

# PARAMETERIZING COMPLEMENTATION

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This paper shows that Mandarin Chinese permits complementation of unselected syntactic elements, and provides an explanation for this phenomenon. First, two word order asymmetries in Mandarin Chinese are discussed: the adjunct/complement asymmetry and the preverbal/postverbal asymmetry. According to these asymmetries, a Mandarin Chinese sentence can only take an adverbial in preverbal position but not in postverbal position, and, furthermore, when a modifier occurs in postverbal position, it is turned into a complement or is excluded. All of this points to a “Kaynean” character of the phrase structures in Mandarin Chinese as they meet the prediction of Kayne’s (1994) Linear Correspondence Axiom (LCA). This paper adopts the theory of Lin (2001) and assumes that Mandarin Chinese verbs and predicates do not have arguments of their own. A consequence of this theory is that the merger of syntactic elements in Mandarin Chinese, being free from the obscuring effects of predicate-argument combination (Escribano 2004), only needs to follow the guide of the LCA. This results in the “Kaynean” character of the phrase structures in Mandarin Chinese and specifically the two word order asymmetries mentioned above.

## 1. Introduction

The traditional conception about the operation Merge (Chomsky 1995) in grammar is that if X is merged with Y, then X must be a selected item in the argument structure of Y. This conception is implicitly or explicitly assumed by most researchers, for instance the following:

- (1) Saito 2003
  - (a) Merge applies only to satisfy selectional requirements.  
(Merge implies selection.)
  - (b) Selectional requirements must be satisfied by Merge.  
(Selection implies Merge.)
- (2) Chomsky 2000, Collins 2002  
Properties of the probe/selector  $\alpha$  must be satisfied before new elements of the lexical subarray are accessed to drive further operations.

However, this work shows that Mandarin Chinese (MC henceforth) permits merger, or complementation, of elements not selected by a head. The reason is that MC verbs and predicates don't have arguments of their own, and as a result narrow syntax is the locus where argument structure is formed. This makes MC a "Kaynean" language, in that the word order phenomenon in this language is largely predicted by the Linear Correspondence Axiom (LCA) in Kayne's (1994) theory.

## 2. Two word order puzzles in MC

To start with, we will see two word order asymmetries in MC. We call them the *adjunct/complement asymmetry* and the *preverbal/postverbal asymmetry*.

### 2.1 The adjunct/complement asymmetry

The first asymmetry is the *adjunct/complement asymmetry*. In MC a locative expression is an adjunct in preverbal position, but it becomes a complement in postverbal position (Tai 1975). Below are some examples.<sup>1</sup>

- (3) Houzi zai ma-bei-shang tiao. (Adjunct, location)  
 monkey at horse-back-on jump  
 'The monkey is jumping on the horse back.'
- (4) Houzi tiao zai ma-bei-shang. (Complement, goal)  
 monkey jump at horse-back-on  
 'The monkey jumped onto the horse back.'

In fact this asymmetry is not limited to locative expressions; other adverbials, such as the goal *dao* phrase and the recipient *gei* phrase, show the same asymmetry. See the following examples.

- (5) Zhangsan mai dongxi dao Lisi-jia. (Complement, goal)  
 Zhangsan buy thing to Lisi-home  
 'Zhangsan bought things [and as a result brought them] to Lisi's home.'
- (6) Zhangsan dao Lisi-jia mai dongxi. (Adjunct, location)  
 Zhangsan to Lisi-home buy thing  
 'Zhangsan bought things at Lisi's home.'

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<sup>1</sup> The abbreviations used in the glosses are: Cl: classifier; Disp: the disposal marker; Dur: the durative aspect marker; Ext: the extent-result marker; Perf: the perfective aspect marker; Prt: the sentence-final particle.

- (7) Zhangsan ba dongxi mai dao Lisi-jia. (The *ba* construction)  
 Zhangsan Disp thing buy to Lisi-home  
 ‘Zhangsan bought [those] things [and as a result brought them] to Lisi’s home.’
- (8) Zhangsan kao yi-tao yu gei Lisi. (Complement, goal)  
 Zhangsan grill one-Cl fish give Lisi  
 ‘Zhangsan grilled a fish [and as a result gave it] to Lisi.’
- (9) Zhangsan gei Lisi kao yi-tiao yu. (Adjunct, beneficiary)  
 Zhangsan give Lisi grill one-Cl fish  
 ‘Zhangsan grilled a fish for Lisi.’
- (10) Zhangsan ba yu kao gei Lisi. (The *ba* construction)  
 Zhangsan Disp fish grill give Lisi  
 ‘Zhangsan grilled the fish [and as a result gave it] to Lisi’

In the sentences (5) and (8), the *gei* and *dao* expressions are in postverbal position, and they are understood as resultative complements. On the other hand, in sentences (6) and (9), the same expressions are in preverbal position; but in this case the *gei* and *dao* expressions can only be understood as simple location-denoting adverbials, without any sense of resultative state. The *ba* sentences in (7) and (10) indicate that the postverbal *dao* and *gei* phrases are indeed complements - only complements can occur in postverbal position in the *ba* construction (see Liao 2004 for relevant discussion).<sup>2</sup> The question, of course, is why a syntactic element is an adjunct in preverbal position but a complement in postverbal position. This is particularly intriguing in view of the fact that these expressions in fact are not selected items of the verbs. In conventional understanding, the verbs *mai* ‘buy’ and *kao* ‘grill’ do not take a goal argument. So the question naturally arises: How can merger of an unselected expression as (resultative) complement be possible, as in sentences like (5) and (8)?

## 2.2 The preverbal/postverbal asymmetry

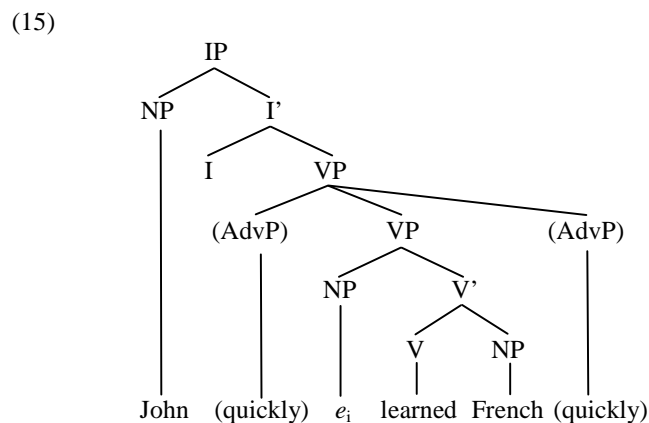
The second asymmetry is the *preverbal/postverbal asymmetry*. In MC, the adverbials can only be preverbal. In the sentences (11)-(14), the temporal adverb *zuotian* ‘yesterday’ and the manner adverb *xiaoxindi* ‘carefully’ can only be preverbal; if they are postverbal, the sentences are ungrammatical.

- (11) Zuotian Zhangsan mai-le yi-ben shu.  
 yesterday Zhangsan buy-Perf one-Cl book  
 ‘Yesterday Zhangsan bought a book.’

<sup>2</sup> The *ba* construction in MC shifts the object to the preverbal position and marks it with the element *ba*. It requires that its predicate be telic (Liu 1997). A bare verb is not telic and thus cannot occur in the *ba* construction (Li and Thompson 1981). On the other hand, a complement can provide the required telic end for the predicate and therefore make the formation of the *ba* construction possible (Liao 2004). For this reason the *ba* construction can be used as a test for complementhood.

- (12) \*Zhangsan mai-le yi-ben shu zuotian.  
 Zhangsan buy-Perf one-Cl book yesterday  
 ‘Zhangsan bought a book yesterday.’
- (13) Zhangsan xiaoxindi chaichu jiqi.  
 Zhangsan carefully dismantlemachine  
 ‘Zhangsan carefully dismantled the machine.’
- (14) \*Zhangsan chaichu jiqi xiaoxin-di.  
 Zhangsan dismantle machine carefully  
 ‘Zhangsan dismantled the machine carefully.’

The question is why adverbials in MC are not like those in English, which can be preverbal or postverbal. According to Bowers (1993), adverbials in English can left-adjoin or right-adjoin to the structure, resulting in preverbal or postverbal adverbials. See (15) for example:



In (15) the adverb *quickly* can be adjoined to the left or to the right of the predicate, yielding *John quickly learned French* or *John learned French quickly*. The question, again, is: Why are adverbials in MC not permitted to right-adjoin to the predicate?<sup>3</sup>

### 2.3 A “Kaynean” perspective

Before moving on to further discussion, we need to know one thing. That is, even though MC has these intriguing word order asymmetries and looks very different from English, the word order phenomena in MC are in fact very much

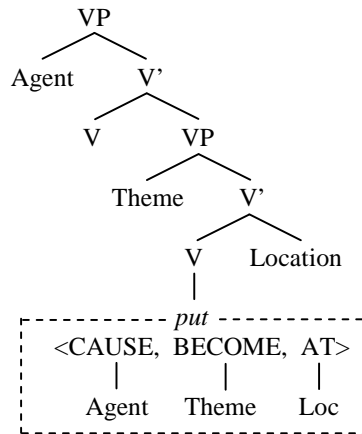
<sup>3</sup> We refer to Bower’s (1993) analysis here simply for illustration purposes. We do not really accept Bower’s analysis. We will come back to this issue in section 4.1, where we adopt Escribano’s (2004) theory for the positioning of adverbials in English.



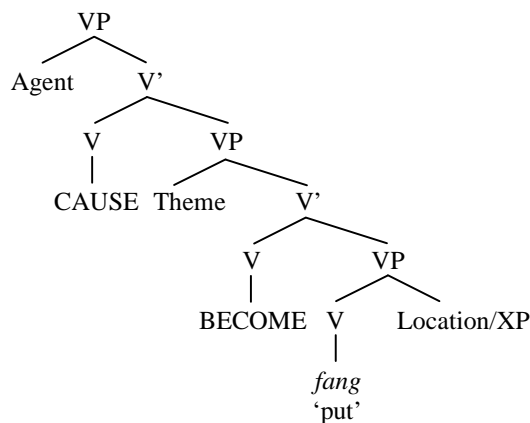


Languages like English do not permit such unselectiveness of subject and object. Lin (2001) suggests a parameterization to account for the relevant variation, the *Lexicalization Parameter*. It says that languages may differ in the extent to which event information is lexicalized into individual word form. In English, most of the event information is lexicalized into the verb as argument structure; therefore the building of phrase structure is simply a reflection of the information contained in the argument structure. On the other hand, in MC, most of the event information is not lexicalized (or is only trivially lexicalized) and then is sent to narrow syntax for computation. There is no argument structure that dictates the building of structure. The syntactic structure is the product of mergers of verbs and event predicates. The diagrams (24) and (25) illustrate the relevant points and the differences between English and MC, with the verbs *put* in English and *fang* 'put' in MC.

(24) The verb *put* in English



(25) The verb *fang* 'put' in MC



We know that the verb *put* in English is a three-place predicate; it has an agent, a theme, and a location in its argument structure. This is the case because, according to Lin's (2001) analysis, the lexico-conceptual structure of the verb *put* contains the event predicates CAUSE, BECOME and AT, and they are subsequently lexicalized into one single word form, that is, the verb *put*. As a result the projection VP headed by the verb *put* is such that there must be an agent argument, a theme argument, and a location argument in the phrase structure, in response to the demand set by the argument structure of the verb *put*. In this sense the building of syntactic structure in English is a reflection of the argument structure of the verb. The case of MC is very different. In MC, the lexico-conceptual structure for the verb *fang* 'put' contains the same set of event elements, but these elements only go through trivial lexicalization and then are sent to narrow syntax for syntactic merger. The result is that the event predicates, which are turned into lexical properties in English, remain syntactic in MC and serve as building blocks for syntactic structure. A very interesting consequence follows from this difference between English and MC. In Lin and Liu (2005) it is observed that what syntax does in MC is very much parallel to what lexicon does in English. The syntactic representation of an MC sentence is its lexical representation. There is no distinction between the two. In a manner of speaking, it can even be said that the "argument structure" in MC is formed in narrow syntax, subject to semantic conditions and restrictions of world knowledge. On the other hand, in languages like English, the lexical representation and the syntactic representation are distinct. The argument structure formed in the lexical representation dictates the way a structure is built in the syntactic representation. The two are distinct grammatical levels. To summarize: while in English the lexical representation and the syntactic representation are distinct components of grammar, in MC they are one and the same. This is why complementation or merger of an unselected element is possible in MC, since this would be equivalent to argument structure formation in languages like English.

### 3.2 The *gei* complement

To illustrate the lexico-conceptual nature of the complementation of unselected elements in MC (as opposed to licensing by argument structure), we examine two sample cases, the *gei* complement and the *dao* complement. In this subsection we discuss the *gei* complement. The literal meaning of the element *gei* is 'to give', and it may occur in a number of contexts with different functions, as in the examples (26)-(28).

- (26) Zhangsan **gei** Lisi yi-ben shu.  
 Zhangsan give Lisi one-Cl book  
 'Zhangsan gave Lisi a book.' (*gei* as a ditransitive verb)



- (27) Zhangsan song yi-ben shu gei Lisi.  
 Zhangsan send one-Cl book give Lisi  
 ‘Zhangsan sent a book to Lisi.’ (*gei* as a dative-object marker)
- (28) Zhangsan gei Lisi qing chufang.  
 Zhangsan give Lisi clean kitchen  
 ‘Zhangsan cleaned the kitchen for Lisi.’ (*gei* as a beneficiary marker)

What interests us is the status of *gei* marking transaction in a predicate that *does not* denote transaction, as in the following examples.

- (29) Zhangsan jian yi-tiao yu gei Lisi.  
 Zhangsan fry one-Cl fish give Lisi  
 ‘Zhangsan fried a fish [and as a result gave it] to Lisi.’
- (30) Zhangsan sha yi-zhi ji gei Lisi.  
 Zhangsan kill one-Cl chicken give Lisi  
 ‘Zhangsan butchered a chicken [and as a result gave it] to Lisi.’

The verbs in (29)-(30) are *jian* ‘fry’ and *sha* ‘kill’, which are not ditransitive verbs; furthermore, there is no reason to assume that they take a goal or recipient argument. Nonetheless, they can take the *gei* complement. The complementhood of the *gei* phrase can be seen in (31), in which the *gei* phrase is embedded in the *ba* construction, as we have pointed out earlier.

- (31) Zhangsan [ ba na-tiao yu [ jian gei Lisi ]].  
 Zhangsan Disp that-Cl fish fry give Lisi  
 ‘Zhangsan fried a fish [and as a result gave it] to Lisi.’

Not every verb could take the *gei* complement, though. Semantically, for a predicate to take the *gei* complement, it must denote an action that makes something available for transaction. Look at the following examples for instance. The verb *pao* ‘run’ and *chi* ‘eat’ in (32)-(33) do not denote an action that makes something available for transaction, so they don’t permit the merger of the *gei* complement, as the result is semantically uninterpretable. On the other hand, the verb *zhai* ‘pluck’ in (34) semantically entails that something (e.g. a flower) is made available for further transaction (to be transferred to some other); in this case the merger of the *gei* complement is acceptable, since the result is semantically interpretable.<sup>5</sup>

- (32) \*Zhangsan pao gei Lisi.  
 Zhangsan run give Lisi

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<sup>5</sup> The case of *zhai* ‘pluck’ indicates that the verbs that permit complementation of the *gei* phrase are not identical to the verbs of production or creation. The action of plucking doesn’t produce anything or bring anything into existence, under the standard understanding of the semantics of verbs of production or creation.

- (33) \*Zhangsan chi hanbao gei Lisi.  
Zhangsan eat burger give Lisi
- (34) Zhangsan zhai yi-duo hua gei Lisi.  
Zhangsan pluck one-cl flower give Lisi  
'Zhangsan plucked a flower [an as a result gave it] to Lisi.'

A piece of evidence for the semantic nature of the merger of the *gei* complement is the verb *sha* 'kill'. Consider the following examples:

- (35) Zhangsan sha-le yi-zhi ji gei Lisi.  
Zhangsan kill-Perf one-Cl chicken give Lisi  
'Zhangsan butchered a chicken [and as a result gave it] to Lisi.'
- (36) \*Zhangsan sha-le yi-ge ren gei Lisi.  
Zhangsan kill-Perf one-Cl person give Lisi

When *sha* 'kill' takes *ji* 'chicken' as object, it is understood as butchering; in this case the *gei* complement is acceptable. On the other hand, if the object is *ren* 'human', *sha* 'kill' is understood as murdering, and the *gei* complement is unacceptable. This contrast would be hard to explain if a goal role or recipient role were in the argument structure of the verb *sha* 'kill' implemented as the *gei* phrase - why is this role acceptable in (35) but not in (36)? In conclusion, the *gei* complement simply gets merged with a verb without licensing from the argument structure. The merger itself is very much on a par with "argument structure formation."

### 3.3 The *dao* complement

The second example is the *dao* complement. The element *dao* means 'arrive' or 'to'; typically it occurs with verbs of motion or verbs of transportation. See the sentence in (37).

- (37) Zhangsan diu yi-ge shitou dao wuding.  
Zhangsan throw one-Cl stone to roof  
'Zhangsan throw a stone onto the roof.'

But again, the *dao* complement may occur with verbs that have nothing to do with motion or transportation. See the examples in (38)-(39). (40)-(41) are examples of the *dao* complement embedded in the *ba* construction. This indicates that the *dao* phrases in these examples are indeed complements.

- (38) Zhangsan mai shiwu dao Lisi-jia.  
Zhangsan buy food to Lisi-home  
'Zhangsan bought food [and as a result took it] to Lisi's home.'

- (39)      Zhangsan   baohu   Lisi   dao   Taipei.  
              Zhangsan   protect   Lisi   to   Taipei  
              ‘Zhangsan escorted Lisi to Taipei’
- (40)      Zhangsan   ba   shiwu   mai   dao   Lisi-jia.  
              Zhangsan   Disp   food   buy   to   Lisi-home  
              ‘Zhangsan bought food [and as a result took it] to Lisi’s home.’
- (41)      Zhangsan   ba   Lisi   baohu   dao   Taipei.  
              Zhangsan   Disp   Lisi   protect   to   Taipei  
              ‘Zhangsan escorted Lisi to Taipei’

The verbs in these examples are *mai* ‘buy’ and *baohu* ‘protect’, which don’t take a goal or location argument. The point is the same: the merger of the *dao* complement need not be licensed by the argument structure of the verb. As long as the resulting semantics is acceptable, the merger is licensed. The semantic condition for the complementation of the *dao* phrase can be stated as follows. If a predicate denotes an action which, once initiated, may enact (e.g. the case of *mai* ‘buy’) or facilitate (e.g. the case of *baohu* ‘protect’) the transportation of something, then the predicate can take the *dao* complement. This semantic condition dictates the merger, not the argument structure of the verb. This once again shows that the merger of the *dao* complement is on a par with “argument structure formation” in languages like English.

#### 4. The account

##### 4.1 Predicate-argument combination and word order

In this section we pursue an explanation for the word order phenomena in MC. We make recourse to an interesting theory by Escribano (2004). This theory tries to account for the word order of modifiers in English; it could shed light on the account of the word order problem in MC. Escribano (2004) makes the following assumptions.

- Modifiers are predicates, and the modified is the argument of the modifier.
- When an argument X is merged with a predicate P, X may project. In fact this is what adjunction is.
- The LCA holds.

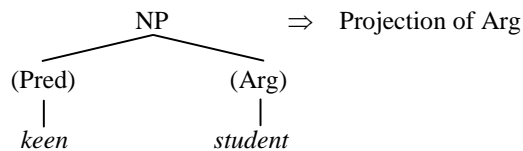
Escribano argues that these assumptions account for the examples in (42)-(44):

- (42)      a [AP keen] student
- (43)      a student [AP keen [PP on jazz]]

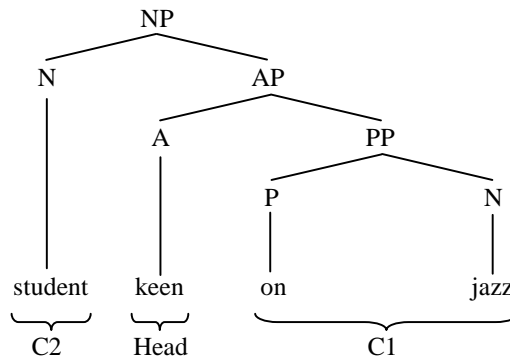
(44) \*a [AP keen [PP on jazz]] student

In English an adjectival modifier may precede the modified noun, as *keen* in (42). However, when the adjectival modifier takes a complement of its own, e.g. *keen on jazz*, it cannot precede the modified noun; instead, it has to follow it, as in (43)-(44). The reason is as follows. The adjectival modifier *keen* is a predicate, and in (42) it takes *student* as its argument. According to the LCA, a head-complement order follows; this accounts for the word order in (42). Notice that in this structure the argument *student* projects, hence the category NP. On the other hand, in the case of an adjectival modifier with its own complement, such as *keen on jazz*, the adjective *keen* takes the PP *on jazz* as the first argument (the complement), and then it takes *student* as its second argument (the specifier). This yields the correct word order *student keen on jazz*, which is specifier-head-complement. This accounts for the grammaticality of (43) and the ungrammaticality of (44) (as the LCA is violated). The diagrams (45)-(46) illustrate the relevant points.

(45)

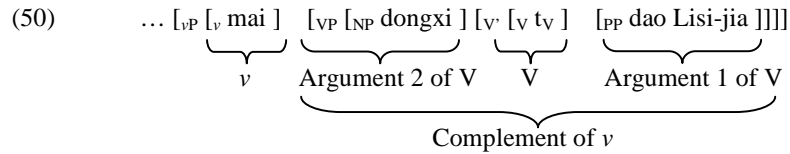


(46)



According to Escribano's theory, what determines the word order of modifiers is the predicate-argument relation between the modifier and the modified. But there could also be other factors that obscure the effects of the predicate-argument combination. For instance, some adverbs in English may occur preverbally or postverbally, such as *quickly*, which we saw earlier. According to Escribano, this is because an adverb in English may take VP or vP as complement. In the former case, the main verb moves to *v* and leaves the adverb





In this sentence, the verb *mai* ‘buy’ first merges with the *dao* phrase. A “complement semantics” is then assigned to the *dao* phrase. After this the object *dongxi* ‘thing’ is merged as the specifier of the VP. The VP, in turn, is merged with *v* as complement. The verb *mai* ‘buy’ then moves to *v*, yielding the surface structure that we see. The word order of the syntactic elements is as demanded by the LCA.

If the merger of an element *X* with the verb doesn’t yield an acceptable semantics, *X* is not licensed as a complement. Furthermore, the LCA excludes right adjunction of an adverbial; if *X* is not licensed as a complement, it still cannot stay in postverbal position as an adverbial modifier. The resulting structure is ungrammatical, since the LCA is violated. This is the origin of the preverbal/postverbal asymmetry.

Our conclusion, therefore, is that the lack of argument structure of verbs and predicates in MC results in the “Kaynean” character of the phrase structure in MC.

## 5. On the cross-linguistic variation

In this last section we provide some observations and speculations on the cross-linguistic variation. It is actually not difficult to find languages that permit unselected element as resultative complement. English is one such language; see the sentences in (51) for example.

(51)      John hammered the metal **flat**.

(52)      The boat floated **under the bridge**.

Higginbotham (1995) notes that the sentence (52) is ambiguous; it has an activity reading (*under the bridge* as the location of the floating event) and an accomplishment or resultative reading (*under the bridge* as the goal of the floating event). The accomplishment reading, Higginbotham proposes, is the result of a rule that composes two event arguments into a “telic pair,” as in (53).

(53)      float(the boat, *e*<sub>1</sub>) & under(the bridge, *e*<sub>1</sub>, *e*<sub>2</sub>)

On the other hand, however, it is known that such composition is not universal to all languages. For instance, Spanish doesn’t permit such composition; see (54)-(57) (Snyder 2001 and Beck 2005).

- (54) Mary beat the metal flat.
- (55) Mary golpeó el metal (\*plano).  
Mary beat the metal flat
- (56) John swam under the bridge.
- (57) Juan nadó debajo del Puente (\*en una hora).  
Juan swam under the bridge in an hour

There are proposals that aim at accounting for the resultative complementation of unselected syntactic elements, such as Higginbotham's (1995) telic pair formation rule, von Stechow's (1995) Principle R, and Snider's (2001) Complex Predicate Parameter (also see Beck 2005).

- (58) Complex Predicate Parameter (Snyder 2001, Beck 2005) [*the R-parameter*]:  
One grammatical parameter is responsible for the availability of complex predicate constructions (resultatives, verb-particle constructions and others).
- (59) Principle (R) (von Stechow 1995):  
If  $\alpha = [{}_v \gamma_{SC} \beta]$  and  $\beta'$  is of type  $\langle i, t \rangle$  and  $\gamma'$  is of type  $\langle e, \dots \langle e, \langle i, t \rangle \rangle \rangle$  (an n-place predicate), then  
 $\alpha' = \lambda x_1 \dots \lambda x_n \lambda e. \gamma'_e(x_1) \dots (x_n) \ \& \ \exists e' [\text{BECOME}_{e'}(\beta')] \ \& \ \text{CAUSE}(e')(e)]$

But things may be more complicated than a simple yes-no parameter. In fact whether a language could convert an unselected element into a resultative complement seems to be a matter of extent. For example, Spanish is the hardest, and then Japanese. English is quite free, but it is still less easy than MC. A scalar ranking can be as follows:

- (60) Spanish > Japanese > English > MC

We know that resultative complementation in Spanish is difficult because of examples such as (55) and (57). Japanese is quite difficult too, though it permits resultative complement to some extent, under strict semantic conditions. Washio (1997) observes that in Japanese, if an element X denotes a state that is naturally entailed by the verb V, then X can be a resultative complement of V. Without such semantic entailment, the resultative complement is ungrammatical. See the following examples.

- (61) John-ga kabe-o buruu-ni nut-ta.  
John-Non wall-Acc blue-Dat paint-Past  
'John painted the wall blue.'

- (62) Mary-ga doresu-o pinku-ni some-ta.  
 Mary-Nom dress-Acc pink-Dat dye-Past  
 'Mary dyed the dress pink.'
- (63) ??John-ga kinzoku-o petyanko-ni tatai-ta.  
 John-Nom metal-ACC flat-Dat pound-Past  
 'John pounded the metal flat.'
- (64) \*karera-wa sono otoko-o timamire-ni nagut-ta.  
 they-Top the man-Acc bloody-Dat hit-Past  
 'They beat the man bloody.'

English is freer than Japanese, but it is still not as free as MC, as we have seen in this work. It therefore seems that the cross-linguistic variation in resultative complementation is scalar in nature. The case of MC leads one to the speculation that this may have to do with the lexicalization of event structure, as suggested by Lin (2001). It is likely that the extent of lexicalization of the event structure determines the extent in which the language is free to take unselected elements as resultative complement. Since the validation of this hypothesis requires investigation of many questions in these languages, we will leave them for future research.

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