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Rule Interaction as a Cause of Grammatical Variation: Evidence from Mandarin Chinese

One-Soon Her
Executive Communication Systems, Inc.

BACKGROUND

The neogrammarian doctrine, known also as the ‘regularity hypothesis’, that all sound changes operate without exceptions, is a significant contribution to the study of language in that it recognizes that language changes are systematic. Of equal importance is the ‘lexical diffusion hypothesis’ that Wang (1969) put forth to account for irregularity in a sound change, which is not uncommon to observe. The lexical diffusion hypothesis maintains that a sound change, though phonetically abrupt, affects the applicable lexical items in the lexicon gradually, or, in essence, that all sound changes take an extended period of time to complete. A sound change thus may not reach the entire lexicon if there is a concurrent sound change competing for the same domain in the lexicon. Competing changes thus may cause residue, or irregularity.

The lexical diffusion hypothesis does not necessarily contradict the neogrammarian regularity hypothesis, however. Rather the former complements the latter, with two additional factors taken into consideration: the duration of a change and the interference of other changes. Linguistic changes can still be recognized as regular; however, irregularities may arise when during the course of change there is another change competing for (part of) the domain of application.

In his pursuit of a balance between the formalist and the functionalist approaches in the description of the grammar of Chinese, Hsieh (1989, 1990), incorporating and extending Wang’s concept of competing changes, subscribes to a thesis of interaction, one that accounts for variation in synchronic grammatical constructions in terms of the interaction among grammatical rules affecting a particular domain within a grammar. Based on the model of Lexical-Functional Grammar (Kaplan and黄 1990, Huang 1989) and Tai’s (1985, 1989) discovery of the pertinence of iconic principles in Chinese syntax, Hsieh (1990) proposes that a grammar consists of four distinct parallel planes: i-structure (iconic structure), t-structure (thematic structure), f-structure (functional structure), and c-structure (constituent structure).

The interaction thesis holds that at any point in time, given any grammatical pattern, grammatical rules, which may be of the same or different linguistic planes, applicable to this particular pattern are engaged in a constant interaction of some sort, e.g. competition or complementation; variation or irregularity is the consequence of such interaction. Within such a view, the distinction between irregularity in historical changes and variation in synchronic patterns is rendered superfluous. This thesis also provides a plausible interpretation of the ever-changing nature of language.

Several basic types of rule interaction have been identified (Hsieh ms.). Two rules are said to be in complementation if their domains of application do not intersect; on the other hand, they are in competition if the domains of application do intersect. Competition often yields variation or irregularity; in such cases, the competing rules are said to be in conflict. Nonetheless, they are in conspiracy if no variation or irregularity arises from the competition.
Thus far, in Chinese linguistics, Chang (1990) provided a well-balanced account of the verb copying construction within the interaction thesis. Previously, Huang (1984) accounted for Mandarin verb copying with a general PSC (Phrase Structure Condition) which specifies that in Mandarin the verb can have no more than one constituent to its right. Tai (1989), however, having observed that the verb copying construction in general obeys the Principle of Temporal Sequence (PTS), which specifies that the linear order of constituents in Mandarin follows their temporal sequence, argued that variation in verb copying is due to interacting forces of phonology, semantics, and iconicity in the grammar. Chang (1990) showed that the variation of verb copying existing among verbs can be fully described only with the consideration of both PSC and PTS and observed further constraints in the thematic structures of verbs. Variation is thus attributed to the interaction of constraints on different linguistic planes: iconic, thematic, and constituent. Other than specific syntactic constructions, this interaction thesis has also been applied in dialect subgrouping (Hsieh 1990), and in explicating the dialectic process between the source and target languages in translation (Hsieh 1991).

In the remainder of the paper, we will provide further empirical support to this interaction thesis, with studies of the historical development of the two famous, if not infamous, lexical elements $\text{ba3}$ and $\text{jiang1}$ in Chinese during the Tang Dynasty (A.D. 610-907), Her (1990a) observed a reoccurring pattern of changes among several lexical elements.

**Stage 1: before Tang, in Archaic Chinese**

a. $\text{yi3}$’s functions were many: verbal, adverbial, and prepositional (marking Theme, Instrument, and Goal).
b. $\text{jiang1}$, as a verb, shared one of the verbal usages of $\text{yi3}$, meaning ‘to take’.

**Stage 2: during the Tang Dynasty**

a. $\text{yi3}$ lost nearly all functions as a verb and functioned as a preposition only scarcely.
b. $\text{jiang1}$’s functions increased: verbal and prepositional (marking both Theme and Instrument).
c. $\text{ba3}$ shared $\text{jiang1}$’s function as a verb, meaning ‘to take’ or ‘to hold’. In limited cases, $\text{ba3}$ also started to function sporadically as a preposition, marking Theme and Instrument.

**Stage 3: after Tang, in Modern Mandarin**

a. $\text{jiang1}$ is hardly ever used in speech, and in written texts its only use is prepositional, marking Theme.
b. \( ba_3 \) is only used as a preposition assigning Theme, in both speech and writing.

c. \( na_3 \) shares \( ba_3 \)'s earlier function as a verb, meaning 'to take' or 'to hold'. Also, \( na_3 \) has the prepositional function of marking Instrument and, in some limited cases, Theme.

These data suggest that there are two principles at work encouraging this chain of changes: refinement and analogy, formalized as the following.

The Principle of Refinement: if element X has multiple functions, e.g., \( f_1 \), \( f_2 \), and \( f_3 \), then X is likely to reduce the number of its functions.

The Principle of Analogy: if element Y shares its function, e.g., \( f_1 \), 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., \( f_2 \) and \( f_3 \).

At different stages, the lexical items in question are susceptible to the effects of these two principles.

Stage 1:
- \( yi_3 \): candidate for refinement
- \( jiang_1 \): candidate for analogy to \( yi_3 \)

Stage 2:
- \( yi_3 \): had undergone refinement
- \( jiang_1 \): was undergoing analogy to \( yi_3 \), and also becoming a candidate for refinement
- \( ba_3 \): candidate for analogy to \( jiang_1 \), and also started undergoing the process

Stage 3:
- \( jiang_1 \): has undergone refinement
- \( ba_3 \): has also undergone refinement
- \( na_3 \): candidate for analogy to \( ba_3 \), and started the process

Notice that while the refinement process forces towards linguistic "transparency" (Langacker 1977) by reducing a one-to-many relation between a linguistic form and its functions to one-to-one, analogy, on the contrary, destroys a one-to-one relation by acquiring more functions.

Stage 1:
- \( yi_3 \): one-to-many
- \( jiang_1 \): one-to-one

Stage 2:
- \( yi_3 \): one-to-one
- \( jiang_1 \): one-to-many
- \( ba_3 \): one-to-many in transition to one-to-many

Stage 3:
- \( jiang_1 \): one-to-one
- \( ba_3 \): one-to-one
- \( na_3 \): one-to-one in transition to one-to-many

The dynamic counteraction between these two factors not only accounts for the reoccurring pattern of historical changes among \( yi_3 \), \( jiang_1 \), \( ba_3 \), and \( na_3 \), but also explains, partially at least, why languages are constantly changing and yet in the long run they do not appear to decrease nor increase in overall complexity.

Since refinement affects only linguistic forms with multiple functions, while analogy applies to elements with a single function, these two principles do not compete for their domain of application. Therefore they serve as an example of rules that apply in complementation. In fact, the Principle of Analogy is in a "feeding" relation with the Principle of Refinement, in that the outcome of the former is applicable to, or "feeds", the latter, again to borrow the terminology from historical phonology.

<table>
<thead>
<tr>
<th>RULE</th>
<th>DOMAIN OF APPLICATION</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analogy</td>
<td>forms with a single function</td>
<td>one-to-many</td>
</tr>
<tr>
<td>Refinement</td>
<td>forms with multiple functions</td>
<td>one-to-one</td>
</tr>
<tr>
<td></td>
<td>No intersection</td>
<td>(feeding)</td>
</tr>
</tbody>
</table>

Figure 3. Complementation of analogy and refinement
TRANSITIVITY OF VO COMPOUND VERBS:
RULES IN COMPETITION

In this section we will show the variation in transitivity in mandarin VO compound verbs as an example of two competing rules in conflict, or in a "bleeding" relation. VO compounding, where a verb incorporates its object to form a single lexical unit, is one of the word formation mechanisms in Chinese (e.g. Chao 1968, Li and Thompson 1981). The majority of VO compound verbs are intransitive and do not allow objective postverbal NPs, but some of them do behave transitively. Nonetheless, very interestingly, a small number of VO verbs like na3shou3 'to be good at', first observed by Huang (1989), do not fit in either category in that they cannot take objective postverbal NPs and yet require an objective topic. Thus, three types of VO compound verbs are identified: (A) intransitive, e.g. jie2hun1 'to get married', (B) transitive, e.g. fu4ze2 'to be responsible for', and (C) semi-transitive, e.g. na3shou3 'to be good at.'

1. A: jie2 'to tie' + hun1 'marriage' -> jie2hun1
   B: fu4 'to bear' + ze2 'responsibility' -> fu4ze2
   C: na3 'to take' + shou3 'hand' -> na3shou3

2. a. Ta jie2hun1 le. 'intransitive
   he marry LE
   He got married.

   He married Mary.

   c. *Ma3li4, ta1 jie3hun1 le.
   He married Mary.

3. a. *Ta fu4ze2. 'transitive
   he be-responsible-for

   b. Ta fu4ze2 zhei4 jian4 shi4
   He be-responsible-for this CLS matter
   He is responsible for this matter.

   c. Zhei4 jian4 shi4, ta1 fu4ze2.
   This matter, he is responsible for.

4. a. *Ta na3shou3. 'semi-transitive
   he be-good-at
   He is good at.

   b. *Ta na3shou3 shu4xue2.
   He is good at math.

   c. Shu4xue2, ta1 na3shou3.
   Math, he is good at.

We adopt Her's (1990) analysis for these verbs in LFG, recognizing that TOPIC as a grammatical function cannot be subcategorized in Chinese.

5. a. jie2hun1 V
   (↑ PRED) = 'MARRY <SUBJ>'
   b. fu4ze2 V
   (↑ PRED)
   = 'BE-RESPONSIBLE-FOR <SUBJ OBJ>,'
   c. na3shou3 V
   (↑ PRED)
   = 'BE-GOOD-AT <SUBJ OBJ>,'
   (↑ OBJ BACKGROUND) = c +

6. a. S' -> NP S
   (↑ TOPIC) = ↓  ↑ = ↓
   (↓ BACKGROUND) = +
   (↑ . . .) = ↓
   b. S -> (NP) VP
   (↑ SUBJ) = ↓  ↑ = ↓
   c. NP -> V (NP)
   ↑ = ↓  (↑ OBJ) = ↓

We will illustrate the c- and f-structure of 4c below.
According to this analysis, 4a and 4b are ill-formed because their respective f-structure violates the functional constraint $\uparrow \text{OBJ BACKGROUND} =_c +$, which requires $\text{[BACKGROUND +]}$ in na3shou3's OBJ. However, this constraint is satisfied in the above f-structure of 4c since its OBJ unifies with TOPIC through the operation of functional uncertainty, $(\uparrow ... ) = \downarrow$.

This LFG analysis thus specifies that a transitive verb must subcategorize for OBJ in f-structure and allows, but does not require, an objective postverbal NP in c-structure; an intransitive verb, on the other hand, must NOT subcategorize for OBJ in f-structure and does not allow objective postverbal NPs. Semi-transitive verbs are thus treated as subcategorizing for OBJ in f-structure and yet not allowing objective postverbal NPs.

To account for the variations of transitivity in VO compound verbs, we consider the incorporation process in VO compounding a reanalysis of the VO syntactic structure as a morphological one; the variation of transitivity is therefore the consequence of two competing rules affecting the f-structure and c-structure in these compound verbs.

\[ \text{A. } [-\text{TRANSITIVE}] \]
\[ \text{B. } [+\text{TRANSITIVE}] \]

Four logical consequences may result from the competition of 7A and 7B in c- and f-structures of VO compound verbs.

In transitive VO compounds like fu4ze2, the Transitive Rule 7B has prevailed in both c- and f-structures, while the Intransitive Rule 7A has been fully realized in intransitive VO compounds like jie2hun1. As for semi-transitive VO verbs like na3shou3, the Intransitive Rule 7A has affected their c-structure; hence they cannot take a lexically overt postverbal objective NP, while the competing Transitive Rule 7B has affected their f-structure. 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 contain the constraint: $(\uparrow \text{OBJ BACKGROUND}) =_c +$, 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 be assigned $\text{[BACKGROUND +]}$.

The last logical consequence due to this interaction is VO compounds whose c-structure is influenced by 7B and thus transitive but whose f-structure is intransitive due to 7A and does not subcategorize for OBJ. Nonetheless, we find no such cases in Chinese; and we doubt it will ever be found in any language. Such a consequence necessarily leads 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 7A and 7B will never yield such a consequence.

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 applicability of the other.

<table>
<thead>
<tr>
<th></th>
<th>c-structure</th>
<th>f-structure</th>
<th>Consequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>-</td>
<td>-</td>
<td>Intransitive: jie2hun1</td>
</tr>
<tr>
<td>R</td>
<td>+</td>
<td>+</td>
<td>Transitive: fu4ze2</td>
</tr>
<tr>
<td>A</td>
<td>-</td>
<td>+</td>
<td>Semi-transitive: na3shou3</td>
</tr>
<tr>
<td>N</td>
<td>+</td>
<td>-</td>
<td>None</td>
</tr>
</tbody>
</table>

Figure 4. Variation of transitivity in VO verbs
In sentence 8b, (e) indicates the missing, empty category to be identified with the topic. Topics, usually occupying the sentence-initial position, thus function as the spatial, temporal or individual framework within which the main predication is to be interpreted. Sentence 8a serves as a good example.

Therefore, GPS may be seen as an iconic constraint on the well-formedness of topic construction in that the topic must provide a sensible interpretive frame for the main predication. The following sentences are therefore unacceptable.

9.a.*Nei4 zhan3 deng1, zuo1shang4 hen3 liang4.
That lamp on the desk is very bright.

b.*Yi1 ben3 shu 1, tai xi3huan1.
a CLS book he like
There is a certain book that he likes.

In 9a, in terms of the predicate liang4 ‘bright’, zuo1shang4 ‘desk-top’ provides a more general framework than deng1 ‘lamp’ and therefore according to GPS should precede deng1. In 9b, yi1 ben3 shu1 ‘a certain book’, due to its indefinite characteristic denoted by yi1, cannot serve as the known, and therefore specific, background information. Many previous studies confirm this observation (e.g. Li and Thompson 1975, Light 1979).
Further constraint on topicalization can be observed on the level of f-structure as well. Topic in Chinese, as in many other languages, could be identified with a missing grammatical function in an embedded clause many layers down. The relation between topic as the filler and the unbounded missing function as the gap is thus of the so-called 'long-distance dependency'. In such cases, the missing function is often described as 'topicalized'. However, not all missing grammatical functions can be topicalized in Chinese. According to the study by Huang et al (1989), in Chinese the gap has to be either a subject or object. Our previous rule of 6a thus should be modified accordingly:

\[ S' \rightarrow \text{NP} \]
\[ (\uparrow \text{TOPIC}) = \downarrow \]
\[ (\downarrow \text{BACKGROUND}) = + \]
\[ (\uparrow \text{TOPIC}) = (\uparrow \text{[SUBJ, OBJ, COMP, XCOMP]})* \{\text{SUBJ, OBJ}\} \]

The notation \{X, Y\} means either X or Y; and * here means zero or more. The last functional equation related to TOPIC therefore specifies that TOPIC can be identified with either SUBJ or OBJ with any number of SUBJ, OBJ, COMP, and XCOMP intervening, as shown in 10.

10.a. Huai4 dian4ying3, wo3 bu4 yao4 ta1 kan4 (e).
    bad movie I not want he see
    Bad movies, I don't want him to see.

b. Ma3li4, wo3 ren4wei2 (e) shi4 hao3 xue2-shneg1.
    Mary I think be good student
    Mary, I think is a good student.

In contrast, topics in sentences 11b and 11d, though satisfying GPS, are ill-formed, for the gap of 11b is NCOMP (noun complement) and in 11d it is PCOMP (prepositional complement) that is missing.

11.a. Ta1 bu4 shi4 ma3li4.
    she not be Mary
    She is not Mary.

b. *Ma3li4, ta1 bu4 shi4 (e).
    Mary she not be

Mary, she is not.

c. Ta1 gen1 ma3li4 tiao4wu3.
    he with Mary dance
    He danced with Mary.

d. *Ma3li4, ta1 (e) tiao4wu3.
    Mary he dance
    Mary, he danced with.

This f-structure constraint and GPS together still do not account for the following ill-formed topicalization.

12.a. Ta1 si3 le mu3qin1.
    he die LE mother.
    He had his mother die on him.

b. *Mu3qin1, ta1 si3 le (e).
    mother he die LE
    He had his mother die on him.

c. Ta1 qiang2po4 Ma3li4 qu4.
    he force Mary go
    He forced Mary to go.

d. *Ma3li4, ta1 qiang4po4 (e) qu4.
    Mary he force go
    Mary, he forced to go.

Both of the missing grammatical functions in 12b and 12d are objects, which are permissible for topicalization. We therefore suspect that there is another constraint over topicalization in a different linguistic plane—the thematic structure. Chang (1990) found it necessary to distinguish the thematic role Patient from Theme, in that verbs with a Theme role and those with a Patient behave differently in terms of verb copying; and also suggested that while Theme may be topicalized, Patient cannot, confirming Bresnan and Kanerva's (1989) claim that one of the differences between Theme and Patient is that an argument bearing Theme role can occupy the sentence-initial position while one that bearing Patient cannot.

We therefore need to find out whether the untopicalizable object in 12b and 12d indeed bears the thematic role of Patient, not Theme. Two tests are available in Chinese for the Theme role: the ba3
construction and the *be4 construction. An argument of the Theme role should be able to appear in both constructions.

13.a.*Ta1 ba3 mu3qin1 si3 le.
   he BA mother die LE
   His mother died on him.

b.*Mu3qin1 bei4 ta1 si3 le.
   mother BEI he die
   His mother died because of him.

c.*Ta1 ba3 ma3li4 qiang2po4 qu4.
   he BA Mary force go
   He forced Mary to go.

d.*Ma3li4 bei4 ta1 qiang4po4 qu4.
   Mary BEI he force go
   Mary was forced to go by him.

Since the object in 12b and 12d cannot appear in either ba3 or be4 construction, we may conclude that it bears the Patient role, not Theme. In terms of topicalization, we therefore verify both Chang (1990) and Bresnan and Kanerva’s finding that a constituent bearing the thematic role of Patient cannot be topicalized in Chinese.

What we have shown here is that a single rule or rules of a single linguistic plane cannot account for the topicalization construction in Chinese. Rather, it is regulated by several constraints at different levels: iconic, thematic and functional. The variation in topicalization that we have observed thus, again, can be viewed as the consequence of the competition among the iconic constraint that general information precedes specific, the f-structure constraint that only subject and object can be topicalized, and the thematic condition that Patient cannot be topicalized.

CONCLUSION

The lexical diffusion hypothesis did not invent the existence or the reality of competing sound changes that affect a lexicon gradually; rather, it simply provided the necessary theoretical constructs within which irregularity in sound changes can be accounted for. By applying this hypothesis to the description of grammatical constructions, Hsieh extended its two most important theoretical constructs beyond the study of historical phonology: one, changes affecting the lexicon take effect gradually; two, variations in a grammar are due to the interaction among rules. In this paper we have presented the essential concepts of the interaction thesis and applied it to account for several observations in Mandarin Chinese.

Among the contemporary grammatical theories, there seem to be two significant points of convergence: the reduced role of transformations and the increased role of the lexicon. The limitation or elimination of transformations and the shifting of emphasis to the lexicon have been two of the most significant foci in the study of syntax in the past two decades. The Government and Binding Theory has reduced the earlier various ad hoc transformational rules to a single Move- (move anything to anywhere) and devised a network of constraints to regulate the application of this single transformation. Variations of various types, e.g. dialectal or typological, can no doubt be expressed in terms of the interaction of these constraints. The study of parameters in the universal grammar can also be approached from the view of interaction. LFG, 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. 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 and topicalization, rules across different linguistic planes may interact and cause variation. The interaction thesis is therefore consistent with the current linguistic trend and provides a promising framework for linguistic description.

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One-Soon Her: B.A. in English, Tunghai University, Taichung, Taiwan, 1978; M.A. in TESOL, Portland State University, Portland, Oregon, 1983; Ph.D. in Linguistics, University of Hawaii, Honolulu, Hawaii, 1990; Director of Chinese Linguistics at ECS since 1986. Areas of interest: syntax; Chinese linguistics; computational linguistics; language acquisition, learning, and teaching; and language change.