

COERCION, EVENT STRUCTURE, AND SYNTAX*

T.-H. Jonah Lin and C.-Y. Cecilia Liu

National Tsing Hua University and National Chiao Tung University

1. Introduction

How much information does a lexical item contain? It can be a lot, as Pustejovsky's (1995) theory of Generative Lexicon (GL) claims. According to GL, a lexical item contains bundles of grammatical information which is so rich that it can even "sneak" into the syntactic representation of a sentence and satisfy the selectional needs of a syntactic element. This is called *Type Coercion* in the theory of GL. On the assumption that lexical items are formed in basically the same way with the same richness across languages, one would expect that Type Coercion apply universally to human languages. But this doesn't appear true, though. In what follows we will show that most of the coercion mechanisms postulated by GL don't seem to work in Mandarin Chinese. An intriguing implication follows from this discovery—that is, *languages do not share the same degree of richness in sub-lexical event information with their lexical items.*

Why this is the case is the question that we are going to take up in this paper. The view that we hold is a fairly radical one: the syntactic representation in Mandarin Chinese grammar exhibits properties that pertain to the lexicon in English grammar. If the rich event information contained in individual lexical items in English results from the operation of *lexicalization*, then lexical items in Mandarin Chinese appear to stay in a pre-lexicalized state and are sent out for syntactic computation as such. Thus lexical items in Mandarin Chinese are accessed and processed as if they were still in the lexicon. The event structures are therefore represented syntactically. To derive such a typologically distinct characteristic of phrase structure, we suggest to consider Chomsky's (1998, 1999) theory seriously that the computation of human language faculty starts from selecting a set of features and assembling them into a set of lexical items. This source of language variation has not received real attention in researches of grammatical theory. In fact, languages may select distinct sets of features; furthermore, languages can select the same set of features but treat them in different ways. Suppose that in English the primitives that carry event information are extensively incorporated into individual lexical forms, but in Mandarin Chinese they are not; instead, they are sent directly to syntactic computation. This will then explain the richness of event

* The authors wish to thank the audiences in the seminar of syntax (2004-2005) at Graduate Institute of Linguistics, National Tsing Hua University and Workshop on East Asian Languages at Nanzan University (2005) for very helpful comments and suggestions. All remaining errors are our responsibility. The first author is grateful for the research grants from National Science Council, Taiwan (NSC 93-2411-H-007-034) and Center for Linguistics, Nanzan University.

information in lexical items in English and the poverty thereof in Mandarin Chinese, and will also explain the “Davidsonian” character of the phrase structure of Mandarin Chinese sentences (Lin 2001).

This paper is organized as follows. In section 2 we examine some coercion mechanisms postulated in GL and show that they don’t work in Mandarin Chinese. In section 3 it is shown that nominals in Mandarin Chinese don’t appear to have an event argument as many researchers suggest. In section 4 we provide a hypothesis for this lack of intra-nominal event information, arguing that lexicalization plays an important role in enriching the event information in lexical items. Section 5 provides a sample analysis for coercion in syntax, focusing on the multiple senses and syntactic behaviors of the verb *fan* ‘turn over’ in Mandarin Chinese. Section 6 is the conclusion.

2. Coercion Mechanisms and Their Applications

Pustejovsky (1995) introduces a number of mechanisms to generate new senses from an individual lexical item. The operation involved is called Type Coercion, defined as follows (Pustejovsky 1995: 111).

(1) Type Coercion

A semantic operation that converts an argument to the type which is expected by a function, where it would otherwise result in a type error.

A new sense doesn’t come out of blue; typically it has already been in the lexical specification of the lexical item. Thus, for a composition $X(Y)$, X a head and Y an argument of X , the selectional requirement of X can be satisfied not only by Y but also by some sub-lexical information contained in Y . Of special interest here are the following coercion mechanisms: True Complement Coercion, Selectional Binding, and coercion of causative subject.¹ They are illustrated by the examples below (adapted from Pustejovsky (1995)).

(2) True Complement Coercion

- a. John began a book.
- b. John began reading / to read a book.
- c. John began writing / to write a book.

(3) Selectional Binding

- a. We will need a fast boat to get back in time.

¹ Other coercion mechanisms include Subtype Coercion and Co-composition. Mandarin Chinese seems to exhibit effects of Subtype Coercion; see the discussion in section 3.

- b. John is a fast typist.
- c. Fast drivers will be caught and ticketed.

(4) Coercion of causative subject

- a. John killed Mary.
- b. The gun killed Mary.
- c. The storm killed Mary.
- d. The war killed Mary.
- e. John's shooting Mary killed her.

We examine these examples in turn.

First, True Type Coercion. The verb *begin* is an aspectual verb, and presumably it subcategorizes an event-denoting expression as complement.² The event-denoting expression can be a gerundive clause or an infinitival clause, as in (2b) and (2c). In English, however, sentences of (2a) type is fully acceptable, where the verb *begin* only takes a nominal complement *book*. The question then is why (2a) is grammatical. Pustejovsky (1995) argues for a very rich lexical specification for lexical items. The verb *begin* and the noun *book*, for example, are represented as below (GL: 116).

(5) The lexical structure of the verb *begin*

$$\left[\begin{array}{l} \mathbf{begin} \\ \text{EVENTSTR} = \left[\begin{array}{l} E_1 = \mathbf{transition} \\ E_2 = \mathbf{transition} \\ \text{RESTR} = < \circ \alpha \end{array} \right] \\ \text{ARGSTR} = \left[\begin{array}{l} \text{ARG1} = \mathbf{x : human} \\ \text{ARG2} = \mathbf{e_2} \end{array} \right] \\ \text{QUALIA} = \left[\begin{array}{l} \text{FORMAL} = \mathbf{P(e_2, x)} \\ \text{AGENTIVE} = \mathbf{begin_act(e_1, x, e_2)} \end{array} \right] \end{array} \right]$$

² The verbs *enjoy* and *want* are also included in this class of verbs.

(6) The lexical structure of the noun *book*

$$\left[\begin{array}{l} \mathbf{book} \\ \\ \text{ARGSTR} = \left[\begin{array}{l} \text{ARG1} = \mathbf{x : info} \\ \text{ARG2} = \mathbf{y : physobj} \end{array} \right] \\ \\ \text{QUALIA} = \left[\begin{array}{l} \mathbf{info \bullet physobj_lcp} \\ \text{FORMAL} = \mathbf{hold(y, x)} \\ \text{TELIC} = \mathbf{read(e, w, x, y)} \\ \text{AGENTIVE} = \mathbf{write(e', v, x, y)} \end{array} \right] \end{array} \right]$$

A lexical item has properties that can be organized into a *qualia structure*, which consists of four distinct semantic roles: FORMAL, CONSTITUTIVE, AGENTIVE, and TELIC. FORMAL represents information on the relation between an object and its constituents or proper parts, CONSTITUTIVE represents information that distinguishes the object within a larger domain, AGENTIVE provides factors involved in the origin of the object, and TELIC shows information on the purpose and function of the object (GL: 85-86). That *begin* takes an event-denoting expression as complement is mandated by its argument structure, namely ARG2 in the specification of ARGSTR. What interests us here is the lexical specification of the noun *book* in (6). Besides its usual denotational function, *book* incorporates much event information in its lexical specification: for instance the AGENTIVE role indicates that a book comes into being through some writing event, and the TELIC role shows that the purpose of a book is to be read by people. It is such event information that satisfies the selectional requirement of the verb *begin* in (2a). When *begin* composes with an event-denoting clausal structure like *reading/to read a book* or *writing / to write a book*, the event argument carried in the clausal structure satisfies its argument structure, in particular e_2 in (5). But when *begin* composes with the nominal (*a*) *book*, it can also “look into” the lexical specification of the noun *book*, picking up an event argument therein to satisfy the need of its argument structure. For the sentence (2a), e_2 of *begin* can pick up the event argument of the TELIC role (reading), or that of the AGENTIVE role (writing). Type Coercion as defined in (1) makes this possible.

The same approach applies to the examples of Selective Binding in (3). When one says something is fast, it is meant that the thing moves quickly along certain track. On this construal, a fast boat denotes a boat that moves fast (see (3a)). But a fast typist doesn't necessarily mean a typist who moves fast, nor does a fast driver necessarily move quickly. A fast typist types fast, and a fast driver drives fast. These latter readings can be obtained if the adjective *fast* does not only modify the individuals that the nouns *typist* and *driver* denote, but also the event arguments representing typing and driving in the TELIC role of the qualia structures of these two nouns.

As to the coercion of causative subject in (4), look at the lexical structure of the verb *kill* (GL: 208):

(7) The lexical structure of the verb *kill*

$$\left[\begin{array}{l} \mathbf{kill} \\ \\ \text{EVENTSTR} = \left[\begin{array}{l} E_1 = e_1 : \mathbf{process} \\ E_2 = e_2 : \mathbf{state} \\ \text{RESTR} = < \alpha \\ \text{HEAD} = e_1 \end{array} \right] \\ \\ \text{ARGSTR} = \left[\begin{array}{l} \text{ARG1} = [1] [\mathbf{top}] \\ \text{ARG2} = [2] \left[\begin{array}{l} \mathbf{animate_ind} \\ \text{FORMAL} = \mathbf{physobj} \end{array} \right] \end{array} \right] \\ \\ \text{QUALIA} = \left[\begin{array}{l} \mathbf{dc_lcp} \\ \text{FORMAL} = \mathbf{dead}(e_2, [2]) \\ \text{AGENTIVE} = \mathbf{kill_act}(e_1, [1], [2]) \end{array} \right] \end{array} \right]$$

In the case of (4a), John satisfies ARG1, namely [1]. In the case of (4b-d), the gun, the storm and the war participate in the event e_1 of the AGENTIVE role of the qualia structure (a process called *argument coherence* by Pustejovsky 1995). In the case of (4e), the shooting is identified with e_1 . Based on all this, the different subjects in (4) satisfy the need of the argument structure of the verb *kill*.

In summary, the basis of Type Coercion is the richness of event information in lexical items. Heads can “look into” the lexical specification of arguments (or the reverse, arguments can “look into” the head, as in the case of the subjects of *kill*) so as to satisfy the selectional needs. Without the richness of event information in lexical items, Type Coercion is not possible.

3. Failure of Coercion in Mandarin Chinese

Now we turn to Mandarin Chinese. It appears that none of the coercion mechanisms alluded above works in Mandarin Chinese. Look at the following examples.

- (8) a. *Zhangsan kaishi yi-ben shu.
Zhangsan begin one-CL book
'Zhangsan began a book.'
- b. Zhangsan kaishi **du** yi-ben shu.
Zhangsan begin read one-CL book
'Zhangsan began to read a book.'

- c. Zhangsan kaishi **xie** yi-ben shu.
Zhangsan begin write one-CL book

‘Zhangsan began to read a book.’

- d. Zhangsan kaishi **bien** yi-ben shu.
Zhangsan begin edit one-CL book

‘Zhangsan began to edit a book.’

(8a) shows that composition of “begin a book” type is not grammatical at all in Mandarin Chinese. To obtain a grammatical expression, the action must be explicitly provided, such as (8b) for reading and (8c) for writing. Of course, one can do other things in relation with a book, such as editing in (8d). These examples indicate that the verb *kaishi* ‘begin’ in Mandarin Chinese does not “look into” its complement for satisfaction of its argument structure requirement.

The same holds of the case of Selective Binding. Look at the following examples.

- (9) a. ?Women xuyao yi-sao hen kuai de chuan.³
we need one-CL very fast MOD boat

‘We need a fast boat.’

- b. *Zhangsan shi yi-ge hen kuai de dazi-yuan.
Zhangsan be one-CL very fast MOD typist

‘Zhangsan is a fast typist.’

- c. *Hen kuai de jiashi hui bei jingcha kai fadan.
very fast MOD driver will PASSIVE police issue ticket

‘Fast drivers will be ticketed by police.’

While *hen kuai de chuan* ‘fast boat’ doesn’t sound completely out of the question (but see the discussion later), *hen kuai de dazi-yuan* ‘fast typist’ and *hen kuai de jiashi* ‘fast driver’ are totally unacceptable on the construal intended. To obtain the desired readings, verbal elements must be inserted specifying the actions characterized as being fast, resulting in relative-modification structures. See the following examples.

- (10)a. Women xuyao yi-sao [**pao-de** hen kuai de] chuan.
we need one-CL run-EXT very fast MOD boat

‘We need a boat that sails fast.’

³ The occurrence of *hen* ‘very’ with the adjectives here and below doesn’t serve the function of intensification. Adjectives in Mandarin Chinese typically need it for modification and predication. See Li and Thompson (1981) for discussion.

- b. Zhangsan shi yi-ge [**dazi** hen kuai de] dazi-yuan.
 Zhangsan be one-CL type very fast MOD typist

‘Zhangsan is a typist that types fast.’

- c. [**Kai che** hen kuai de] jiashi
 drive car very fast MOD driver
 hui bei jingcha kai fadan.
 will PASSIVE police issue ticket

‘Drivers that drive fast will be ticketed by police.’

These examples show that the actions of sailing (of a boat), typing, and driving must be explicitly spelled out in the syntactic representation to be modified by the adjective *kuai* ‘fast’. There is no “look into” of event information in the nouns.

As to the coercion of causative subject, consider the following examples.

- (11) a. Zhangsan sha-le Lisi.
 Zhangsan kill-PERF Lisi
 ‘Zhangsan killed Lisi.’
- b. *Zhe-ba qiang sha-le Lisi.
 this-CL gun kill-PERF Lisi
 ‘This gun killed Lisi.’
- c. *Na-chang baofengyu sha-le Lisi.
 that-CL storm kill-PERF Lisi
 ‘That storm killed Lisi.’
- d. *Zhanzheng sha-le Lisi.
 war kill-PERF Lisi
 ‘The war killed Lisi.’
- e. *Zhangsan-de wu-ji sha-le Lisi
 Zhangsa’s misfire kill-PERF Lisi
 ‘Zhangsan’s misfire killed Lisi.’

It is clear that no expression other than the agent of the action can function as the subject argument of the verb *sha* ‘kill’ in Mandarin Chinese (see Kuno 1973 for the Japanese verb

korosu ‘kill’). What one can do to obtain sensible expressions is to paraphrase *sha* ‘kill’ as ‘cause to die’, as the examples below show.⁴

- (12) a. Zhe-ba qiang rang Lisi / henduo ren siwang.
 this-CL gun make Lisi many people die
 ‘This gun made Lisi / many people die.’ =
 ‘This gun killed Lisi / many people.’
- b. Na-chang baofengyu shi Lisi / henduo ren siwang.
 that-CL storm cause Lisi many people die
 ‘That storm made Lisi / many people die.’ =
 ‘That storm killed Lisi / many people.’
- c. Zhanzheng shi Lisi / henduo ren siwang.
 war make Lisi many people die
 ‘The war made Lisi / many people die.’ =
 ‘The war killed Lisi / many people.’
- d. Zhangsan-de wu-ji shi Lisi / henduo ren siwang
 Zhangsa’s misfire cause Lisi many people die
 ‘Zhangsan’s misfire made Lisi / many people die.’ =
 ‘Zhangsan’s misfire killed Lisi / many people.’

Non-agents cannot be the subject of the verb *sha* ‘kill’; they can only be the subject of a phrasal causative construction as indirect causers. Again, no “look into” is at work here.

The illustration above indicates that Type Coercion by and large doesn’t work in Mandarin Chinese. Why? There are quite a few possibilities; for example, one could simply assume that coercion is language-specific in the grammar of English, and that English grammar entitles a head to have its selectional needs satisfied by sub-lexical information of its arguments, whereas Mandarin Chinese grammar doesn’t. However, we don’t think this line of thinking is on the right track, for two reasons. First, Subtype Coercion (Pustejovsky 1995) works in Mandarin Chinese. The noun *Toyota* contains sub-lexical information that it is a subtype of the type *cars*, and this renders the English sentence in (13a) grammatical—the verb *drive* ‘looks into’ such sub-lexical information, which yields the reading that John drives a car of the brand Toyota. The fact that (13b) is acceptable indicates that the verb *kai* ‘drive’ in Mandarin can also “look into” the noun *Fengtian* ‘[the pronunciation of the Chinese characters of] Toyota’ for such information.

⁴ In the examples in (12) we use *shi* ‘cause’ and *rang* ‘let’. The distinction between the two words doesn’t matter for our purposes.

- (13)a. John drives a Toyota.
- b. Zhangsan kai yi-liang Fengtian.
Zhangsan drive one-CL Toyota
'Zhangsan drives a Toyota.'

Second, nominals in Mandarin Chinese that are inherently event-denoting, e.g. nominals denoting actions and events, can compose with aspectual verbs like *kaishi* 'begin'.⁵ Also, they fare better when modified by adjectives like *kuai* 'fast'. See the following sentences.

- (14)a. Women kaishi zhe-chang bisai.
we begin this-CL game
'Let us begin the game.'
- b. Meiguo kaishi ta yu Ilake de zhanzheng
America begin its with Iraq MOD war
'America starts the war with Iraq.'
- (15)a. Zhe shi yi-chang hen kuai de bisai.
this be one-CL very fast MOD game
'This is a game [that proceeds] fast.'
- b. Meiguo dui Ilake jinxing-le yi-chang hen kuai de zhanzheng.
America to Iraq proceed-PERF one-CL very fast MOD war
'America launched a fast war with Iraq.'

If sub-lexical information is simply unavailable to heads or modifiers in Mandarin Chinese, it is not clear why the sentences in (14-15) (and also (13b)) are acceptable.

An alternative way to perceive the matter is as follows. The richness of sub-lexical event information of lexical items appears to be the basis for coercion. On this logic, coercion may fail in Mandarin Chinese because there is nothing to "look into" in the first place. In particular, nominals like *book* have no sub-lexical *event information* to be retrieved. In other words, the poverty of sub-lexical event information makes coercion inapplicable in this language. Subtype Coercion works in Mandarin Chinese because it involves no event information; other types of coercion fail (event/action-denoting nouns being exceptional) because they refer to sub-lexical event information.

There is evidence for this hypothesis. Many researchers have argued for the Davidsonian event argument in linguistic expressions (see, among many others, Higginbotham 1985, 2000 and Larson 1998). Higginbotham (2000, 2004) even argues that ordinary nominals, such as

⁵ For discussion of event-denoting nominals in Mandarin Chinese, see Yang (2001).

book, frog, and dinosaurs, have an event argument. One benefit for introducing the event argument into nominals is that the ambiguity of intersective and non-intersective modifications can be reduced to modification of individuals and that of events (see Larson 1998 among many others). Consider the following example:

- (16) A beautiful dancer
- i. ‘A dancer who is beautiful’
 - ii. ‘A dancer who dances beautifully’

Larson (1998) argues that nominals like *dancer* have two arguments $\langle x, e \rangle$, x the individual argument and e the event argument. The (i) reading arises from modification of the individual argument x , while the (ii) reading arises from modification of the event argument e . Now look at the counterpart of (16) in Mandarin Chinese.

- (17) Piaoliang de wu-zhe
 beautiful MOD dancer
- i. ‘A dancer who is beautiful’, but not
 - ii. *‘A dancer who dances beautifully’

The Mandarin Chinese expression (17) only has the individual-modification reading; the event-modification reading is unavailable.⁶ If we assume that the nominal *wu-zhe* ‘dancer’ doesn’t have an event argument, the unacceptability of (17.ii) is accounted for. What is more, the failure of the coercion mechanisms noted above can be explained—no event information in lexical items, hence no retrieval of such information.

At this point, it is beneficial to consider potential counterexamples to the hypothesis that nouns in Mandarin Chinese don’t have event argument. We think of two potential counterexamples. First, nouns in Mandarin Chinese can be modified by the adjective *hao* ‘good’ (cf. Saint-Dizier 1998 for the modification of the French adjective *bon* ‘good’ in GL terms). See the following examples.

- (18) a. good eye / screwdriver
 b. good musician / restaurant

⁶ Notice that *piaoliang* ‘beautiful’ can modify the action of dancing, as in (i). Thus the unavailability of the event-modification reading in (17) cannot arise from some deficiency of the modificational power of *piaoliang* ‘beautiful’.

- (i) Zhansan hen piaoliang-di tiao-zhe wu.
 Zhangsan very beautifully dance-ASP dance

‘Zhangsan is dancing beautifully.’

- (19) a. hen hao de yanjing / daozi
 very good MOD eye knife
- b. hen hao de yinyue-jia / canting
 very good MOD musician restaurant

One may probably consider, say, *hao-de yinyue-jia* ‘good musician’ on a par with *a beautiful dancer*—just as a beautiful dancer dances beautifully (on the event-modification reading), a good musician *plays music good*. This would be a case of modification of the event argument in a noun.

But this may not be the case. A good musician can be in good in many perceivable ways; s/he can play her/his role in an orchestra well but not good in doing solo; s/he may be a good composer specializing in no particular musical instruments. Likewise, a knife can be good because it fits the hand or is so delicately made that people would keep it in collection. Thus *a good N* need not involve modification of the event argument in *N*; it can be just vagueness. Compare, for example, *a fast driver* and *a good driver*. A driver may be good for a politician simply because he/she keeps secrets.

The second potential counterexample is sentences of the following sort:⁷

- (20) Zhangsan shi yi-ge hen kuai de pao-zhe.
 Zhangsan be one-CL very fast MOD runner

‘Zhangsan is a fast runner.’

(20) looks as if *kuai* ‘fast’ modifies the event argument representing running in the noun *pao-zhe* ‘runner’. But in fact it is not the case. If it were, it would be a mystery why (20) is grammatical but (21) is not.

- (21) ??Zhangsan shi yi-ge hen kuai de wu-zhe.
 Zhangsan be one-CL very fast MOD dancer

‘Zhangsan is a fast dancer.’

Our explanation for (20) is as follows. Things can be fast as long as it moves fast along a certain track, be it a baseball or a baseball runner. This has nothing to do with the event argument in the noun. Thus the adjective *kuai* ‘fast’ in (20) simply modifies the individual denoted by the noun *pao-zhe* ‘runner’, and that is all. No event argument is involved. If event argument is involved, it is not clear why *pao-zhe* ‘runner’ has an event argument but *wu-zhe* ‘dancer’ doesn’t have one. Incidentally, we noticed earlier that (9a) doesn’t sound very bad. That is because a boat can be fast as long as it (as an individual) moves fast. This reading is fine. But if (9a) is intended to mean that the boat *sails* fast, the sentence is ungrammatical, since *chuan* ‘boat’ doesn’t have an event argument to be modified.

⁷ We thank Barry Yang (personal communication) for bringing this sentence to our attention.

4. Lexicalization

Now we have a feasible hypothesis, namely, that nouns in Mandarin Chinese don't have sub-lexical event information. The next thing is to ask why this is the case. Suppose that sub-lexical event information comes into a lexical item through the process of *lexicalization* (or *conflation*; see Talmy 1985). Lexical items in English are rich in sub-lexical information because much of such information is incorporated into individual lexical items in the process of lexicalization. An inference then is that the impoverishment of event information in the lexical items in Mandarin Chinese arises from little event information incorporated into individual lexical items, or, put in different terms, that lexicalization trivially applies to the root of lexical items in Mandarin Chinese. A support for this view comes from the following observation. The above discussion shows that the adjective *kuai* 'fast' doesn't modify a non-event-denoting nominal. But in compounds, such modification appears to be a lot easier. See the following examples.

- | | |
|--|--|
| (22) a. kuai-can
fast-meal

'fast food' | d. kuai-che
fast-car

'express train/bus' |
| b. kuai-shou
fast-hand

'people who do things fast' | e. kuai-chuan
fast-ship

'ships that sail fast' |
| c. kuai-bi
fast-pen

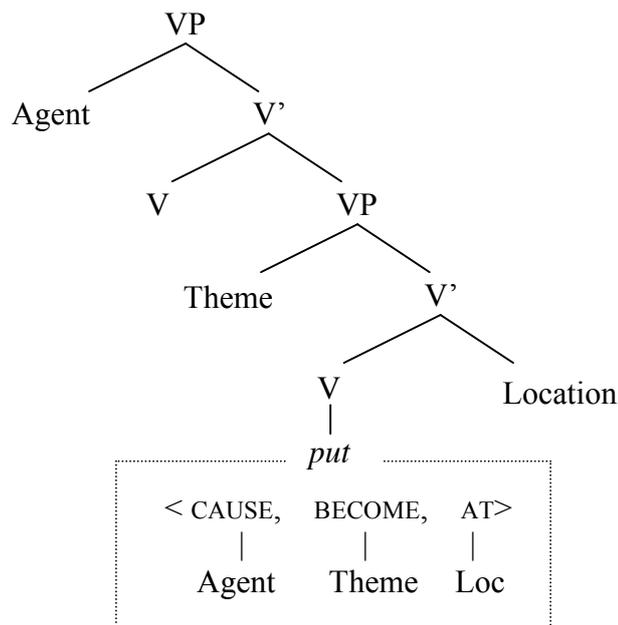
'people who write fast and nice' | |

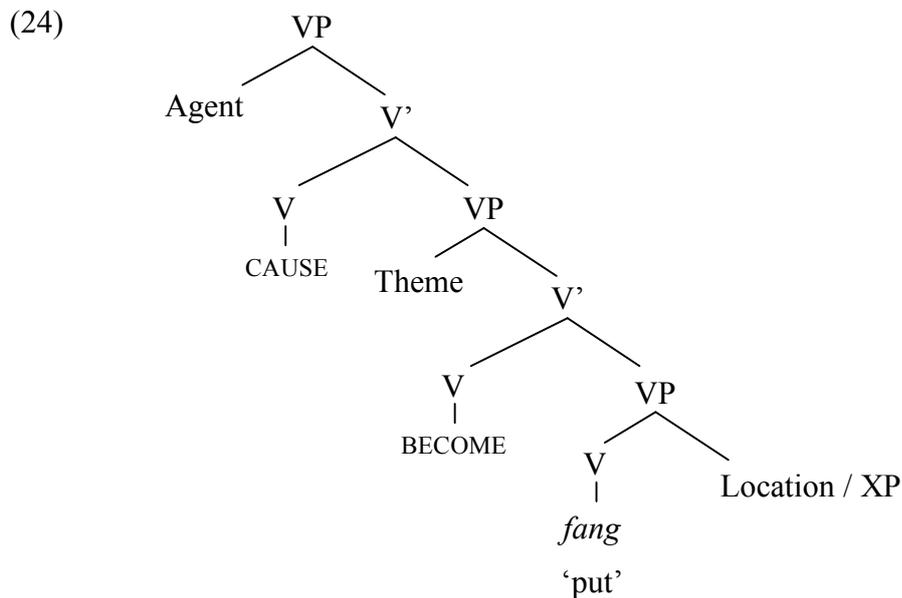
In these examples, *kuai* 'fast' comes to modify a non-event-denoting noun through compounding. Notice that in these examples what *kuai* 'fast' modifies is in fact some sub-lexical event information in the noun. For instance, in *kuai-can* 'fast-meal', *kuai* 'fast' modifies the serving of the food; in *kuai-shou* 'fast-hand', *kuai* 'fast' modifies the action of the hand (writing). Likewise, in *kuai-che* 'fast-car' and *kuai-chuan* 'fast ship', *kuai* 'fast' modifies the running and sailing of the car and ship. If compounding like (22a-e) involves non-trivial lexicalization, these compounds provide support for the idea that event information comes into lexical items by way of lexicalization.⁸

⁸ As to why non-trivial lexicalization entitles modification of the event argument, and how event argument comes into the compounds, we assume a economy-based explanation. Compounding doesn't just involve juxtaposition or concatenation of lexical items; if it were the case, compounding as an independent morphological operation would lose its stance in grammar. More information has to be incorporated into the compounds, and event information is a good candidate. This can be a partial reason for the well-known observation that compounds usually exhibit more specific meanings than the corresponding phrasal expressions, such as *girl friend* vs. *girlfriend* and *black bird* vs. *blackbird*.

The conclusion that we reach is reminiscent of Lin’s (2001) theory of light verb structure and its lexicalization. According to Lin (2001), languages may differ in the extent to which the light verb structures (that is, event structures) undergo lexicalization into individual lexical items—this is what Lin (2001) calls the *Lexicalization Parameter*. Lin’s (2001) theory explains the difference between English and Mandarin Chinese noted above. In English, a great extent of lexicalization applies, resulting in rich event information in lexical items. In Mandarin Chinese, lexicalization trivially applies to the root of the lexical item, leaving the bulk of event-constituting elements intact sent directly to syntactic computation. The consequence of this difference is that, as much event information is incorporated into lexical items, the phrase structure in English projects following the instruction of the event information contained in the lexical items; this results in the “shell” character of the phrase structure in English (Larson 1988), as the phrase structure in English simply serves to realize the event information already contained in the lexical items. On the other hand, lexical items in Mandarin Chinese don’t have much event information lexicalized into them; much of the event information remains intact in the form of independent event predicates sent to narrow syntax. Lexical items compose with event predicates through the usual syntactic operations, and this results in the situation that Mandarin Chinese *builds event structure in syntax*. The difference between English and Chinese can be illustrated by the following two diagrams, with the verbs *put* in English and *fang* “put’ in Mandarin Chinese as examples. (For detailed discussion, see Lin 2001).

(23)





In English, the verb *put* has already had a rich array of event information contained in its lexical specification—it is an accomplishment verb, therefore the event predicates CAUSE, BECOME, and AT are in it (cf. Dowty 1979, Kageyama 1993, 1996); these event predicates then introduce different arguments, Agent, Theme, and Location. The phrase structure is projected accordingly: a two-layered VP structure is projected so as to provide three slots for the arguments, which θ -bind the thematic roles in the argument structure in the verb *put* (Higginbotham 1985). In case an argument is too far, as Agent, verb movement applies and the verb *put* incorporates to the higher V, which has no semantics of its own (but see Hale and Keyser 1993).⁹ In summary, all that is projected is already included in the lexical specification of the verb *put*. The phrase structure simply serves to realize the sub-lexical event information. On the other hand, for the verb *fang* ‘put’ in Mandarin Chinese, no specific event information is lexicalized into it. The event predicates CAUSE, BECOME, and so on are sent to narrow syntax and merged into the structure via usual syntactic means. *Fang* ‘put’ doesn’t take any argument; the event predicates do. The whole structure in (24) thus is not only a phrase structure, but also represents the event structure of the verb *fang* ‘put’ as an accomplishment verb. In this sense Mandarin Chinese builds event structure in syntax. (For more discussion, see Lin 2001.)

How do we derive this difference between English and Chinese? Intuitively the difference has to do with the ways that pieces of sub-lexical event information are organized into lexical items in the two languages. If what we have is a “Bloomfieldian” lexicon, namely a list of idiosyncratic properties and exceptions (Chomsky 1995), then one could simply say that the lexical items in the two languages are just different. But there may be something more to this question. Consider Chomsky’s (1998: 12-13) suggestion below.

⁹ Hale and Keyser (1993) assume that the light verb V represents an elementary event *e*, which interact with other event elements in the phrase structure to derive an event structure.

“UG makes available a set F of features (linguistic properties) and operations C_{HL} (the computational procedure of human language) that access F to generate expressions. The language L maps F to a particular set of expressions EXP . Operative complexity is reduced if L makes a one-time selection of a subset $\{F\}$ of F , dispensing with further access to F . It is reduced further if L includes a one-time operation that assembles elements of $\{F\}$ into a lexicon LEX , with no new assembly as computation proceeds. On these (conventional) assumptions, acquiring a language involves at least selection of the features $\{F\}$, construction of lexical items LEX , and refinement of C_{HL} in one of the possible ways – parameter setting.”

“We assume, then, that a language L maps $(\{F\}, LEX)$ to EXP .”

The computation of human language faculty starts with selecting a set of features F and assembling them into lexical expressions LEX . Obviously this is a possible source for typological differences among languages—some languages have a full set of grammatical features entering into LEX (e.g. Latin, French), while others have much less grammatical features in LEX (e.g. Japanese, Mandarin Chinese). Suppose that included in the universal set of feature F are semantic features that bear event information. Furthermore, suppose that languages may select the same set of features, but differ in the extent to which the features are assembled into elements in LEX —some languages, like English, involve a great extent of such assembly, whereas some other languages, like Mandarin Chinese, do not. This can be another important source for typological differences among languages. Thus, Mandarin Chinese may select the same set of semantic features from F as English, though those features are sent directly to syntactic computation in the way characterized above. This is the origin of Lin’s (2001) Lexicalization Parameter. The operation of lexicalization is nothing but the assembly of features selected from F .

Languages may choose different sets of features, or they may choose the same set of features but treat them differently. This gives rise to typologically diverse languages, though the grammatical principles and operations are the same across all the languages.

5. Building Event Structure in Syntax

Notice that, if the theory sketched above is correct, there wouldn’t be substantial distinction between lexicon and syntax in Mandarin Chinese. The reason is that many of the elements treated as sub-lexical elements in English are treated as syntactic primitives in Mandarin Chinese. This results in a very intriguing situation with Mandarin Chinese; that is, what syntax does in Mandarin Chinese is very much parallel to what lexicon does in English, in terms of the elements being processed. There are interesting consequences from this observation. For example, the major purpose of GL is to capture the polysemy of words, by way of retrieval to sub-lexical event information in lexical items. But since what syntax does in Mandarin Chinese is on a par with what lexicon does in English, one will expect polysemy of words in Mandarin Chinese resulting directly from *syntax*.

We believe there are indeed cases in Mandarin Chinese where polysemy arises directly from syntax. Here we provide an example, the verb *fan* ‘turn over’.

The verb *fan* can be used in three different senses. Let’s call them *fan*₁, *fan*₂, and *fan*₃. We first examine *fan*₁. *Fan*₁ is fixed to the agentive use, and it cannot be unaccusativized. See the examples below.

(25) a. Laowang fan zhuozi.
Laowang turn-over table
‘Laowang turned the table over.’

b. ??Zhuozi fan le.
table turn-over SFP

For *fan*₂, on the other hand, unaccusativization is possible. See (26a). The pure agentive use of the verb is not good; compounding with an action verb (e.g. *da* ‘hit’) is required. See (26b) and (26c).

(26) a. Na-sao chuan fan le.
that-CL boat turn-over SFP
‘That boat capsized.’

b. ??Hai-lang fan-le na-sao chuan.
sea-wave turn-over-PERF that-CL boat
‘(Intended) The waves capsized that boat.’

c. Hai-lang da-fan-le na-sao chuan.
sea-wave hit-turn-over-PERF that-CL boat
‘The waves capsized that boat.’

Also, *fan*₂ can be used in a special way, called the *occurrence* use (Huang 1997, Lin 2001), which is not possible for *fan*₁. This construction is characterized by the presence of a temporal or locative subject. See the following examples.

(27) a. Zuotian / chunzi-li fan-le liang-sao chuan.
yesterday village-in capsize-PERF two-CL boat
‘(Lit.) There capsized two boats yesterday / in the village.’

b. ??Zuotian / cunzi-li fan-le liang-zhang zhuozi.
yesterday village-in turn-over-PERFF two-CL table
‘(Lit.) There flipped two tables yesterday / in the village.’

*Fan*₃ can be used agentively, as in (28a). But notice that the theme being turned over has to be pages, not the entire book; compare (28a) with (28b). *Fan*₃ can assume the unaccusative use, like *fan*₂. This is shown in (28c). What is more, *fan*₃ can assume the pure stative use, which is not possible for *fan*₁ and *fan*₂. See (28d).

- (28) a. Zhangsan fan-le san-ye (de) shu.
Zhangsan turn-over-PERF three-page MOD book
'Zhangsan turned over three pages of the book.'
- b. ??Zhangsan fan-le san-ben (de) shu.
Zhangsan turn-over-PERF three-CL MOD book
'Zhangsan turned over three books.'
- c. (Feng yi chui,) shu fan-le san ye.
wind as blow book turn-over-PERF three page
'(As the wind breezes,) three pages of the book turned over.'
- d. Zidian fan zai zhuo-shang, (ni ziji cha).
dictionary turn-over at table-on you self check
'The dictionary is on the table open; you go check by yourself.'

The following table summarizes the relevant properties of the three *fan*'s.

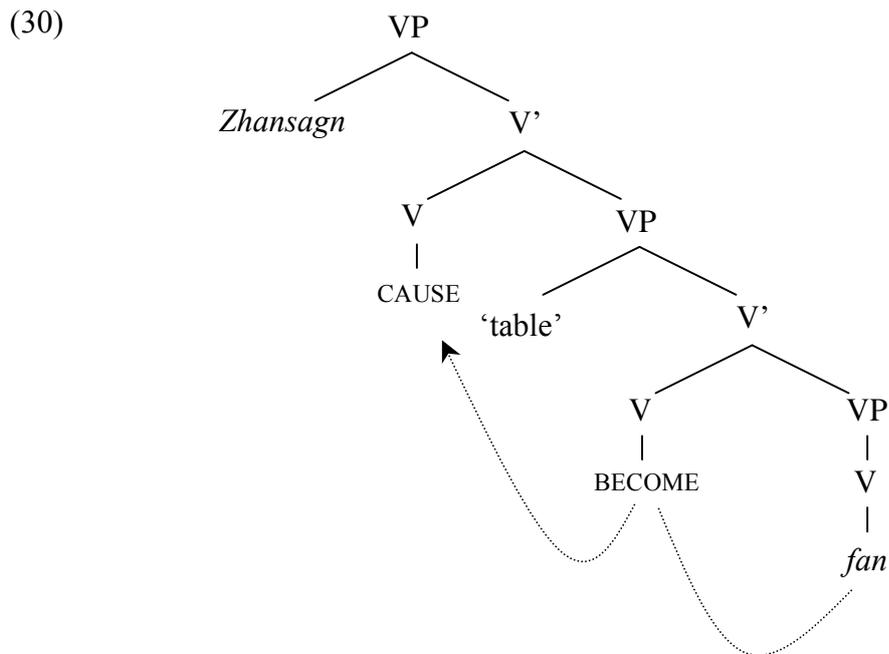
(29) ((√): Acceptable with restrictions)

	THEME	AGENTIVE	UNACCUSATIVE	OCCURRENCE	STATIVE
<i>Fan</i> ₁	'table'	√			
<i>Fan</i> ₂	'boat'	(√)	√	√	
<i>Fan</i> ₃	'book'	(√)	√		√

With all these acceptable and unacceptable examples, it appears to be a question whether one can come up with a uniform analysis for the verb *fan* in Mandarin Chinese—notice that different senses of *fan* exhibit different, or even conflicting, syntactic properties. One might simply suggest that there are three *fan*'s or three distinct senses of *fan*. But here we would like to propose an analysis that is closer to the intuition. Notice that what matters in all these examples seems to be the theme argument, *zhuozi* 'table', *chuan* 'boat', or *shu* 'book', and the way it is affected. A table, or anything of that size or kind, gets thrown over by way of human force with full intention and agentivity, thus the table is fairly much like a patient in thematic terms. On the other hand, the overturn of a boat is somewhat beyond the capability of an individual human force; it seems to be a larger event and requires forces of different kinds. In fact, the overturn of a boat can be the result of an external cause much larger than individual

force (e.g. waves) or no external cause at all (e.g. leakage or overloading). This somehow points out that the overturn of a boat is something of completely different nature than the overturn of a table. As to the turning over of (the pages of) a book, it seems to be too small an action for one to exercise full agentivity—one or two fingers will do the job. Thus it is hardly entitled for the term “event” in our commonsense. The above considerations suggest that the nature of the theme affected determines the agentivity and the underlying event/action, which in turn determines the event structure in which the verb *fan* is embedded.

Let us implement this idea. Overturning of a table is an action with strong agentivity, and this, we suppose, imposes a governing principle on the use of the verb *fan* and its relation with the theme “table”. Thus the light verb structure for *fan* in this use is as follows.



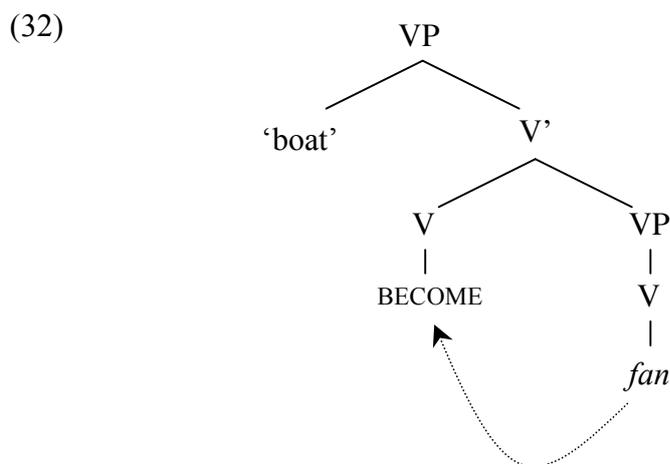
The light verbs CAUSE and BECOME are merged with *fan* to yield a fully agentive structure. Syntactically CAUSE and BECOME don't have to occur; in that case we would get, say, a becoming event if CAUSE doesn't show up. But that violates the principle that if a table or something of that size or kind is affected by the action of *fan*-ing, full agentivity is involved (hence the causative structure).¹⁰ Thus the whole structure in (30) is not reducible, not for syntactic reason, but for semantic naturalness. Any further reduction of the event structure results in awkward semantics, and this is why the unaccusative construction, the occurrence construction, and the stative construction cannot take the theme *zhuozi* ‘table’, which require fewer event predicates or different types of event predicates (see discussion below).

¹⁰ We believe that the notion of “kind” is important here. For example, the turning over of a poker card, namely showing hand, appears to be a case of *fan*₁, since showing a card apparently involves the intention of the player—there is no such thing as showing hand carelessly. There are interesting questions in this regard, but we will not go into them here. Incidentally, we do not make a distinction between intention and agentivity in this paper, though the distinction is important.

We have evidence that *fan*₁ involves intentional agentivity. The following examples show that both *fan* and *da-fan* ‘hit-turn-over’ can occur with the adverb *guyi* ‘intentionally’, but only *da-fan* can occur with the adverb *bu-xiaoxin* ‘carelessly’.

- (31) a. Zhangsan guyi fan zhuozi.
 Zhangsan intentionally turn-over table
 ‘Zhangsan overthrew the table on intention.’
- b. Zhangsan guyi da-fan zhuozi.
 Zhangsan intentionally hit-turn-over table
 ‘Zhangsan made the table turned over on intention.’
- c. ??Zhangsan bu-xiaoxin fan zhuozi.
 Zhangsan carelessly turn-over table
 ‘Zhangsan carelessly overthrew the table.’
- d. Zhangsan bu-xiaoxin da-fan zhuozi.
 Zhangsan carelessly hit-turn-over table
 ‘Zhangsan carelessly made the table turned over.’

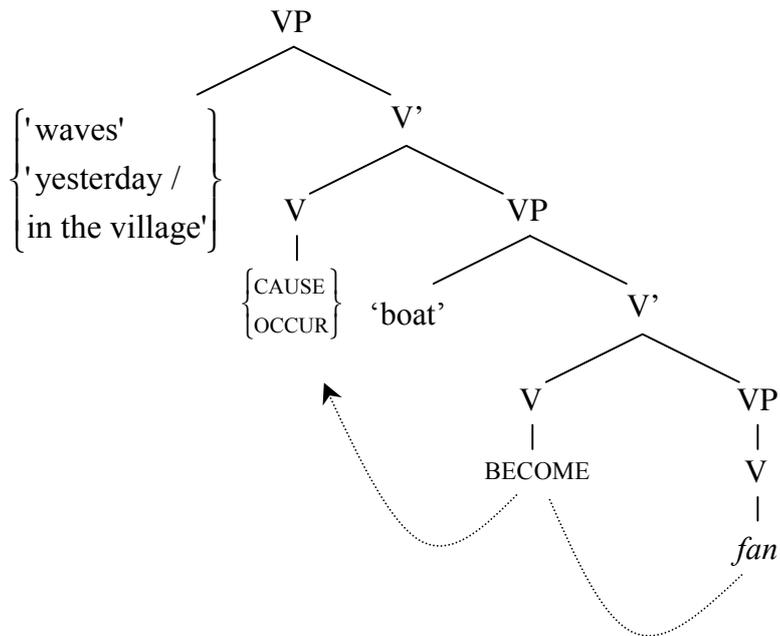
Overturn of a boat is an event of a different nature. Typically it has no bearing on individual force and often requires causes of different kinds (waves, leakage, overloading, etc.). Suppose that events of this kind are *changes*. This gives us the following light verb structure.



This structure explains why *fan*₂ can be unaccusative—it is unaccusative to start with. One can merge one more layer of VP to the structure in (32) and make it into a causative (with CAUSE and a causer subject) or occurrence (with OCCUR and a temporal/locative subject) construction. This accounts for the agentive and occurrence uses of *fan*₂. But remember the contrast between *fan* and *da-fan* in (31)—the causative *fan* presupposes intentional agentivity, which is incompatible with the forces that cause the overturn of a boat. Thus *da-fan* must be used

instead if *fan*₂ is embedded in a causative structure. (For discussion on verbal compounds like *da-fan*, see Shen and Lin 2005, in which work *V*₁ of a verbal compound *V*₁-*V*₂ is considered a manner/mode element which can license a non-agentive subject.)

(33)



A piece of evidence for our analysis is that the occurrence construction must involve becoming events; activity and accomplishment verbs are not compatible with the occurrence construction. See the following examples.

(34)a. Fanren pao le.
prisoner escape SFP

‘Prisoners escaped.’

b. Zuotian pao-le san-ge fanren.
yesterday escape-PERF three-CL prisoner

‘(Lit.) There escaped three prisoners yesterday.’

c. Henduo ren si le.
many people die SFP

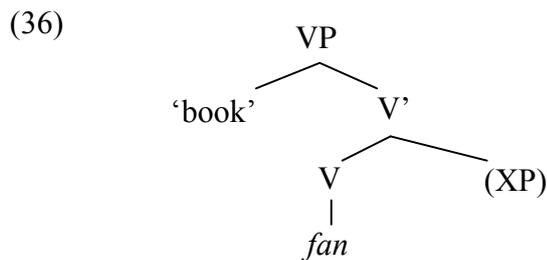
‘Many people died.’

d. Zuotian si-le henduo ren.
yesterday die-PERF many people

‘(Lit.) There died many people yesterday.’

- (35) a. Henduo ren pao-zhe. (Activity)
 many people run-DUR
 ‘Many people are running.’
- b. *Zuotian pao-zhe henduo ren.
 yesterday run-DUR many people
 ‘(Intended) There were running many people.’
- c. Zhangsan gai-le henduo fangzi. (Accomplishment)
 Zhangsan build-PERF many house
 ‘Zhangsan built many houses.’
- d. *Zuotian gai-le henduo fangzi.
 yesterday build-PERF many house
 ‘(Intended) There built many houses.’

Turning pages over is an action that requires much less effort than the overthrowing of a table. If the structure in (30) takes the theme ‘book’, one obtains a meaning that would be considered an “exaggeration”—a tiny thing such as a book requires no “overthrowing”. We suppose that the meaning of *fan* thus automatically shifts to (the state of) page-opening rather than overturn of a book. Suppose that such event structure realizes as a “bare” VP (with an optional complement, as the locative complement in (28d)). This accounts for the stative use of *fan*₃.



On this VP one can stack more light VPs, such as BECOME and CAUSE. This accounts for the unaccusative and agentive uses of *fan*₃.

Why can't *fan*₃ assume the occurrence use? If the structure in (36) can be turned into a becoming structure by way of the merger of the light verb BECOME, further merger of OCCUR should be possible. Our answer to this question is that, in ordinary cases turning pages over doesn't count as a significant event that would be worth of the sense of “occurrence of an event.” That's why *fan*₃ isn't compatible with the light verb OCCUR even if BECOME is in the structure.

The analysis presented above, if correct, shows that in Mandarin Chinese polysemy can arise from composition of arguments and light verbs *in syntax*. The different senses of *fan* discussed above arise not from any sub-lexical event information contained in the verb *fan*, but from the theme affected and the event structure that the world knowledge or cognitive considerations bring in along with the theme. All this is done in syntax. This is the case not because syntax keeps an eye on semantics, but because the elements under syntactic processing in Mandarin Chinese are elements of sub-lexical nature (e.g. the event predicates CAUSE, BECOME, etc.). This is the reason that in Mandarin Chinese the event structures are built “in syntax as they are in lexicon.”

6. Conclusion

The claim of this paper can be summarized as follows.

(A) The lexical items in different languages do not enjoy the same level of richness in sub-lexical event information. Coercion only works in languages whose lexical items are rich in sub-lexical event information.

(B) The computation of human language faculty starts from selecting a set of features and assembly them into lexical items. Languages may select different features; they may also select the same set of features but perform different extents of feature assembly. These differences result in typologically different languages.

(C) English and Mandarin Chinese may have selected basically the same set of features, but in English much event information is assembled into individual lexical items, whereas in Mandarin Chinese little is. In Mandarin Chinese pieces of event information are sent to narrow syntax for processing, which results in the Davidsonian character of phrase structure in this language, namely building event structure in syntax.

(D) A sample analysis is given for the verb *fan* ‘turn over’ and its three senses. It is shown that polysemy can arise in syntax. This provides an illustration that the syntactic structures in Mandarin Chinese has a lexical flavor.

References

- Chomsky, N. (1995) *The Minimalist Program*, MIT Press, Cambridge, Mass.
- Chomsky, N. (1998) “Minimalist Inquiries,” *MIT Occasional Papers in Linguistics* 15, Department of Linguistics and Philosophy, Massachusetts Institute of Technology.
- Chomsky, N. (1999) “Derivation by Phase,” *MIT Occasional Papers in Linguistics* 18, Department of Linguistics and Philosophy, Massachusetts Institute of Technology.
- Dowty, D. (1979) *Word Meaning and Montague Grammar*, Reidel, Dordrecht.
- Hale, K., and S. J. Keyser (1993) “On Argument Structure and the Lexical Expression of Syntactic Relations,” in K. Hale and S. J. Keyser, eds. *The view from building 20: Essays in Linguistics in honor of Sylvain Bromberger*, MIT Press, Cambridge, Mass.

- Higginbotham, J. (1985) "On Semantics," *Linguistic Inquiry* 16.
- Higginbotham, J. (2000) "On Events in Linguistic Semantics," in J. Higginbotham, F. Pianesi, and A. Varzi, eds. *Speaking of Events*, Oxford University Press, Oxford and New York.
- Higginbotham, J. (2004) "Events, States, and Actions: Some Clarifications," talk given at National Tsing Hua University, Hsinchu.
- Huang, C.-T. J. (1997) "On Lexical Structure and Syntactic Projection," *Chinese Languages and Linguistics* 3, Academia Sinica, Taipei.
- Kageyama, T. (1993) *Bunpo to Gokeisei [Grammar and Word Formation]*, Hituzi Syobo, Tokyo.
- Kageyama, T. (1996) *Doosi Imiron [Verb Semantics]*, Kurosio, Tokyo.
- Kuno, S. (1973) *The Structure of the Japanese Languages*, MIT Press, Cambridge, Mass.
- Larson, R. (1988) "On the Double Object Construction," *Linguistic Inquiry* 19.
- Larson, R. (1998) "Events and Modification in Nominals," in D. Strolovitch and A. Lawson eds., *Proceedings of Semantics and Linguistic Theory* 8, CLC Publications, Ithaca, New York.
- Li, N. and S. Thompson (1981) *Mandarin Chinese*, University of California Press, Berkeley and Los Angeles.
- Lin, T.-H. (2001) *Light Verb Syntax and the Theory of Phrase Structure*, Ph.D. dissertation, University of California, Irvine.
- Pustejovsky, J. (1995) *The Generative Lexicon*, MIT Press, Cambridge, Mass.
- Saint-Dizier, P. (1998) "A Generative Lexicon Perspective for Adjectival Modification." in *Proceedings of the Association for Computational Linguistics and 17th International Conference on Computational Linguistics*.
- Shen, L. and T.-H. Lin (2005) "Agentivity Agreement and Lexicalization in Resultative Verbal Compounding," Unpublished manuscript, Doshisha University and National Tsing Hua University.
- Talmy, L. (1985) "Lexicalization Patterns," in T. Shopen ed., *Language Typology and Syntactic Description*, Cambridge University Press, Cambridge.
- Yang, R. (2001) *Common Nouns, Classifiers, and Quantification in Chinese*, Ph.D. dissertation, Rutgers University.