LEXICAL INFORMATION AND BEYOND: MEANING COERCION AND CONSTRUCTIONAL INFERENCE OF THE MANDARIN VERB GAN

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ABSTRACT
This paper argues for the inclusion of constructional inferences in semantic representation of verbs. By examining the transitive pattern of the Mandarin verb 亡 (亡) ‘rush’, it is found that verbal semantics can only be adequately represented if constructionally coerced information is taken into consideration. The construction [亡 N] renders specific interpretations that cannot be directly derived from the lexical meaning of either the verb or the object NP. The construction itself carries salient information for the appropriate interpretation. The ‘ellipsed’ eventive information is analyzed from the perspective of Construction Grammar (Goldberg 1995). Moreover, a compositional framework based on Qualia Structure (Pustejovsky 1995) is utilized to resolve the potential ambiguity arising from the construction-triggered meaning. By combining the two complementary approaches, this paper attempts to account for and represent contextualized information as well as varied meaning facets associated with a partially-filled construction.

SUBJECT KEY WORDS
Lexical semantics, Mandarin verb, constructional inference, meaning coercion, Construction Grammar

1. INTRODUCTION
Knowledge representation of the verbal lexicon has always been one of the core issues in both theoretical and computational linguistics. In the early generative paradigm, verbs are considered to be the structural head of the sentence since they subcategorize its arguments and hence dictate the form of the sentence. Verb meanings are treated as general tendencies in selectional preferences, and the
semantic details of individual verbs are largely neglected. Recent development in lexical research has shifted the focus to investigating the interdependency between verb meanings and syntactic behavior. Most lexical semanticists share a common assumption that the syntactic behavior of a verb, especially its argument expression, is determined by the meaning of the verb (cf. Levin, Song and Atkins 1997, Pustejovsky 1995, Levin 1993, Atkins and Levin 1991, Atkins et al. 1988, etc.). Levin (1993) tries to categorize English verbs into semantically distinct classes on the basis of their argument alternation patterns. Pustejovsky’s (1995) program on the generative lexicon moves one step further in spelling out a multi-layered representational scheme for lexical information that includes Argument Structure, Event Structure, Qualia Structure, and Inheritance Structure. His goal is to fully represent word meanings as well as compositional interaction.

Another commonly shared belief among lexical semanticists is that the traditional ‘sense enumerative lexicon’, as Pustejovsky puts it, is inadequate to capture the real picture of natural language semantics. Specifically, such an approach cannot account for three lexically relevant phenomena: the creative use of words, the permeability of word senses, and the expression of multiple syntactic forms with a single word (Pustejovsky 1995: 39). It is argued that a more powerful compositional mechanism with predictive force is needed to allow coercion of lexical meanings into more complicated or innovative senses.

In view of the fact that lexical knowledge involves more than just the listing of different senses or simple combination of word meanings, we would like to present in this paper an interesting case in Mandarin where a single verb gives rise to various contextualized meanings when combined with different complement NPs. The issue under study is the transitive use of 吵吵 (chǎo) ‘rush’ in the pattern of [吵吵 + NP], such as 吵吵 gōngchē ‘rush (to catch) the bus’ or 吵吵 bāogào ‘rush (in writing) a paper’. The appropriate interpretation of the pattern requires incorporation of semantic components beyond the individually specified lexical information. It is proposed that to fully represent the semantics of the pattern, constructional inferences should be included in the knowledge representation of lexical information.

2. THE DATA

The main body of data for the analysis comes from the Balanced Sinica Corpus of both written and spoken contemporary Mandarin (http://www.sinica.edu.tw/fms-bin/kiwi.sh), containing a total of 5 million words, developed by the CKIP group in Academia Sinica, Taiwan. The total number of occurrences of 吵吵 in the corpus is 54, and the transitive use occupies 32% of the data. The paper starts initially as a contrastive study of the near-synonym pair - 吵吵 (chǎo) vs. 追追 (zhuī), following a corpus-based approach to Mandarin verbal semantic research (cf. Tsai et al 1998, Liu 1999, Liu et al 2000, Huang et al 2000). It then evolves into a special case study of contextual inferencing beyond lexical information. In the section below, the particular use of 吵吵 will be discussed in detail.
3. INITIAL OBSERVATIONS

3.1 Temporal Reference in the Use of itmap\n
The unique meaning of itmap can be highlighted when compared with its near-synonymous counterpart itmap (`chase'). It is suggested that unlike itmap, which merely takes on a nominal sense extension, the typical use of itmap requires a nominal sense extension as well as a temporal reference. Compare the following examples, where itmap and itmap can both take `bus' as a direct object but render completely different interpretations:

(1)  
- itmap  
  `to chase the bus'
- itmap  
  `to rush to catch the bus'

Example (1a) is a prototypical instance of transitive predication where the verb itmap `chase' describes a spatial motion that takes a movable, spatio-physical entity as its direct object. The object itself is the spatial goal for the act of chasing. On the other hand, the direct object in (1b) is not merely a spatial goal. The object with itmap `rush' does not fulfill the typical role of a locative GOAL as in a typical motional event; it is rather temporally specified. Example (1b) represents a peculiar and semi-fixed pattern in which the NPs following itmap refer to a physio-temporal target that is contextually bound with a given time frame. Therefore, in (1b), itmap `to rush to catch the bus' should not be interpreted as a simple event of directed motion; rather, it describes `an act of rushing in order to get to a PLACE (`the bus stop' in this case) by a certain TIME'. The motional activity involved is under-specified; it might be `running' or `getting a quick ride', etc. Such a contrast between the different roles played by the direct object NP can be captured as follows:

(2)  
\begin{tabular}{|c|l|}
  \hline  
  & Role of the Direct Object NP \\
  \hline  
  itmap & Spatially-defined Goal \\
  itmap & Temporally-defined Target \\
  \hline  
\end{tabular}
3.2 Event-Evoking Nominals in the Use of .generated

A further contrast between the uses of ZHU and GÅN is that GÅN not only requires a temporal reference, but it is followed only by nominals that may implicate an event (i.e., an activity nominal). Consider the following pair of examples where the verb is followed by a measured path:

(3) a. 他 追/*趕 了兩百公尺
    tâ ZHU/*GÅN le liâng-bâi gôngchê
    3sg chase PFV two-hundred meter
    ‘He chased (someone) for two hundred meters.’

b. 他 趕 了兩百公尺的路
    tâ GÅN le liâng-bâi gôngchê de lû
    3sg rush PFV two-hundred meter NOM journey
    ‘He rushed two hundred meters to finish the journey.’

In (3a), while it is perfectly fine to add a bare distance or measuring phrase (‘two hundred meters’) as an adjunct with ZHU, it is not permitted with GÅN. However, if the measure is embedded in a noun phrase to modify an undertaken journey as in (3b), it can then follow GÅN. Similar contrasts hold for frequency adjuncts. The verb ZHU, but not GÅN, can be readily modified by a bare frequency phrase ‘three times’, as illustrated in (4a), while GÅN only takes an embedded frequency phrase that modifies the nominal activity associated with the NP-object, as in (4b):

(4) a. 他 追/*趕 了三次
    tâ ZHU/*GÅN le sān cí
    3sg chase PFV three times
    ‘S/he chased (it) three times’ (i.e. S/he made three attempts of chasing.)

b. 他 趕 了三次公車
    tâ GÅN le sān-tâng gôngchê
    3sg rush PFV three-times bus
    ‘S/he rushed to catch three buses.’

The above examples show that the event of ZHU can be directly modified by a distance or frequency adjunct, but the event of GÅN may not. In the use of GÅN, the object NP denotes, or more precisely, implicates a ‘secondary’ event and the distance/frequency adjuncts can only refer to this event-implicating object NP. In
other words, there is an ‘ellipsed’ activity, inferred by the nominal object in the use of \( \text{G}_N \), which is the real target of the adjunct modification. The reason why \( \text{G}_N \) only allows internal modification with embedded verbal measurement in the NP-object is that \( \text{G}_N \) as a predicate only serves to encode manner or ‘set a tone’ for the implicated secondary activity; it describes broadly how the activity is carried out, i.e., in a rushed manner within a tight time-frame. As a predicate, \( \text{G}_N \) does not provide any specific eventive information regarding the actual activity undertaken. The semantics of \( \text{G}_N \) only denotes an under-specified pro-event that involves a temporally framed activity. The actual activity predicated must be inferred from the event-evoking nominal, which is also the focus for adjunct modification.

This observation can be further supported by the fact that the ill-formed example in (3a) above, \( \text{G}_N \leq \text{lia} \; \text{ba} \; \text{gōng} \; \text{chi} \) (赶了两百公尺) ‘rushed two hundred meters’, may turn out to be acceptable if it refers to an activity that can be ‘measured out’ by the adjunct (Tenny 1992). A context of making ropes/strings would be perfectly suitable for such an expression, as provided below:

\[
\begin{aligned}
\text{A:} & \quad \text{你繩子做好了嗎?} \\
& \quad nǐ \; \text{shéngzi zuò hǎo le ma} \\
& \quad ‘\text{you rope make done PFV Q}’
\end{aligned}
\]

\[
\begin{aligned}
\text{B:} & \quad \text{我已經趕了兩百公尺了} \\
& \quad wǒ \; \text{yǐjīng gān le liàng-bǎi gōngchǐ le.} \\
& \quad ‘\text{I already GAN PFV two-hundred meters CRS}’
\end{aligned}
\]

A: ‘Have you finished your rope-making?’
B: ‘I’ve rushed in finishing two hundred meters (of rope).’

The above examples clearly show that the event of \( \text{ZHI} \) can be directly modified by external, adverbial adjuncts, but in the case of \( \text{G}_N \), it is the event-evoking object NP that takes such modifications. Instead of predicing an event, the verb \( \text{G}_N \) ‘sets a frame’ or ‘profiles the manner’ in which a contextually inferrable activity may take place. The peculiar status of \( \text{G}_N \) in the lexicon is certainly not an isolated phenomenon; it is actually echoed by some other verbs in the Mandarin lexicon, as introduced below.

### 3.3 Other Related Cases

The appropriate reading of \( [\text{G}_N + \text{NP}] \) requires an incorporation of contextual 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 various activities/events that are not explicitly or lexically specified by the verb. Below are two such verbs:
The first verb 捡 (抢) ‘vie for, rob’ in (6) evokes a semantic frame (in the sense of Fillmore and Atkins 1992) that highlights two essential concepts: COMPETITION and GAIN, but the specific ‘activity’ is inferred from the NP complement. In (7), the verb 玩 (玩) ‘play, enjoy’ works in the same way: it generally refers to a ‘playful manner’, and the specific eventive information is supplied by the postverbal nominal. Other similar verbs may include 做 (做) ‘do, make’ and 弄 (弄) ‘do, play with’. A more comprehensive study would be needed to unveil the semantics of these frame-denoting verbs.

Another interesting and related issue is that for some prototypical transitive verbs that normally take a patient-object, there are also novel (and recent) V-N combinations that require a highly contextualized but relatively fixed interpretation. The semantic relation between the verb and the noun is not as straightforward as a typical V-O compound where the O functions as either the direct or indirect object. In example (8) below, the postverbal NP is not a necessary argument typically subcategorized by the verbs (’throw’ and ’hit’). The action named by the verb does not impose a direct, transitive impact on the surface object, although it may be perceived as a pre-requisite for obtaining the entity. The semantic role of the co-occurring nominal should be understood as some sort of an incremental theme arising from the contextually inferred activity:

(8) a. 投飲料
    TOU yinliào
    throw drink
    ‘to get a (canned) drink from throwing a coin to the vending machine’
<p>b. 打可樂
   dǎ kělè
   hit kele
   ‘to get a coke from punching the vending machine’

In both examples, the logical participant or the Patient - ‘a coin’ in (8a) and ‘a vending machine’ in (8b), was completely omitted in the surface form but contextually inferrable from the constellation itself. Cognitively, this may be viewed as another interesting instance of event conflation, as defined in Talmy (1991), where a complex event is conceptualized as simplex and syntactically realized as a single clause. A follow-up question to a cognitive semanticist would be: to what extent and on what basis can two separate events be conceptually ‘conflated’ as one? However, the relevant issue here with this kind of novel usage is: what kind of information is syntactically omitted but semantically and contextually recoverable, and how?

As demonstrated above, contextual inferences that go beyond lexical information pose a problem for lexical semantic studies and call for a systematic and unified treatment. Ideally, the adopted framework should be applicable to all the above-mentioned cases.

4. CONSTRUCTIONAL INFERENCES IN THE CASE OF GāN

As an attempt to probe into a possible solution and fully demonstrate the semantic complexity involved, the following sections will focus solely on the use of GāN. As shown above, the verb GāN selects an inanimate, potentially event-evoking NP as its argument. But the semantic range of the NP-argument is quite diverse. In the corpus, there are four major types of NP associated with the pattern [GāN + NP], and each facilitates a unique interpretation of the construction.

4.1 Semantic Types of the NP in [GāN + NP]

The NPs following GāN are inanimate in general and can be further divided into four sub-groups, as shown in (9):

(9) Inanimate NPs following GāN:

   a. Scheduled special events:
      趕集/考/廟會/演講
      Gānjí/kǎo/miào-huì/yǎnjǔng
      GāN market/exam/temple-festival/speech
      ‘to rush to take part in the market/exam/religious festival/public speech’
b. Vehicles running on a fixed schedule:

\textit{赶公車/飛機}

\textit{gān gōngchē/fēijī}

\textit{gān bus/aircraft}

‘to rush to catch the bus/airplane’

c. Lexically specified (overt) time expressions:

\textit{趕時間/進度/三點半}

\textit{gān shíjiān/jìn dù/sān-diǎn-bān}

\textit{gān time/schedule/three-o’clock-half}

‘to rush to save time/to catch up with a schedule/to get to the bank by 3:30 pm’

d. Artifacts to be produced by a deadline:

\textit{趕報告/作業/課/衣服/貨}

\textit{gān bàoɡào/zuòyè/kè/yīfu/huò}

\textit{gān report/homework/clothes/goods}

‘to rush to finish writing a paper/to rush to finish writing homework/to rush to finish teaching classes/to rush to finish making clothes/to rush to finish manufacturing goods’

The different types of NPs share the same surface form - \( [gān + NP] \), but render quite different interpretations of the actual event involved. In general, the event inferred from the NP is a volitional activity requiring speed to reach a certain goal by a certain time.

4.2 Interpretation

As shown above, the constellation \( [gān + NP] \) describes a telic event that is temporally bounded by a target state. With \textit{gān} functioning as a pro-verb, the interpretation of \( [gān + NP] \) reads like: ‘to achieve a \textit{STATE} by a certain \textit{TIME} through a speedy engagement in an \textit{ACTIVITY}’. It requires at least three meaning components: an Activity performed by the agent, a Target State associated with the nominal, and a Time Frame defined contextually or conventionally. In the example of \textit{gān bàoɡào} (\textit{赶報告} ‘rush a paper’), the under-specified Activity is ‘writing’, the Target State is ‘to get the paper done’, and the Time Frame is the ‘deadline’ for submitting the paper. All three components are needed for a complete semantic representation. What is unusual here, however, is that all the important information regarding Activity/Goal/Time is missing or lacking from the lexical semantics of either the verb or the nominal, if defined individually. It is the combination of the verb and the nominal, i.e., the verbal construction, that gives rise to the appropriate reading. The constructional inference can be captured as follows:
4.3 Setting the Frame: 《an as a Pro-verb

Given the interpretational complexity in the pattern [《an + Inanimate NP], more has to be said concerning the details of its semantic representation. If 《an is taken as a superordinate pro-verb, its lexical status is bound to be different from basic-level predicates (cf. Smith 1991). Instead of predicking events as other verbs normally do, it is used to ‘set a frame’ for various activities to take place. Here, the notion of a ‘frame’ is defined in a similar vein as in Fillmore and Atkins (1992:76), namely, ‘a structured background of experience, beliefs or practices, constituting a kind of conceptual prerequisite for understanding the meaning’. However, 《an (and other frame-setting verbs) is unique in that the frame is lexically inferred rather than syntactically realized with an array of arguments (‘frame elements’). The semantics of 《an or more precisely, the ‘semantic frame’ set by 《an, may be spelled out with the following properties:

- Presupposition: Normal pace of performing the activity is not enough (possible scenario: already being late with respect to the TIME frame).
- Manner: with an accelerating pace.
- Telicity: The event is directed towards a goal (Smith 1991), the projected Target State.
- Agent-control: The activity has to be volitional and under the agent’s control.

The last feature captures the fact that the agent of 《an has to be the actor typically associated with and undertaking the implicated activity. For example, 《an yīfū (赶衣服) ‘rush (to make) clothes’ cannot be taken as ‘rushing someone to finish making the clothes’, but can only be said of a dressmaker or tailor, who is the agent of the clothes-making activity.

The main point here is that the semantic information of the ‘ellipsed’ activity in the [《an + Inanimate NP] pattern cannot be obtained directly from the lexicon. It can only be obtained as deriving from the constructional pattern: only when the pro-verb 《an is combined with a potentially event-evoking inanimate nominal, can all the detailed eventive information be automatically inferred.

5. INFORMATION BEYOND THE VERB: EXPLANATORY FRAMEWORK

How can we explain and represent the fact that the pattern [《an + NP] expresses more information than the sum of the typical meanings encoded by the
verb and the noun? Basically the study adopts the construction-based approach, taking \([gān + NP]\) as a partially filled form-meaning pair. The form is associated systematically with the frame-evoked meaning. However, in some instances, there might be dual pairing. As shown below, some of the \([gān + NP]\) cases may allow dual interpretations of the role played by the postverbal NP. To account for the potential ambiguity, the mechanism of Qualia structure as proposed in Pustejovsky (1991, 1995) is also utilized. It is shown that the range of possible interpretations of \([gān + NP]\) falls within the range of semantic coercions from the four aspects of Qualia structure, as will be discussed in 5.2 below. In other words, the analysis provided here is a construction-based account with generative lexical dynamics.

5.1 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 what is contained in the constituent lexical items’ (Jackendoff 1997:553). A construction (or constructional idiom) represents a form-meaning association that functions in the same way as a lexical item functions in language. A lexical item ‘lexicalizes’ a certain concept or meaning that needs to be learned. In a similar fashion, a construction delimits certain aspects of meaning that are learnable. Taking the semi-fixed V-O pattern of \([gān + NP]\) as a constructional idiom allows us to specify the unique semantic features associated with the pattern that goes beyond the semantics of its constituent words.

In view of fact that \([gān + NP]\) is associated with particular frame-setting information as discussed above, we may propose that there is a semi-filled Construction in the Mandarin lexicon:

(11) Construction with \(gān\)

**FORM:** \([gān + Inanimate NP]\)

**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)]

**SPECIFICATION** on NP slot: Event-evoking NPs (an Activity Nominal or Time Reference that stands for a default activity/event.)

**EXAMPLES:**
- 趕作業 ‘gān -homework’ (NP-Nominal Activity)
  ACTIVITY [writing the homework] by TIME [deadline]
- 趕三點半 ‘gān -3:30 pm’ (NP-Time)
  ACTIVITY [rushing to the bank] by TIME [3:30]
The constructional meaning as specified above is temporally oriented, although it may have its semantic root in the conceptual link between SPACE and TIME. Activities are perceived as movement in space and therefore reaching a temporal point is perceived as ‘moving towards a locative goal’. This conceptual transfer may also explain the intuitive link between the spatial motional sense of Gân with animate objects (e.g. Gân yâi ‘chase ducks out’) and the frame-setting Gân. In some isolated cases, the spatial motional use of Gân ‘push’ is preserved in a more archaic form, which may juxtapose with the contemporary use for setting the temporal frame. What is at work here is the general cognitive principle that spatial movement is utilized as a conceptual basis for expressing temporal or eventive processes (The Localist Hypothesis, Gruber 1976, Jackendoff 1990).

However, there is one crucial problem that the constructional approach cannot readily solve. That is, the construction may be ambiguous regarding the role of the agent/actor. Take Gân - 表演 (Gân -biàyân) ‘rush (to finish) a performance’ as an example, it may either mean that ‘the audience rush to catch a drama performance’ or ‘the performers rush to finish a performance’. This problem of potential ambiguity can nevertheless be accounted for within the framework of Qualia Structure (Pustejovsky 1991, 1995), as introduced below.

5.2 Incorporating Further Semantic Extensions: Qualia Structure

Pustejovsky (1991, 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 information regarding the number, type and syntactic realization of logical arguments), 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, be it a verb or a noun. It specifies four essential aspects of the meaning of a word:

- Constitutive: the relation between an object and its constituent parts;
- Formal: factors that distinguish 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) has clarified, 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:

(12) 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: Constitutive, Formal, Telic, and Agentive.

The analysis of English enjoy parallels the case of Mandarin ottage with inanimate NPs in that [ottage + NP] also involves an ellipsed activity whose information is provided by the object-NP. Through coercion of the relevant qualia role, information about the Activity or Time Frame can be selected to derive an integrated interpretation of the predication, as illustrated below:

(13) Qualia Representation
a. ottage ottage ottage ottage 'rush to catch the bus'
   Bus [Telic = running on a fixed schedule]

b. ottage ottage ottage ottage 'rush to finish the paper'
   Paper [Agentive = writing]

In (13a), the Telic role of ‘bus’ is profiled in relation to the inferred time frame. In (13b), it is the Agentive role of ‘paper’ that gives rise to the inference of a ‘writing’ activity. The qualia roles are the source information for interpreting the activity involved in the use of ottage. What is advantageous with the proposal of Qualia Structure is that it can also solve the issue of potential ambiguity, as mentioned above. Take 赶比赛 ’ottage (ball) games’ as an example. It may allow two different interpretations of the activity involved: ‘play a game’ or ‘watch a game’, as shown below:

(14) Two Different Interpretations with 赶比赛 ’ottage (ball) game’
   赶了三场比赛.
   ottage le sān-chǎng bǐsài.
   a. ‘rushed to finish playing three games’
   b. ‘rushed to finish watching three games.’

The two distinct interpretations can be viewed as deriving from two distinct roles of the NP:

(15) Different Roles for 赛 ’(ball) games’
    a. [Agentive = playing]
    b. [Telic = entertaining/watching]

The suggested Qualia specification thus provides a convenient way to differentiate the two possible readings of the same pattern.

Moreover, the distinction between Telic and Agentive roles is also crucial in deriving the correct interpretation of [ottage + NP] in cases where the agentive function
of the NP takes precedence over other possible roles. With NPs that typically require a process of ‘production’ or ‘creation’, prior to and separable from the telic purpose, such as ‘(writing) a book/song’, the Agentive interpretation is always preferred. In the examples below, the Agentive interpretation is the intuitive and default choice:

(16) Agentive interpretation:

a. 趕書
   gǎn shū
   rush book
   ‘to rush to finish writing a book’ [Agentive]
   ‘to rush to finish reading a book’ [Telic]

b. 趕歌
   gǎn gē
   rush song
   ‘to rush to finish composing a song’ [Agentive]
   ‘to rush to finish singing a song’ [Telic]

With the pre-defined 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.

By incorporating two originally distinct approaches, this study provides a systematic and effective account of constructional inferences beyond lexical information. While constructional specification provides the necessary frame-related properties, the generative mechanism with Qualia characterization helps to differentiate the possible roles associated with the NP involved.

6. CONCLUSION

This paper presents an interesting case for semantic representation of Mandarin verbs. The appropriate interpretation of the construction [gǎn + NP] involves information beyond lexical semantic specification of its constituent words and thus require additional mechanisms for semantic integration. To fully represent the information, two equally applicable approaches are introduced in this paper. The first is based on proposals of Construction Grammar, in which ‘constructions’ are treated as lexical items that are uniquely associated with a given ‘meaning’. In this view, the pattern [gǎn + NP] will be listed in the lexicon as a meaning-bearing unit with all the information needed. The second approach is introduced in Pustejovsky (1991, 1995), where a Qualia Structure is used to specify four different meaning facets (Constitutive, Formal, Telic and Agentive attributes) for each lexical item, and contextual interpretation can be borne out through attribute and type coercion. Given that this paper aims to present the issue of semantic inference and examine what current theories can offer to handle the issue, the above two
approaches have been equally weighed and subsequently considered complementary: the constructional analysis helps to specify the inferential meaning while the potential ambiguity associated with the construction may be readily solved by applying the mechanism of Qualia Structure.

It is conceivable that an alternative explanation for the diverse usage of Gān may be one based on metaphor. The various derived meanings can be viewed as extending through metaphorical mappings from more concrete/physical to less concrete/physical domains. However, the metaphor approach would still need to spell out the semantic core of Gān that is mirrored across different domains. Moreover, based on corpus observations, the use of Gān ranges over a wide variety of senses pertaining predominantly to physical and concrete domains, as introduced in 4.1 above. It might be imaginable that some conceptual links may exist among these equally concrete domains. But the very fact that Gān functions differently from the majority of event-predicating verbs still requires an explanation. To provide a detailed characterization of the semantic properties of this widely used verb is precisely the goal of the present study.

Finally, as a pilot work on Mandarin lexical semantic research, this study bears the following implications:

- Lexical semantic studies lay an important foundation for tasks in both knowledge representation and natural language processing. The semantic information encoded on verbs is considered essential for sentence understanding. While most verbs are used for event predication, verbs like Gān appear to set a frame, or denote a manner, rather than naming a specific activity. To what extent can a verb be ‘extracted’ or removed from its event-predicating function? Besides lexically encoded eventive information, what else could be salient in defining a verb’s meaning? These are some further questions that need to be asked when dealing with lexical semantics of verbs.

- While the verb provides the central information regarding event structure and participant roles, constructional patterns may also coerce certain meaning components into the interpretation. Inferences arising from V-NP combinations as discussed above simply exemplify one kind of the compositional mechanism. Novel combinations of verbs and nouns with highly contextualized meanings will also need further investigation. Semantic information arising from lexical constellations as studied here calls for a unified and systematic treatment when dealing with knowledge representation of the Mandarin lexicon.

NOTES

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1 In the glosses, le is taken as the perfective marker (PFV) and de the marker of a modifying phrase (termed nominalizer (NOM) in Li and Thompson 1981).

2 Another possible translation is ‘S/he had to rush three (separate) times for buses.’

3 CRS stands for ‘currently relevant state’ (Li and Thompson 1981).

4 A different sense of GĀN is found in sentences where the object is animate and self-movable:

   趕人/蚊子/麻雀/牛/羊
   GĀN rén/wénzǐ/máquè/niú/yáng
   GĀN people/mosquito/sparrow/cow/sheep
   ‘to drive away people/mosquitoes/sparrows/cows/sheep’

5 In Taiwan, banks close at 3:30 pm. Therefore, the idiomatic expression 赶三點半 ‘GĀN -3:30 pm’ is conventionally known as rushing to the bank by 3:30 pm.

6 Following footnote 4, the other use, and hence another sense, of GĀN with animate NPs can also be viewed as a partially filled construction with the following specification:

   FORM: [GĀN + 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].
   SPECIFICATION on NP slot: animate, self-movable entities
   EXAMPLE: 赶人’GĀN-people’ (= get people out of a designated location).

Or, an alternative solution would be treating [GĀN +NP] as a constructional polysem with two sense associations: one with inanimate NP, the other with animate NP.

7 See footnote 5 for this particular use in Taiwan Mandarin.

8 See footnotes 4 and 6.

9 An interesting sense relation seems to hold in the potentially ambiguous use of 赶车 GĀN chē, which may mean 1) steering/pushing a carriage (archaic use), or 2) catch a bus/tram (contemporary use). The physio-spatial entity that is being pushed becomes the physio-temporal target the agent is pushing himself/herself towards.
In theory, every lexical word should possess all four aspects of Qualia structure, but most of the examples given in Pustejovsky (1995) are nouns and verbs.

A telic reading, though still possible, requires additional and particular marking in the context:

e.g. 老师要他读十本书，他一个晚上就读了五本书。

Teacher want him read 10-CL book, he one-CL night then

GAN LE 5-CL book

'The teacher required him to read 10 books, and he finished reading 5 books in one night.'

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詞彙訊息之外：由中文動詞「趕」探討句構內涵及衍生語意

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本文旨在探討詞彙訊息與句式內涵的語意互補關係，強調特定句式與詞彙結合後的「衍生語意」亦為動詞語意研究的重要課題。中文動詞「追」、「趕」雖為近義詞，但其語意類型差異頗大。「趕」提供動詞語意研究上一個有趣的現象，即動詞詞彙本身並不提供明確的事件訊息，而是透過所連結的名詞補語來標示述語活動，例如「趕作業」、「趕戲」、「趕三點半」皆內含不同的特定事件。在「趕+NP」的句構中，事件動作訊息在動詞上缺席，卻由名詞補語來界定補充，「趕」本身成為語意框架與情態的標記，功能類似一「代動詞」。此一現象可由「句構語法」及「衍生詞法」兩種理論觀點加以分析解釋。本文的最終目標是要指出詞彙訊息的表徵實應包括句式的組合及衍生語意的考量。

關鍵詞：詞彙語意、中文動詞、句構訊息、語意衍生、句構語法