Abstract

Chinese Abstract

在詞彙語意的研究中，動詞語意及句法的關聯一直是研究的重要課題。一般來說，論元結構可藉由語意特點來體現。根據 Levin 等人(1997)的說法，句法人關的語意成分的認定需要對不同類別的動詞作縝密的論元分析比較。為了對國語動詞語意作進一步的研究，我們共分析了四組分屬不同語意範疇的動詞：投擲類、擦拭類、批評類及追趕類動詞。前三類是以語意成分的不同特徵來加以區分各語意範疇中的近義詞。最後一類動詞的觀察則著重於「趕」字的不同用法，並提出「句式語意」的概念，以確立我們的分析。本研究最終採用「模組與屬性模式」來表達語意特徵。

English Abstract

The association between word meaning and syntactic behavior has long been the focus of lexical semantic studies. It is generally assumed that only certain aspects of word meaning can figure in linguistic generalizations and determine the way arguments are expressed. In practice, Levin et al (1997) has suggested that the identification of these syntactically-relevant meaning components requires a careful consideration of the range of argument expression options exhibited b*y members of various classes of verbs.* As an attempt to further the understanding of Mandarin verbal semantics, we examined four sets of verbs that belong to four distinct semantic fields: verbs of throwing, verbs of surface contact, verbs of judging, and verbs of chasing. The first three sets were analyzed with the goal of identifying and characterizing the meaning components that differentiate the group members. The last set of verbs was analyzed with a focus on the varying interpretation associated with GAN, which leads to observations concerning constructional inferences. Verb meanings are finally represented with the Module-Attribute Representational Scheme proposed in Huang and Ahrens (1999).

➢ **Part I**

1. Introduction

Recent advances in lexical semantic studies have shown that verbal semantics plays a central role in dictating the grammatical expression of a verb.　As Levin and Rappaport Hovav (to appear) suggested, the syntactic realization of a verb, i.e. the grammatical structure and function of its arguments, can be predicted to a large extent from the meaning of the verb.　Therefore, efforts of research have been made to identify the semantic factors that are syntactically crucial as well as the general principles governing the mapping between lexical semantics and syntax.

1.1 Lexical Semantic Study of Verbs in General

In the early generative paradigm, the main concern on verbs is limited to their subcategorization frames. Verbs are considered to be the structural head of the sentence, since it subcategorizes its arguments and hence assigns the structure of the sentence. Verb meanings are treated only as general tendencies in selectional preferences, and the semantic details of individual verbs are largely neglected. However, recent development in lexical research has shifted the focus to investigating the grammatically-relevant semantic properties of verbs. Researchers are trying to define and establish patterns of interdependencies between verb meanings and syntactic behavior. A common and basic assumption shared by most lexical semanticists is that *the syntactic behavior of a verb, especially its argument expression, is determined by the meaning of the verb* (cf., Levin 1997, Pustejovsky 1995, Levin 1993, Atkins and Levin 1991, Atkins et al. 1988, etc.). As a consequence, Levin (1993), in a comprehensive attempt, categorizes English verbs into semantically distinct classes on the basis of their argument alternation patterns. A more recent study on English verbs of sound (Levin et al 1997) has successfully factored out the syntactically relevant elements of verb meaning, based on corpus patterns of verb behavior.

With regard to the general semantic mechanisms that govern a verb's argument realization, Levin and Rappaport Hovav (to appear) presented an overview of the earlier works that explain everything with semantic role lists (cf. Fillmore 1968) and the later works that reply more on the conceptualization of event structure. According to them, three different event structure schemata have been developed for explaining verbal semantics: the localist appraoch (Jackendoff 1976, 1983, 1990), the aspectual approach (Tenny 1992), and the causal approach (Croft 1991). The three approaches highlight different semantic principles for argument assignment. Basically, the localists assume that all events can be represented in terms of spatial motion and location. The aspectual approach claims that only arguments which can 'measure out' or 'delimit' the event are expressed as objects. The causal approach believes that arguments correspond to the points of a causal chain of the force dynamic relationships denoted by the verb.

1.2 Lexical Semantic Studies of Mandarin Verbs

As for the research on Mandarin verbal semantics, a series of corpus-based studies have aimed to explore the meaning contrast among verbs of the same semantic field by way of comparing their syntactic distribution in a large balanced corpus, the Sinica Corpus (e.g. Chang et al 1999; Liu, 1999; Liu et al 1999; Liu et al 1998, Huang et al 1998, Tsai et al 1996, etc.). Among them, Tsai et al (1996) represents an

pioneering effort in fine-tuning Mandarin verb meanings in their attempt to differentiate the near-synonym pair - 高興 'happy, glad' vs. 快樂 'happy, joyful'. By examining the correlation between syntactic behavior and lexical semantic properties, they concluded that two semantic features <+control> and <+ change-of-state> may be responsible for the syntactic contrasts between the verbs. Liu (1999) and Liu et al (1998) took on two other sets of near-synonyms: verbs of 'building' (樂、樂、樂) and verbs of 'throwing' (投、擲、丟、扔), respectively. It is shown that in the event of building, the aspectual focus ('event focus' or profile) plays an important role in argument placing and interpretation. In the event of throwing, role-internal features pertaining to the semantic role Goal (i.e. path-endpoint and directionality) can be used to explain the differences in object selection among verbs of throwing. Chang (1999) expanded the scope of study to include all subgroups of 'emotion' verbs and pointed to the morphological make-up (VV vs. non-VV compounds) as the key to their syntactic variation. Liu et al (1999) went one step further to spell out the importance of contextual inferences beyond lexical specification. All these efforts help to build a sound and solid foundation for further exploration of the wonder and wealth of lexical semantics of Mandarin verbs. As Liu et al (1999) puts it:

(1) Mandarin lexical semantic studies are advancing but remain still in a pioneering and primitive stage. More comprehensive investigation is needed to help identify a set of crucial semantic attributes as well as compositional principles that have syntactic consequences.

1.3 Representational Framework for Mandarin Verb Semantics

From a more theoretical and methodological perspective, we wonder if the framework used for English can be readily transferred to Chinese, given the typological and parametric variations between languages? Liu (1996b) found that purely alternation-based approach (such as Levin 1993) may not be adequate in categorizing and defining Mandarin verb classes. A more **semantically constrained** system is needed for the representation of Mandarin verb meanings.

The studies mentioned above all lead to one important question: What would be a principled way of representing verbal distinctions in Mandarin? In Huang and Ahrens (1999), a lexically based model called Module-Attribute Representation of Verbal Semantics (MARVS) was proposed as a first step toward developing a comprehensive framework for detecting and representing Mandarin verb meanings.

1.3.1 The Model

The model takes each verbal sense as one *event structure* conveying distinct

eventive information which consists of two modules: Event Module with event compositional information and Role Module with salient participant role information. Within each module, detailed specifications are represented as attributes: Inherent Attributes are features concerning the semantics of the event itself and Role-internal Attributes are features further specifying a participant role. The model can be schematized as follows:

(2) Module-Attribute Representation of Verbal Semantics (MARVS):

$$Verb - Sense_i - Eventive\ Information$$
$$|$$

$$
\begin{array}{ccc}
\text{Event Module} & \text{---------} & \text{Role Module} \\
| & & | \\
\text{Inherent Attribute} & & \text{Role-Internal Attribute}
\end{array}
$$
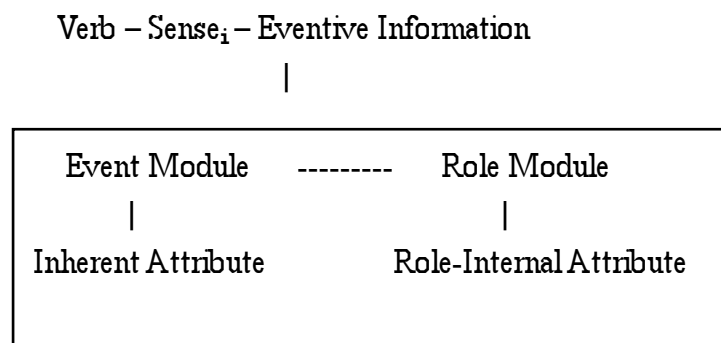
1.3.2 Basic Constructs

    The model is built upon three theoretical premises.　First, all grammatical information is encoded in the lexicon.　Grammar is information-based and lexicon-driven.　Second, verbs express eventive information.　The identification of verbal senses is then dependent on the identification of event types and event structures. Third, the classification of information is twofold: structural vs. attributive. There are therefore two ways to break down verbal semantic information to atomic units.　Structural components are viewed as modules while attributive information are treated as features.

    More specifically, Event Modules are the basic building blocks of the event contour.　There are five event modules:

- Boundary : an event module that can be identified with a temporal point and must be regarded as a whole (including Complete Event);
- Punctuality: an event module that represents an single occurrence of an activity that cannot be measured by duration.
- Process: an event module that represents an activity that has a time course; i.e. it can be measured in terms of temporal duration.
- State: a homogeneous event module in which the concept of temporal duration is irrelevant; i.e. it is neither punctual nor has a time course.
- Stage: an event module consisting of iterative sub-events.

The five modules can be symbolized as follows:

(3) Symbol Representaion of Event Modules
    a.   Boundary
    b.   Punctuality   /
    c.   Process   /////
    d.   State   ____
    e.   Stage   ^^^^

    The five basic building blocks may be combined to render three event composition types attensted in Mandarin: Nucleus Event, Simplex Events, and Composite Events (for details of the these event types, please see Huang and Ahrens 1999). This framework of modules and attributes provides a preliminary basis or working schema for encoding and representing verbal semantic distinctions in Mandarin. The next section provides a simple illustration of the framework

1.4 An Illustration with Verbs of Construction
    There are three verbs in Mandarin which can all be translated as 'build' – 樂、樂、樂, but their meanings are actually distinct if we observe carefully the typical object they take:

    (4) Objects for Verbs of Building:
    a. 地主在河川地 樂川樂川*樂 房子。
    b. 政府在山上樂川樂川*樂 水庫
    c. 計劃與波音合作樂川*樂川*樂 飛機。

    It is clear that 樂 only occurs with objects denoting 'building', 樂 takes an architecture as its object, while 樂 requires the object to have some kind of internal design.　Their difference in the semantic requirement of the object (or the incremental theme) also explains why only 樂 can be used in the following sentence:
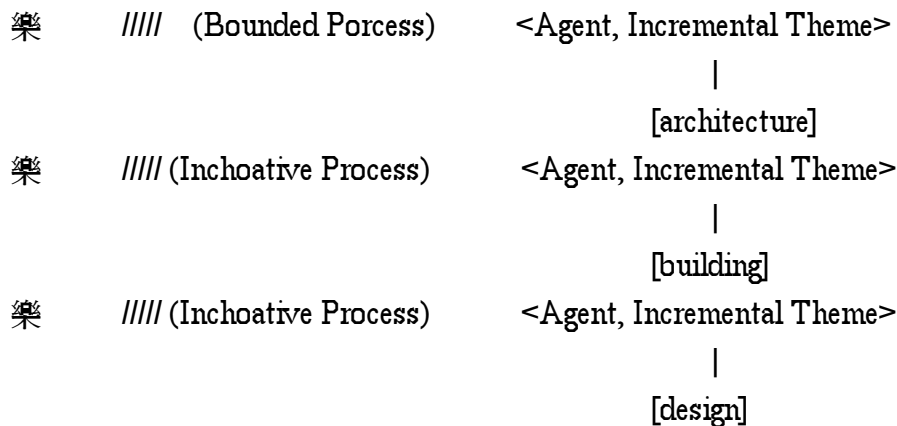
    (5)　工程師樂川*樂川*樂 不出房子。

Since 工程師 'engineers' are not designers, they are not able to create any houses.
    Besides, the three verbs also differ in aspectual composition. Only 樂 can be used in the sentence below, pointing to the fact that 樂 may allow a focus on the endpoint or completion of the activity:

(6)　房子樂川*樂川*樂　了三年了還沒人住。

In sum, although the three verbs share the same Role Module (all taking an incremental theme), they can be differentiated in terms of Event Module and Role-internal Attribute, as specified below:

(7) MARVS Representation of 樂、樂、樂
樂　　　/////　(Bounded Porcess)　　　<Agent, Incremental Theme>
　　　　　　　　　　　　　　　　　　　　　　|
　　　　　　　　　　　　　　　　　　　　[architecture]
樂　　　///// (Inchoative Process)　　　<Agent, Incremental Theme>
　　　　　　　　　　　　　　　　　　　　　　|
　　　　　　　　　　　　　　　　　　　　[building]
樂　　　///// (Inchoative Process)　　　<Agent, Incremental Theme>
　　　　　　　　　　　　　　　　　　　　　　|
　　　　　　　　　　　　　　　　　　　　[design]

To show in more details how this framework can be used for differentiating as well as representing Mandarin verbal semantics, we investigate other groups of verbs, verbs of throwing, verbs of surface contact, and verbs of judging, in the following sections.

2. Verbs of Throwing
2.1 The Data
The data for the analysis of this paper come from a Mandarin corpus, the Sinica Corpus, which is the largest balanced corpus of both written and spoken contemporary Mandarin, containing a total of 5 million word, developed by the CKIP group in Academia Sinica, Taiwan.　The relevant data were extracted from the corpus by a key-word search with 30 additional words on either side.　The total number of occurrences of each verb follows:
(8)
　　投: 556　　　擲: 303
　　丟: 268　　　扔: 77

2.2 Four Types of Event-Structure Attributes
A further effort is made to capture the lexical semantic features that are relevant to event focus as well as event components.　A module-attribute representational

scheme was proposed as the basis for verbal semantic description and representation (Huang and Ahrens, 1999). It describes a verb meaning in terms of event module, with inherent attributes, and role module with role-internal attributes:

- **Event Module**: properties pertaining to the aspectual composition of the event(s). Five atomic event structures are distinguished ; they are Boundary [.], Punctuality [/], Process [/////], State [___], and Stage [^^^^]. The combination of these atomic event structures renders 12 different event types.
- **Inherent Attributes**: attributes referring to the semantics of the event itself, such as Control, Change-of-state, etc.
- **Role Module**: properties referring to focussed (though not necessarily obligatory in its predicate argument structure) roles of the event, such as Agent, Theme, Instrument, Manner, Gaol, etc.
- **Role-Internal Attributes**: attributes referring to the internal semantics of a particular focussed role (of the event), such as Factive, Generic, Sentience, Volition, Affectedness, etc.

2.3 Lexical Semantic Differences Redefined with Event-Structure Attributes

The distinction among the four verbs, 投, 擲, 丟, 扔 can be re-defined with the proposed Module-Attribute Model (Huang and Ahrens, 1999):

- In terms of Event Module, all four verbs describe an activity with a natural event-endpoint; that is, they are process events with a boundary, represented as [/////.]
- In terms of Inherent Attributes, 丟 differs from the others (activity-focused) in that it may focus on the event-endpoint (a boundary), thus rendering an intransitive-causative use. Moreover, 投/擲 behave differently from 丟/扔 in that 投/擲 are highly directional, while 丟/扔 is underspecified in directionality.
- In terms of Role Module, 投/擲 can both take a Path-endpoint as the direct object, while the role of Path-endpoint is not salient in the meaning of 丟/扔.
- With regard to Role-internal Attributes, 投 casts a further specification on the spatial characteristics of the Path-endpoint: it has to be bounded .

(9) Summary of Lexical-Semantic Distinctions with Event-Structure Attributes

Module/ Attributes	住	住	住	住
Event Module	Process+boundary [/////.]	Process+boundary [/////.]	Process+boundary [/////.]	Process+boundary [/////.]

Inherent Attributes	+ Directional	+ Directional	- Directional + Boundary-focused	- Directional
Role Module	+ Path-endpoint	+ Path-endpoint	- Path-endpoint	- Path-endpoint
Role-Internal Attributes	+ Bounded			

3. Verbs of Surface Contact

In this paper, we focus on a group of Mandarin verbs that can be referred to as 'verbs of surface contact by motion'. The group members include: 擦、拭、塗、抹、敷、揩、刮、削、掃、刷、洗、塗、漆、噴、剃、撢、擦拭、塗抹、洗刷、清洗、拂拭、掃除, etc. These verbs generally describe *contact through repeated motion with the surface of a location for the purpose of removing or putting on some substances or physical objects.* Although most of the class members are monosyllabic, combinations of the verbs into V-V compounds are also common. Our initial observation shows that they display similar syntactic behavior in several aspects: They are all transitive verbs that take an overt object, as in (10a); they may all take a resultative complement, as in (10b); they occur commonly with a frequency phrase, as in (10c); and they can form compounds with a preverbal manner adverbial:

(10) a. 除在 擦桌子川抹地板川刷廚房川漆牆壁川刮鬍子
 b. 地 擦川抹川刷川掃川洗 得很乾淨
 c. 一淨 擦川抹川刷川掃川洗 兩次
 d. 亂擦川勤拭川輕刷川猛刮

3.1 The Locus-Locatum Alternation

In terms of their argument expression as transitive verbs, the most unique property of these verbs is that they may take two semantic types of object. The object may be specified either as a locational boundary for the contact (referred to as *locus* in this paper) or the substance or physical object in the location (the *locatum*, a term originally used by Clark and Clark (1979) and adopted by Levin and Rappaport Hovav (1991b)). The two types of object are illustrated below with examples taken from the Sinica Corpus.

(11) The Locus-Locatum Alternation for Verbs of Surface Contact

Verb	*Locus* as Object	*Locatum* as Object
擦	擦地板	擦灰塵
拭	拭塵	拭塵
塗	塗麵包	塗奶油
抹	抹油	抹上的油
敷	敷受傷部位	敷位
刮	刮塵	刮鬍子

刷	刷位子	刷位位
位	位牆	位泥巴
揩	揩塵	揩巴
漆	漆牆壁	漆油漆
削	削蘋果	削果
剃	剃果	剃果
撢	撢沙發	撢灰塵
塗抹	塗抹發部	塗抹油發
擦拭	擦拭槍枝	擦拭灰塵
洗刷	洗刷桌枝	洗刷枝位

Although motional surface contact verbs in general share the Locus-Locatum Alternation, as illustrated above, the Alternation itself is by no means an exclusive property of the class.   It is found that verbs of other semantic classes may also display the alternation.   In the sections below, we will discuss two other verb classes with the Locus-Locatum Alternation: verbs of clearing and verbs of loading.

3.2 Locational Change of the Locatum

When looking more closely at the syntactic distribution across the members of the class, we found that despite their common pattern with the Locus-Locatum Alternation, the verbs diverge in terms of what kind of directional resultative they may take to form a V-R compound.   The resultatives 上 and 去（掉）with their opposing directionality may be used to differentiate the verbs:

(12) a. V-上:　　敷上/*敷去 位發
　　 b. V-去（掉）:　　剃掉/*剃上 ）果
　　 c. V-上 and V-去（掉）:　　擦上川擦掉 口紅

When occurring with a locatum, verbs like 敷 may only take the resultative 上, which indicates that the verb is only semantically compatible with the meaning 上, characterizing the locatum as being 'put on' and thus covering a surface, while verbs like 剃 can only take the resultative 掉, indicating their semantic compatibility with the meaning '(taking) away': the motion of 剃 thus only results in the removing of the locatum from a location.   On the other hand, verbs like 擦 allow both kinds of resultatives; the locatum can either be removed from or put on a location. This indicates that the resultant position of the locatum is lexically under-specified or may not be central to the verb meaning.   Therefore, in term of the purpose of the surface contact motion as well as the positional change of the locatum, we can divide the verbs into three sub-groups:

(13) Classification of Motional Surface Contact Verbs in Terms of the Positional Change of the Locatum:

Positional Change of the Locatum	Verbs
Put on or Taken away from a surface	擦、塗、抹、刷
Taken away from a surface	掃、削、剃、揩、刮、撢
Put on a surface	敷、漆、位、噴

The distinction in the positional/locational change of the locatum bears some syntactic consequences in determining the possible patterns of argument expression. First, only the verbs complying with the 'putting/covering' component may occur in the construction known as Locative Inversion:

(14) a. 牆上漆了紅紅的油漆
b. 塵上敷了小黃瓜
c. 牆上位了瓜

According to Levin (1993: 94), the set of verbs found in the Locative Inversion construction have been characterized as verbs of existence and appearance. Or more accurately, verbs show an existence or appearance sense when found in this construction. The locational change of the locatum as being put, thus 'appearing' at the surface of the locus, complies nicely with the sense of appearance or existence required by the construction of Locative Inversion.

Secondly, only the verbs complying with the 'putting/covering' meaning component allow the locus to be coded as a possessor of the locatum, thus the contrast in (15):

(15) a. 撢桌子∥撢灰塵∥撢桌子上的灰塵
b. 漆牆壁∥漆油漆∥*漆牆壁上的油漆

The verb 撢 in (15a) specifies the locatum as being removed from the locus. For this to happen, the locatum has to pre-exist as part of the locus. In other words, the meaning of removal presupposes a part-whole relationship between the locatum and the locus.

Moreover, only the verbs with the component of removal may pattern like verbs of creation in the following construction, allowing the object to be an incremental theme (Dowty 1991):

(16) a. 掃（出）了一推垃圾
b. 削（下）了一堆果
b. 刮（出）了一個大獎
c. 剃（出）了一個獎

As verbs of creation can be 'measured' or 'delimited' by the incremental theme object (Tenny 1992), the verbs encoding removal by surface contact motion can also be delimited by the object.   By means of separating the locatum from the locus, the verbs create and accomplish a completely new state of the locatum.

3.3 Representation of Verbal Semantics for the class

3.3.1 Event Structure Distinction for the three Sub-groups

Adopting the toxonomy of event-structure attributes proposed in Huang and Tsai (1997), we can characterize the three sub-groups of motional surface contact verbs as follows:

In terms of Event Module, all three groups are basically activity verbs that represent a process with a time course, i.e. can be measured in terms of its temporal duration (as opposed to 'puctuality').   In terms of Inherent Attributes, these verbs all lexicalize a specification on the 'means' of contact – either a manner or instrument, but the removal-class (掃-class) and the putting-class (敷-class) also encodes a positional/state change.   In terms of Role Module, they share the Locus-Locatum Alternation. And in terms of the Role-Internal attribute, the removal-class requires a locatum that can be removed from a surface, and the putting-class requires a locatum that can be put on a surface:

(17) Representation of Event-Structure Attributes of the three Sub-groups:

Module/ Attribute	摖-Class	摖-Class	摖-Class
Event Module	Process /////	Process /////	Process /////
Inherent Attributes	Manner/Instrument	Manner/Instrument; Positional/state change	Manner/Instrument; Positional/state change
Role Module	Locus/Locatum	Locus/Locatum	Locus/Locatum
Role- Internal Attributes	(underspecified)	Locatum being removed from Locus	Locatum being put on Locus

3.3.2 The Issue of Polysemy

It is noted from the corpus data that some of the verbs are polysemous, e.g. the verb 擦 can be used either in 擦桌子 or in 擦傷, and the verb 刷 has two meanings too: 刷地 vs. 刷漿.   The different senses are associated with different syntactic patterns, and can be attributed to the difference in event structure.   With respect to the Role attributes, the 'scratch' sense of 擦 and the 'swipe' sense of 刷 do not display the Locus-Locatum alternation, but can only take a Theme-object:

(18) Non-alternating 擦 and 刷

　　　a.   磨胸擦臂

b. 刷獎（vs. *刷機）

In terms of the Aspectual attributes, the alternating 擦 and 刷 encode repeated, durative events, while the non-alternating members are more punctual:
(19) a. 刷了三個小臂的地
b. ?刷了三個小臂的獎

When occurring with the adverbial 臂, the non-alternating member may allow a *spatial* interpretation, while the alternating members render an *experiential* reading:
(20) Different Reading with -臂

Verb	Experiential-臂	Spatial-臂 'over'
擦	擦臂乳液	（樹枝）擦臂褲腳
刷	刷臂油漆	（信用獎）刷臂讀獎機
刮	刮臂鬍子	（刀）刮臂桌面

It seems that the punctual event is more easily associated with a specified Path on the spatial domain. Again, the Event-structure attributes introduced above may be used to represent the semantic distinction between the different senses of the polyseme:
(21) Polysemous Distinction with Event-Structure Attributes

Modules	獎（地）／刷（地）	獎（傷）／刷（卡）
Event (Aspectual)	Repeated, Durative	Punctual
Role	Locus/Locatum	Theme

4. Mandarin Verbs of Judging

Verbs of judging, as a semantic group, can be defined as verbs that describe a person's judgmental attitude towards another person (or institute) on a certain, presumably factual ground.　These verbs may be purely mental (eg. 卡意、不卡) or accompanied with speaking act (eg. 稱讚、責罵).　To narrow the scope of our study, we first look at verbs of negative judgement.　Its class members include: 不卡、罵怨、批評、指責、斥責、責備、責難、責罵、責怪、駁斥、痛斥、怒斥、罵、咒罵、叫罵、破口大罵, etc.

At first sight, we noticed that these verbs are quite heterogeneous in terms of verbal kinetics, or the Stative vs. Active distinction:

(22)　Distinction in Verbal Kinetics
Highly stative: 不卡
Highly active: 斥責、罵

It is also observable that the active verbs in this group can also be characterized as verbs of speaking in that they denote a verbal act outwardly reflecting the negative judgement.   One immediate question follows: does the distinction in kinetics bear any significant consequences in their syntactic behavior?   To answer the question, we looked carefully at their uses in the corpus and found that they have quite different distributions in the following aspects.

4.1   **Grammatical Roles**

These verbs differ in terms of the major grammatical functions they may be used for.   Although they all occur as verbs, their distributions among other grammatical functions vary.   Among all the verbs, 不卡 displays the widest range of grammatical roles: it may be used as adjectival modifier, adverbial modifier, nominal object or complement, and verbal predicate.   In the table below, we listed the distributional differences for six of the verbs in this group:

(23) Distribution among Major Grammatical Roles:

	不卡	批評	指責	斥責	責怪	罵
Total #	178	833	200	93	86	272
Adjectival	4%(8)	3%(24)	0	0	0	<1%(2)
Adverbial	2%(4)	0	0	0	0	0
Nominal	52%(92)	25%(208)	18%(34)	13%(12)	2% (2)	<1%(2)
Verbal	42%(80)	72%(601)	88%(166)	85%(81)	98%(86)	99%(268)

4.3 Argument Expression

When used as verbal predicates, most of the verbs display a similar range of argument expression.   They can take a single NP-Goal, or a clausal complement denoting Goal with Cause.   But a clear difference is found with some Action-denoting verbs as they can also be used as quotation verbs with or without '說', where the content of speaking is taken as a salient argument:

(24) a. 以台語斥責說：車子是怎麼開的。
遭中共人員斥責：這裡是大陸，不是香港。

Among the Action-denoting verbs, 罵 differs from the others in its specification of the Goal-argument (if there is one) and its tendency of taking the content of speaking as its sole argument.

4.4 Passive Construction

It is widely known that Mandarin passive construction is semantically negative, i.e., associated with negative evaluation. Therefore, we looked at the co-occurrence of these negative judgement verbs with the passive marker 遭 or 遭. What we found was that 不卡, as a highly stative and attitude-denoting verb, is incompatible with passive construction. In the corpus, 不卡 never occurs with passive markers such as 遭 or 遭, as shown below:

(25) Occurrence with Passive Markers

	不卡	批評	斥責	責怪	責備
Total #	178	833	93	86	49
遭	0	6%(46)	3%(3)	2%(2)	10%(5)
遭(遭/受)	0	8%(65)	13%(12)	1%(1)	8%(4)

This finding is not surprising given that stative verbs in general cannot be passivized, as an universal trend in most languages.

4.5 Degree vs. Manner Modifier

Another interesting observation related to the Attitude-denoting vs. Action-denoting distinction is that the two types of verbs display different patterns of adverbial modification:

(26) Different Types of Adverbial Modification

	不卡	批評	斥責	指責	責備
總筆數	178	833	93	200	49
Degree	29%(51)	3%(22)	0	<1% (1)	2%(1)
Manner	0	6%(50)	12%(11)	7%(12)	6%(3)

4.6 MARVS Representation of Verbs of Judging
Adopting the representational scheme MARVS, we can identify the meaning differences among verbs of judging in terms of the following Module-Attribute characterization, using 不卡、罵怨、指責、罵 as four representative verbs:

● With regard to Event Module, 不卡 differs from other verbs in that it denotes a state rather than a process. More specifically, 不卡 encodes an effect state or inchoative state (schematized as · ____), which allows an event focus on either the effect or the durative state. Other verbs behave more like inchoative process (symbolized as · //////). The difference between 罵怨 and 指責川罵

can then be captured with a further specification on Inherent Attribute: 罵怨 allows attitude-denoting, which enables it to be used as an adjectival or adverbial modifier.

●With regard to Role Module, 不卡 and 罵怨 both take a Goal or Goal-Cause as their argument, while 指責 may in addition take the Content (direct quotation) as a salient argument.   In contrast, although 罵 may also take a Goal-NP, it differs from the others in that it does not occur with Cause-argument; instead, it takes a Content-argument, as either a direct quotation or a clausal complement.   Furthermore, 罵 enforces a Role-internal restriction on the semantics of the Goal: it has to be animate.

(27) MARVS Representation of Four Types of Negative Judging Verbs

	不卡	罵怨	指責	罵
Event Module	· ____	· /////	· /////	· /////
| Inherent Attribute	Attitude-denoting	Attitude-denoting Action-denoting	Action-denoting	Action-denoting Speech Act
Role Module	[Goal – (Cause)]	[Goal – (Cause)]	[Goal – (Cause)] [Content]	[Goal-(Content)] [Content]
| Role-Internal Attribute				Goal: +Animate

These four verbs are typical of four sub-groups of judgement verbs.   Among them, the 指責-group seems to be the largest.   It is also tentatively noted that the four-way distinction may apply to positive judgement verbs as well, with corresponding members such as 卡意、讚許、稱讚、誇.   A follow-up study is needed to confirm the speculation.

➢ **Part II**
1. Introduction
This part aims to show that semantic representation of verbs may require the inclusion of constructional inferences in addition to lexical specifications.   By examining the transitive pattern of the Mandarin verb *GAN*(趕) 'rush', we found that verbal semantics can only be adequately represented if constructionally coerced information is taken into consideration.   The construction [*GAN* + NP] renders specific interpretations that are not directly derived from the lexical meaning of either the verb or the object NP.   The construction itself carries salient information for the appropriate interpretation.   Besides outlining a compositional approach with Qualia Structure (Pustejovsky 1995), this paper attempts to account for the

construction-triggered meanings from the perspective of Construction Grammar and to explain their interrelationship with cognitive mechanisms for sense extension.

2. Verbs of Chasing

The verb *GAN* is rather restrictive in its argument selection with respect to the transitive pattern [*GAN* + NP].　In the corpus, there are two major types of NPs associated with the pattern, and each facilitates a unique interpretation of the construction.

2.1 Types of NPs in [*GAN* + NP]

The NPs following *GAN* can be either Animate or Inanimate.　Animate NPs refer mostly to humans or animals, as shown in (1).　Inanimate NPs can be further divided into four sub-groups, as shown in (2):

(1) Animate NPs:
　　趕 人/蚊子/麻雀/牛/羊
　　GAN ren/wenzi/maque/niu/yang
　　'to drive away people/mosquitoes/sparrows/cows/sheep'

(2) Inanimate NPs:
a.　Scheduled special events:
　　趕 集/考/廟會/演講
　　GAN ji/kao/miaohui/yanjiang
　　'to rush to take part in the market/exam/religious celebration/public speech'

b.　Vehicles running on a fixed schedule:
　　趕 公車/飛機
　　GAN gongche/feiji
　　'to rush to catch the bus/airplane'

c.　Lexically specified (overt) time expressions:
　　趕 時間/三點半/進度
　　GAN shijian/san-dian-ban/jindu
　　'to rush to save time/to get to the bank by 3:30/to catch up with projected
　　　　progress'

d.　Artifacts to be produced by a deadline:

趕 報告/作告/課/衣服/服
*GAN*baogao/zuoye/ke/yifu/huo
'to rush to finish writing a paper/writing homework/teaching classes/making clothes/manufacturing products'

The two types of NPs share the same surface form - [*GAN* + NP], but render quite different interpretations.

2.2 Interpretational Distinction

As discussed above, the construction [*GAN* + NP] describes a telic event, that is, the event is bounded with a target state. With Animate object-NPs, the verb *GAN* encodes a purposeful action that aims to 'move the object IN or OUT of a designated area'. In the example of *GAN ren* (趕人), the agent is performing an action to drive *'people'* out of a certain place; while in the example of *GAN yang* (趕雀), it's more likely that the agent is driving the sheep into an area (e.g. the pen). The action of *GAN* results in a spatial movement or locational change on the part of the object-NP.

With Inanimate object-NPs, however, [*GAN* + NP] describes a bounded event whose interpretation is much more complicated. The interpretation reads like: 'to achieve a STATE by a certain TIME through engaging in an ACTIVITY'. It involves at least three meaning components: an ACTIVITY performed by the agent, a STATE associated with the object, and a TIME FRAME. In the example of *GAN baogao* (趕報告), the underspecified activity is 'writing a paper', the goal is to get the paper done, and the time frame is the deadline for submitting the paper. What's interesting is that all the information about the 'ellipsed' activity/goal/time is missing from the purely lexically-specified meaning of either the verb or the nominal. The interpretational distinction between the two types of [*GAN* + NP] can be captured as follows:

(3) Animacy and Interpretational Difference in x [*GAN* + NP(y)]

	Interpretation
With Animate NP	Target State = (in-or-out (y, Loc))
With Inanimate NP	Target State = (x reaches State (y) by Time (t) through Activity (*w*))

2.3 Other Salient Information with Inanimate NPs

Given the interpretational complexity in the pattern [*GAN* + Inanimate NP], more has to be said concerning the details of its semantic representation. We found that the semantics of the inanimate pattern should also include the following:

- **Presupposition**: Normal pace of performing the activity is not enough (already being late with respect to the TIME frame).
- **Manner**: with accelerating pace
- **Telicity**: The event is bounded with a projected endpoint (the target state).
- **Agent-control**: The activity is completely under the agent's control.

This last feature captures the fact that the agent of *GAN* has to be the actor undertaking the implicated activity.　For example, *GAN yifu* (趕衣服) cannot be taken as 'rushing someone to finish making the clothes', but can only be said of a dressmaker or tailor.

The issue here is that all the above semantic specificities and the information about the "ellipsed" activity/goal/time in the [*GAN* + Inanimate NP] pattern cannot be obtained directly from the lexicon.　Only when combining the verb *GAN* with a potentially event-evoking inanimate nominal is the information automatically generated.

3.　Information Beyond the Verb: Explanatory Frameworks

How can we explain and represent the fact that the construction [*GAN* + NP] contains more information than what is specified in the lexicon for the individual word.　There are two ways of dealing with it.　One is the construction-based approach, taking [*GAN* + NP] as a form-meaning pair.　The other is the compositional approach that allows coercion of lexical information.

3.1　Construction-Based Approach

From the perspective of Construction Grammar (Goldberg 1995, Fillmore and Kay 1993), a 'construction' can be viewed as a meaning-bearing unit, i.e. the syntactic configuration itself 'contributes semantic content above and beyond that contained in the constituent lexical items' (Jackendoff 1997:553).　A construction (or constructional idiom) represents a form-meaning association, that functions, in a broader sense, just like a lexical item.　The meaning of a construction is learnable in the same way word meanings are learned.　Taking a semi-fixed VP pattern [*GAN* + NP] as a constructional idiom allows as to specify the unique semantic features associated with the pattern which go beyond the semantics of its constituent words.

Given the fact that two types of NPs may occur with *GAN* and each is associated with a peculiar interpretation, we may propose that there are two distinct Constructions:

(4)

a. Construction 1

Form: [*GAN* + Animate NP]

Meaning: a spatially bounded event [to reach a Target State by causing the NP to move

In or Out of a designated space].

Example: 趕人 '*GAN*-people'

b. Construction 2

Form: [*GAN* + Inanimate NP]

Meaning: a temporally bounded event [to reach a Target State (associated with the NP) through speeding up in an Activity (agent-control) with a Temporal Reference (contextually defined or world knowledge)]

Example: 趕作告 '*GAN*-homework'

An alternative solution is to propose that a Constructional Polyseme be recognized, as specified and represented as follows:

(5) Constructional Polyseme :

Form: [*GAN* + NP]

a. Sense Association 1

Meaning: a spatially bounded event [to reach a Target State by causing the NP to move

In or Out of a designated space].

Specification on NP slot: animate, self-movable entities

Instantiation: 趕人 '*GAN*-people'

b. Sense Association 2

Meaning: a temporally bounded event [to reach a Target State through speeding up in   an Activity (agent-control) with a Temporal Reference (contextually defined or   world knowledge)]

Specification on NP slot: Event-evoking NPs (Activity Nominals or Time References that stand for a default activity/event.)

Instantiation:

- 趕作告 '*GAN*-homework' (NP-Nominal Activity)

ACTIVITY [writing the homework] by TIME [deadline]

- 趕三點講 '*GAN*-3:30' (NP-Time)

ACTIVITY [rushing to the bank] by TIME [3:30]

Although the associated meanings are quite distinct, the construction is considered to be polysemous in the sense that there seems to be a conceptual link between the two senses. Sense 1 highlights a intended movement in space, which is utilized to describe the progression of event in time. This confirms the general cognitive principle that spatial movement usually provides the conceptual basis for expressing temporal or eventive processes (The Localist Hypothesis, Lyons 1977).

3.3 Compositional Approach: Qualia Structure

Pustejovsky (1995) proposed a generative, multi-leveled framework to represent lexical information. The four levels in the structured representation are Argument Structure (for the representation of adicity information for functional elements), Event Structure (for the representation of information related to Aktionsarten and event type, in the sense of Vendler 1967), Qualia Structure (for the representation of the defining attributes of an object), and Inheritance Structure (for the representation of the relation between the lexical item and others in the lexicon). Among the four levels, Qualia Structure is responsible for the relational force of a lexical item. It specifies four essential aspects of a word's meaning:

- Constitutive: the relation between an object and its constituent parts;
- Formal: that which distinguishes it within a larger domain;
- Telic: its purpose and function;
- Agentive: factors involved in its origin or 'bringing it about'.

As Pustejovsky (1995: 87-88) made it clear that Qualia Structure, as defined above, not only characterizes our knowledge of words, but also suggests interpretations of words in context. The English verb *enjoy* is used as an illustration. Consider the examples below:

(6)   a. *Mary enjoyed the movie last night.* (watching)
      b. *John quite enjoys his morning coffee.* (drinking)

The different contextual meanings of *enjoy* or the 'ellipsed' activities are supplied by information from the complement. More specifically, the Telic roles for *movie* and *coffee* project the activities of *watching the movie* and *drinking coffee*, respectively, to the interpretation of the VP. In other words, Qualia structure provides a compositional means for meaning coercion based on characterizations of the four different roles.

The analysis of English *enjoy* parallels the case of Mandarin *GAN* with Inanimate NPs in that [*GAN* + Inanimate NP] also involves an ellipsed activity whose information is provided by the object-NP. Through coercion of one of the qualia roles, the information about the Activity or Time Frame can be integrated into the interpretation of the verb phrase, as illustrated below:

(7) Qualia Representaion
   a. *GAN gongche* 趕講車 'rush to catch <u>the bus</u>'
       Bus [Telic = running on a fixed schedule]
   b. *GAN baogao* 趕報告 'rush to finish the paper'
       Paper [Agentive = *writing*]

What is interesting here is that Qualia Structure can also solve potential ambiguity problems in some cases. Take 趕比服 '*GAN-Ball Games*' as an example, which allows two different interpretations, each with a different qualia role:

(8) Two Different Interpretations with 趕比服 '*GAN-Ball Games*'
   趕了三服比服.
   GAN le san-chang bisai.
   a. 'rushed in playing three games'
   b. 'rushed in watching three games.'

(9) Different Roles for 比服 '*(Ball) Games*'
   a. [Telic = entertaining/watching]
   b. [Agentive = playing]

The distinction between Telic and Agentive role is also crucial in deriving the correct interpretation of [*GAN* + NP] where the NP is associated with verbs of creation, i.e. the NP comes into being through verbs of creation, such as '(*writing*) *a book/song*'. In the examples below, only the Agentive interpretation is allowed:

(10) Agentive interpretation
   a. 趕服
       GAN shu
       'rushed in writing/*reading the book'

   b. 趕服
       GAN ge

'rushed in composing/*singing the song'

    c.   趕服
        GAN xi
        'rushed in producing/*watching the show'

With the specified attributes or roles in the Qualia Structure, contextual meanings or information beyond individual lexical items can be facilitated through semantic coercion, without the cost of additional explanatory or representational mechanisms.

4. OTHER RELATED CASES

The semantics of [*GAN* + NP] requires incorporation of constructional inferences that are not inherent in the lexical semantics of its constituent words. In a similar vein, there are other interesting cases of transitive verbs whose object-NPs suggest different "activities or events" that are not explicitly expressed but deemed important in semantic representation. Below we list two of such verbs:

(11) 服 'rob, vie for'
a. 服 服　　'to rob money or rush to earn money'
b. 服 金牌　'to win the gold medal'
c. 服 位子　'to occupy a seat'
d. 服 股票　'to buy stocks'
e. 服 臂講　'to earn time'

(12) 票 'play, enjoy'
a. 票票服　'to play a game'
b. 票票除　'to play the guitar'
c. 票票牌　'to play the bridge
d. 票票人　'to womanize'

There must be more Mandarin verbs displaying a similar behavior, in addition to the two listed above. A unified approach, once adopted, can be applied to all these verbs.

Conclusion

This study has shown that based on corpus observation and analysis, the groups of throwing verbs, surface contact verbs and negative judging verbs all have distinct syntactic behavior that stems from their unique properties in lexical meaning. The

representational framework based on Module-Attribute taxonomy (MARVS) was adopted for systematic sense differentiation. The model helps to delimit and identify the meaning components that are syntactically crucial and provides a principled way to represent these features as well-defined eventive information.

Given that the processing of Mandarin depends largely on semantic information, a representational framework that is semantically-constrained is indeed needed. Focusing on verbal semantics, the present work can be seen as a preliminary effort towards developing a comprehensive model for knowledge representation as well as future application.

● References

Atkins, B.T. and Levin, B. 1991. Admitting impediments. In Lexical Acquisition: Exploiting On-line Resources to Build a Lexicon, ed. by U. Zernik. Hillsdale, NJ: Lawrence Erlbaum Associates.

Clark, E.V. and Clark, H.H. 1979. When nouns surface as verbs. Language 55: 767-811.

Croft, William. 1991 Syntactic categories and grammatical relations, University of Chicago Press, Chicago,IL

------. 1990. Possible verbs and the structure of events. In Meanings and Prototypes: Studies in Linguistic Categorization, ed. by S. Tsohatzidis. London/New York: Routledge.

Dowty, David. 1991. Thematic proto-roles and argument selection. Language 67:3.547-619.

Filmore, C.J. 1968. The case for case. In Universals in Linguistic Theory, ed. by E. Bach and R. T. Harms, 1-88. Holt, Rinehart and Winston New York, NY.

Grandy, Richard E. 1992. Semantic fields, prototypes, and the lexicon. In Frames, Fields, and Contrasts: new Essays in Semantic and Lexical Organization, ed. by Lehrer and Kittay, 10-122. Hillsdale: Lawrence Erlbaum.

Huang, Chu-ren, and Ahrens, Kathleen. 1999. Module-Attribute Representation of Verb Semantics. Working Papers on Mandarin Verb Semantics. Taipei: Academia Sinica.

Huang, Chu-Ren, Mei-chun Liu, and Mei-chih Tsai. 1998. From lexical meaning to event structure attributes: across semantic classes of Mandarin verbs. Paper presented at the 6th International Conference on Chinese Linguistics/The 10th North American Conference on Chinese Linguistics. Stanford U.

Jackendoff, R. S. 1983. Semantics and Cognition. Cambridge: MIT Press.

-------. 1990. Semantic Structures. Cambridge: MIT Press.

-------. 1996. Conceptual semantics and cognitive linguistics. Cognitive Linguistics 7: 93-129.

-------. 1997. Twistin' the night away. Language 73 (3): 534-559.

Juffs, A. (1993). The syntax ans semantics of locative verbs in Chinese. ESCOL *92*, 137-148.

Levin, Beth. 1993. Verb Classes and Alternation. Chicago: U of Chicago Press.

Levin, B., G. Song and B.T. S. Atkins. 1997. Making sense of corpus data: A case study of verbs of sound. International Journal of Corpus Linguistics 2(1): 23-64.

Levin, B. and M. Rappaport Hovav. 1991a. The lexical semantics of verbs of motion: The perspective from unaccusativity. In Thematic Structure: Its role in grammar, ed. by I. Roca. Berlin: Walter de Gruyter.

-------. 1991b. Wiping the slate clean: A lexical semantic exploration. Cognition 41: 123-151.

Levin, Beth, and M. Rappaport. Hovav. To appear. From lexical semantics to argument realization. In Handbook of Morphosyntax and Argument Structure, ed. by H. Borer.

Liu, Meichun. 1996. A pilot study on Chinese verb classes and alternations. NSC Project Report (NSC85-2418-H-009-003).

-------. 1997. Conceptual basis and categorial structure: a study of Mandarin V-R compounds as a radial category. In Chinese Languages and Linguistics IV: 425-51. Taipei: Academia Sinica.

-------. 1999. Lexical meaning and discourse patterning - the three Mandarin cases of '*build*'. In Cognition and Function in Language, ed. by Barbara Fox, Dan Jurafsky, Laura Michaelis, 181-199. Stanford: CSLI.

Liu, Meichun, Chu-Ren Huang, Charles Lee, and Ching-Yi Lee. 1998. When endpoint meets endpoint: a corpus-based lexical semantic study of Mandarin verbs of '*throwing*'. Paper presented in IACL-7/NACCL-10, Stanford University.

Liu, Meichun, Chu-Ren Huang, and Ching-Yi Lee. 1999. Lexical information and beyond: constructional inferences in semantic representation. Proceedings of the 13th Pacific Asia Conference on Language, Information and Computation, Taipei.

Liu, Meichn, Chu-Ren Huang, and Chih-Ling Chang. 1999. The locus-locatum alternation: a lexical semantic study of Mandarin verbs of surface contact. Paper presented at the 11th North American Conference on Chinese Linguistics, Harvard University.

Lyons, John. 1977. Semantics. Cambridge: Cambridge University Press.

Pustejovsky, James. 1991. The syntax of event structure. Cognition 41:47-81.

-------. 1995. The Generative Lexicon. Cambridge: The MIT Press.

Pustejovsky, James, S. Bergler, and P. Anick. 1993. Lexical semantic techniques for

corpus Analysis. Computational linguistics 19 (2):331-358.

Rappaport, M., & Levin, B. 1988. What to do with theta-roles. In Thematic Relations, ed. by W. Wikins, 7-36. New York: Academic Press.

Smith, Carlota. 1991. The Parameter of Aspect. Dodrecht: Kluwer Academic Publishers.

Teng, Shou-hsin, ed. 1994. Chinese Synonyms Usage Dictionary. Taipei: Crane Publishing Co.

Tenny, Carol. 1992. The aspectual interface hypothesis. In Lexical Matters, ed. By
Ivan A. Sag and Anna Szabolcsi. Stanford: CSLI.

-------. 1994. Aspectual Roles and the Syntax-Semantics Interface. Dordrecht: Kluwer.

Tsai, Mei-Chih, Chu-Ren Huang, Keh-Jiann Chen. 1996. 由近意詞辨義標準看語意 句法之互動。Paper presented in IsCLL V, Taipei: National Cheng-Chi University. In the Proceedings of the Fifth International Symposium on Chinese Languages and Linguistics, 167-180.

Tsai, Mei-Chih, Chu-Ren Huang, Keh-Jiann Chen, and Kathleen Ahrens. 1998. Towards representation of verbal semantics -- an approach based on near synonyms. Computational Linguistics and Chinese Language Processing 3 (1): 61-74.

Vendler, Zeno. 1967. Linguistics in Philosophy. Ithaca: Cornell University Press.