Verb Movement and

Some Syntax-semantics Mismatches

in Chinese

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A number of apparent mismatches between the syntactic forms of sentences and their interpretation are shown to be resolved under a theory of grammar which embodies a process of Verb-to-Verb Movement. One of these mismatches involves sentences in which certain event quantifiers occur in construction with concrete, non-event-denoting nouns. Another mismatch involves agentive phrases occurring as the surface possessors of concrete noun objects. It is proposed that these sentences have underlying structures with gerundive complements embedded under an abstract 'light verb', and that the surface form is derived after the verb contained in the gerundive complement is raised to the position of the abstract light verb. A somewhat different process raises a verb out of a VP into the head of a higher VP shell, accounting for the form of certain complex causative sentences and the well-known possessive object construction. It is concluded that although Chinese differs from English and French with respect to the existence of V to I movement, the process V-to-V movement (or incorporation) appears to be generally available in language.

1. Introduction

One of the central assumptions of current theoretical work on syntax and the relationship between syntax and semantics is that the semantics of

natural language sentences can be deduced from their syntax by a finite set of rules of semantic composition or interpretation. In the normal cases, there is a good match between syntax and semantics, so that given the normal rules of composition and interpretation, the meaning of sentences can be directly "read off" from their surface form. In many cases, however, surface sentences appear to resist direct interpretation by normal interpretive procedures. These include cases where certain constituents appear away from positions where they are expected:

(1)   a.   Which pictures of himself does he like most?

   b.   Considerable advantage was taken of John.

   c.   John seems to be an honest guy.

For example, in (1a) the reflexive *himself* is interpretable as taking the pronoun *he* as its antecedent, but it does not appear in the scope of the latter, thus contradicting otherwise general requirements on reflexive interpretation. In (1b) the idiom chunk *advantage* does not appear in its expected syntactic position (as object of *take*) to receive the intended idiomatic interpretation. And in (1c) the NP *John* is the semantic subject of the lower predicate *to be an honest guy,* not that of the higher verb *seem,* but it appears, syntactically, as the subject of the latter. In cases of mismatches like these, the standard treatment is to postulate a syntactic rule of movement, which moves a noun phrase from its semantically "expected" position to its syntactically observed position. Such a treatment not only solves the problem raised by the observed mismatch, but may often be shown to capture other linguistically significant generalizations.

The role of a movement rule in generative grammar is of course familiar where the rule affects a phrasal category of one kind or another. In more recent years it has become increasingly clear that movement also affects a

lexical category--a word, in an equally significant way in natural language syntax. In particular, it is now well known that the postulation of verb-movement is fundamental to a proper understanding of the word order pattern of so-called "verb-second" languages. In other languages, the postulation of a rule that moves a verb to a higher position I^o containing the inflectional and modality features of a sentence, also provides a revealing account of certain syntax-semantics mismatches. For example, in Modern English the auxiliary verbs *have* and *be* appear before *not* though the perfective and the progressive aspects are apparently within the scope of negation:

(2)   a.   John has not seen Bill.

   b.   John is not discussing the problem.

Thus, (2a) means "it is not the case that John has seen Bill," but not "it has been the case that John does not see Bill," even though the perfective *has* precedes and asymmetrically c-commands *not.* Similarly, (2b) means "it is not the case that John is discussing the problem," but not "it is being the case that John does not discuss the problem." The mismatch observed here is accounted for by the hypothesis that the auxiliary verbs appear underlyingly below negation, but raise to I^o above negation on the surface. Thus (2a) is associated with the d-structure (3a) and the s-structure (3b):

(3)   a.   [$_{IP}$ John [$_{I'}$ [$_{I^o}$ -es] not [$_{VP}$ have seen Bill]]].

   b.   [$_{IP}$ John [$_{I'}$ [$_{I^o}$ have$_i$ -es] not [$_{VP}$ t$_i$ seen Bill]]].

In French, furthermore, even finite main verbs appear before negation and other sentential adverbs, indicating that main verbs also move into I^o:

(4)   a.   *John knows not your name.

      Je ne parle pas Francais.

(5) a. *John kisses often Mary.

   b. Jean embrasse souvent Marie.

The difference between Modern English and French lies then in whether or not a rule exists that moves main verbs into I^o (Emonds (1978), Pollock (1989)). In Modern English, V to I movement applies to auxiliary verbs only; but in French, it applies to main verbs as well.

   In the relevant respects Chinese clearly patterns more closely with Modern English in not allowing a main verb to move to I^o:

(6) a. Zhangsan bu xihuan Lisi.

      Zhangsan not like Lisi

      Zhangsan does not like Lisi.

   b. *Zhangsan xihuan bu Lisi.

      Zhangsan likes not Lisi.

(7) a. Zhangsan changchang ma Lisi.

      Zhangsan often scold Lisi

      Zhangsan often scolded Lisi.

   b. *Zhangsan ma changchang Lisi.

      Zhangsan scold often Lisi

In fact, even auxiliary verbs do not appear to move to I^o, as they must follow negation:[1]

(8) a. Zhangsan mei you kanjian Lisi.

      Zhangsan not have seen Lisi.

      Zhangsan has not seen Lisi.

   b. *Zhangsan you mei kanjian Lisi.

      Zhangsan have not seen Lisi.

(9) a. Zhangsan bu shi zuotian lai de.

      Zhangsan not be yesterday come DE

      It wasn't yesterday that Zhangsan came.

   b. *Zhangsan shi bu zuotian lai de.

      Zhangsan be not yesterday come DE

   In each of the grammatical sentences here, the relative position of negation or an adverb like 'often' to the following verb or auxiliary corresponds exactly to their relative scope order, and there is no reason to assume that any V to I movement has occurred in these cases.[2]

   From these observations it might be tempting to conclude that the verb does not move at all in Chinese. However, I would like to show in this paper that, although V does not move into and surface in I^o, there does exist a process by which it moves into a higher V. I will exhibit four sets of data each indicating a significant mismatch between syntax and semantics, and argue that all of these mismatches fall naturally into place under a postulated rule of V-V movement. It follows that the general process of verb movement (a case of head-movement) exists in Chinese as it does in other languages.[3]

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1   In Huang (1990) I analyzed perfective *you* and cleft *shi* as auxiliary verbs that appear in I^o. In view of Emonds (1978) and Pollock (1989), and the facts shown in (5)-(6), these elements should now be assumed to stay in their V positions.

2   In Huang (1988) I analyzed Wang's (1965) rule of -*le* hopping as a V-to-I movement for Chinese; in view of Pollock's (1990) argument, that rule should still be kept in the form of an Infl lowering (affix hopping) rule.

3   The hypothesis that verb movement exists in Chinese is not new, and has been proposed in earlier studies couched within the framework of generative semantics or Fillmorean Case grammar (cf. S.-F. Huang (1974), among others). The earlier studies were primarily concerned with predicate raising of the sort proposed in McCawley (1968), by which a lower verb raises and combines with a higher verb to form a resultative compound. The cases of verb movement discussed here have not been reported before in this earlier literature, and the analysis is based on facts beyond those considered earlier.

2. Event Quantification

One type of syntax-semantics mismatch is illustrated by the (b) examples of the following pairs of sentences:

(10)   a.   ta kan shu kan-le san tian.

        he read book read-Perf three day

        He read (books) for three days.

     b.   ta kan-le san tian shu.

        he read-Perf three day book

        He read (books) for three days.

(11)   a.   ta chang ge chang-le liang ci.

        he sing song sing-Perf two times

        He sang (songs) twice.

     b.   ta chang-le liang ci ge.

        he sing-Perf two time song

        He sang twice.

The sentences in (10) each contain a quantity expression indicating the duration over which he read, and in (11) the sentences contain an expression indicating the frequency with which the event of singing has occurred. In traditional descriptions of Chinese grammar, these expressions are called "measure phrases of verbs" (*dong-liang* 動量). This seems quite appropriate from the semantic point of view, as duration and frequency expressions seem to quantify over actions or events in much the same way that normal prenominal quantifier phrases quantify over objects. These are the "measure phrases of nouns" (*ming-liang* 名量), illustrated by *yi-ben, wu-ge* in the following examples:

(12)   ta mai-le yi-ben shu.

       he buy-Perf one-CL book

       He bought one book.

(13)   ta chi-le wu-ge pingguo.

       he eat-Perf five-CL apple

       He ate five apples.

In an equally appropriate way, Chinese grammarians have described certain quantity expressions as "measure phrases of adjectives" (*xing-liang* 形量):

(14)   Zhangsan liu ci gao.

       Zhangsan six foot tall

       Zhangsan is six feet tall.

(15)   zhe-kuai bu ba ci chang.

       this-piece cloth eight foot long

       This piece of cloth is eight feet long.

This treatment captures, in a rather insightful way, a cross-categorial generalization about the structure of major phrase categories: like NPs, VPs and APs may contain measure phrases as well. In each case a measure phrase contains a numeral expression followed by a classifier of some sort, including *ben, ge*, etc., for nouns; *ci* 'time', *tian* 'day', etc., for verbs; and *ci* 'foot', *cun* 'inch', etc., for adjectives.

The main point of interest for our current purposes is the fact that, whereas the nominal and adjectival measure phrases occur in a position to modify their head nouns or adjectives (as must be the case in (12)-(15)), the frequency and duration expressions, as verbal quantifiers, need not occur in a syntactic position to modify their head verbs. In (10a) and (11a), the verbal measures occur in construction with the head verbs, and directly modify the latter. In the (b) sentences, however, the verbal measures clearly

occur in construction with the object noun following the verb, and in a position typically occupied by nominal quantifiers.

That the verbal measure occurs in a syntactic position to modify the postverbal object in (10b) and (11b) can be easily established by the fact that they each form a movable constituent with the object, as evidenced by sentences like the following, provided by Zhu Dexi (personal communication):

(16)　ta lian yi tian shu dou mei kan.

　　　he even one day book all not read

　　　He did not even for one day read a book.

(17)　ta lian yi ci ge dou mei chang-guo.

　　　he even one time song all not sing-Exp

　　　He did not even sing once.

Here, then, is a case of syntax-semantics mismatch. In (10b), (11b) and (16)-(17), we have measure phrases that behave syntactically as nominal measure phrases, though semantically they really quantify over actions, given the synonymy of (10b) and (11b) with their counterparts in (a), and as the translation of (16)-(17) shows. That is, in each case we have a semantic *dong-liang* 動量 behaving syntactically as a *ming-liang* 名量. The normal rule of semantic interpretation would treat these measure phrases as quantifying over the nouns they modify, and these sentences would be literally interpreted as 'three days of books', 'twice of songs', etc., but books, cars, and languages denote objects but not events, and as such they cannot be quantified in terms of frequency and duration. Some other examples illustrating the same kind of mismatch are given below:

(18)　a.　ta qu-le san ci Beijing.

　　　　　he go-Perf three time Beijing

　　　　　He went to Beijing three times.

　　b.　ta piping-le liang nian Zhangsan.

　　　　he criticize-Perf two year Zhangsan

　　　　He criticized Zhangsan for two years.

　　c.　ta sao-le wu tian cesuo.

　　　　he clean-Perf five day toilet

　　　　He cleaned the toilet five times.

　　d.　ta jintian zhi xiao-le yi ci bian.

　　　　he today only take-Perf one time pee

　　　　He urinated only once today.

I suggest that the key to solving this mismatch is to analyze these sentences as involving a structure of gerundive nominalization and a process of verb-raising. More specifically, I propose that (10b) has the following underlying structure:

(19)
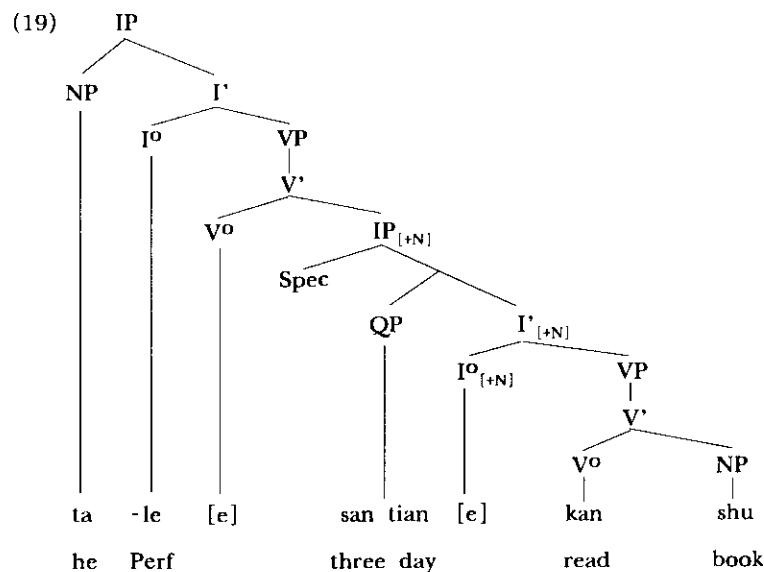
In this structure, a VP containing the sequence *kan shu* 'read books' is

embedded within a nominal clause IP, as a complement to the nominal I^o. In other words, the VP *kan shu* is treated as part of a gerundive construction, which is in turn embedded as the object of an empty verb meaning 'do'. This gerundive phrase is quantified by the numeral classifier phrase *san tian* 'three days'.[4] According to this structure, the entire sentence means "he did three days of reading books."

As is well known from English gerundive constructions, a gerundive phrase behaves like a verb phrase in some respects, but like noun phrases in others--another instance of a mismatch. More specifically, gerund phrases behave externally as noun phrases because they occupy typical NP positions and their Spec's take the Genitive Case, but internally they behave as VPs because the verb may take a direct object, assigning Accusative Case to it, and is modified by adverbial but not by adjectival expressions. In English, this "mismatch" can be aptly explained by the assumption that gerundives are nominal IPs headed by *-ing,* which takes VP as its complement. The gerundive phrase in (20a) has the structure indicated in (20b):

(20)　a.　John is angry at Bill's carelessly dismissing his argument.

　　　b.　[$_{IP}$ Bill's [$_{I'}$ [$_{I^o}$ -ing] [$_{VP}$ carelessly dismiss his argument]]].

The verb behaves internally as the head of VP, but the gerundive as a whole is a nominal clause, and behaves externally as an NP. (cf. Huang (1982), Reuland (1983).)[5] In a similar way, I propose that sentence (10b) has the

4　An alternative is to follow Tang (1990), who, in the spirit of Chao (1948) and Chomsky's (1986) extended X' theory, proposed that a noun phrase containing a numeral classifier experssion is in fact a "Classifier Phrase," i.e., a phrase headed by the numeral-classifier element. Under this assumption, the nominal IP would be a CLP, and the numeral specifier would be the head of CLP taking the VP as its complement.

5　Within X-bar theory categories like N, V, A, P are understood to represent bundles of features [α N] and [β V]. Extension of X-bar theory to the IP

structure of a gerundive construction. According to (19), (10b) is underlyingly a sentence with a transitive verb which is phonetically empty and semantically bleached (i.e., meaning 'do'). This transitive verb takes a gerund object meaning 'reading books', which is quantified by 'three days'. In this structure, the verb *kan* 'read' behaves as a verb within VP, taking the object *shu* 'book' and assigning ACC case to it. Externally, however, the whole VP is complement to an abstract nominal head, and is part of a nominal IP.

Given that the transitive verb is empty, the verb contained in the gerundive VP raises to fill it, enabling it to assign Case to the entire gerundive construction.[6] This process of verb movement, plus other house keeping rules, results in the surface word order given in (10b). Thus, a D-Structure corresponding to something like "He did three days of book reading" is

system offers a nice way to categorize the various clausal types observed in English: tensed, gerundive, participial, and infinitival. Assuming all IPs are [+I], the features [α N] and [β V] aptly characterize these clause types as verbal, adjectival, and prepositional clauses:

Tensed clauses are verbal IPs:	[+I, -N, +V]
Gerundives are nominal IPs:	[+I, +N, -V]
Participials are adjectival IPs:	[+I, +N, +V]
Infinitivals are prepositional IPs:	[+I, -N, -V]

That tenses are verbal seems uncontroversial. Participials are adjectival since both present and past participants are used to modify nouns or to predicate on NPs. The prepositional nature of infinitival clarses is of course matched by *to* as their head. They also behave on a par with PPs with respect to Case Theory: like PPs and unlike NPs, they don't need Case; and like PPs and unlike tensed clauses, they do not resist Case (under Stowell's (1981) theory of Case Resistance).

6　I assume that the movement proceeds successive-cyclically, through the empty head of the gerund. I assume that although V cannot move into and stay within an I^o in Chinese, it can move through it as long as movement does not violate amy general constraint of grammar.

turned into a surface string that literally translates as "*He read three days of books." Similarly, in (11b), an underlying structure corresponding to "He did two times of singing songs" surfaces in a form that literally translates as "*He sang two times of songs," etc.

According to the proposed analysis, then, the observed syntax-semantics mismatch reduces to a familiar case of nominalization. The frequency and duration expressions in (10b) and (11b) are appropriately analyzed as a nominal measure in the syntax quantifying over nominal categories (a nominal I' in (19), analogous to an N-bar), but since the gerundive phrases they quantify over denote events or actions, these sentences are correctly interpreted as involving event quantification, as much as their (a) counterparts do.

The account we have provided for (10b) and similar sentences also extends to the following examples, where a frequency or duration expression is followed by the prenominal modifier marker *de*.

(21)　a.　ta kan-le san tian de shu.

　　　　　he read-Perf three day DE book

　　　　　He read (books) for three days.

　　　b.　ta xue-le liang ci de Yingwen.

　　　　　he study-Perf two time DE English

　　　　　He studied English twice.

　　　c.　ta zhi kan-le san-ge zhongtou de dianying.[7]

　　　　　he watch-Perf three-CL hour DE movie

　　　　　He watched moves for only three hours.

7　This sentence is ambiguous between a reading according to which 'three hours' modifies a concrete noun 'movie' and one according to which it quantifies over an event of watching movies. According to the former reading the sentence means he watched only three-hour movies (i.e., only movies that last three hours, but not, say, movies that last two hours).

　　　d.　ta yigong sao-le wu ci de cesuo.

　　　　　he altogether clean-Perf five time DE toilet

　　　　　Altogether he cleaned the toilet five times.

The possible addition of *de* to the measure phrase is not surprising, given our proposed analysis, since it is also often possible for a typical nominal measure to take *de*.

(22)　a.　wo mai-le liang ben (de) shu.

　　　　　I　buy-Perf two volume DE book

　　　　　I bought two books.

　　　b.　ta mai-le san bang (de) zhurou.

　　　　　he buy-Perf three pound DE pork

　　　　　He bought three pounds of pork.

It is obvious that the classifier originates as a noun, and the measure phrase may still behave like a full NP. The measure phrase, then, may appear in a determiner position (without *de*), or it may occur in a prenominal genitive position.
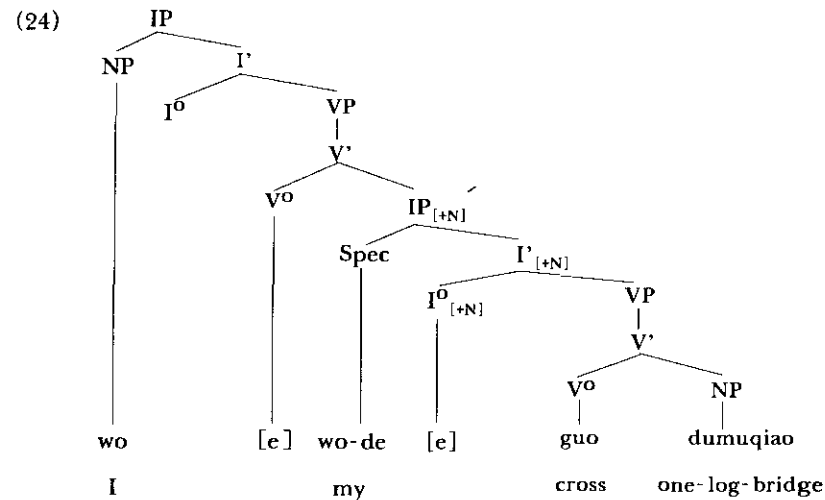
3. Possessive Agents

Another type of syntax-semantics mismatch is illustrated by examples of what we may call the "possessive agent construction":

(23)　a.　ni zou ni-de yangguandao, wo guo wo-de dumuqiao.

　　　　　you go your wide-avenue　I　pass my　one-log-bridge

　　　　　You walk your 'Champs Elyses' and I cross my one-log bridge.

　　　b.　ta nian ta-de shu, wo shui wo-de jiao.

　　　　　he read his book　I　sleep my　sleep

　　　　　He read his book and I slept my sleep.

c.   ni haohao jiao ni-de Yingwen ba.

you well teach your English Prt

You better teach your English well.

In each of these sentences, the object has the form of an NP with a genitive modifier.[8] However, the genitive NP is clearly not the possessor of the object denoted by its head. For example, *yangguandao* does not belong to you any more than the *dumuqiao* belongs to me. In the reading under consideration, the sentence (23b) does not entail that he owns the book, even with *ta* and *ta-de* co-indexed. Finally, 'sleep' and 'English' simply cannot be owned. Since these head nouns denote objects but not processes or actions, the genitive NP also cannot be construed as an argument (agent, theme, etc.) of the head noun.[9]

I propose, as before, that these sentences involve nominalization and that the genitive NP is an agent argument of an event nominal whose verbal head has moved up to a higher empty verb position. Thus the expression literally rendered as 'I cross my one-log bridge' really derives from one that means 'I do my crossing of the one-log bridge':

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8   For convenience, I shall speak of the sequence NP *de* as a genitive NP on the basis of its English counterpart. It is of course a problem to treat *de* as a genitive case marker, since apparently the same morpheme is used with relative clauses and other categories that do not need cases.

9   See Grimshaw (1990) and the references cited there for the argument that only (certain) event-denoting nouns have argument structures.

(24)

After the verb *guo* 'cross' raises into the higher verb position, the surface string *wo guo wo de dumuqiao* in (23a) is obtained. In this analysis, the genitive NP is correctly represented as the subject of a gerundive phrase, or the agent of the action denoted by the gerundive, but not as an argument of the object head noun.

In the examples in (23), the verb undergoing raising is transitive. An intransitive action verb may likewise raise, resulting in sentences like the following:

(25)   ta ku ta-de, wo xiao wo-de.

he cry his   I   laugh my

He did his crying, and I did my laughing.

As in the case of the verbal measure phrases, a mismatch between what is syntactically a modifier of a concrete noun and what is semantically an argument of a verb disappears under the assumption that verb movement takes place out of a structure in which the genitive NP appears syntactically as the subject of a gerund.

I assume that the need for verb movement in these cases follows from general principles of grammar. In a structure like (24) or (19), verb raising is required because the main verb is phonetically empty, and unable to assign Case to its object. If the main verb is lexically filled, verb raising does not take place. The alternation observed below provides some evidence for our analysis:

(26) a. ta gao ta-de gexin, ni gao ni-de fugu.

      he do his   innovation you do your renaissance

      He did his innovation, and you did your renaissance.

      b. ta ge ta-de xin, ni   fu ni-de gu.

      he *ge-* his   *-xin* you *fu-* your *-gu*.

      (*gexin* 'to innovate', *fugu* 'to revive')

It might be suggested that the analysis we have proposed for the "possessive agent" constructions is not necessary, and that what is needed is simply an extension of the range of possible meanings of a genitive NP. In particular, instead of limiting the genitive NP modifying a non-process noun to its possessive meaning, one might allow for it to denote also the agent of an event with which the modified noun is somehow associated as a patient. It is of course true that a genitive NP modifying a non-process noun is not limited to denoting a possessor: *zuotian de chehuo* 'yesterday's accident', *Taibei de tianqi* 'Taipei's weather', etc. The expression *ni de Yingwen* 'your English' in *ni de Yingwen hen hao* 'your English is good', for example, does not mean the English language that you own, but the English that you speak. Given this, one might suggest directly extending the meaning of *ni de Yingwen* 'your English' to 'the English that you teach' in (23c), and eliminate the need to appeal to an analysis involving raising and nominalization.

However, such a view has fundamental difficulties. For one thing, the interpretation of *ni de Yingwen* as 'the English you speak' is context-independent, but its interpretation as 'the English that you teach' is completely limited to specific contexts like (23c), e.g., when the verb is 'teach'. No theory that attempts to interpret a genitive NP compositionally solely within the local domain of modification can capture this distinction. More importantly, it is in fact a mistake to interpret (23c) as meaning 'you better teach well the English that you are teaching'. More precisely, (23c) means 'you better do your job of teaching English well'. *ni de Yingwen* does not refer to the language, but to the job of teaching the language.

Our analysis is further supported by an important prediction it makes: that only transitive action sentences may have the agentive interpretation under consideration for the genitive NP. Thus, in the stative sentences below, the genitive NPs *ta de, wo de* can only have a possessive interpretation:

(27)   ta xihuan ta de shubao, wo xihuan wo de bitong.

       He likes his bookbag, and I like my pen holder.

(28)   wo kanjian-le wo de shu, ta kanjian-le ta de bi.

       I saw my books, and he saw his pens.

In our analysis, the lack of ambiguity of these sentences is predicted because stative predicates cannot be analyzed as a nominalization that is a complement to the action verb 'do' or 'perform'. If I teach English, then I do or perform the teaching of English; but if I like a backpack or see a book, I do not do or perform an action. Now, the lack of ambiguity in these sentences does not follow from a theory that interprets (23c) by simply extending the range of possible meanings of a genitive NP. If the interpretation of *ni de Yingwen* can be stretched to 'the English that you

teach', then there seems to be no reason why *wo de shu* in (28) must mean 'my books', but cannot somehow be stretched to mean 'the book that I saw'.

In view of the analysis proposed, the following sentences are also examples of the "possessive agent" construction:

(29)   ta de laoshi dang de hao.

       his teacher serve-as DE well

       He serves well as a teacher.

(30)   ta de toufa li de bu cuo.

       his hair cut De not bad

a.   His hair was cut quite well.

b.   He cuts hair quite well.

In (29), *laoshi* 'teacher' is semantically the object of *dang* 'serve as'. Although the surface string translates literally as 'his teacher serves well', the sentence really means he serves well as a teacher or, in terms of our analysis, his service as a teacher was performed well. (30) is ambiguous. On one reading, *ta de toufa* refers to his hair; on the other reading, it refers to his performance as a barber, so the sentence means that his job of cutting hair is well performed. The analysis proposed here will treat *dang* and *li* (for the reading (30b)) as having raised out of a nominalized phrase that means 'his serving as a teacher' and 'his cutting hair', respectively.

This analysis differs from earlier analyses of the same sentences. In Mei (1978) and Huang (1982), for example, these examples are analyzed as involving object preposing followed by a process of *de*-insertion. Thus, from the d-structure (31a) object preposing gives (31b), which is turned into (31c) after *de*-insertion:

(31)   a.   ta li toufa de hao.

            he cut hair DE well

b.   ta toufa li de hao.

     he hair cut DE well

c.   ta de toufa li de hao.

     he 's hair cut DE well

Assuming that *de*-insertion takes place as a surface phenomenon, the surface NP that results from it, *ta de toufa*, is not interpreted as an NP constituent, and the analysis correctly interprets (31c) as 'he cuts hair well', without appealing to nominalization and verb raising. Although this seems to work well as far as these sentences are concerned, the analysis involves an overly permissive rule of *de*-insertion, which inserts *de* into a string that does not form a constituent (e.g., *ta toufa* consists of a subject and a preposed object). According to this analysis, sentences like (32c) should be well-formed on a par with (31c) and (32a)-(32b):

(32)   a.   ta hen xihuan shuxue.

            he very like mathematics.

            He likes math very much.

b.   ta shuxue hen xihuan.

     he mathematics very like

     He likes math very much.

c.   *ta de shuxue hen xihuan.

     he 's mathematics very like

Notice that the crucial difference between (31c) and (32c) is that between action and stative sentences. Both action and stative sentences allow their objects to be preposed, but only action sentences trigger *de*-insertion. This generalization does not follow from anything under the insertion approach. On the other hand, our proposal that (31c) arises from nominalization and verb raising correctly rules out stative sentences like (32c), since stative

sentences cannot be analyzed as nominalized complements of the action verb 'do'.

4. Possessive Objects

The third type of mismatch to be dealt with under verb movement has to do with "possessive object" constructions like the following:

(33)   tamen bang-le wo-de piao.

they   tie-Perf my   ticket

They kidnapped me.

(34)   qing   ni bie   kai   Lisi de   wanxiao.

please you don't make Lisi 's   fun

Please do not joke with Lisi.

The expression *bang piao* is a V-O construction with the idiomatic meaning 'to kidnap', and the expression *kai wanxiao* means 'to joke about'. In both cases, we see that what is semantically the object of the idiomatic expression appears in genitive form in construction with the object of the V-O construction. Similar examples of this kind of mismatch abound in Chinese. Other examples include *da ta-de erguang* 'slap him', *ce ta-de houtui* 'pull his leg', *chi ta-de chu* 'be jealous of him', *dan ta-de xin* 'worry about him', *sheng ta-de qi* 'be angry at him', etc.

I propose, following Huang (1988), that these sentences derive from underlying structures in which the possessive NP appears in an "outer object" position of the idiomatic V' phrase (with a verb and an "inner object"), in the Spec of VP position.

(35)   tamen [VP [V e] [VP wo [V' bang piao]]]

they   me   tie   ticket

(36)   qing   ni bie [VP [V e] [VP Lisi [V' kai   wanxiao]]]

please you don't   Lisi   make fun

I assume with Larson (1988) that the syntactic structure of a transitive sentence contains a VP embedded under a "VP shell" with a phonetically empty head. To such a structure verb movement may apply, resulting in the following sentences:

(37)   tamen bang-le wo piao.

they   tie-Perf me ticket

They kidnapped me.

(38)   qing   ni bie   kai   Lisi wanxiao.

please you don't make Lisi fun

Please do not joke with Lisi.

In these sentences the outer objects *wo* and *Lisi* appear immediately before the inner objects *piao* and *wanxiao* respectively. The juxtaposition of the two NPs enables them to be optionally reanalyzed as a single one, with the outer object as the modifier of the inner object. This causes *de* to be inserted, resulting in the surface NPs *wo-de piao, Lisi de wanxiao,* as in (33) and (34).

Note that the analysis proposed here for the possessive object construction differs from that proposed for the possessive agent construction and for the constructions involving event quantification in NP. Instead of postulating verb movement out of a gerundive phrase, I assume that the possessive object construction involves verb movement out of a lower VP. This explains a number of important differences between the possessive object construction and the possessive agent construction. First, whereas the possessive agent is typically coreferential with the subject of the empty matrix verb, the possessive object is required to be disjoint in reference from the matrix subject. Thus, in the examples in (23), the possessive agent

is clearly coreferential with the main clause subject. However, in (33)-(34) the possessive object is disjoint in reference from the subject. The following sentence, with the possessive object *ta-de* coindexed with Zhangsan, is unacceptable:

> (39) Zhangsan$_i$ changchang kai ta$_i$-de wanxiao.
>
> Zhangsan often make his fun
>
> Zhangsan often made fun of him.

This difference follows from the proposed analysis. In the possessive agent construction, the possessive agent appears in the subject position of an NP. A pronoun in such a position can easily corefer with an NP outside, as is in the case of *John saw his book*. In the possessive object construction, however, the possessive object pronoun appears in Spec of VP prior to the application of the surface rule of reanalysis. In this position it has the main clause as its governing category, and disjoint reference is required.

A second difference between possessive object and possessive agent constructions is that the morpheme *de* is obligatorily required only in the latter but not in the former constructions. Thus, both the examples with *de* in (33)-(34) and those without *de* in (37) and (38) are well formed. But in contrast to the sentences in (23), the following are ungrammatical:

> (40) *ta nian ta shu, wo shui wo jiao.
>
> he read he book, I sleep I sleep

> (41) *ni haohao jiao ni Yingwen ba.
>
> you well teach you English Prt

This follows naturally from the assumption that the reanalysis rule is optional, and *de* is required in the possessive object construction only when reanalysis has applied. The possessive agent appears in an NP (nominal IP) at D-Structure and continues to stay there at surface structure, however, and *de*

is therefore obligatory.

The ambiguity of the following sentence provides a further argument for the need to systematically distinguish between the possessive agent and possessive object constructions. The sentence has the meanings of both these constructions, each associated with its unique properties regarding coreference and the occurrence of *de*. The expression *ge-ming* is a V-O phrase meaning 'to revolutionize'. In the example below, the verb is separated from the object by verb movement:

> (42) Zhangsan hai zai ge ta-de ming.
>
> Zhangsan still at *ge* his *ming*
>
> a. Zhangsan is still doing his revolutionizing.
>
> b. Zhangsan is revolutionizing against him.

Under the first reading, the verb *ge* raises out of a gerundive phrase. The possessive agent corefers with *Zhangsan* and the genitive marker *de* cannot be deleted. Under the second reading, the pronoun starts out in Spec of VP, and takes the genitive marker only after verb movement and reanalysis have taken place. Coreference is impossible, and *de* is optional. The ambiguity shows that both analyses proposed here are needed.

5. Causative Sentences

The last case of mismatch to be discussed here is illustrated by certain kinds of resultative constructions (also considered in Huang (1988)):

> (43) zhe-ping jiu zui-de ta zhan-bu-qilai.
>
> this-CL wine drunk-DE he cannot-stand-up
>
> This bottle of wine got him so drunk that he could not stand up.

(44)   zhe-zhi wu tiao-de ta man-tou da-han.

this-CL dance dance-DE he whole-head big-sweat

This dance got him to dance until he sweated all over.

(45)   zhe-ge xiaoxi le-de ta shui-bu-zhao jiao.

this-CL news happy-DE he cannot-sleep sleep

This news got him so happy as to be unable to sleep.

In these sentences the matrix verb appears in a position higher than what is apparently its logical subject. In (43), for example, *zui* is a stative expression that predicates on the pronoun *ta*, but this pronoun clearly does not occur in a subject position of the predicate for predication to be possible. Instead, what appears in the subject position of the predicate is an NP that, on other grounds, is clearly incapable of being its subject: a bottle of wine cannot be drunk, a dance cannot dance, and a piece of news does not get happy. In Huang (1988), I proposed that these are causative sentences containing an empty causative verb which is filled by a verb raised out of an inchoative clause:

(46) [$_{IP}$ zhe-ping jiu [$_{VP}$ [$_{V}$ e] [$_{IP}$ ta [$_{VP}$ zui-de [$_{Result}$ zhan-bu-qilai]]]]].

this-CL wine   he   drunk-DE   can't-stand-up

For more details and arguments, see Huang (1988, 1991).

6. Concluding Remarks

In this paper we have seen that a head movement rule that moves a verb out of a gerundive phrase, a verb phrase, or an inchoative clause provides an explanation for a number of otherwise unexpected word order facts and apparent syntax-semantics mismatches. We conclude therefore that, although Chinese does not move a main verb or an auxiliary verb into I^o, it does move a verb into a higher verb position in a variety of constructions. Chinese does not differ from English and French, then, in whether the verb can move or not, but where it can move to. The languages differ with respect to whether I^o can be the ultimate landing site of verb movement.

A theoretical question that arises is what makes these languages differ in this way. A plausible answer to this question would presumably lie in how the languages differ in the nature of I^o. In Pollock (1989), the relevant differences between French and English are related to the fact that French has a fuller inflectional system of agreement than English. The ability to host a raised verb is related to whether or not a given Agr^o is sufficiently rich to transmit the theta-role assignment properties of the raised verb. In French tensed clauses, the Agr^o is sufficiently rich in content, so it can host a raised verb. In English, the Agr^o in tensed clauses is not rich enough to transmit the theta-roles of the raised verb, so only the auxiliary verb *have* and *be*, which do not enter into theta-role assignment, may raise into I^o in this language. This explanation also explains why V to I also does not occur in French infinitival clauses. Since the Agr^o in the French infinitival clause is no richer than that in English tensed or tenseless clauses, the non-occurrence of V to I in such clauses is expected.

The case of Chinese seems to fall readily along the same line. As is well known, in Chinese there is no verb-subject agreement. One natural assumption is that Chinese IPs lack the node Agr^o altogether, though they may contain other I^o categories, such as Asp^o, etc. (cf. Cheng (1990)). Suppose further that V moves to I only if it is hosted in Agr^o, then it follows that in Chinese, neither main verbs nor auxiliaries move to I^o at all.

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