, model theoretic semantics.

Furthermore, if all moved categories must bind traces, and all traces are subject to the ECP, we may derive the generally accepted analyzability condition (cf. Chapter 3) that movement affects maximal categories only. If movement affects less-than-maximal categories (specifically, heads), then their traces cannot be lexically governed (the lexical head is itself moved away). Therefore, the trace of a moved head must be governed by the moved head itself. This rules out movement of a head noun away from its modifiers or complements. The trace of the head noun cannot be governed by the head itself, since the maximal NP node blocks government. For example, in the string some people from every walk of life, movement may not affect only people or some people; this has the desirable consequences concerning May's "inversely-linked" quantification, as noted earlier.[12]

7.7. Some Problems Raised

Although the theory advanced here has a number of desirable consequences, it is, unfortunately, not without its own problems. In this section I will indicate the problems that I know of that must be solved before the theory can be regarded as fully satisfactory. I will speculate on how these problems might be solved, but their ultimate solution must await further research.

First, I have treated the ungrammatical sentences in (43), (45), and (49) as a special case of a more general overt complement/non-complement asymmetry, on a par with standard overt COMP-trace effects under the ECP at SS. While this is quite nice as indicated by the contrast between (115a-b) on the one hand and (116a-b) on the other:

(115) a. *[$_{\bar{s}}$ On which day$_i$ [$_s$ did you wonder [$_{\bar{s}}$ what$_j$ [$_s$ I bought t_j t_i]]]]?

b. *[$_{\bar{s}}$ Who$_i$ [$_s$ did you wonder [$_{\bar{s}}$ what$_j$ [$_s$ t_i bought yesterday]]]]?

(116) a. ??[$_{\bar{s}}$ What$_i$ [$_s$ did you wonder [$_{\bar{s}}$ when$_j$ [$_s$ I bought t_i t_j]]]]?

b. ??[$_{\bar{s}}$ What$_i$ [$_s$ did you wonder [$_{\bar{s}}$ who$_j$ [$_s$ t_j bought t_i yesterday]]]]?

there is an unexpected difference between subjects and adjuncts, as indicated in (117):

(117) a. *[$_{\bar{s}}$ Who$_i$ [$_s$ did you think [$_{\bar{s}}$ that [$_s$ t_i would come]]]]?

b. [$_{\bar{s}}$ On which day$_i$ [$_s$ did you say [$_{\bar{s}}$ that [$_s$ he was coming t_i]]]]?

That is, when the embedded COMP is that, there is still a subject/complement asymmetry but the expected adjunct/complement asymmetry disappears. This is unexpected since the ill-formedness of (117a) is usually agreed to be a standard ECP violation. To solve this problem, one might try to derive the ill-formedness of (117a) from elsewhere independent of the ECP. While this is certain to bring about a certain degree of inelegance, it is not completely objectionable. Note that in LF the presence of that does not seem to block wh subject extraction, although the presence of a wh word in COMP does. For some speakers the contrast below seems to obtain:

(118) a. ?Who recommends that who buy the books?

b. ?Which man ordered that which woman see Mary?

(119) a. *Who remembers why who bought the books?

b. *Who wonders whether who should come?

If the contrast between (118) and (119) is real and systematic, this may indicate that (117a) should be treated differently. But there are further complications involved here, and hardly no conclusion can be drawn at this stage. For example, there are some speakers who do not accept (118a-b) (e.g. Hankamer 1975), and others who do not find (119) entirely ill-formed. Another way to solve the problem presented by (117) might make use of the idea that the COMP node of $\overline{S}$ is an adjunct, like the adjunct on which day, but unlike the argument who. More specifically, suppose we say that when a COMP contains that and an intermediate trace, the intermediate trace will be considered the head of the COMP if and only if it is the intermediate trace of an adjunct, but not if it is the intermediate trace of an argument, then the COMP in (117b) will be identified with the index i, but not the COMP in (117a). This will allow the COMP to locally control the adjunct trace, but not the subject trace, giving the contrast in (117). Still another way to solve the problem might make use of the idea, akin to the one proposed in Reinhart (1979b), that there are two COMP positions per sentence. Suppose, for example, that adjuncts are immediate daughters of $\overline{S}$ and subjects are immediate daughters of Ss. Furthermore, suppose that there is a COMP under $\overline{\overline{S}}$ and one under $\overline{S}$ and that the complementizer that is generated in the lower COMP. One might stipulate, then, that adjuncts may be moved directly to the higher COMP , although arguments must be moved first to the lower COMP then to the higher COMP. If the

lower COMP contains that, it will then prevent the intermediate trace of a moved subject from locally controlling its original trace, but will not have any effect on the intermediate trace of a moved adjunct. All these ideas, I think, are not too far-fetched, but they all need to be greatly substantiated before anything significant can be determined about them.

The second problem has to do with the claim made in our theory that movement of any non-complement out of an NP will violate the ECP. We saw that this is the case with the movement of a PP modifier within NP (cf. (99)-(102)). However, certain problems arise when we consider rightward movement rules like extraposition from NP. First, consider the following:

(120) [The claim t_i] was made that all squares were round$_i$.

(121) [A book t_i] appeared yesterday on Warlpiri partitives$_i$.

These sentences do not present problems with respect to the ECP, since the trace t_i in each of them may be said to be properly (lexically) governed. The extraposed sentence that all squares were round is a complement of the noun claim, and the PP on Warlpiri partitives is a complement of book. In the following sentences, however, a non-complement is extraposed ((124) from Gueron 1980):

(122) [A book t_i] appeared yesterday that I like$_i$.

(123) [The fact t_i] remains that all squares are not round$_i$.

(124) [A man t_i] died from India$_i$.

In (122) a relative clause is extraposed, and in (123) an appositive clause is extraposed. In both cases what is extraposed is an adjunct.

In (124), too, the PP from India is also an adjunct modifying a man. If it is assumed that adjuncts are adjoined to maximal NPs, then the trace t_i in each of (122)-(124) is neither lexically governed nor locally controlled, in violation of the ECP. Note that one cannot stipulate that nouns do lexically govern their adjuncts, or we would lose the account we have given for the contrast between (99)-(100) on the one hand and (101)-(102) on the other. What seems to be the fact is that while there is a normal complement/non-complement asymmetry under wh movement (as shown by (99)-(102)), there is no such asymmetry under rightward movement (as shown by (120)-(124)). Compare also (124) with (125):

(125) *From which country$_i$ did you see [a man t_i]?

To deal with the problem presented here by extraposition, I will stipulate that traces of rightward movement do not have to be properly governed. This is, of course, hardly a solution, but there appears to be some independent motivation for it, suggestion that something more general may have to be stipulated. Note that all extraposition processes also violate the Condition on Extraction Domain (6.118). It seems then that the entire theory of proper government does not hold of traces of rightward movement.

As an attempt to eliminate this stipulation, one might follow Chomsky and Lasnik (1977) and regard rightward movement rules as instances of stylistic movement in PF, and as such the trace is not subject to the ECP (the trace need not even be visible at all), though Subjacency will probably have to be generalized to apply in the

stylistic component.[13] A difficulty with this approach, as often noted, is the fact that anaphoric relations are often altered as a result of such "stylistic" movements. Consider:

(126) A book that John$_i$ ordered pleased him$_i$.

(127) ?*A book pleased him$_i$ that John$_i$ ordered.

Finally, a problem arises in contrasts of the sort below, noted in Chomsky (1981b):

(128) ??Which man did he go to college without speaking to t?

(129) *To which man did he go to college without speaking t?

We have indicated that the proper distinction between the two types of operators is more suitably drawn between those whose traces occupy argument positions and those whose traces occupy adjunct positions. This has been based on the well-formedness of such sentences as (50) and (51) in Italian, and on considerations of plausibility. In the example (129), the trace of to which man occurs in argument position -- exactly as the trace of a cui 'to whom' would in (50), but the sentence is much worse than (128). Since the trace in (128) differs from that in (129) in categorial type, i.e. NP vs. non-NP, rather than argument vs. adjunct, the contrast between the two sentences would seem to contradict our earlier conclusion. As a possible way out, one may stipulate (as suggested in Chomsky 1981b) that only empty NPs can be base-generated, but not empty PPs, and that an empty category whose derivation would be blocked by a bounding condition may nevertheless be base-generated without violating the condition, resulting in a sentence

with some degree of acceptability, provided that the option of base-generation is available. (The bounding condition would be the condition (6.118) construed as a condition on movement, with government defined in terms of the stricter notion of "maximal", the "lowest maximal" in an adjoined structure, as discussed in 6.5). The stipulation that only NPs may be base-generated empty is, again, not implausible. For example, one would want to exclude empty PPs (PRO PPs) in sentences like the following:

(130) *John saw Bill [$_{pp}$PRO].

(131) *John tried [to come [$_{pp}$PRO]].

One would want to exclude the empty PP (an empty adverbial of time, say) in (130)-(131) for the same reason that one wants to exclude PRO from John saw PRO's books. (130) may be excluded by the binding theory on the assumption that PRO is governed by INFL in it. But the PRO in (129) is ungoverned, and cannot be excluded by the binding theory, though it may be excluded if the option of base-generation is not made available to PPs.

CHAPTER SEVEN: FOOTNOTES

1. This will be discussed in connection with sentences (55)-(57) below.

2. Since a focus indicates the emphasis of a speaker (either the speaker of a direct discourse or that of an indirect discourse i.e. the matrix subject), a minimal requirement for a focus to be interpreted as having scope over a clause C is that C must be a direct discourse itself or, in some sense, a direct discourse complement to a verb or a noun. Thus sentential complements to verbs like 'say', 'think' and nouns like 'statement', 'claim', etc., meet this requirement, and a focus may have scope over such a complement indicating the emphasis of the "speaker" of the quoted speech. On the other hand, a relative clause is neither a direct nor a quoted discourse. Therefore, a focus cannot have a relative clause as its sole scope.

3. The same contrast also obtains in these sentences when the wh's in situ are construed as having embedded scope, i.e., as paired with the embedded wh in COMP.

4. In obtaining judgements for these sentences, care must be taken so that they are not construed as echo questions. Also, the wh in situ should not be taken alone as indicating an additional question. (40e) does not mean "who remembers what we bought, and why?"

5. A similar range of facts also obtain in Hebrew (Reinhart 1979b), and in Japanese (M. Saito, p.c.).

6. It is tempting to suggest an explanation for the ill-formedness of (43) and (45) on the basis of "ease of parsing", namely the distracting factor just mentioned that it is easy to construe the wh words why, how, where, and when with the highest verbs in the $\bar{S}$ in which they occur. However, observe that in (i) below it is possible to construe the matrix COMP why with the embedded verb just as easily as with the matrix verb:

(i) Why did you say that he came?

The crucial fact that makes the difference between (i) and (43)-(45) is, obviously, that in each of (43)-(45) the embedded verb is located within an island. So even in terms of a theory of parsing, one must still make crucial reference to the presence of a wh island. But this immediately reduces to the same question of why this interpretation process for non-trace-binding adjuncts must be subject to a stricter version of Subjacency than the movement of arguments like what.

7. Some examples showing the same freedom of topicalization with respect to the wh Island Constraint are:

(i) neiben shu$_i$, wo xiang-zhidao ni weisheme wen wo mai-bu-mai t_i.
that book I wonder you why ask I buy-not-buy
'??That book, I wonder why you asked me if I would buy t_i or not.'

(ii) neiben shu$_i$, wo qing wen ni zhi-bu-zhidao ta you-mei-you wen
that book I please ask you know-not-know he have-not-have ask

ni yao-bu-yao mai t_i.
you want-not-want buy

'*That book$_i$, may I please ask whether or not you knew whether or not he asked whether or not you wanted to buy t_i.'

8. A question arises on whether the intermediate trace is subject to the ECP. In the spirit of our assumption that all traces are subject to the ECP, including traces of moved adjuncts, it is only natural to assume that the trace in COMP is also subject to the principle. To do so, one may make use of Kayne's idea that a verb may govern across an $\overline{S}$ but not across both an $\overline{S}$ and an S, so that a COMP may be properly governed by its matrix verb, but not an embedded subject. An alternative is to assume that $\overline{S}$ may be deleted by certain verbs, in particular all bridge verbs (including raising verbs), as informally suggested in Chomsky (1981a). For a somewhat different approach, see Stowell (1980). I leave this as a detail of execution, though a choice among these alternatives or others is not, of course, without consequences.

9. Chomsky (p.c.) has pointed out to me that this rule of COMP identification cannot be derived as a consequence of the common percolation of a head to a parent node. In particular, we want to say that even an intransitive verb does not govern its subject, as in $[_{s}$ John $[_{vp}[_{v}$ came]]]. If any non-branching node can be identified with its sole daughter, then came may govern John because the VP may be identified with came. To make the required distinction between this type of unwanted identification and the wanted COMP identification, we will say that in our special case of percolation, only referential indices get percolated from head to parent. Since verbs do not have referential indices but anything that is moved into COMP does, the required distinction can be made.

10. The ill-formedness of (81) and (82) is assumed in my (1982),

and separately in Aoun, Hornstein, and Sportiche (1981), to be due to the failure of the non-objectional why, how to undergo the rule of Absorption proposed in Higginbotham and May (1981). According to Higginbotham and May's proposal, the Absorption rule has the effect of turning a COMP containing n quantifiers into an n-ary quantifier:

(i) $[_{\bar{s}}[_{comp}\ WH_1, WH_2, \ldots, WH_n][_s \ldots]] \rightarrow [_{\bar{s}}\ WH_{(1,2,\ldots,n)}\ [_s \ldots]]$

Thus, given the LF representation (iii) for the sentence (ii):

(ii) Who saw what?

(iii) $[_{\bar{s}}[_{comp_i}\ What_j\ who_i]\ [_s\ t_i\ saw\ t_j]]$

Absorption will turn (iii) into (iv):

(iv) $[_{\bar{s}}$[For which (j, j a thing; i, i a person)$[_s\ t_i$ saw $t_j]]$

or the equivalent:

(V) For which (x, x a person; y, y a thing), x saw y.

A natural way of interpreting the function of Absorption is that it absorbs the features of who and what in (iii) into one single super feature matrix. This enables every absorbed wh phrase to c-command, or properly bind its variable. Note that in (iii), only who_i c-commands t_i, because the COMP is indentified with the index i, but $what_j$ does not c-command t_j. This violates both the CPB and CQB. However, after Absorption applies, it is natural to assume that both the index i and the index j may percolate up to the top of COMP. Therefore, both what and who properly bind their variables at this stage. If we apply the CPB and the CQB at a stage after Absorption, (ii) will be correctly ruled in without any special modification of the notion of c-command or proper binding. Now, if we assume

that the non-objectual why and how cannot absorb with the objectual what, who etc., then sentences in (81) and (82) will be automatically ruled out by these two principles of quantification. However, the assumption is not correct with these examples, because the sentences in (84)-(86) are well formed. If why and what cannot be absored into the same matrix, there is no reason why (85), for example, is well-formed whereas (81a) is ill-formed. The correct account for these examples, then, is to come from the ECP, as we show immediately below in the text. On the other hand, note that this itself does not argue against the plausibility of having a rule of Absorption and its role in legitimizing sentences that would otherwise be excluded by the two principles of quantification CPB and CQB. What we need to do is to assume that Absorption applies to LF, i.e. in the component LF', so that the contrast between (81)-(82) and (84)-(86) may be accounted for at LF. We will also need to allow adjuncts like why and how to be absorbed with NPs like what, who. However, whether must be prevented from being absorbed with anything:

(vi) *I wonder whether you bought what.

Since what is a complement in (vi), the ill-formedness of (vi) cannot be due to the ECP, but may be assumed to be due to its failure to undergo Absorption with whether. The same point may be illustrated with (vii), where what must have wide scope, and (viii), if we assume there is an abstract whether base-generated in the matrix COMP:

(vii) Who remembers whether we bought what?

(viii) *Did you buy what?

11. To some speakers (86) is a little less natural than (85). I

know of no explanation of this peculiarity. Nor does this seem to be entirely accidental, for some speakers also find (i) to be a little worse than (ii):

(i) *What did who buy?

(ii) ?*Who remembers why who bought the books?

Finally, another fact for which I have no solution, and know of no solution either, is, as pointed out in Chomsky (1981a), that when all wh-questionable phrases are wh-questioned, all the asymmetries we have observed are completely washed out:

(iii) What did who buy when?

(vi) Who remembers what who bought where?

12. The only type of head-movement allowed is when it takes place intra-categorially. Two such examples that come to mind are AUX inversion (as in English) and Verb-fronting (as in, e.g. Spanish, cf. Torrego 1981). In the case of AUX-inversion, the AUX gets fronted to sentence initial position, but since it is not moved out of its own maximal projection, the trace is properly governed. As for V-fronting, no problem arises if S is a projection of V. In languages in which INFL is the head of S, however, there is a problem. One might assume that a verb first gets incorporated with an INFL first, where it governs its trace in VP, by assumption (cf. footnote 7 on government of an intermediate trace in COMP).

13. For discussion of problems associated with Subjacency with respect to extraposition, see Koster (1978b).

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