Interaction of Syntactic Changes

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The recent thesis of rule interaction expounded in Hsieh (1989, 1990, ms.) extends the concept of competing rules in lexical diffusion (Wang 1969) by viewing irregularity in historical changes as well as variation in synchronic grammatical constructions as consequences of the internal interaction among applicable rules. This paper provides further empirical support for the interaction thesis, by illustrating the two types of interaction, i.e., complementation and competition, with the historical development of *yi3*, *ba3*, *jiang1*, and *na3* and the variation of transitivity in VO compound verbs, respectively.

0. Introduction

In this paper we will first review the essential concepts of the 'lexical diffusion hypothesis', originally put forth by Wang (1969) to account for irregularity, or residue, in sound changes. We then present the two basic types of rule interaction, complementation and competition, in the recent thesis of rule interaction conceived in Hsieh (1989, 1990) and more explicitly formulated in Hsieh (ms.). While maintaining the notion of lexical diffusion, the thesis of interaction extends the concept of competing rules to other areas of grammatical change and variation. We will illustrate 'complementation' with the two principles: refinement and analogy, which facilitated the recurring pattern of the historical development among *yi3*,

jiang1, ba3, and *na2.* We then demonstrate that, within the framework of Lexical-Functional Grammar, or LFG (e.g., Kaplan and Bresnan 1982, Sells 1985, and Kaplan 1989), the variation of transitivity among three types of VO compound verbs can be attributed to the conflict of two rules competing for transitivity in the constituent structure and functional structure of VO compound verbs.

1. Lexical Diffusion and Rule Interaction

Since the advent of the neogrammarian doctrine, now also known as the 'regularity hypothesis', which holds that all sound changes operate without exceptions, one of the most significant theoretical breakthroughs in historical phonology is the 'lexical diffusion hypothesis' (Wang 1969). The lexical diffusion hypothesis maintains that a sound change, though phonetically abrupt, affects the applicable lexical items in the lexicon in a gradual manner. Essentially, it recognizes that a sound change must take an extended period of time to complete; thus, before it reaches all the applicable lexical items in the lexicon, there may exist another concurrent sound change that competes for all or part of the same range of applicable lexical items in the language. Competing changes therefore may cause residue, or irregularity.

The lexical diffusion hypothesis, however, does not contradict the neogrammarian regularity hypothesis, which, in recognizing that linguistic changes operate in a systematic manner, provides an essential, if not necessary, working basis (e.g., Wang 1969, Labov 1978). Rather, the lexical diffusion hypothesis complements the neogrammarian principle by taking into consideration two additional factors--1) the temporal duration of the course of a sound change and 2) the possible interference of other changes. Linguistic changes therefore can still be recognized as regular, by default;

however, irregularity may occur when during the course of a change there is another change competing for all or part of the same domain of application.

Extending this concept of rule competition to the study of syntactic changes as well as variations of a synchronic grammatical construction, Hsieh (1989, 1990, 1991) derives a thesis of rule interaction, which holds that at any point in time, given a syntactic construction, grammatical rules applicable to this particular construction are engaged in a constant interaction of some sort. Variation or irregularity is viewed as the normal and natural consequence of such interaction. Thus, within such a view, the conventional distinction between irregularity in historical changes and variations in synchronic constructions is rendered superfluous. Furthermore, while this thesis provides an interpretation of the ever-changing nature of language, it makes no prediction as to whether linguistic changes simplify or complicate grammar in the long run.

Two basic types of rule interaction are identified: complementation and competition (Hsieh ms.), as shown in Fig. 1. Two rules are said to be in 'complementation' if their domains of application do not intersect. Furthermore, if we borrow the more familiar terminology in historical phonology, then when the output of one rule expands, or 'feeds', the other rule's domain of application, then they are also in a 'feeding' relation (Kiparsky 1978). On the other hand, two rules are in 'competition' if their domains of application intersect or coincide. Competition often yields variation or irregularity; in such cases, the competing rules are said to be in 'conflict'. Two rules in conflict are also in a 'bleeding' relation, for now the application of one deprives the other of its inputs (Kiparsky 1978). However, if no variation or irregularity arises from the competition, then the two rules are in 'conspiracy'.
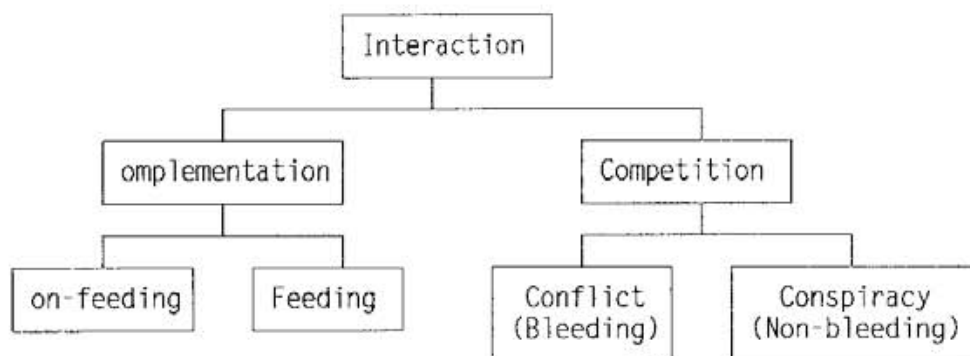
Fig. 1. Basic types of interaction

We will now reiterate the definitions of the various types of rule interaction in more formal terms, based on Hsieh (ms.). Note however that we identify Hsieh's conflict and conspiracy with bleeding and non-bleeding respectively. We further distinguish the complementation type as having two subtypes, feeding and non-feeding, and thus achieve a symmetry between complementation and competition.

Complementation: Given a specified domain, D, and two rules, R1 and R2, if R1 applies in D while R2 does not, then R1 and R2 are in complementation.

Feeding: Given two rules in complementation, R1 and R2, if the output of R1 serves as the input of R2, then R1 is in a feeding relationship with R2 (but not vice versa).

Non-feeding: Given two rules in complementation, R1 and R2, if the output of R1 is not the input of R2, then R1 is in a non-feeding relationship with R2 (but not vice versa).

Competition: Given a specified domain, D, and two rules, R1 and R2, if both R1 and R2 apply in D, then R1 and R2 are in competition.

Conflict (or bleeding): Given two competing rules, R1 and R2, if the same input yields two or more results, then R1 and R2 are in conflict (or in a bleeding relationship).

Conspiracy (or non-bleeding): Given two competing rules, R1 and R2, if the same input yields a unique result, then R1 and R2 are in conspiracy (or in a non-bleeding relationship).

According to this taxonomy, the following logical relations among feeding, bleeding, non-feeding, and non-bleeding can also be observed. It is possible for feeding to obtain only when two complementary rules are ordered consecutively; otherwise, non-feeding obtains. Bleeding obtains only when two competing rules subvert each other; otherwise, non-bleeding obtains. Thus, non-feeding and non-bleeding can be subsumed under the relation of 'disassociation' or 'disconnection'--while two disassociated rules in complementation are non-feeding, two disassociated rules in competition are non-bleeding. Likewise, feeding and bleeding are subsumed under the relation of 'association'--while two associated rules in complementation are feeding, two associated rules in competition are bleeding.

The concept of competing rules in lexical diffusion has become well established by now in historical phonology (e.g., Chen and Wang 1975, Lien 1987, Ogura 1990, Shen 1990). The extended thesis of rule interaction has also been applied in several areas of Chinese syntax, e.g., Chang (1990, 1991), Her (1991a), M. Hsieh (1991), Gai (1991), Zhu (1991), Cheng (ms.),

and H. Hsieh (1990, 1991). In this paper, we will illustrate the two types of interaction: complementation and competition, with observations of the historical development of *ba3/jiang1* and variation of transitivity in VO compound verbs, respectively, and thus further validate the interaction thesis.

2. Refinement and Analogy: Rules in Complementation

Although there is still argument among scholars regarding the specific mechanisms which brought out the prepositional functions of *ba3/jiang1*, certain observations have become generally accepted.[1] *Ba3* and *jiang1* functioned solely as verbs until the Tang Dynasty (A.D. 618-907) when they acquired the instrumental and disposal functions (e.g., Wang 1958, Bennett 1981, Peyraube 1989).[2] Yet, contrary to their use in modern Mandarin, during the Tang Dynasty, *jiang1* appeared much more frequently than *ba3* in the instrumental as well as disposal constructions (e.g., Huang 1986, Peyraube 1989, Lu 1955, Her 1990). Before the Tang Dynasty, *yi3*, aside from being a verb, appeared primarily in the instrumental construction and, in restricted cases, the disposal construction as well (e.g., Bennett 1981, Zhan 1973).[3] *Na2*, like *ba3* and *jiang1*, was originally only a verb, until the Ching

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1   Ross (1991) and Mo (1990) have argued recently that *ba3* should still be analyzed as a verb in modern Mandarin; such a position was of course hinted as early as Mei (1978). However, we will stay with the more conventional account and regard *ba3, jiang1,* and *na2* as prepositions in instrumental and disposal constructions.

2   For ease of discussion, in this paper we will maintain the traditional term 'disposal' to refer to the *ba3/jiang1* prepositional function of assigning a Theme (versus Patient) role to the following NP (Chang 1990, Her 1991). Furthermore, to maintain a more concise discussion, we refer the interested readers to Her (1990) or Peyraube (1989) for actual examples of *ba3/jiang1* in the Tang Dynasty.

3   We are referring to the very common use of *yi3* in the double object construction (e.g., Zhan 1973, Bennett 1981) and the few instances where *yi3* marks a

Dynasty (A.D. 1644-1911) when it also acquired the instrumental function, as observed by Wang (1958).[4] Based upon these observations and specific statistics on data from *Shishuo Xinyu* and texts of *Chuanqi* and *Bianwen*, the following systematic account is given in Her (1990), where ample examples and detailed argumentation on the particular historical mechanisms facilitating these changes can also be found.

Stage 1: before the Tang Dynasty

a.   *yi3* functioned in verbal, instrumental and disposal constructions.

b.   *jiang1*, a verb, shared *yi3*'s verbal function.

c.   *ba3*, also a complete verb, shared *jiang1*'s function as a verb, meaning 'to take' or 'to hold'.

Stage 2: during the Tang Dynasty

a.   *yi3* lost its function as a verb and the use of *yi3* in instrumental and disposal constructions decreased.

b.   *jiang1*'s functions increased: verbal, instrumental, and disposal, and in the disposal construction, *jiang1* was the dominant choice.

c.   *ba3* also started to appear, though far less frequently than *jiang1*, in instrumental and disposal constructions.

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preposed object when the verb is followed by a locational complement (e.g., Zhan 1973:371):

    9.   Yi3 bai3   qian2   gua4 mei2tou2

        YI hundred money hang branch

        (He) hang a hundred coins on the branch.

4   Arguably, *ba3* may still be analyzed as an independent verb in idiomatic expressions like *ba3-feng1* 'to be on the lookout'.

Stage 3: in modern Mandarin

a.   *yi3* has lost all its functions in speech.

b.   *jiang1* is hardly ever used in speech, either.

c.   *ba3* dominates the disposal construction, but it has lost all the other functions.[5]

d.   *na2*, which shares *ba3*'s verbal meaning, has also acquired the instrumental function, and in some limited cases, it is competing with disposal *ba3*.[6]

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5   During the Ching Dynasty, *na2* surely was competing with *ba3* in the instrumental construction, as evidenced in the following sentence from the novel *Hongloumeng* where *na2* and *ba3* are used interchangeably in the instrumental construction (Lu 1955:141).

    10.   Jia3yun2...na2   yan3   ba3   Xiao3hong2 yilliu1;
           Jiayun   NA   eye   BA   Xiaohong   look
           na4   Xiao3hong2...ye3   ba3 yan3 qu4 yilliu1 Jia3yun2
           that Xiaohong   also BA eye   to   look   Jiayun
           Jiayun glanced at Xiaohong quickly; Xiaohong also took a quick look at Jiayun.

6   We are referring to the following types of use of *na2*, where its NP seems to be assigned the Theme role.

    11a.   Bie2   na2   ta1 qu3xiao4.
          don't NA   he   laugh-at
          Don't laugh at him.

    11b.   Bie2 qu3xiao4   ta1.
          Don't laugh at   him.

    12a.   Ni3 gen1ben3 na2   ta1 bu4   dang1   ren2.
          you at-all   NA   he not   treat-as human
          You don't treat him as a human at all.

    12b.   Ni3 gen1ben3 ba3 ta1 bu4   dang1   ren2.
          You don't treat him as a human at all.

    13a.   Ni3 na2   wo3 gen1 ta1 bi3.
          you NA I   with   he   compare
          You compare me with him.

    13b.   Ni3 ba3 wo3 gen1   ta1 bi3.
          you BA I   with   he   compare
          You compare me with him.

Note that during the Tang Dynasty, as the use of instrumental and disposal *jiang1* was mounting, that of *yi3* was falling dramatically in speech (Her 1990). In addition to this, the observation that *yi3* and *jiang1* shared similar functions during and before the Tang Dynasty led Bennett (1981) to the belief that the rise of instrumental and disposal *jiang1* was instigated by *yi3*. In modern Mandarin, however, *jiang1*, like *yi3*, has disappeared from speech almost entirely, while *ba3* has become the dominant choice in the disposal construction (e.g., Lu 1955, Ding et al 1979, Chen et al 1982, Sun and Givon 1985). This historical factor and the observation of the similar verbal meanings of *ba3* and *jiang1*, and the preferred use of instrumental and disposal *jiang1* over *ba3* in the Tang Dynasty all seem to support Huang's (1986) assertion that the development of *ba3* during the Tang Dynasty was modeled after *jiang1*.[7] In turn, the recent downfall of verbal and instrumental *ba3* in Mandarin coincides with the rise of verbal and instrumental *na2*. In some limited cases, *na2* has also started invading *ba3*'s disposal function. Again, this observation and the similar verbal meaning between *ba3* and *na2* suggest that *na2* is modelling itself after *ba3*, a relationship similar to that of *jiang1* and *ba3*, and also that of *yi3* and *jiang1*

Moreover, the fact that in some dialects of Chinese, such as Wu, only *na2*, not *ba3*, is used in the disposal construction (e.g., Wang 1985) also strongly indicates that *na2* has been encroaching upon disposal *ba3*.

This position assumes that verbal *jiang1* reanalyzed to acquire the instrumental and disposal functions prior to the emergence of instrumental and disposal *ba3*. We recognize that this assumption may need further evidence; however, the fact that not only throughout the Tang Dynasty but even towards the end of the 10th century *jiang1* was still overwhelmingly the preferred choice in both constructions strongly favors this assumption. See Huang's (1986) statistics on *ba3* and *jiang1* of *Zutanji* (A.D. 952), a collection of Zen dialogues.

(Her 1990).[8]

The rise and fall of the various functions of *yi3, jiang1, ba3,* and *na2* suggest that there are two principles at work facilitating this chain of changes: refinement (Li 1980) and analogy, formalized as the following (Her 1990):

The principle of refinement:

if element X has multiple functions, e.g. f1, f2, and f3, then X is likely to reduce the number of its functions.

The principle of analogy:

if element Y shares its function, e.g., f1, with X, then Y is more likely, than other elements that share no functions with X, to acquire some or all of X's other functions, e.g., f2 and f3.

While refinement accounts for the eventual decline of *yi3, jiang1,* and verbal and instrumental *ba3,* analogy provides an interpretation of the rise of instrumental and disposal *jiang1, ba3,* and *na2.*[9] Notice also that the

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8   Another lexical item that appeared, though rarely, in the disposal construction in the Tang Dynasty is *zhuo1,* which, according to Peyraube (1989), is found only in Bianwen and disappeared totally from the disposal construction after the Tang Dynasty. Once again, it is interesting to point out the similar meaning of verbal *zhuo1* 'to hold' or 'to catch' and verbal *jiang1, ba3,* and especially *na2.* Therefore, a closer look might reveal that, like *ba3, zhuo1* developed its disposal function modelling after either *jiang1 or ba3.*

9   Most scholars consider that the emergence of instrumental and disposal *ba3,* similar to *jiang1,* was via the reanalysis (or grammaticalization) of verbal *ba3* in serial verb constructions (e.g., Lu 1955, Wang 1958, Li and Thompson 1974, Bennett 1981, Peyraube 1989 and to appear), while Huang (1986) and Her (1990) contend that, unlike the reanalysis of *jiang1* serial verb construction, *ba3* acquired its instrumental and disposal functions by lexically replacing *jiang1.* Aside from the reasons mentioned earlier, their primary argument is that, since *ba3* was

refinement process reduces a one-to-many relation between a linguistic form and its functions and thus promotes linguistic 'transparency' (Langacker 1977); analogy, on the contrary, encourages a one-to-many relation by increasing the syntactic functions of a linguistic form. From this perspective, the development of *yi3*, *jiang1*, *ba3*, and *na2* can be summarized as below:

Stage 1:

a.   *yi3*: candidate for refinement

b.   *jiang1*: candidate for analogy to *yi3*

c.   *ba3*: candidate for analogy to *jiang1*

Stage 2:

a.   *yi3*: undergoing refinement

b.   *jiang1*: undergoing analogy to *yi3*, and also becoming a candidate for refinement

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seldom used in the serial verb construction in the Tang Dynasty, it is unreasonable to assume that prepositional *ba3* came from the grammaticalization of verbal *ba3* in the serial verb construction. And, again, observations in other dialects may shed some light. The fact that in the Wu dialect, *na2*, but not *ba3*, is used in the disposal construction (e.g., Wang 1985) and that in the Cantonese vernacular, *jiang1*, not *ba3*, still dominates the disposal construction (Larry Browning, personal communication) indicates that *ba3* and *jiang1* have developed along different paths in Mandarin.

Here, however, it is more important to note that analogy is a higher strategy of language change compatible with both mechanisms, reanalysis and lexical replacement. An excellent example is Peyraube's (1988) account of the development of passive constructions. He suggests that, during the Han period, by analogy with *jian4*, *bei4* lexically replaced *jian4* in its serial verb construction; and later during the Sui and Tang Dynasty, by analogy with *wei2* in the [*wei2* + Agent + V] construction, verbal *bei4* reanalyzed to be a preposition, without lexically replacing *wei2* however.

c.   *ba3*: starting to undergo analogy to *jiang1* and also becoming a candidate for refinement

Stage 3:

a.   *yi3*: has undergone refinement

b.   *jiang1*: has undergone refinement

c.   *ba3*: has also undergone refinement

d.   *na2*: candidate for analogy to *ba3*, and undergoing the process

The dynamic counteraction between these two principles not only accounts for the recurring pattern of historical changes among *yi3*, *jiang1*, *ba3*, and *na2*, but also provides a partial explanation of how languages are constantly changing and yet in the long run they do not appear to decrease nor increase in overall complexity (Langacker 1977). However, it is also implicit in the interaction thesis that the interactive forces may periodically simplifies or complicates a grammar to achieve a dynamic equilibrium of the grammar.

In terms of the interaction between analogy and refinement, since refinement applies to linguistic forms with multiple functions, while analogy tends to apply to elements with a single (shared) function, these two principles do not compete for their domain of application, as shown in Fig. 2. Therefore, they serve as an example of rules in complementation. Moreover, the principle of analogy is also in a 'feeding' relation with the principle of refinement, in that the output of analogy is applicable to, or 'feeds', refinement. Thus, after the analogous development, *ba3* and *jiang1* (and perhaps *na2* as well) have also become candidates for refinement.

RULE TYPE	DOMAIN OF APPLICATION	RESULT
Analogy	forms with a shared function	1 to many
Refinement	forms with multiple functions	1 to 1 or null
	No intersection (COMPLEMENTATION)	(feeding) ↓

Fig. 2. Complementation of analogy and refinement

In the next section we will show an example of two competing rules in conflict, or in a 'bleeding' relation, with an LFG account of the variation in transitivity resulting from the historical reanalysis in VO compound verbs.

3. Transitivity of VO Compound Verbs: Rules in Competition

VO compounding is a well-recognized word formation mechanism in Chinese (e.g., Chao 1968, Li and Thompson 1981, Huang 1984). If we assume lexical integrity, as stated in Huang (1984:60) that 'no phrase-level rule may affect a proper subpart of a word', then a VO compound can be more explicitly defined as a lexical unit (of an X-zero category in terms of X-bar syntax) whose inner structure, though historically traceable to be [V+O], is inaccessible to phrase-level rules. A genuine compound thus should behave exactly like other non-compound words of its syntactic category. The majority of VO compound verbs, e.g., *shilyi4* 'to be depressed' and *kailxin1* 'to be happy', are intransitive and do not allow objective postverbal NPs;

however, there are some VO verbs that do behave transitively, e.g., *de2zui4* 'to offend' and *chu1ban3* 'to publish'.

In English, there is also a class of verbs which seems to be of a similar nature, for example, *babysit, bartend, job-hunt,* and *grocery-shop,* etc. However, these may not be compounds of the genuine OV-type, as there is no general pattern of [OV] in English syntax. Rather, these are sporadic backformations from the fairly productive noun-noun compounds like *babysitter, bartender, job-hunting,* and *grocery-shopping* (Baker 1988:78). Like VO verbs in Chinese, however, although most of these verbs are intransitive, a few exceptions do exist, e.g., *babysit* and *typeset.*

1a. Jenny has to babysit her little brother tonight.

1b. We can typeset the book for you at $8.00 per page.

In Mandarin, nonetheless, as first observed by Huang (1989a), there exists yet another type of VO verbs, e.g., *na2shou3* 'to be good at', which cannot take an objective postverbal NP and yet require an objective topic. We will refer to this small set of VO verbs as 'semi-transitive' verbs. Thus, three types of VO compound verbs are identified: (a) intransitive, e.g., *shi1yi4* 'to be depressed', (b) transitive, e.g., *de2zui4* 'to offend', and (c) semi-transitive, e.g., *na2shou3* 'to be good at.' More examples are given in the appendix.

2a: shi1 'to lose' + yi4 'sentiment' -> shi1yi4

2b: de2 'to gain' + zui4 'guilt' -> de2zui4

2c: na2 'to take' + shou3 'hand' -> na2shou3

3a.   Ta zui4jin4 hen3 shi1yi4.   'intransitive'

       he recently very depressed

       He has been very depressed recently.

3b.   *Ta hen3 shi1yi4 ma3li4.

       he very depressed Mary

4a.   *Ta de2zui4.   'transitive'

       he offend

4b.   Ta mei2 de2zui4 ma3li4.

       He not offend Mary

       He didn't offend Mary.

4c.   Ma3li4, ta1 mei2 de2zui4.

       Mary, he didn't offend.

5a.   *Ta na2shou3.   'semi-transitive'

       he good-at

5b.   *Ta na2shou3 shu4xue2.

       He is good at math.

5c.   Shu4xue2, ta1 na2shou3.

       Math, he is good at.

We adopt an analysis for these verbs in LFG (Her 1991, 1991a). An LFG grammar assigns two levels of syntactic representation to a sentence: a c-structure (constituent structure), which reflects the constituent hierarchy and linear ordering in a sentence, and an f-structure (functional structure), which represents the grammatical, functional information. It is in the f-structure that grammatical relations like TOPIC, SUBJ (subject) and OBJ

(object) are stated. The c- and f-structures together form a co-description of a linguistic expression; thus, although they are two different kinds of syntactic representation, they are an integrated whole. The following illustration depicts the co-description of the c- and f-structure of the sentence 'They like Mary.'
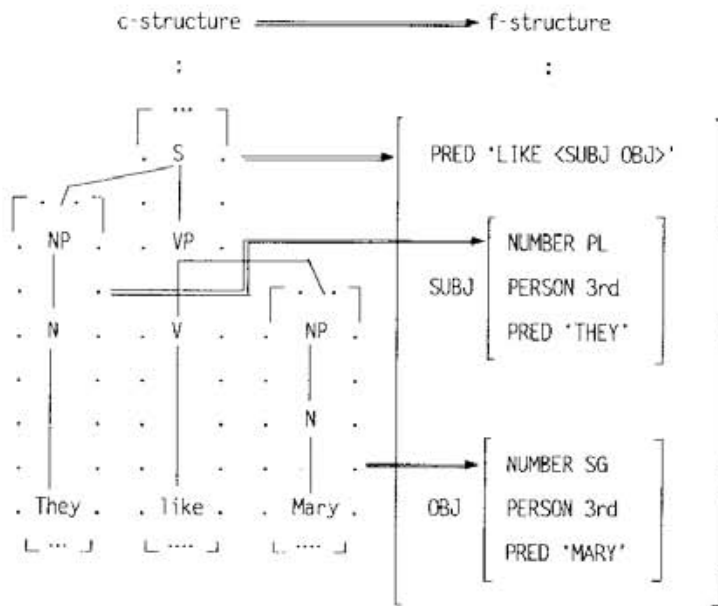

Fig. 3. Co-description of c- and f-structure

While phrase structure rules regulate c-structures, LFG also posits certain well-formedness conditions on f-structures, e.g., Completeness and Coherence. The Completeness and Coherence conditions are directly related to the concept of subcategorized grammatical functions.

Completeness

An f-structure is locally complete if and only if it contains all the subcategorizable grammatical functions that its predicate subcategorizes

for. An f-structure is complete if and only if all its subsidiary f-structures are locally complete.

Coherence

An f-structure is locally coherent if and only if all the subcategorizable grammatical functions that it contains are subcategorized-for by a local predicate. An f-structure is coherent if and only if all its subsidiary f-structures are locally coherent.

A subcategorizable function must obey the conditions of Completeness and Coherence; yet, a non-subcategorizable function, e.g., ADJUNCTS, need not. A grammatical function is either subcategorizable or non-subcategorizable in a given language; it cannot be both. TOPIC in LFG is a grammatical relation parallel to subject and object. While SUBJ and OBJ are recognized in the theory as universally subcategorizable, TOPIC's sub-categorizablity is said to be language-dependent. However, as demonstrated substantially in Her (1991, 1991a), an analysis of subcategorized TOPICs in Chinese, such as the ones proposed in Huang (1989a) and Mo (1990), poses several unresolvable problems and misses all kinds of generalizations; thus, in spite of its (often exaggerated) prominence in Chinese, TOPIC has to be considered a non-subcategorizable function.

A transitive verb subcategorizes for OBJ in its f-structure and allows, but does not require, an objective postverbal NP in c-structure; an intransitive verb, on the other hand, does not subcategorize for OBJ, nor does it allow any objective postverbal NP. This analysis also specifies that although semi-transitive verbs such as *na2shou3* in 6c do indeed subcategorize for an OBJ in f-structure, this OBJ is required to be [FRAME +], which, as

regulated by rule 7a, can be obtained only through unification with the matrix TOPIC. As a consequence of this constraint on semi-transitive verbs, overt postverbal objective NPs are ruled out while a matrix TOPIC is required. The unique assignment of the semantic attribute [FRAME +] to TOPIC is justified for TOPIC's semantic function can be characterized as setting 'a spatial, temporal or individual framework within which the main predication holds' (Chafe 1976:50).[10] Relevant sample lexical entries and augmented phrase structure rules are given in 6 and 7.

6a.　shi1yi4 V

$(\uparrow$　PRED$)$ = 'DEPRESSED <SUBJ>'

6b.　de2zui4 V

$(\uparrow$　PRED$)$ = 'OFFEND <SUBJ OBJ>'

6c.　na2shou3 V

$(\uparrow$　PRED$)$ = 'BE-GOOD-AT <SUBJ OBJ>'

$(\uparrow$　OBJ FRAME$) =_c$ +

7a.　S'　->　　　NP　　　　　S

$(\uparrow$　TOPIC$)$ = $\downarrow$　$\uparrow$ = $\downarrow$

$(\downarrow$　FRAME$)$ = +
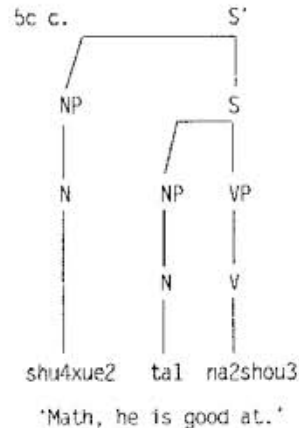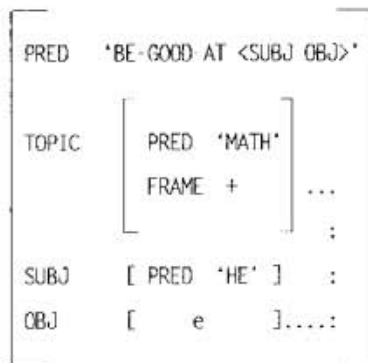
$(\uparrow$　...$)$ = $\downarrow$

10　Her (1991a) thus proposes the term 'frame' to refer to the semantic or discoursal function encoded by topic, now a syntactic notion, since topic functions semantically as the interpretive framework of the main predication. Chao's (1968: 69) famous statement that the semantic relation of subject and predicate in Mandarin is that of topic and comment could now be restated: the semantic relation between topic and predicate in Mandarin is that of frame and comment.

7b.   S   ->   (NP)   VP

$$(\uparrow \text{ SUBJ}) = \downarrow \quad \uparrow = \downarrow$$

7c.   NP   ->   V   (NP)

$$\uparrow = \downarrow \quad (\uparrow \text{ OBJ}) = \downarrow$$

Within this analysis, 5a and 5b are ill-formed because their respective f-structures violate the functional constraint specified in the lexical entries of semi-transitive verbs, $(\uparrow \text{ OBJ FRAME}) =_c +$, which requires [FRAME +] in *na2shou3*'s OBJ. However, this constraint is satisfied in the f-structure of 5c since its OBJ unifies with TOPIC through the operation of functional uncertainty, $(\uparrow \text{ ...}) = \downarrow$.[11] We will illustrate the well-formed c- and f-structure of 5c below.

5c-f. Shu4xue2, ta1 na2shou3.

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┌                                      ┐
│ PRED    'BE-GOOD AT <SUBJ OBJ>'      │
│                                      │
│           ┌                 ┐        │
│ TOPIC     │ PRED   'MATH'   │        │
│           │ FRAME  +        │  ...   │
│           └                 ┘    :   │
│                                      │
│ SUBJ      [ PRED  'HE' ]       :     │
│ OBJ       [    e      ]....:         │
└                                      ┘
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5c c.

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                          S'
        ╱                      │
      NP                       S
      │                   ╱
      N              NP       VP
      │              │        │
                     N        V
                     │        │
   shu4xue2        ta1     na2shou3
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'Math, he is good at.'

To account for the variations of transitivity in VO compound verbs, we suggest that there are two competing rules affecting the c- and f-structures of VO compound verbs. The incorporation process is thus viewed as a

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11   Refer to Huang et al (1989) and Xie (1990) for more thorough LFG accounts of functional uncertainty and topics in Mandarin Chinese.

reanalysis of the VO syntactic structure into a morphological one.

8. [V incorporates OBJ] > V:
 A. [TRANSITIVE]
 B. [+ TRANSITIVE]

In terms of transitivity, four logical consequences may result from the competition of 8A and 8B in c- and f-structures of VO compound verbs. Each consequence corresponds to an individual type of transitivity in VO verbs, as depicted in Fig. 4, where the + and - signs indicate transitivity (the vertical TRAN).

	c-structure	f-structure	Consequence
T	-	-	Intransitive: *shi1yi4*
R	+	+	Transitive: *de2zui4*
A	-	+	Semi-transitive: *na2shou3*
N	+	-	None

Fig. 4. Transitivity of VO verbs

The Intransitive Rule 8A has been fully realized in intransitive VO compounds like *shiyi4*; thus, they do not subcategorize for OBJ, nor allow objective postverbal NPs. On the other hand, in transitive VO compounds like *de2zui4*, the Transitive Rule 8B has prevailed in both f- and c-structures; they therefore subcategorize for OBJ in f-structure and also allow objective postverbal NPs in c-structure.

As for semi-transitive VO verbs like *na2shou3*, the Intransitive Rule 8A has affected their c-structure; hence they cannot take a lexically overt objective postverbal NP. Yet, the competing Transitive Rule 8B has affected their f-structure; they thus subcategorize for OBJ. Consequently, the OBJ

required by the f-structure cannot be fulfilled by a lexically overt postverbal NP; rather it has to be fulfilled by an anaphoric control relation with the matrix TOPIC. Their lexical entries therefore must specify ($\uparrow$ OBJ FRAME) $=_c$ + to ensure the existence of a matrix TOPIC that anaphorically controls their OBJ, and to also rule out a lexically overt, structurally assigned OBJ, which would not receive [FRAME +].[12]

The fourth and last logical consequence due to the interaction of these two competing rules is VO compounds whose c-structure is transitive but whose f-structure is intransitive, exactly the opposite of semi-transitive verbs. We find no such case in Chinese; and we doubt they will ever be found in any language. Such a consequence would necessarily lead to an incoherent, thus ill-formed, f-structure since the lexically overt, structurally assigned OBJ, a universally subcategorizable function, is not subcategorized for by the verb within the f-structure. The universal grammar therefore predicts, correctly, that the interaction between the two rules 8A and 8B will never yield such a consequence.

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12 Again, recall that the c- and f-structure in LFG are co-description of a linguistic expression. Although they are two different kinds of information, they are an integrated whole. Thus, what appears to be a c-structure constraint may in fact be fulfilled by an f-structure condition. Take the following sentence for example:

    14. *Mary kissed John a kiss.

      (Intended meaning: Mary gave John a kiss.)

    Although it is a c-structure constraint that prohibits the verb *kiss* from taking a second NP, the actual fulfillment of this constraint is by way of an f-structure condition--the sentence is ruled out due to the incoherent OBJ2 (indirect object) in the f-structure. Similarly, the fact that in the f-structure *kiss* cannot have OBJ2 also means that in c-structure it does not allow a second NP. Similarly, the c-structure constraint that *na2shou3* does not allow postverbal objective NPs is fulfilled through an f-structure constraint that its OBJ must contain [FRAME +].

RULE	DOMAIN OF APPLICATION	RESULT
- TRAN	c- and f-structure of VO verbs	Intran. c- and f-s.
+ TRAN	c- and f-structure of VO verbs	Tran. c- and f-s.
	intersection (COMPETITION)	(bleeding) (CONFLICT)

Fig. 5. Competition of transitivity and intransitivity

As shown in Fig. 5, since the Transitive Rule and the Intransitive Rule are both applicable to the c- and f-structures of VO compound verbs, they are in competition. In other words, the domains of their application intersect. Furthermore, since as a result of their competition, a single input of these two rules may have three possible variations in terms of its transitivity, the two rules are also in conflict, or in a 'bleeding' relation, i.e., the application of one rule deprives the other rule of its applicability.

4. Concluding Remarks

Wang's (1969) lexical diffusion hypothesis did not fancifully invent the existence or the reality of competing sound changes that affect a lexicon gradually; rather, it provided the necessary theoretical constructs within which irregularity in sound changes can be precisely accounted for. By applying this well-tested hypothesis to the description of syntax, Hsieh (1989) extended its two most important theoretical constructs beyond the study of phonology: 1) changes affecting the grammar take effect gradually; and 2) variations of a grammatical construction are due to the interaction of

competing rules. Furthermore, by identifying a taxonomy of interaction, Hsieh (ms) ingeniously covers all possible types of interplay among rules and allows either regularity or variation as the result of an interplay. In fact, this taxonomy of rule interaction, by dividing interaction into complementation and competition, has tacitly reconciled the dispute between the determined neogrammarian stance and the resolute variationist position, for while competition tends to create variation, complementation coincides largely with regularity.

In this paper we have presented the essential concepts within this thesis of rule interaction and applied them to account for two observations in Chinese syntax. The recurring pattern of change among yi3, jiang1, ba3, and na2 is attributed to the 'feeding' complementation of two principles, refinement and analogy; and, within an LFG analysis, the variation of transitivity in VO verbs is accounted for through the conflict of two rules competing for transitivity in c- and f-structures. While the latter is an instance of competition of two specific rules, the former illustrates the complementation between two general rule types.

Within the mainstream grammatical theory, the Government and Binding Theory (GB), much emphasis has been placed on reducing the earlier various ad hoc transformations to a single rule, Move-α, and on formulating a network of constraints in different syntactic modules to regulate the application of this single transformation. Variations of grammatical constructions can no doubt be expressed in terms of the interaction of the different modules or the various constraints. Huang (1988), which constitutes an original analysis of the variations of the Chinese A-not-A construction, for instance, can be seen as a study which seeks to account for these variations from the point of view of interaction between syntax and phonology. It

should also be fruitful to approach the study of parameters in the universal grammar from the perspective of interaction. LFG, as possibly the most popular alternative theory to GB, on the other hand, has eliminated entirely the theoretical validity of transformations and employs morpho-lexical processes to account for many syntactic phenomena that were previously accounted for by transformations (e.g., Huang 1989). Grammatical variations, therefore, can be accounted for in terms of the interaction of these morpho-lexical processes. Also, as we have demonstrated with VO verbs, rules affecting different linguistic planes, e.g., the thematic, c- and f-structures, may interact and cause variation. The interaction thesis is therefore compatible with current linguistic theories and provides a promising framework for linguistic description.

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