CHINESE BA CONSTRUCTION IN HPSG

Man Gao

Department of Linguistics
University of Victoria

1. INTRODUCTION

The *ba* construction in Chinese is one of the most controversial issues in Chinese linguistics. Therefore, there is little agreement on a proper analysis of this construction. The most fundamental question regarding this construction is the status of *ba*, whether it is a verb, a preposition or merely a case marker. In this paper, I am not going to address this issue; rather my focus will be at the sentence structure level and specifically on the valency of the main verb in the *ba* construction under the framework of Head-Driven Phrase Structure Grammar (hereafter HPSG). The aim of this analysis is to provide some insights into the complex syntactic situation and the open question on the status of *ba*.

The discussion is composed of two parts: section 2 deals with the fundamental properties of the *ba* construction and some previous analyses that are relevant to my HPSG analysis, presented in section 3. This analysis proposes one principle and two lexical rules to account for the valency structure of both the word *ba* and the verb that follows it. In addition, this analysis accounts for the complicated syntactic structure of the *ba* construction by the combination between these three rules and the GAP principle and the Head-filler rule (Sag & Wasow 1999). I summarize the paper in section 4.

2. DESCRIPTIONS AND ARGUMENTS

2.1. The properties of *ba*-construction

The Chinese *ba* construction has been labeled differently by various linguists. The first and most popular name, by L. Wang (1954), Chao (1968), Li and Thompson (1981) and Tiee (1986), is 'disposal structure'. What they mean by this term is that *ba* has a meaning close to 'disposal', if we assume that the *ba* construction has the form 'X *ba* Y Z', then it gives us the meaning of X 'disposes' of Y in the way described by Z (Tsao 1986), e.g.

(1) *Wo   ba   fangzi   shao-le.*
    I   *ba*   house   burned-perf.
    'I burned the house.'

(2) *Zhangsan   ba   Lisi   ganzou-le.*
    Zhangsan   ba   Lisi   drive away-perf.
    'Zhangsan drove away Lisi.'

To put this sentence into a closer translation to the intention behind sentence (1): 'I put/caused the house into a situation in which it was burned.' Other linguists refer to this construction as the 'executive construction' (Hashimoto 1971), 'accusative construction' (Teng 1975), 'ergative construction' (Frei 1956), or simply '*ba* construction'. But they all try to express the idea that the *ba* sentence "states how a person is handled, manipulated, or dealt with; how something is disposed of, or how an affair is conducted." (Y.-C. Li 1974)

The reason we call this sentence structure in Chinese a *ba* sentence lies in the fact that *ba* is playing a significant role in the construction; it takes an NP after it and requires a following VP at the end of the sentence, otherwise it is ungrammatical.

(3) * *Wo*   *ba* *fangzi.* / * *Wo*   *ba* *shao-le.* / * *Wo*   *ba* *shao-le*   *fangzi.*
1ˢᵗ pers.sg. *ba* house/ 1ˢᵗ pers.sg. *ba* burn-perf./1ˢᵗ pers.sg. *ba* burn-perf house

So the representation of this structure is:

(4) NP1   *ba* NP2   VP

    I am going to use NP1 to refer to the NP preceding *ba*, and NP2 to the NP following *ba* in the rest of this paper.

    There are some constraints at the end of the *ba* sentence. First, stative verbs cannot appear in the *ba* construction, such as *you* 'have', *xiang* 'miss' and *zhidao* 'know', but they are not prohibited from the corresponding non-*ba* sentences (Zou 1993):

(5) a. * *Wo*   *ba* *shu*   *you-le.*
    1ˢᵗ pers.sg. *ba* book have-perf.
   b. *Wo*   *you* *shu.*
    1ˢᵗ pers.sg. have book
    'I have books.'

    Secondly, some perception and psychological verbs cannot be used in the *ba* construction, such as *ai* 'love', *xihuan* 'like', *kanjian* 'see ':

(6) a. * *Ta*   *ba* *Zhangsan* *ai-le.*
    3ʳᵈ pers.sg. *ba* Zhangsan love-perf.
   b. *Ta*   *ai*   *Zhangsan*
    3ʳᵈ pers.sg. love   Zhangsan
    'He/she loves   Zhangsan.'

    Finally, a perfective aspect marker –*le,* a durative aspect marker –*zhe*, or a directional or resultative adverb such as *wan* 'end' is usually required to follow the verb, otherwise it may cause ungrammaticality, e.g.:

(7) a. * *Wo*   *ba* *fangzi*   *shao.*
    1ˢᵗ pers.sg. *ba* house   burn
    'I burned the house.'
   b. *Wo*   *ba* *fangzi*   *shao-le.*
    1ˢᵗ pers.sg. *ba* house   burn -perf.
    'I burned the house.'

    However, more concern is put on the relation between NP2 and the V (head of VP) in the *ba* construction. Although the NP2 can be the object of the verb, it is not necessarily so. In sentence (1), *fangzi* 'house' is the object of the verb *shao* 'burn', but some relations are also possible in *ba*-construction, e.g.:

(8) *Wo*   *ba*   *juzi*   *bo-le*   *pi.*
    1ˢᵗ pers.sg. *ba*   orange peel-perf   peel(n.)
    ' I peeled the skin off the orange.'

    The NP2 in sentence (6) is not the object of the verb *bo* 'peel', rather it is the possessor of the actual object, *pi* 'peel (n.)'. We will come back to this in the next part, as this possessive relation is one focus of my analysis.

    Lastly, all sentences with *ba* have a counterpart without *ba* (Sybesma, 1999), e.g.:

(9) a. *Wangwu*   *ba*   *ta*   *muqin*   *ganzou-le.*
    Wangwu   *ba* 3ʳᵈ pers.sg.   mother   drive-away-perf.

'Wangwu drove his mother away.'

b. *Wangwu   ganzou-le   ta   muqin.*
   Wangwu   drive-away-perf   3rdpers.sg.   mother
   'Wangwu drove his mother away.'

These two sentences share similar meanings, though some linguists argue that there is some difference between them. However, this difference lies in the sense of 'disposal' in the *ba* construction.

So far, we have examined the basic properties of *ba* construction, I am going to first present two relevant analyses on the projection that *ba* is heading and the syntactic structure of the *ba* sentence, and then make assumptions for the following HPSG analysis.

2.2. *Ba* Phrase

Zou (1993) develops his theory with the assumption that there is a deep structure (D-structure) for the *ba* construction. His deep structure is represented as:

(10) [IP **Wo** [*BaP* [*ba* *ba*] [ASPP -le] [VP **qiang** [NP **ta**]]]]]
      I   *ba*   -perf   rob   him.

He treats *ba* as a functional category heading its own projection *ba*-phrase, and it selects an aspect phrase (ASPP) or a directional/resultative particle phrase (PARP) as its complement. Thus, the VP is the complement of the head of the ASPP phrase. In the D-structure, the verb *qiang* 'rob' assigns a θ-role to the NP *ta* 'him' which then moves to the specifier position of ASPP to get case from *ba*. The verb *qiang* 'rob' is raised to the position of ASP, amalgamating with the aspect marker –*le*. Under this analysis, the surface structure of *ba*-sentence is derived from a D-structure by NP movement and verb-raising. The problem with this analysis is the treatment of VP and the ASP phrase. The head of the ASPP, according to Zou, is the perfective (aspect) marker –*le*, which is only a suffix indicating aspect. Its complement, the verb, plays a more important semantic role in this sentence. I do not see the necessity of treating the VP as the complement of ASPP and then raising it from the original position. Therefore, the D-structure that he proposes is also problematic. In my analysis, the *ba* construction does not have any D-structure, since every *ba* sentence has its non-*ba* counterpart, the non-*ba* sentence is an ideal reference to how the *ba* construction is formed.

However, Zou's analysis provides me with a helpful clue in how to treat the projection headed by *ba* in my analysis. Zou treats *ba* as the head heading its own *ba*-phrase, which is a neutral way of treating it. Since I am not going to deal with the status of *ba* and will leave it an open question, I will treat *ba* as Zou does.

Based on the above discussion, I propose that *ba* heads its own projection, the *ba*-phrase, and selects an NP and a VP as its complements.

2.3. The syntactic structure

Based on the assumption that *ba* is heading a *ba* phrase, and making use of the NP movement and verb-raising, Zou (1993) presents the syntactic structure of *ba*-sentence in this way:

(11) [IP **Wo** [*BaP* [*ba* *ba*] [ASPP **tai**   [ASP **qiangj -le**] [VP **tj** [NP **ti**]]]]]
      I   *ba*   3rdpers.sg.   rob-perf.

(12)

```
                        IP
        NP1 _____/  _____ BaP
        Wo                        /  \
                               ba      \___ ASPP
                                          /‾‾\
                                      NP2   ASP   VP
                                      ta  qiang-le  / \
                                                   V   NP
                                                   tj   ti
```
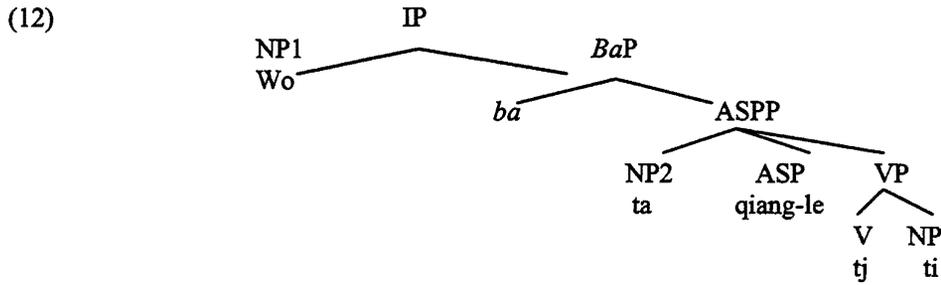
The tree structure in (12) shows that *ba* only takes one complement ASPP, and NP2 is the specifier of the head ASP, while VP is the complement. This structure has two problems: 1). It does not capture the properties of *ba* which requires a following NP and then a VP; 2). The combination of NP, ASP and VP is not a constituent by standard constituency tests.

(13) * *Wo   ba   [ta   qiang-le]   you   [ni   qiang-le].*
      1st pers.sg. *ba* 3rd pers.sg. rob-perf   and 2nd pers.sg. rob-perf.

(14) *Wo   [ba   ta   qiang-le]   you   [ba   ni   qiang-le].*
      1st pers.sg. *ba* 3rd pers.sg rob-perf   and   *ba* 2nd pers.sg rob-perf.
      'I not only robbed him, but also robbed you.'

The coordination test in (14) shows that *[ba ta qiang-le]* is a constituent in the sentence, whereas the ungrammaticality of (13) provides evidence that *[ta qiang-le]* is not a constituent, under the assumption that only like constituents can be coordinated.

The question test is another constituency test:

(15) A: *Ni   zuo   shen-me?*   'What are you doing?'
     B: *Ta qiang-le.*

(16) A: *Ni   zuo   shen-me?*   'What are you doing?'
     B: *Ba ta qiang-le.*   'Robbed him.'

The fact that (15) cannot pass the question test, while (16) can, again proves that *[ta qiang-le]* is not a constituent as it cannot stand alone. Therefore, the syntactic structure in (12) is not appropriate for the *ba* construction.

Bender (2000) also has a brief discussion on the structure of *ba* sentences. She discusses two different structures and argues for (18).

(17)

```
                        S
        NP _____/  _____ VP
        Wo                        /  \
                              PP ___/    \___ V(P)
                             /  \              |
                          (P)    NP         qiang-le
                          ba     ta
```

(18)

```
                        S
        NP _____/  _____ VP
        Wo                        /|\
                          V ____/ |  \___ VP
                          ba    NP      qiang-le
                                ta
```
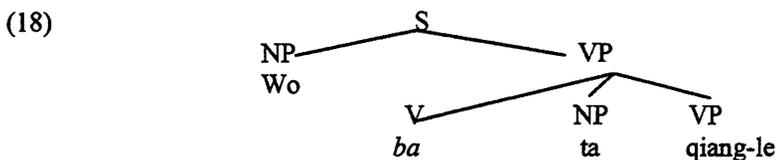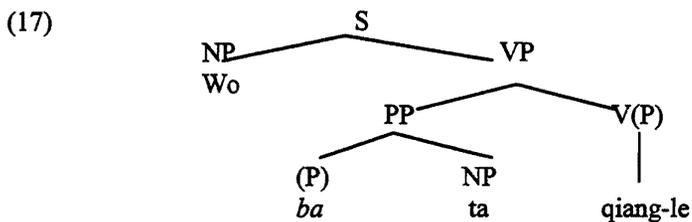
Although the structure in (17) also treats *[ba ta qiang-le]* as one constituent, which I have just proved with the constituency tests is a valid constituent, it treats *[ba ta]* as a constituent as well. However, the fact that *[ba ta]* cannot pass either of the constituency tests shows that it is not a constituent. Therefore, the structure in (17) is problematic.

(19) a. * *Wo* *[ba ni]*   *he [ba ta]*   *qiang-le.*
   1st.pers.sg. *ba* 2nd pers.sg. and *ba* 3rd pers.sg. rob-perf
  b. *Wo*   *ba [ni]* *he* *[ta]* *qiang-le.*
   1st.pers.sg. *ba* 2rd pers.sg. and 3rd pers.sg. rob-perf
    'I robbed you and him.'

(20) A: *Ni qiang-le shei?* 'Who did you rob?'
   B: **Ba ta. / Ta.*   'Him.'

In my analysis that follows, I use the structure in (18), but with modifications of the labels of the constituent in the tree.

Based on the above discussion, I assume that in the *ba* sentence, *ba*, NP2 and VP form one projection, the *ba*-phrase, and NP2 and VP are complements of the head *ba*. This assumption leads to the following structure:

(21)
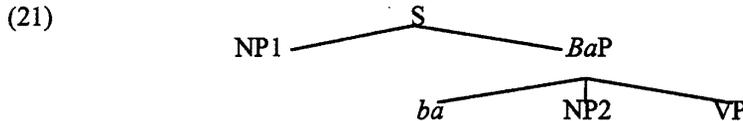
3. HPSG ANALYSIS

The *ba*-construction in Chinese has been dealt with under a wide range of frameworks, such as GB (He 1996) and LFG (Bender 2000). But how is it to be accounted in the framework of HPSG? In this part, I am going apply the HPSG theory (Sag & Wasow 1999) by using the relevant features, rules and principles to the Chinese *ba* construction.

3.1. Subject raising

According to M.Q.Wang (1987), the *ba* construction is 'a highly transitive construction', where 'transitivity' is defined as 'the carrying over of an activity from an agent to a patient.' This 'transitivity' aspect makes the *ba* sentence distinctive from its non-*ba* counterpart, thus the word *ba* bears the 'transitivity' character of carrying over an activity from NP1 to NP2. Being the specifier of the *ba* phrase, NP1 is also the syntactic subject of the embedded VP of the *ba* phrase.

(22) a. *Wo* *ba* *ta*   *qiang-le.*
   1^{st}pers.sg. *ba* 3^{rd}pers.sg. rob-perf.
   'I robbed him.'
  b. *Wo*   *qiang-le* *ta.*
   1^{st}pers.sg. rob-perf 3^{rd}pers.sg.
   'I robbed him.'

Comparing the *ba* sentence and the non-*ba* counterpart (22a) and (22b), we will find that the NP1 is acting both as the specifier of the matrix sentence and of the embedded VP of *ba*-construction, i.e. *ba* and its VP complement share the same NP in their SPR list. In addition, *ba* cannot pose any restrictions on NP1; it is the head of the embedded VP that selects the subject in both sentences.

Subject-raising and subject-control words are the two classes of words that share the property of subject sharing between the head of the matrix clause and its complement. The distinction between them is

whether the subject is playing a semantic role in the head of the matrix clause. As to the *ba* construction under discussion, I argue that *ba* is the subject-control word with the passive test.

(23) a.   *Ta   ba   wo   bei   qiang-le.
          3rd pers.sg.   ba   1st pers.sg.   by(pass.)   rob-perf.

      b.   Ta   ba   wo   qiang-le.
          3rd pers.sg.   ba   1st pers.sg.   rob-perf.
          'He robbed me.'

      c.   Ta   qiang-le   wo.
          3rd pers.sg.   rob-perf   1st pers.sg.
          'He robbed me.'

The fact that (23a) is ungrammatical and (22a) contrasts (23b) shows that *ba* is a subject-control word. In addition, *ba* is representing a relation of 'disposal' as discussed in section 2. The subject, although selected by the embedded verb, is assigned to the DISPOSER role in the *ba* construction. I will not elaborate this topic further since the discussion of the semantic relations in *ba* construction is beyond the scope of this paper.

We now turn to the question of how NP1 is assigned the position of specifier of *ba* although it is actually selected by the embedded verb.

The tree structure of the *ba* sentence in (21) shows that NP1 is raised to a higher level than VP in the *ba* construction but not in the non-*ba* counterpart. I propose a principle that accounts for the raising of the subject NP1 in the *ba* construction:

(24) Subject Raising Principle:

$$\begin{bmatrix} \text{phrase } ba \\ \text{HEAD [0]} \end{bmatrix}$$

$$\begin{bmatrix} Ba \\ \text{HEAD [0]} \\ \text{SPR <[1] NP1>} \end{bmatrix} \quad \dots \quad \begin{bmatrix} \text{word} \\ \text{HEAD verb} \\ \text{SPR <[1] NP1>} \end{bmatrix}$$
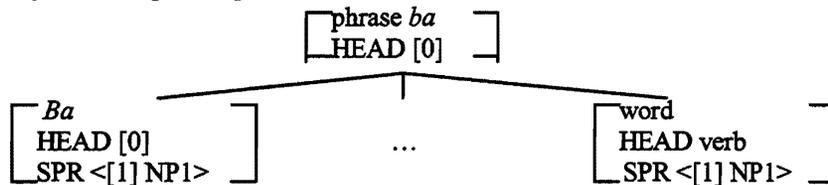
The Subject Raising Principle in (24) shows the NP1 that is originally from the SPR list of the embedded verb is raised to the SPR list of *ba* – the head of the matrix clause in a *ba* construction, thus both *ba* and its VP complement have NP1 as the subject. The term subject refers to the single element in the SPR list. Tsao (1986) argues that NP1 in *ba* sentences is a topic but not a subject with some examples that may seem problematic at the first glance:

(25) Na   chang   qiu   ba   women   kan-de-lei-si   le.
     That   Class. ball-game   ba   1stper.pl. see-Part.-tire-dead   Part.
     ' That ball game, we watched it until we were tired to death.'   (Tsao 1986)

The NP1 *Na chang qiu* 'The ball game' is not the subject of the verb *kan* 'watch', he argues, *women* 'we' is selected as the subject by the verb instead. I agree with him in the sense of semantics that 'the ball game' is actually the topic, and *women* 'we' should be subject, however, it is perfectly grammatical to say:

(26) Na   chang   qiu   kan-de   women   lei-si   le.
     That   Class. ball-game   see-Part.   1stper.pl. tire-dead   Part.
     ' That ball game, we watched it until we were tired to death.'

Sentence (26) is the non-*ba* counterpart of (25), and the fact that *Na chang qiu* 'that ball game' is in the subject position of (26) indicates that syntactically it is the subject in the non-*ba* counterpart and also in the *ba*-sentence.

3.2. Extraction

The relation between NP2 and the embedded verbal complex is more complicated than that between NP1 and the embedded VP I have just discussed. We will start with sentences with a simple structure.

(27) a. *Gou   ba   ta   yao-le.*
      Dog   ba   3rdpers.sg.   bite-perf.
      'Dog bite him.'
  b. *Gou   yao-le   ta.*
      Dog   bite-perf   3rdpers.sg.
      'Dog bite him.'

We can tell from sentence (27b) that NP2 *ta* 'he', is the object of the verb *yao* 'bite'. Since *ba* cannot be stranded, it requires a following NP, *ta* to be extracted from the COMPS list of the verb *yao* 'bite' to a higher position – the COMPS list of *ba*. Therefore, we can form one lexical rule licensing the object extraction in this case.

(28) Object Extraction Lexical Rule

$$
\begin{bmatrix} \text{word} \\ \text{HEAD} \quad \text{verb} \\ \text{SPR} \quad <\text{NP1}> \\ \text{COMPS} \ <[2]\text{NP2}> \end{bmatrix}
\rightarrow \quad \text{SPR} \quad
\begin{bmatrix} \text{word} \\ \text{HEAD} \quad \text{verb} \\ <\text{NP1}> \\ \text{COMPS} <> \\ \text{GAP} \quad <[2]> \end{bmatrix}
$$

When the object is extracted from the COMPS list of the verb, the verb is missing a complement encoded by the feature GAP. According to the GAP principle: the GAP values of all the daughters in a headed structure must add up to be the GAP value of the mother, unless the rule sanctioning the structure is the Head-Filler Rule (Sag & Wasow 1999). The GAP value [2] in 28 will be carried up by the GAP principle to the upper level until it gets terminated by the Head-filler rule when the GAP meets its filler.

But what if the verb has more than one NP in its COMPS list? Which one gets extracted by the Object Extraction Lexical Rule in the *ba* construction?

(29) a. *Ta   ba na-xie shu   song-ge   wo.*
     3rd pers.sg. ba those   books give-to   1stpers.sg.
     'He gives those books to me.'
  b. *Ta   song na-xie shu   ge   wo.*
     3rd pers.sg. gives those   books to   1stpers.sg.
     'He gives those books to me.'

(30) a. **Ta   ba wo   song-ge   na-xie   shu.*
     3rd pers.sg. ba   1stpers.sg. give-to   those   books
     * 'He gives me to the books.'
  b. *Ta   song-ge wo   na-xie shu.*
     3rd pers.sg. gives   1stpers.sg. those   books
     'He gives me those books.'

It seems from the above example that the first NP in the COMPS list is the one that gets extracted, because the extraction of the second NP *wo* 'I' would cause ungrammaticality. But which one is the non-*ba* counterpart of the grammatical *ba* sentence (29a), is it (29b) or (30b) as they share the similar meaning? It is widely agreed that *ba*-construction is one of the topicalization structures, according to Tsao (1986) both NP1 and NP2 are topics. NP2 is topicalized in the preverbal position in (29a). Here, *na-xie shu* 'those books' is the topic that attracts more attention than the NP in the postverbal position *wo* 'I'. Comparing sentence (29b) and (30b), *na-xie shu* 'those books' is more salient than *wo* 'I' in (29b) while vice versa in (30b). Thus, I assume (29b) is the non-*ba* counterpart of (29a) because they are more semantically similar than (29a) and (30b), although these three sentences mean the same thing.

(31) a. *Wo   ba   shu   fang-zai   shu-jia   shang.*
     1[st]pers.sg. *ba*   book   put-on   book-shelf   above
       'I put the book on the bookshelf.'
  b. *Wo   ba   shu-jia   fang-man-le   shu.*
     1[st]pers.sg. *ba*   book-shelf   put-full-Perf.   book
       'I filled the book-shelf with books.'

(32) a. *Wo   fang   shu   zai   shu-jia   shang.*
     1[st]pers.sg.   put   book   on   book-shelf   above
       'I put the book on the bookshelf.'
  b. *Wo   fang-man-le   shu-jia   shu.*
     1[st]pers.sg.   put-full-Perf.   book-shelf   book
       'I filled the book-shelf with books.'

The *ba* sentences and their counterparts in (31) and (32) provides further evidence that the first NP in the COMPS list of the verb is extracted. Sentences 32a is the non-*ba* counterpart of 31a, in which *shu* 'book' is the first NP in the COMPS list of the verb *fang* 'put', it gets extracted in the NP2 position in (31a). Similarly in (32b), *shu-jia* 'bookshelf' is the first NP and gets extracted to the NP2 position in (31b). The revised version of the extraction rule specifies that the first NP in the COMPS list of the verb is extracted in the *ba* construction:

(33) Object Extraction Lexical Rule (Revised Version)

$$
\begin{bmatrix} \text{word} \\ \text{HEAD} \quad \text{verb} \\ \text{SPR} \quad <\text{NP1}> \\ \text{COMPS} <[2]\text{NP2}, [3]\text{NP},...> \end{bmatrix} \rightarrow \begin{bmatrix} \text{word} \\ \text{HEAD} \quad \text{verb} \\ \text{SPR} \quad <\text{NP1}> \\ \text{COMPS} <[3]\text{NP},...> \\ \text{GAP} \quad <[2]> \end{bmatrix}
$$
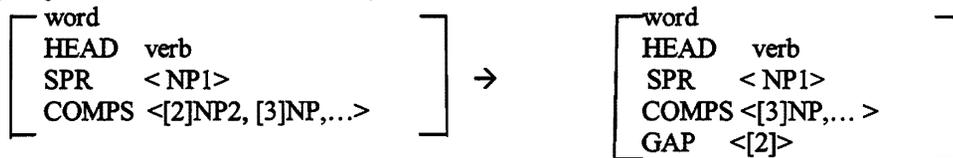
The COMPS list of a verb can be more complicated than a list with more than one NPs; it can have an NP with some inner structure, e.g.:

(34) *Wo   mai-le   san-tou   zhu.*
     1[st]pers.sg.   sell-Perf.   three-Class   pig
       'I sold three pigs.'

The first and only NP in the COMPS list of the verb *mai* 'buy' is *san-tou zhu* 'three (Classifier) pigs', which is different from any NP in the COMPS list we have examined, e.g. *shu* 'book'. This NP is composed of a quantifier (or Class. Phrase) *san-tou* 'three-Class.' and an NP *zhu* 'pigs'. There are two *ba* sentences corresponding to the same non-*ba* sentence of (34).

(35) a. *Wo   ba   san-tou   zhu   mai-le.*
     1[st]pers.sg. *ba*   three-Class   pig   sell-Perf.
       'I sold three pigs.'
  b. *Wo   ba   zhu   mai-le   san-tou.*
     1[st]pers.sg. *ba*   pig   sell-Perf.   three-Class
       'I sold three pigs.'

The revised version of the Extraction Lexical Rule only licenses (35a), since the NP as a whole is removed from the COMPS list. But the fact that (35b) is also grammatical shows that the extraction rule can look into the deeper structure than the valence list of the main verb—the valence structure of the verbal valent NP. If the valent NP of the main verb contains another NP, the embedded NP can be extracted instead of the superordinate one. With the Object Extraction Lexical Rule licensing the extraction of the first NP (completely) from the COMPS list of the verb, e.g. (35a), we need another extraction rule licensing the extraction of the valent NP of the first NP on the COMPS list of the main verb, e.g. (35b)., in which *zhu* 'pig' is the head and the only NP of the phrase *san-tou zhu* 'three pigs'. But what if the first NP on the COMPS list has more than one NP in its inner structure? Is it the head daughter that gets extracted?

Let us examine some other examples before coming to an answer to this question. The inner structure of the valent NP on the COMPS list analyzed above is the combination of the quantifier and the head noun. The examples we are going to examine involve valent NP with possessive relations.

(36) a. *Wo   bo-le   juzi   pi.*
      1st pers.sg. peel-Perf. orange   peel
      'I peeled the orange('s) peel.'
  b. *Wo   ba juzi   pi   bo-le.*
      1st pers.sg. *ba* orange peel peel-Perf.
      'I peeled the orange('s) peel.'
  c. *Wo   ba juzi   bo-le   pi.*
      1st pers.sg. *ba* orange peel-Perf peel.
      'I peeled the orange.'
  d. **Wo   ba pi   bo-le   juzi.*
      1st pers.sg. *ba* peel peel-Perf orange.

The *ba* sentence in (36b) is licensed by the rule stated in (33) as the first NP on the COMPS list of the verb *bo-le* 'peel' in (36a) is extracted. The NP is a possessive phrase, in which *juzi* 'orange' is the possessor and *pi* 'peel' is the possessed and also the head daughter of the larger NP. If we assume that it is the head daughter that gets extracted, then this will result in ungrammaticality in (36d). Therefore, the status of the head daughter is not the key factor for the extraction, but the syntactically first available NP. In the NP *juzi pi* 'orange('s) peel', *juzi* is the specifier of *pi*, thus is preceding the head daughter and therefore is the first NP available for extraction, whereas the phrase *san-tou zhu* 'three pigs' in (34), though *san-tou* is preceding the head daughter *zhu*, it is a ClP (classifier phrase) rather than an NP and thus the first available NP *zhu* is extracted. The specification of this extraction rule is:

(37) Extraction Lexical Rule II. (Revised Version)

$$
\begin{bmatrix}
\text{word} \\
\text{HEAD} \quad \text{verb} \\
\text{SPR} \quad <\text{NP1}> \\
\text{COMPS} <[2]\text{NP} \begin{bmatrix} \text{phrase} \\ \text{HEAD-DTR [[5] NP [SPR [4]NP]]} \\ \text{NON-HEAD-DTR} <[4]> \end{bmatrix}, ([3] \text{NP}...)>
\end{bmatrix} \rightarrow
$$

$$
\begin{bmatrix}
\text{word} \\
\text{HEAD} \quad \text{verb} \\
\text{SPR} \quad <\text{NP1}> \\
\text{COMPS} <[2] \text{NP} \begin{bmatrix} \text{phrase} \\ \text{HEAD-DTR [[5] NP [SPR<>, GAP <[4]>]]} \\ \text{NON-HEAD-DTR} <> \end{bmatrix}, ([3] \text{NP}...)>
\end{bmatrix}
$$
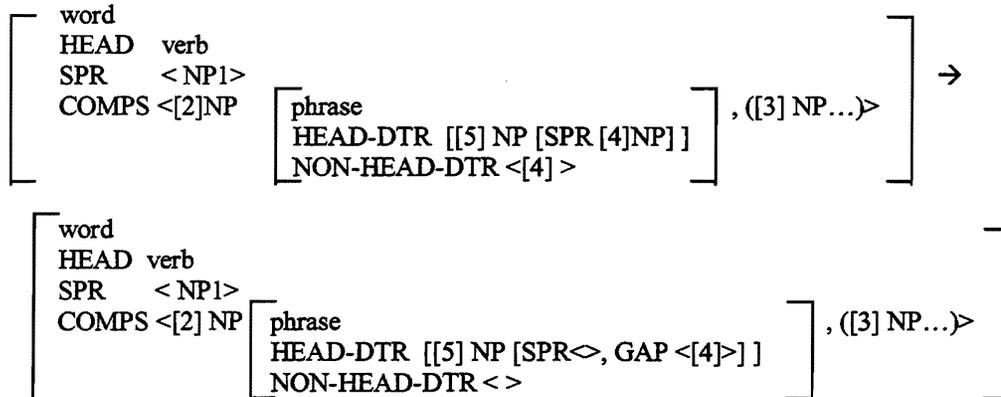
The structure of Chinese NPs is regular in the sense that the head daughter is always right-sided. Therefore, the extraction rule always checks the specifier (or modifier in other cases) of the head daughter first to see if there is any available NP that can be extracted, and if not, then turns to the head daughter. One of the most 'popular' sentences in various analyses of the *ba* construction also shows the validity of the rule stated in (37).

(38) a *Wo   ba ta   sha-le   fuqin.* (Li 1990)
      1st pers.sg. *ba* 3rd pers.sg. kill-Perf. father
      'I killed his father(he was affected by the killing).'
  b. *Wo   sha-le   ta   fuqin.*
      1st pers.sg. kill-Perf. 3rd pers.sg. father
      'I killed his father.'

The Extraction Rule in (37) results in the *ba* sentence (38a), since *ta* 'his' is the first available NP in the bigger phrase *ta fuqin* 'his father'. Of course it is always grammatical to extract the higher level NP as a whole: *Wo ba ta fuqin sha-le*. ' I killed his father.'

There are two different ways of expressing the possessive relation in Chinese NPs. One is what we have examined that consists of two NPs with which the possessor is the specifier of the head daughter—the possessed. The other more common way is with the particle *–de*, which is in this sense similar to genitive *'s* in English. So the phrase 'my father', in Chinese is either *wo fuqin* 'I father'or *wo-de fuqin* 'my father'. But if the latter appears in the non-*ba* sentence instead of the former in (38b), the *ba* sentence is different correspondingly.

(39) a. *Wo   sha-le   ta-de   fuqin.*
    1stpers.sg. kill-Perf. 3rdpers.sg.Gen. father
    'I killed his father.'
    b. **Wo   ba   ta-de   sha-le   fuqin.*
    1stpers.sg. *ba* 3rdpers.sg.Gen. kill-Perf. father
    c. *Wo   ba   ta-de   fuqin   sha-le.*
    1stpers.sg. *ba* 3rdpers.sg.Gen. father   kill-Perf.
    'I killed his father.'

The rule in (37) seems problematic since it cannot predict the ungrammaticality of (39b). However, I am not going to elaborate this issue further in this paper, but my intuitive explanation is: the phrase *wo-de* 'my' is not a noun phrase because of the particle *–de* which represents the possessive relationship. In addition, the classifier phrase (ClP hereafter) *san-tou* 'three' can be stranded, whereas *wo-de* 'my' is a phrase that cannot be stranded in Chinese, which rules out another possible *ba* sentence candidate: '*Wo ba fuqin sha-le ta-de.*'

Going through the data in other analyses of the *ba*-sentence, I find that only lower level NPs can be extracted from the NPs with quantifier (classifier phrase) or possessive relation, as discussed above.

3.3. The GAP and the whole picture of *ba*-construction

GAP is a feature used in HPSG to encode the fact that a phrase is missing a certain kind of element (Sag & Wasow 1999). I have discussed the GAP feature briefly in the above section. Since an element, an NP in this case, is extracted from either the COMPS list of the main verb or a deeper level to a higher position, an NP is missing and we have to use the feature GAP indicating the missing NP. The GAP principle allows the GAP information to be propagated upward through the tree structure (Sag & Wasow 1999), until the GAP value is charged off by the Head-filler rule when it meets its filler.

In this part, I am going to apply the GAP principle and the Head-filler rule to the *ba*-construction and see if they match. I will start with a *ba* sentence with simpler structure.

(22) a. *Wo   ba   ta   qiang-le.*
    1stpers.sg. *ba* 3rdpers.sg. rob-perf.
    'I robbed him.'

(40)
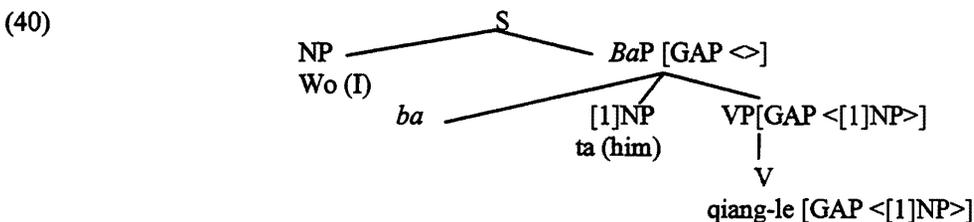
The GAP principle and the Head-Filler Rule work well with the *ba* sentence in 22. The GAP originating from the verb *qiang-le* 'rob' is carried up by the GAP principle to the VP level, where it meets

its filler *ta* 'him' and then gets emptied by the Head-Filler Rule. As a result, the GAP feature at the upper level *Ba*P is empty. The same applies to *ba* sentences whose complement VP has the GAP feature with the first NP complement missing, and this GAP feature is charged off at the BaP level after it meets the filler.

What is more interesting is the case when Extraction Rule II applies, i.e. the NP from the deeper level is extracted instead of the NP in the COMPS list of the main verb. Consider the sentence we have discussed:

(35) b. *Wo   ba zhu mai-le   san-tou.*
1^{st}pers.sg. *ba* pig sell-Perf. three-Class
'I sold three pigs.'

(41)

```
                                    S
              NP ─────────────────────────── BaP [GAP <>]
              Wo (I)                         ╱
                        ba ────── [1]NPi   VP[GAP <[1]NP>]
                                   zhu      ╱
                                      V          NP [GAP <[1]NP>]
                                    mai-le          ╱
                                               ClP      ti
                                              san-tou
```
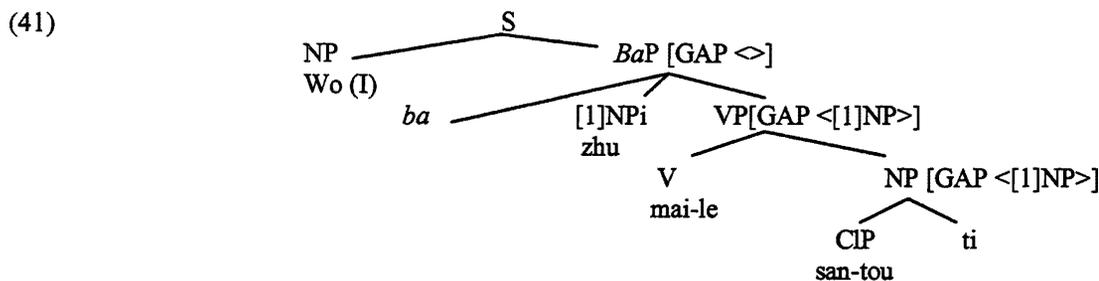
The interesting thing about this sentence is that the head daughter is missing rather than the complement, which is what HPSG theory has not yet dealt with, according to my knowledge. If we assume that the GAP feature also accounts for the missing head daughter of a phrase, then the GAP originates from the bigger phrase whose head daughter is missing. It is then carried up by the GAP principle and charged off when it meets the filler.

The same applies to a sentence in which the specifier of the valent NP on the COMPS list of the main verb is extracted.

(36) c. *Wo   ba juzi   bo-le   pi.*
1^{st}pers.sg. *ba* orange peel-Perf peel.
'I peeled the orange.'

(42)

```
                                   S
              NP ───────────────────────── BaP [GAP <>]
              Wo (I)                        ╱
                        ba ────── [1]NPi   VP[GAP <[1]NP>]
                                   juzi     ╱
                                      V        NP [GAP <[1]NP>]
                                    bo-le         ╱
                                              ti     NP
                                                  pi [GAP <[1]NP>]
```
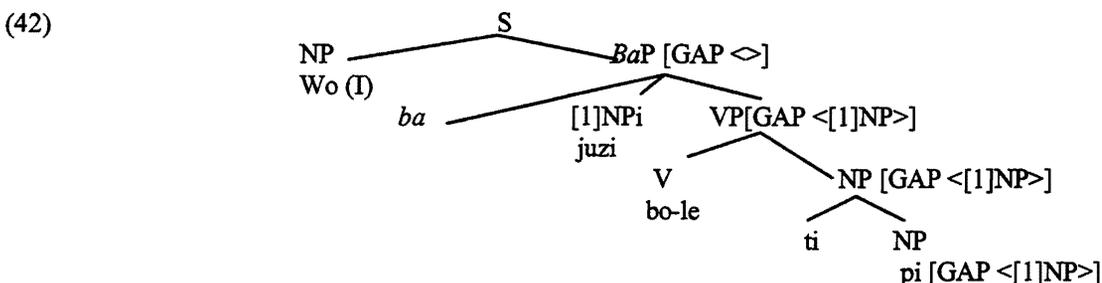
The only difference between (41) and (42) is that the head daughter is not missing in (42). Instead, it is the specifier of the head daughter *juzi* 'orange' that is missing. The GAP feature then originates from the head daughter *pi* 'peel' since its specifier is missing. The GAP gets charged off again at the *Ba*P level.

We are now able to see the whole picture of how the Subject Raising Principle, the Object Extraction Lexical Rule and the Extraction Rule II are applied in a *ba* sentence, and how the GAP Principle and the Head-Filler Rule work in the *ba* sentence. It is also a good wrap-up of the discussion on the Chinese *ba* construction presented in this paper.

(36) a. *Wo   bo-le   juzi   pi.*
1^{st}pers.sg. peel-Perf. orange   peel
'I peeled the orange('s) peel.'

(43) Non-*ba* counterpart

```
                  ┌ phrase                                              ┐
                  │         ┌ HEAD [1] ┬ verb              ┐            │
                  │ SYN     │          └ FORM    pass      │            │
                  │         │ SPR       <>                 │            │
                  │         └ COMPS     <>                 ┘            │
                  └                                                     ┘
              ┌───────────────────────┴──────────────────────┐
  ┌ word                        ┐          ┌ phrase                      ┐
  │ SYN [HEAD noun]             │          │ SYN     ┌ HEAD  [1]   ┐     │
[2]│ ARG-ST <>                  │          │         └ SPR   <[2]> ┘     │
  └                            ┘          │ ARG-ST    <[2]>             │
          │                              └                             ┘
          Wo                   ┌──────────────┴──────────────┐
  ┌ word                        ┐        ┌ phrase                    ┐
  │     ┌ HEAD    [1]   ┐       │     [3]│ SYN [HEAD [4]noun]        │
  │ SYN │ SPR     <[2]> │       │        │ ARG-ST    <>              │
  │     │ COMPS   <[3]> │       │        └                          ┘
  │     └              ┘       │          ┌──────────┴──────────┐
  │ ARG-ST   <[2], [3]>        │     ┌ word               ┐   ┌ word                   ┐
  └                           ┘  [5]│ SYN [HEAD noun]    │   │ SYN ┌ HEAD [4]    ┐    │
          │                         │ ARG-ST    <>       │   │     └ SPR   <[5]> ┘    │
          bo-le                     └                    ┘   │ ARG-ST    <[5]>        │
                                         │                   └                       ┘
                                        juzi                       │
                                                                   pi
```
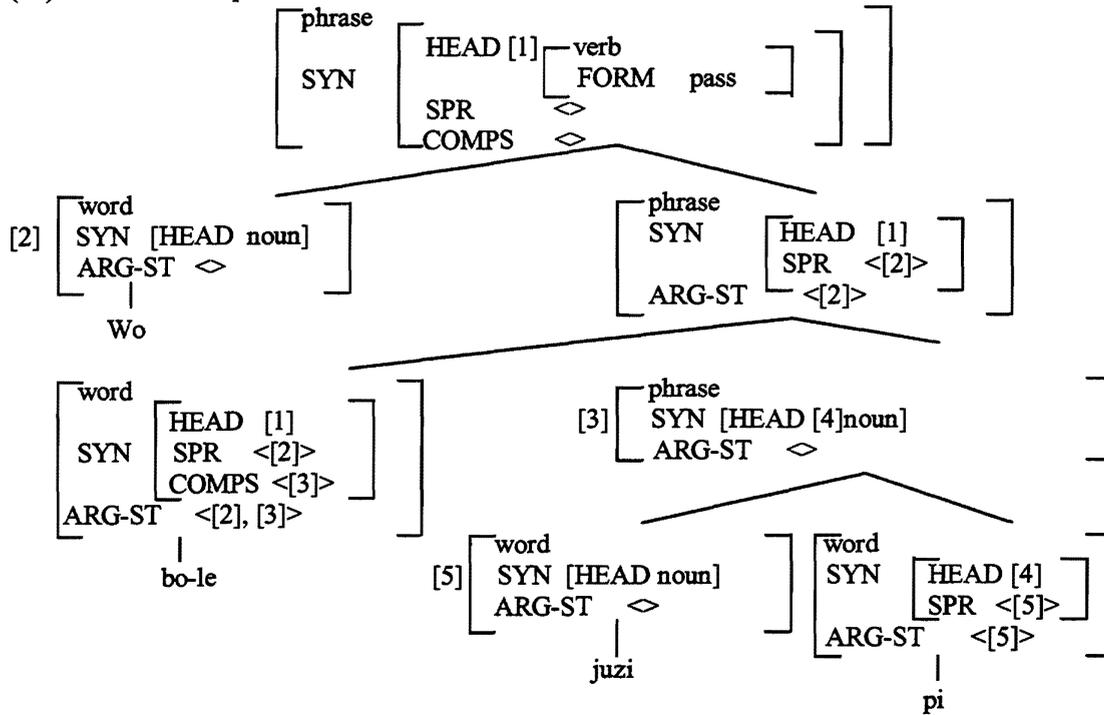
(36) c. *Wo   ba   juzi   bo-le   pi.*
     1[st]pers.sg. *ba* orange peel-Perf peel.
     'I peeled the orange.'

(44) *Ba* construction

```
                  ┌ phrase                                              ┐
                  │         ┌ HEAD [0]   [ba]    ┐                      │
                  │ SYN     │ SPR        <>      │                      │
                  │         └ COMPS      <>      ┘                      │
                  └                                                     ┘
              ┌───────────────────────┴──────────────────────┐
  ┌ word                  ┐          ┌ phrase                          ┐
  │ SYN [HEAD noun]       │          │ SYN     ┌ HEAD    [0]   ┐       │
[2]│ ARG-ST <>            │          │         │ SPR     <[2]> │       │
  └                      ┘          │         │ GAP     <>    │       │
          │                         │         └              ┘       │
          Wo                        │ ARG-ST    <[2]>                │
                                    └                               ┘
       ┌──────────────┬──────────────────┴──────────────────┐
  ┌ word                 ┐     ┌ word                   ┐    ┌ phrase                      ┐
  │     ┌ HEAD    [0]  ┐ │  [5]│ SYN [HEAD [noun]]     │ [6]│ SYN ┌ HEAD [1] verb   ┐    │
  │ SYN │ SPR     <[2]>│ │     │ ARG-ST    <>          │    │     │ SPR   <[2]>     │    │
  │     └ COMPS <[5],[6]>│     └                       ┘    │     └ GAP   <[5]>     ┘    │
  │ ARG-ST  <[2], [5], [6]> │       │                      │ ARG-ST    <[2]>            │
  └                        ┘       juzi                     └                           ┘
          │                                    ┌──────────────┴──────────────┐
          ba                          ┌ word                 ┐    ┌ phrase                   ┐
                                      │     ┌ HEAD   [1]   ┐  │ [3]│ SYN ┌ HEAD [4] noun ┐  │
                                      │ SYN │ SPR    <[2]> │  │    │     │ SPR   <>      │  │
                                      │     │ COMPS  <[3]> │  │    │     └ GAP   <[5]>   ┘  │
                                      │     └             ┘  │    │ ARG-ST    <[5]>        │
                                      │ ARG-ST  <[2], [3]>   │    └                        ┘
                                      └                     ┘           │
                                             │                          pi
                                            bo-le
```
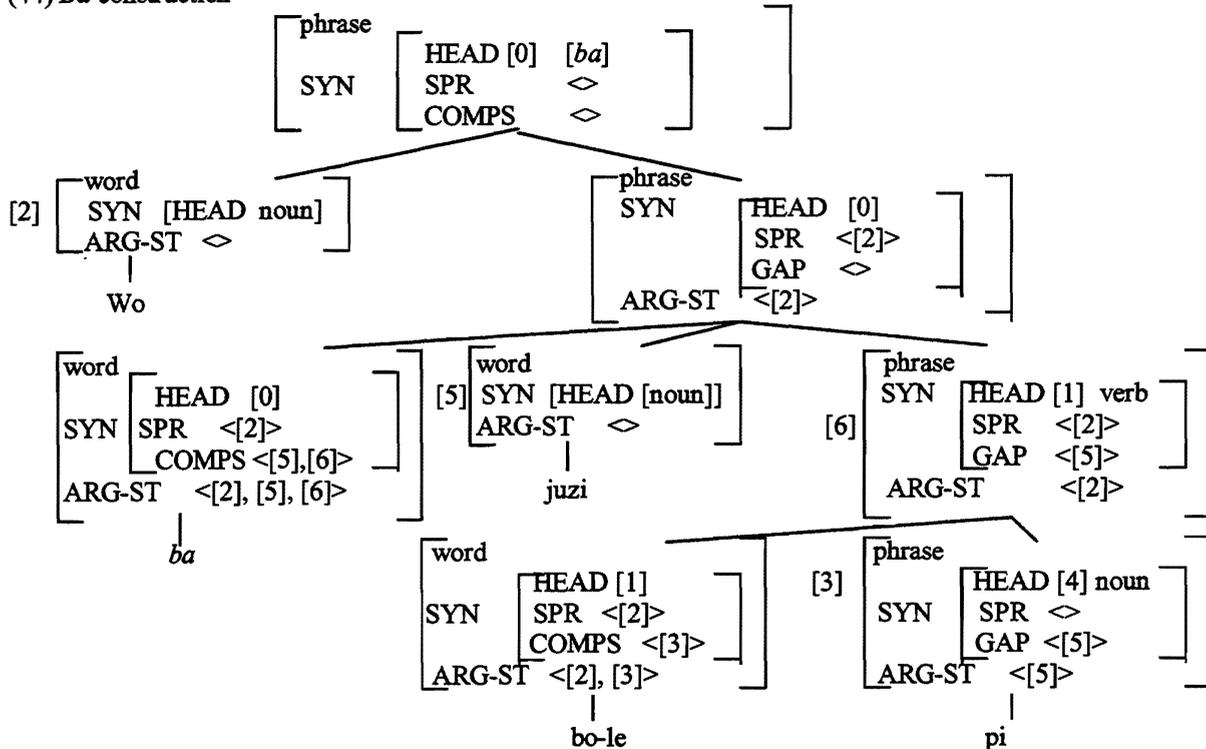
4. CONCLUSION

This analysis of Chinese *ba*-sentences focuses on the NP movements in the *ba* construction under the framework of HPSG. The Subject Raising Principle, the Object Extraction Lexical Rule and the Extraction Lexical Rule II are the rules that were formed in this paper to account for the phenomena found in the Chinese *ba* sentence, and they work well with the GAP Principle and the Head-Filler Rule proposed by Sag and Wasow (1999).

Although this is a preliminary study on the *ba* construction, it shows that the HPSG theory can account for the *ba* construction with the established features, lexical rules and AVM. This paper contributes to the study of the Chinese *ba* construction by introducing the HPSG theory to account for it.

REFERENCES

Bender, Emily (2000) The syntax of Mandarin *ba*: Reconsidering the ver*bal* analysis. *Journal of East Asian Linguistics*. 9 (2): 105-145.

Chao, Yuan-ren (1968) *A Grammar of Spoken Chinese*. Berkeley: University of California Press.

Frei, Henri (1956) The Ergative Construction in Chinese: Theory of Pekinese *pa*. *Gengo Kenkyu* 31: 22-50 (part I); 32: 83-115 (part II).

Hashimoto, Anne Yue (1971) Mandarin Syntactic Structures. *Unicorn* 8: 1-146.

He, Yuanjian (1996) *An Introduction to Government-binding Theory in Chinese Syntax.* New York: The Edwin Mellen Press.

Li, Charles and Sandra Thompson (1981) *Mandarin Chinese: A Functional Reference Grammar*. Los Angles: University of California Press.

Li, Yen-hui Audrey (1990) *Order and Constituency in Mandarin Chinese*. Boston: Kluwer Academic Publishers.

Li, Ying-che (1974) What does 'Disposal' Mean? Features of the Verb and Noun in Chinese. *Journal of Chinese Linguistics* 2: 200-218.

Sag, Ivan, and Wasow, Thomas (1999) *Syntactic Theory: A Formal Introduction*. Stanford: Center for the study of Language and Information Publications.

Sybesma, Rint (1999) *The Mandarin VP*. Kluwer: Dordrecht.

Teng, S.H. (1975) *A Semantic Study of Transitivity Relations in Chinese*. Taipeh: Student Books.

Tiee, H.H.Y. (1986) *A Reference Grammar of Chinese Sentences*. Tucson: University of Arizona Press.

Tsao, Feng-fu (1986) A Topic-Comment Approach to the *ba* Construction. *Journal of Chinese Linguistics* 15: 1-55.

Wang, L. (1954) *Zhongguo Yufa Lilun [Theory of Chinese Grammar]*. Peking: Zhonghua Shuju.

Wang, M.Q. (1987) *Transitivity and the ba-construction in Mandarin*. Doctoral Dissertation, Boston University.

Zou, Ke (1993) The Syntax of the Chinese *ba* Construction. *Linguistics* 31: 715-736.