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FUNCTIONALISM AND FORMALISM IN LINGUISTICS

VOLUME II: CASE STUDIES

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Structure-preservation and Transitivity

The case of Chinese *ba* sentences

Feng-hsi Liu
University of Arizona

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Abstract

The *ba* construction in Mandarin Chinese is subject to various constraints on the predicate and the object of *ba*, and the complexity poses challenges to both the formal approach and the functional approach. This paper proposes that an explanatory account of *ba* is to be found in an aspectual analysis, which is a formal approach. I suggest that the constraints on *ba* can be subsumed under two general properties: the *ba* NP is specific and the *ba* predicate denotes a bounded event. The *ba* NP and predicate are related by a homomorphism; specificity and boundedness are different manifestations of the same property that is inherent in the meaning of the *ba* predicate. I then compare the aspectual analysis with a functional approach, represented by the Transitivity analysis. I show that the Transitivity analysis is compatible with the aspectual analysis; both stress the correlation between the predicate and the argument. But it is the formal approach that offers an explanation for the correlation.

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1. Introduction

One of the most widely-studied constructions in Chinese is the *ba* construction. In this construction what is taken to be the object appears to the left of the verb, as the object of the preposition *ba*, as shown in (1).

(1) *Laowang ba xin xiewan le*
Laowang BA letter write:finish ASP
'Laowang finished writing his letter.'

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The construction is subject to a number of constraints both on the predicate and on the object of *ba*. The complexity of the constraints poses a challenge to a formal analysis, as they are difficult to characterize in syntactic terms. In fact, syntactic analyses of *ba* have to date not been successful; typically they are able to account for only a part of the phenomenon, as in the Case absorption analysis of Koopman (1983), Travis (1984) and Li (1985), and the causative analysis of Sybesma (1992). On the other hand, the construction appears to lend itself naturally to a functional analysis, since *ba* has been shown to serve functions in discourse. From the perspective of information flow, *ba* is said to exhibit high transitivity (Hopper and Thompson 1980), which in turn is linked to foregrounding in discourse. *Ba* is also said to divide the sentence into topic and comment (Hsueh 1986), with the *ba* NP being the topic, and what follows being the comment.

In this paper, I will argue that despite the plausibility of a functional analysis and the seeming difficulties of a formal analysis, it is the formal approach that will offer an explanatory account of *ba*. However, the explanation does not lie in a purely syntactic treatment; rather, it involves formal semantics as well. Essentially, I will propose an aspectual account, which I will compare with Hopper and Thompson's Transitivity account.[1] I will suggest that the two approaches are at root compatible, though the formal approach is superior in that it not only provides more empirical coverage, but it also offers a testable hypothesis for why *ba* occurs in the environment it does.

The paper is organized as follows: Section 2 examines the various environments of *ba* and identifies two requirements: the *ba* predicate (VP) denotes a bounded event and *ba*-NP is specific. Section 3 suggests that boundedness and specificity are related by a structure-preserving function — a homomorphism. Section 4 considers the same data from the perspective of the Transitivity analysis, and section 5 compares the formal analysis with the latter. Section 6 is a brief conclusion.

2. Boundedness and Specificity

2.1 *Distribution of* BA

There are basically two requirements on the well-formedness of a sentence with *ba*, as follows:

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(2) a. *ba*-NP is specific.
b. The VP is complex, in that it must contain some element other than the basic verb.[2]

We will delay the discussion of what it means for an NP to be specific until 2.3. The complex VP with *ba* can be classified into nine cases according to the structural properties of the predicate. These nine cases in turn can be grouped into three classes, (a–g), (h) and (i):[3]

(3) a. V + resultative verb complement
b. V + *de* (resultative)
c. V + retained object
d. V + PP (dative or locative)
e. V + quantified phrase
f. Adv + V
g. V + *yi* + V (the tentative construction)
h. V + perfective marker *-le*
i. V + durative marker *-zhe*

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These environments are illustrated in (4–12):

(4) V + resultative verb complement
Ni dei ba wenti kan qingchu
you have:to BA question read clear
'You have to read the questions clearly.'

(5) V + de (resultative)
Ta ba shou ju-de hen gao
he BA arm raise-DE very high
'He raised his arm very high.'

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(6) V + retained object
Ta ba damen shang-le suo
he BA gate put:on-ASP lock
'He locked the gate.'

(7) V + PP (dative or locative)
Wo ba zidian jie gei Laowang
I BA dictionary lend to Laowang
'I lent the dictionary to Laowang.'

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(8) V + quantified phrase
Ta ba zhe dianying kan-le liangbian
he BA this movie watch-ASP twice
'He watched the movie twice.'

(9) Adv + V
Xiaoming ba dongxi man wuzi reng
Xiaoming BA things whole room throw
'Xiaoming throws things all over the room.'

(10) V + yi + V (the tentative construction)
Qing ni ba xin kan-(yi)-kan
please you BA letter read-one-read
'Please read the letter (a little).'

(11) V + perfective marker -le
Wo ba chezi mai-le
I BA car sell-ASP
'I sold the car.'

(12) V + durative marker -zhe
Ba zhengjian dai-zhe
BA ID carry-ZHE
'Carry your ID (with you).'

We will show that these groups represent three ways whereby bounded events, i.e. events with a beginning point and an end point, are represented in Chinese.

2.2 *Bounded Events*

We will begin with the restrictions on the *ba* predicate. I will make use of the notion "boundedness" to characterize *ba*'s environment. First, however, it will be useful to make the following distinction between events and situations: events refer to denotations of predicates, presented in perfective or imperfective aspect, and situations refer to denotations of uninflected predicates.

Boundedness as discussed in the literature has been described in a number of ways. I will take Dahl's (1985, p. 29) definition as the starting point:

(13) A class of situations or a characterization of a situation [e.g. a sentence] is bounded if and only if it is an essential condition on the members of the class or an essential part of the characterization that a certain limit or end-state is attained.

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In this definition boundedness is the same as telicity. A bounded situation is a telic situation, a situation with an inherent terminal point or a resultative state. I will depart from Dahl's view in two ways, however. First, I will extend the notion of "boundedness" to be a property of events as well as a property of situations. To decide if an event is bounded we consider the entire predicate, including the aspect markers. Second, rather than looking at whether an event or situation has a potential terminal point or a resultative state, to determine whether it is bounded, I will assume that it must have one, and see whether the terminal point or resultative state is treated as part of the meaning of the predicate. A situation may have a potential terminal point or resultative state which is not part of its meaning. In such a case the situation is telic and yet unbounded. See 2.2.2.1 for an example.

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Our claim is that *ba* occurs with predicates that denote bounded events. *Ba*'s environment is constrained by both aspectual classification of verbs (Vendler 1968) and the perfective/imperfective distinction. In Smith's (1991) system, they are the two parameters of aspect — the situational aspect and the viewpoint aspect respectively. In this section, then, we will be primarily concerned with how a bounded event is expressed in Chinese. What we will suggest is that an event can be bounded in two ways: on the basis of the situation denoted by the uninflected predicate, or when a situation of an appropriate type occurs in a certain aspect. If the terminal point or resultative state is included in the meaning of the uninflected predicate, then the situation alone will guarantee a bounded event. If, however, the terminal point or resultative state is included only when the situation occurs in an appropriate aspect, then a bounded event depends on both the situation and the aspect it occurs in. In the first case we consider the situational aspect only, while in the second we consider both the situational aspect and the viewpoint aspect.

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2.2.1 *Bounded Situations*

First, consider the case involving situational aspect only. I suggest that in Chinese bounded situations are characterized by a property given in (14):

(14) Bounded situations do not have internal stages that are static.

Static stages are homogeneous and state-like, like the following:

(15) a. be dark
b. wear a T-shirt
c. look at the picture

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On the other hand, the situation of running three miles, for example, is not static. There is not a moment at which someone is at the state of running three miles. Rather, a situation like running three miles has successive stages, but not static stages. In English it is difficult to test if a situation has static internal stages, given the unreliability of aspectual marking. Progressives are often used, but not always.[4] Of the three static stages in (15), (b) and (c) are marked by progressive, but (a) is not, as in (16):

(16) a. It was still dark when I left home.
b. He was wearing a sweater when I met him.
c. They kept looking at the picture.

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In general, atelic situations have the static stage property, which includes states and activities. However, the converse does not hold. In Chinese there are telic situations that also have the static stage property. See 2.2.2.1.

In Chinese, when stages of a situation are presented as static, they are consistently marked by the imperfective marker *-zhe*:

(17) a. *Wo chumen de shihou tian hai hei-zhe*
I out:door DE time sky still dark-ZHE
'When I went out, it was still dark.'
b. *Ta chuan-zhe maoyi*
he wear-ZHE sweater
'He was wearing a sweater.'
c. *Tamen yizhi kan-zhe neizhang zhaopian*
they continuously watch-ZHE that:CL picture
'They watched the picture continuously.'

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On the other hand, situations that do not have static internal stages cannot be marked by *-zhe*:

(18) a. **Ta pao-zhe sanli lu*
he run-ZHE three:mile road
'He is running three miles.'
b. **Ta zou-zhe dao gongyuan qu*
he walk-ZHE to park DIR
'He is walking to the park.'

-Zhe is considered a marker of the durative aspect (Li and Thompson 1981), a marker that presents a continuous and stable situation without regard to endpoints (Smith 1991). Smith (1991, p. 363) gives the following description for *-zhe*:

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(19) a. *Zhe* [S] presents a moment or interval of a situation S that includes neither its initial nor final endpoints; and that does not precede the initial point.
b. Intervals focused by *-zhe* have the [+State] property.

-Zhe can also occur with predicates denoting non-stative situations, where it focuses on an internal stage of an on-going event, and in this case that stage is viewed as static:

(20) *Renmen tiao-zhe, chang-zhe*
people dance-ZHE sing-ZHE
'People were dancing and singing.'

(21) *Tamen zheng kai-zhe hui ne*
they Prog be:in:session-ZHE meeting PRT
'They are in the middle of a meeting.'

Our concern here is with *-zhe* in non-stative situations. From the above description, it follows that in order for *-zhe* to occur in predicates of non-stative situations, the situations need to be such that their internal stages can be viewed as static, homogeneous states. Situations that do not have this property are incompatible with *-zhe*.

Since predicates denoting non-stative situations with no static internal stages cannot be marked by *-zhe*, we arrive at the following generalization:

(22) If a non-stative predicate cannot be marked by *-zhe*, then it denotes a bounded situation.

We are now ready to return to *ba*. The various predicate structures that accept *ba* are repeated in (23):

(23) a. V + resultative verb complement
b. V + *de* (resultative)
c. V + retained object
d. V + PP (dative or locative)
e. V + quantified phrase
f. Adv + V
g. V + *yi* + V (the tentative construction)
h. V + perfective marker *-le*
i. V + durative marker *-zhe*

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Leaving aside (23h) and (23i), the other seven environments share one feature: none of the predicates can be marked by *-zhe*. This is seen in (24):

(24) a. **Wo ba wenti kan qingchu-zhe*
I BA question see clear-ZHE
?'I'm seeing the question clearly.'

b. **Ta ba jia baochi-zhe de hen ganjing*
he BA home keep-ZHE DE very clean
'He keeps his home very clean.'

c. **wo ba damen shang-zhe suo*
I BA gate put:on-ZHE lock
'I'm locking the gate.'

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d. **Ta ba xin fang-zhe zai zhuoshang*
he BA letter put-ZHE at tablea:on
?'He is putting the letter on the table.'

e. **Ta ba wenti kan-zhe yibian*
he BA question read-ZHE once
*'He is reading the question once.'

f. **Ta ba dongxi man wuzi reng-zhe*
he BA things whole room throw-ZHE
'He is throwing things all over the room.'

g. **Wo ba xin kan-zhe yi kan*
I BA letter look-ZHE one look
*'I'm taking a look at the letter.'

It follows from (22), then, that the predicates denote bounded situations. That is, the seven types of *ba* predicates denote situations where the terminal point or resultative state is included in the meaning of the predicate. The incompatibility between *ba* and *-zhe* is in fact a striking property of *ba* sentences. It points to a fundamental property of *ba*: the events described in *ba* sentences do not have static internal stages.

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2.2.2 -LE *and* -ZHE

The second type of bounded event is where the terminal point or resultative state is not included in the bare predicate, but becomes part of the predicate when the situation is presented in an appropriate aspect. There are two such cases: those marked by *-le* and those marked by *-zhe*.

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2.2.2.1 -LE. In the literature, situations like *mai neiliang che* 'sell that car', illustrated in (25) are taken as Accomplishments:

(25) *Ta ba neiliang che mai-le*
he BA that:CL car sell-ASP
'He sold that car.'

This is because they contain an inherent terminal point, i.e., when the car is sold. However, in Chinese these cases differ from other telic situations in that they cannot license *ba* if they are not presented in the perfective aspect:

(26) **Ta yao ba neiliang che mai*
he will BA that:CL car sell
'He will sell that car.'

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The reason why (26) is unacceptable, I suggest, is because in Chinese, V + specific NP object does not denote bounded situations. Although the situations it denotes have an inherent terminal point, the predicate behaves in a way that does not include that terminal point. Two pieces of evidence can be given in support of our view. First, the structure cannot be modified by the duration phrase *zai* X *nei* 'in X (amount of time)', with the interpretation 'complete/finish something in X'.

(27) a. **Ni neng zai yige zhongtou nei kan neiben shu ma?*
you can at one:CL hour in read that:CL book Q
'Can you read that book in an hour?'
b. **Wo xiwang zai yige xingqi nei mai neiliang che*
I hope at one:CL week in sell that:CL car
'I hope to sell that car in a week.'

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The other telic predicates, on the other hand, can be modified by the duration phrase with the intended reading. Here I will give two examples:

(28) a. *Ta neng zai yige zhongtou nei kanwan neiben shu*
he can at one:CL hour in read:finish that:CL book
'He can finish reading that book in an hour.'
b. *Ta zai yige zhongtou nei ba chuangzi xi-de hen ganjing*
he at one:CL hour in BA window wash-DE very clean
'He washed the windows clean in an hour.'

This suggests that the situations in (27) cannot be temporally bounded, whereas the situations in (28) can. Notice that the English counterpart of (27) are well-formed, which indicates that in English the situations are bounded.

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(29) a. Can you read that book in an hour?
b. I hope to sell that car in a week.

The second piece of evidence comes from interaction of a telic predicate with *-zhe*. The predicate V + specific NP object can be marked by *-zhe*:

(30) a. *Wo zheng kan-zhe neiben shu (ne)*
I PROG read-ZHE that:CL book PRT
'I am reading that book.'
b. *Taishang zheng yanzou-zhe lanse duonaohe*
platform:on PROG play-ZHE blue Danube
'On the platform they are playing The Blue Danube.'

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Other telic predicates, as we saw in 2.2.1, are incompatible with *-zhe*. Since *-zhe* marks an on-going event as stable and static, this suggests that situations described by *kan neiben shu* 'read that book' and *yanzou lanse duonaohe* 'play The Blue Danube' contain internal stages that can be viewed as static.

These two criteria — the inability to be temporally bounded and the ability to be viewed as having static stages — serve to distinguish situations denoted by V + specific NP object from the seven situations discussed in 2.2.1. Thus although *mai neiliang che* 'selling that car' has an inherent terminal point, it is unbounded according to these two criteria. This is a case where telicity does not imply boundedness.

If V + specific NP object describes non-bounded situations, then it follows that V + specific NP object alone will not license *ba*. However, the second strategy of licensing *ba* is operative here. That is, when the situations are viewed perfectively, bounded events will arise. These events may be temporally bounded, as in (31):

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(31) a. *Ta zai yige zhongtou nei kan-le neiben shu*
he at one:CL hour in read-ASP that:CL book
'He read that book in an hour.'
b. *Ta zai santian nei mai-le neiliang che*
he at three:da in sell-ASP that:CL car
'He sold his car in three days.'

That is, although the terminal point is not included in *kan neiben shu* 'read that book', it is included in the perfective form *kan-le neiben shu* 'having read that book'.

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2.2.2.2 -ZHE. The second case of *ba* licensed by inflected predicates concerns *-zhe*, as illustrated in (32):

(32) a. *Ba zhengjian dai-zhe*
BA ID carry-ZHE
'Carry your ID with you.'
b. *Wo ba jieshao xin na-zhe*
I BA recommendation letter take-ZHE
'I'll take the recommendation letter with me.'

After our discussion in 2.2.1 on how *-zhe* is incompatible with the *ba* predicate, it is a puzzle why sentences like (32) are well-formed. To see what is going on, it will be useful to consider more of *-zhe*'s properties.

We already know that *-zhe*'s basic function is to present a stable situation without regard to endpoints. So far all the sentences with *-zhe* are given in the realis mode. However, *-zhe* can also occur in the irrealis mode when a situation is stative or resultative:

(33) a. *Ni neng bu neng zai menkou zhan-zhe?*
you can not can at doorway stand-ZHE
'Can you stand at the door?'
b. *Qing ni dai-zhe shoutao*
please you wear-ZHE gloves
'Could you please wear gloves?'

In (33a) the addressee is asked to go to the door and stand there, and in (33b) the addressee is asked to put on gloves and continue to wear them. In both cases the event consists of two parts; for example, in the first part of (33b) an action of putting on gloves is brought about, and the second part is the continuous and resultative state of wearing gloves. The first part is inceptive, while the second is stative and resultative. The combination of the two constitutes a bounded event, with an action and a resultative state. Such events can be temporally bounded:

(34) a. *Qing ni cong ba dian dao shi dian zai menkou zhan-zhe*
please you from eight o'clock to ten o'clock at doorway stand-ZHE
'Could you please stand at the door from eight to ten?'

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b. *Qing ni zai zhe yige zhongtou nei wubi dai-zhe shoutao*
please you at this one:CL hour in be:sure wear-ZHE gloves
'Could you please make sure to wear gloves for the next hour?'

Thus *-zhe* in an irrealis sentence does not mark some internal stage of an event as static; rather, it serves to mark the resultative state of an event which is yet to happen. The irrealis mode then provides the inception of the action, and from the two combined — the beginning of the action and the resultative state, we can infer that the action will be completed.

Once it is shown that *-zhe* in irrealis denote bounded events, it is not surprising that *ba* occurs in this environment. Our analysis makes a prediction, however; that is, *ba* occurs with *-zhe* only in an irrealis sentence. This is borne out in two aspects. First, *ba* sentences in realis with *-zhe* are ill-formed:

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(35) a. **Ta shi ba jieshao xin na-zhe*
he is BA recommendation letter carry-ZHE
'It is indeed the case that he carries the recommendation letter with him.'

b. *Ta shi na-zhe jieshao xin*
he is carry-ZHE recommendation letter
'It is indeed the case that he carries the recommendation letter with him.'

Secondly, the ambiguity observed in (36) disappears in a *ba* sentence:

(36) *Ni ba wode shou zhua-zhe*
you BA my hand grab-ZHE
'Hold on to my hand.'

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(36) can only be interpreted as an imperative, not a stative, since only in the irrealis mode is the event bounded.

In short,-*zhe* occurring in *ba* sentences concerns stative predicates only, and it can do so only in the irrealis mode because only in the irrealis mode is the event bounded. In the realis mode the same situation is unbounded — it is simply a state, e.g. (35b). *-Zhe* has the same function of marking a resultative state in both modes; however, what makes an event with *-zhe* bounded in the irrealis mode is that the inception of the action is included in the meaning of the sentence, provided by the irrealis mode. This, together with the resultative state, marked by *-zhe*, gives rise to a bounded event, with completion of the action as inference. Thus the fact that *-zhe* occurs in *ba* sentences is not in conflict with

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the claim that events denoted by *ba* predicates do not have internal stages that can be viewed as static. I take the latter to be a central property of *ba* predicates.

2.2.3 *Summary*

In this section we have been concerned with how bounded events are expressed in Chinese. Three types of bounded events are identified. First, events are bounded simply on the basis of the situation denoted by the uninflected predicate. Seven out of nine environments of *ba* are of this type. Bounded situations are characterized by having no static internal stages, and in Chinese they have a morphosyntactic correlate — they cannot be marked by *-zhe*. Secondly, bounded events arise when telic but unbounded situations are presented perfectively. This concerns predicates containing a V and a specific NP object. Thirdly, bounded events occur when irrealis sentences are accompanied by *-zhe*, which marks the resultative state of events that are yet to take place.

In 2.1 we saw that one structural property shared by *ba* predicates is that there must be something other than the basic verb in the predicate. We can now see what functions these extra elements serve. They are the elements which, when combined with the verb, denote bounded events. They do this in one of two ways: the extra elements may lead to bounded situations (23a–g), or they may mark the aspect of a situation (23i, h).

2.3 *Specific Objects*

We now turn to the restrictions on *ba*-NP. In the literature it is observed that *ba*-NP is definite or has a specific interpretation, cf. Hashimoto (1971), Y. Li (1974), and Li and Thompson (1981). Here I will suggest that *ba*-NP is specific in a wider interpretation as follows.

In general, specific NPs are considered to include definite NPs, names, pronouns, and some of the indefinite NPs, e.g. specific indefinite NPs. However, in Liu (1990) it is suggested that specific NPs include a larger class of NPs. A semantic definition of specificity is given on the basis of the behavior of NPs with respect to quantifier scope. Simply put, specificity is associated with scope independence. NPs that can be interpreted as scope-independent when they interact with other NPs are defined as specific. According to that definition, then, specific NPs include not only the NPs listed above, but also universally quantified NPs and NPs with the determiner *most*. Indefinite NPs with modified numeral determiners such as *at least two*, however, are non-specific.

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(37) and (38) show that *mei* 'every' and *daduoshu* 'most' do occur in a *ba* argument:

(37) *Ta ba meiben shu dou kan-le*
he BA every:CL book all read-ASP
'He read every book.'

(38) *Ta ba daduoshu de xuesheng dou xiapao-le*
he BA most DE student all scare:away-ASP
'He scared away most of the students.'

In Chinese there is a syntactic difference between the NPs considered to be specific in my previous analysis and non-specific NPs. Specific NPs occur with the universal quantifier *dou* 'all, each', while non-specific NPs do not. In (39) X, the subject, must be specific:

(39) *X dou lai le*
'X all came.'

where	X =	*tamen*	'they'
		neixie ren	'those people'
		wuge ren	'five people'
		meige ren	'everyone'
		daduoshu de ren	'most people'
and	X ≠	*sanwuge ren*	'three or five people'
		wu dao shi ge ren	'between five and ten people'

Comparing (37–38) and (39), we can see that NPs that can be quantified by *dou* can also occur with *ba*, while (40) shows that NPs incompatible with *dou* are also incompatible with *ba*.

(40) a. **Wo ba sanwuge ren dai dao gongyuan qu le*
I BA three:five people take to park DIR ASP
'I took three to five people to the park.'

b. **Ta ba wu dao shi ge xuesheng qing lai le*
he BA five to ten CL student invite over ASP
'He invited five to ten stuents over.'

Thus the behavior of NPs in Chinese supports a view of specificity that relates to quantifier scope — if an NP can be universally quantified by *dou*, then it is specific. Further, the ability of an NP to occur with *dou* can be used as a diagnostics of specific NPs.

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3. Structure-preserving Function

3.1 *Dependency*

We are now ready to consider the predicate and the *ba* NP together. I will suggest that the restrictions on the predicate and the restrictions on the *ba* NP are connected; that is, there is a dependency between the *ba* NP argument and the predicate, and boundedness and specificity are different manifestations of a property of the dependency. The dependency can be characterized in terms of a very simple notion in semantics. The idea has been explored in Krifka (1989) and Dowty (1991), who capture the way the aspect of telic predicates depends on their NP arguments as a structure preserving function — a homomorphism.

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Dowty (1991) relies on homomorphism to characterize a new type of thematic role, which he calls Incremental Theme. An Incremental Theme is an argument of a telic predicate, which expresses a dependency between the argument denotation and the aspect of the event described by the predicate. For example, in evaluating the event described by *eat an apple*, we can find out the aspect of the event — completed, part-way through, not yet begun — by looking at the apple. If the apple is half-gone, then we know the event is also halfway through; whereas if the apple is gone, then we know the event is completed. This dependency can be captured in terms of a function that is structure preserving. Thus the meaning of a telic predicate is a function which maps the argument denotations into the domain of events, and in telic predicates the structure that is preserved is the "part of" relation: If x is mapped to the event e, then part of x is also mapped to part of e. This is given in the following diagram, where x′ is part of x and e′ is part of e, f is the homomorphism, and g, g′ are comparable relations that hold of (x, x′) and (e, e′) respectively. The structure preserving property guarantees that $f(g(x)) = g'(f(x)) = e'$.

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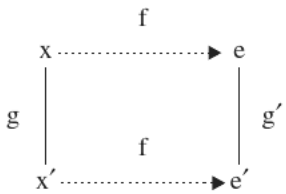

Our suggestion is that homomorphism also offers an elegant way to capture the meaning of *ba* predicates. I will take the meaning of a *ba* predicate to be a homomorphism that maps the *ba* argument denotations into the domain of events,

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and the structure that is preserved in this case is the "all of" relation. For example, *xiewan* 'write and finish' in *ba zhefengxin xiewan* 'write and finish the letter' maps *zhefengxin* 'this letter' to the event writing and finishing this letter. The "all of" relation that is preserved in the mapping makes sure that all of the letter — the entire letter — is mapped to all of the event, i.e. writing and finishing the letter. In the case of *ba dangao chi-le yiban* 'ate half of the cake', the *ba* predicate maps the cake to the event described by the *ba* predicate — eating half of the cake. Again, the "all of" relation that is preserved guarantees that all of the cake is mapped to the entire event, which is eating half of the cake. Here, the dependency between the aspect of the event and the NP denotation is quite obvious — in order to know if the event is complete, whether half of the cake is eaten, one needs to know the size of the entire cake.

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When applied to the predicate, the "all of" relation characterizes the event as bounded, since only events that are bounded can enter into the "all of" relation. Unbounded events like 'know Japanese' cannot be quantified because such events do not have boundaries — beginning point and terminal point. Only events with boundaries (both end points) provide a domain for universal quantification. Similarly, when it comes to NP denotations, the "all of" relation makes sure that the individuals can be quantified by "all of". And only specific NPs denote individuals that can be so quantified. Further, for indefinite NPs that in principle can be interpreted either "specifically" or "non-specifically", only the "specific" interpretation will be possible. Consider (41):

(41) *Wo hui ba sanben shu dou fangzai zhuoshang*
I will BA three:CL book all put:at table:on
'I will put all three books on the table.'

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In this sentence the *ba* NP is the indefinite *sanben shu* 'three books', and it is specific, since it can occur with the universal quantifier *dou*. Now *sanben shu* is interpreted "specifically" as 'the three books', and when the event has reached its end, all of the three books will be on the table. Now if *sanben shu* were interpreted "non-specifically", as any set of three books, then such individuals would not be able to be quantified by "all of", since there is no domain for the quantification to take place. Likewise, if the NP were non-specific, such as *budao wuben shu* 'fewer than five books', its denotation would not be able to be quantified by "all of" either, for the same reason. It does not make any sense to have an individual which is all of the fewer than five books. Thus the "all of" relation inherent in the *ba* predicate ensures that the *ba* NP is specific and that indefinite NPs in this context are interpreted "specifically".

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Further, the "all of" relation will ensure that the *ba* argument participates in the entire event. Therefore, if an argument only participates partially in a bounded event, *ba* will not be allowed. The predicates in (42) are such cases:

(42) a. *kandao dierzhang*
'read up to chapter two'
b. *kanjian Laowang*
'see Laowang'

In (42a) chapter two only participates in the final point of the event, and in (42b) Laowang is part of the event only as a result of the seeing; the argument has not gone through the entire event, even though the latter concerns an instant event. (43) shows that *ba* cannot occur in these predicates:

(43) a. **Jintian women ba dierzhang kandao-le*
today we BA chapter:two read:up:to-ASP
'Today we read up to chapter two.'
b. **Wo ba Laowang kanjian le*
I BA Laowang see ASP
'I saw Laowang.'

In the following we consider some other consequences that follow from our analysis. For a more detailed discussion, see Liu (1997).

3.2 *Consequences*

3.2.1 *Non-quantifiable Events and Entities*

The first consequence of our analysis is that entities and events incompatible with the "all of" relation are also incompatible with *ba*. That is, entities and events that are not quantifiable cannot occur with *ba*.

Since only events with a beginning and an end can be quantified by "all of", it follows that States and Activities do not occur with *ba*. Both States and Activities lack the beginning and end points: the former describe situations that are stable and homogeneous while the latter concern dynamic processes. And neither occurs with *ba*. (44) illustrates that Activities, even when presented perfectively, do not license *ba*, and (45) is an example of States not compatible with *ba*:

(44) a. *Wo jintian zongsuan qi-le che*
I today finally ride-ASP bike
'I finally rode the bike today.'

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b. **Wo jintian zongsuan ba che qi-le*
I today finally BA bike ride-ASP
'I finally rode the bike today.'

(45) **Laowang ba Li xiaojie xihuan*
Laowang BA Li miss like
'Laowang likes Miss Li.'

3.2.2 *The Complete Affectedness Effect*

When the predicate contains a verb of affectedness, the entity denoted by *ba*-NP may exhibit an effect of complete affectedness whereby the entire entity is affected. This follows from the "all of" relation that is preserved in the mapping from the NP denotations to the events. Since, as suggested in section 2, an event may be bounded on the basis of the situation alone or on the basis of both the situation and the aspectual viewpoint, the effect of complete affectedness may also show up in two ways. First, when a situation is bounded, depending on how it is presented, the effect may have already taken place (46) or will take place (47):

(46) a. *Wo song-le hua gei Laowang*
I give-ASP flower to Laowang
'I gave Laowang (some) flowers.'

b. *Wo ba hua song-(le) gei Laowang*
I BA flower give-ASP to Laowang
'I gave Laowang the flowers.'

(47) a. *Wo zhengzai wang wuli ban jiaju*
I PROG toward room:in move furniture
'I am moving (some) furniture into the room.'

b. *Wo zhengzai ba jiaju wang wuli ban*
I PROG BA furniture toward room:in move
'I am moving the furniture into the room.'

In the (a) sentences the entity may or may not be completely affected, but in the (b) sentences the entity is definitely affected as a whole. Thus in (46a), for example, the speaker gave some flowers to Laowang, while in (46b), the speaker gave all of the flowers to Laowang. In this case, then, it is the meaning of the predicate that is responsible for the completeness of the effect.

The individual may also be completely affected because the event is presented perfectively:

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(48) a. *Lai he hongdou tang*
come drink red:bean soup
'Come eat the red bean soup.'
b. *Lai ba hongdou tang he-le*
come BA read:bean soup drink-ASP
'Come eat up the red bean soup.'

In (a) the addressee is only asked to eat some of the soup, but in (b) the addressee is asked to eat all of the soup.

Notice that the "all of" relation is not responsible for the affectedness. Rather, we assume, along with Mei (1978) and Tenny (1987), among others, that affectedness is a property of the verb. A *ba* verb may or may not have the property of affectedness. The "all of" relation only contributes to the completeness of the effect when the affectedness effect is present. Thus as expected, not all *ba* sentences exhibit the affectedness effect, as can be seen in (49):

(49) *Ta ba yige dahao jihui cuoguo le*
he BA one:C big:good opportunity wrong:pass ASP
'He let a great opportunity pass.

In such cases, affectedness is absent, and naturally there is no total affectedness.

4. The Transitivity Analysis

4.1 *The analysis*

In this section we will consider *ba* from a functional approach, represented by the Transitivity analysis. The Transitivity analysis of *ba* is first proposed in Thompson (1973), and it is also advocated in Hopper and Thompson (1980), Li and Thompson (1981), and Sun (1995). On this analysis, the *ba* construction exhibits high transitivity and the various restrictions of *ba* can be explained by this requirement. This analysis incorporates the observation made by traditional grammarians, e.g. Wang (1945), that *ba* expresses a sense of "disposal" — what X did to Y. We will see how the Transitivity analysis accounts for the same data discussed in previous sections.

According to Hopper and Thompson (1980), transitivity is concerned with the effectiveness with which an action takes place. It "involves a number of components, only one of which is the presence of an object of the verb". (50) lists the ten components of transitivity, as given in Hopper and Thompson (p. 252).

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(50) **Components of Transitivity**
A. Participants
B. Kinesis
C. Aspect
D. Punctuality
E. Volitionality
F. Affirmation
G. Mode
H. Agency
I. Affectedness of O
J. Individuation of O

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How is it that *ba* is a case of high transitivity? This can be illustrated with (51a). First, we can identify the following components related to the event: it has two participants, is active, telic, punctual, volitional, affirmative, realis. Further, the agent is highly agentive, and the object is individuated and totally affected. In addition, comparison between (51a) and its counterpart without *ba* (51b) supports the Transitivity Hypothesis, given in (52):

(51) a. *Ta ba yifu xihao-le*
he BA clothes wash:finish-ASP
'He finished washing the clothes.'
b. *Ta xihao-le yifu*
he wash:finish-ASP clothes
'He finished washing clothes.'

(52) **The Transitivity Hypothesis** (Hopper and Thompson 1980:255)
If two clauses (a) and (b) in a language differ in that (a) is higher in Transitivity according to any of the features A-J, then, if a concomitant grammatical or semantic difference appears elsewhere in the clause, that difference will also show (a) to be higher in Transitivity.

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In (51b) the NP can be interpreted specifically or non-specifically, while in (51a) the NP must be interpreted specifically. Thus we see the two sentences differ in the feature individuation of O. Now the predicate in (51a) is telic, while in (51b) it is atelic (activity). Thus the two features correlate — (51a) is consistently marked as higher in transitivity than (51b).

Recall, however, not all telic predicates support the occurrence of *ba*. This is previously seen in the contrast between (25) and (26):

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(25) *Wo ba neiliang che mai le*
I BA that:CL car sell ASP
'I sold that car.'

(26) **Wo ba neiliang che mai*
I BA that:CL car sell
'I sold that car.'

In order for *ba* to occur, the event of selling the car has to be viewed in the perfective. Data like this leads Sun (1995) to suggest that *ba* not only requires telic predicates, but it also involves total affectedness of the action on the patient, made possible by the perfective *-le* in (25). According to Sun, it is in this sense that *ba* exhibits high transitivity.

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Under the Transitivity analysis, many properties of *ba* follow naturally. First, States and Activities in general do not occur with *ba*, because States and Activities are atelic situations, thus exhibiting low transitivity on the aspect component. Secondly, nonspecific NPs do not occur with *ba*, since non-specific NPs show low transitivity on O — they are not individualized. Finally, it is not surprising that *ba* often exhibits total affectedness, since affectedness of O is a component of Transitivity, where total affectedness is a sign of high Transitivity.

4.2 *Inadequacies*

Although a number of properties of *ba* follow from the Transitivity analysis, this analysis also faces problems. Two will be mentioned here.

First, if we evaluate *ba* sentences on the basis of (56), then we will see that not all cases of *ba* are of high transitivity. This can be seen in (53) and (54):

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(53) *Qing ba xin kan yi kan*
please BA letter look one look
'Please take a look at the letter.'

(54) *Ni ba shu na-zhe*
You BA book hold-ZHE
'Hold the book.'

In (54), the mode is irrealis, and O, the letter, is not affected. In (54), we have not only the irrealis mode, but also an imperfective marker *-zhe*. Li and Thompson (1981:489–490) in fact consider (53) and (54) as *ba* sentences that do not enhance the nature of disposal, which is similar to saying that these sentences exhibit low transitivity. (53) and (54) are therefore considered as less likely to

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occur. This is supported by evidence from discourse: in a study of *ba* sentences found in stories and essays, Li and Thompson report that there was no occurrence of cases like (53) and only one occurrence marked by *-zhe*.

However, if sentences like (53–54) have low transitivity, then it is difficult to know why *ba* can occur in such sentences in the Transitivity analysis. In other words, the Transitivity analysis provides no explanation for the existence of (53–54). Further, when (54) is compared with its non-*ba* counterpart (55), a violation of the Transitivity Hypothesis arises:

(55) *Ni na-zhe shu*
you hold-ZHE book
'You are holding the book.'
'Hold the book.'

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(55) is ambiguous between the irrealis mode and the realis mode: it could describe a current state in which the addressee is holding a book now, or as a request for the addressee to take up a book and hold it. (54), on the other hand, is not ambiguous; it can only be interpreted as an imperative. Further, the object *shu* in (54) receives a specific reading, while in (55) it is specific in the irrealis mode, and non-specific in the realis mode. The comparison is given in (56):

(56)

	BA	non-BA
Object	specific	specific or non-specific
Aspect	imperfective	imperfective
Mode	irrealis	irrealis (when NP specific) realis (when NP non-specific)

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The sentences differ in two components: individuation of O and the realis/irrealis distinction. (54) is higher than (55) with respect to individuation of O, since O is always specific in (54), but in (55) it can be either specific or non-specific. We would thus expect (54) is higher as well with respect to the feature of mode — (54) would be expected to be in the realis mode. But this is not the case. Rather, (54) must be interpreted in the irrealis mode. This constitutes a violation of the Transitivity Hypothesis. It is a puzzle, on the Transitivity analysis, why the specific interpretation of O correlates with the irrealis mode, rather than the realis mode.

In 2.2.2.2 we suggested that sentences like (54) in fact denote a bounded event, and the boundedness is a result of combination of three factors — specific NP, *-zhe* marking and the irrealis mode. The imperfective marker *-zhe* marks a resultative state that will hold in the future, the state of holding the book, while

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the irrealis mode provides the inceptive point of taking the book. The two combined together, taking the book and the resultative state of holding the book in the future, constitute a bounded event. On the aspectual analysis discussed in section 3, it follows naturally for a bounded event to correlate with a specific object — both are manifestations of an inherent property in the meaning of a *ba* predicate, which preserves the "all of" relation.

Since bounded events are consistently correlated with the specific NPs, this suggests that the distinction between bounded and unbounded events be included as a component of transitivity. Regardless of how an event is expressed, if it denotes a bounded event, then the clause containing it is high in transitivity. Yet, although the original formulation of Transitivity includes aspect as a component, and Li and Thompson use "telicity" as the central feature of this component, it in fact only concerns the perfective/imperfective distinction. The component is neither concerned with situational aspect nor with the boundedness of an event. In section 2, it is suggested that whether an event is bounded depends on both the perfective/imperfective distinction and on the situational aspect. What is needed, then, is a component that looks at an event as a whole, taking into account both the perfect/imperfective distinction and the aspectual classes of verbs.

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5. Structure-preservation and Transitivity

Having seen how the Transitivity analysis accounts for *ba* and where it runs into problems, we will now compare it with the formal analysis presented in section 3. We will see that in fact the two analyses share an important characteristic; both point out a fundamental property of *ba*. Therefore, the formal approach and the functional approach are compatible. We will further suggest that the formal analysis complements the Transitivity analysis by providing a rationale for the Transitivity Hypothesis.

What the two analyses have in common is the focus on the correlations between the *ba* NP and the *ba* predicate. In the aspectual analysis, the correlation is captured as a structure-preserving function, while in the transitivity analysis high transitivity is reflected not just in the predicate, but also in the NP. The argument-predicate correlation is in fact a key property of the *ba* construction, and since the two analyses converge on this property, it suggests that transitivity is closely related to structure-preserving functions. In general, then, there may be a connection between transitivity and the existence of a formal property as a link

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between a predicate and its argument. We will explore this possibility both in general and with *ba* in particular.

First, why does the structure-preserving function of *ba* reflect high transitivity? I suggest that it is the "all of" relation inherent in the meaning of a *ba* predicate that is responsible for high transitivity. If an event can be quantified by "all of", the clause is likely to be highly transitive. This is because, as discussed in 3.1, the "all of" relation makes sure that the NP argument is specific and the event concerned is bounded. Specific NPs, in turn, correspond to high degree of transitivity on O, while bounded events correspond to high degree of transitivity on various components related to the predicate. On the other hand, statives cannot be quantified by "all of", and they are low in transitivity.

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The *ba* construction is therefore an example where transitivity is a manifestation of an argument-predicate relation that exhibits a formal property. More importantly, the construction also illustrates how a formal property motivates the Transitivity Hypothesis — it offers an explanation for why certain components of transitivity co-vary. Generally, then, the Transitivity Hypothesis is supported whenever the predicate and the argument are related by a structure-preserving function; the latter specifies the nature of the predicate-argument correlation. Here I will offer two more such cases; one concerns the Incremental Theme proposed by Dowty (1991), mentioned earlier in 3.1, while the other concerns the progressive in Finnish.

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An Incremental Theme, as discussed in 3.1, is an argument of a telic predicate, whose meaning is a homomorphism from the argument denotations to events. The structure that is preserved is the "part of" relation. Thus in an telic predicate one can tell the aspect of the event by looking at the individual denoted by the argument. Now since the predicate is telic, the Transitivity Hypothesis predicts that in the following pairs (57a) will be more transitive than (57b) in a component other than telicity. And indeed the object in (57a) is more individuated than the object (57b) — the former is singular, while the latter is plural.

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(57) a. John ate an apple yesterday.
b. John ate apples yesterday.

In this case, the "part of" relation inherent in the meaning of *ate an apple* is responsible for the high transitivity in (57a).

The second case is illustrated by Finnish progressive. The following sentences are from Hopper and Thompson (p. 262):

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(58) a. *Likemies kirjoitti kirjeen valiokunnalle*
businessman wrote letter:ACC committee-to
'The businessman wrote a letter to the committee.'
b. *Kikemies kirjoitti kirjetta valiokunnalle*
businessman wrote letter:PART committee-to
'The businessman was writing a letter to the committee.'

In Finnish the aspect of the clause is not marked on the verb; rather, it is encoded on the object. If the object has the accusative Case, the clause is interpreted in the perfective aspect; on the other hand, if the object has the partitive Case, then the clause is interpreted in the imperfective aspect — the progressive aspect. For Hopper and Thompson the contrast between (58a) and (58b) serves to illustrate how transitivity can be signaled by the nature of objects. A clause with the accusative Case is more transitive than one with the partitive Case. Further, in accordance with the Transitivity Hypothesis, the difference is reflected on how a clause is interpreted with respect to aspect — the accusative Case signals the perfective, while the partitive Case signals the imperfective.

Interestingly, exactly the same type of data is discussed in Krifka (1992) as a case of structure-preserving function. Krifka asks the question why it is possible for progressivity to be marked on an argument of the verb rather than on the verb itself? The reason, he suggests, is that because of the structure-preserving property in the meaning of the predicate, a change of the nature of the object will affect the aspectual nature of the predicate. In this case, what is preserved is the property of partiality, which exists in both the partitive and progressivity.

Thus the two phenomena, the telic predicates in English and the Finnish progressive, support both the Transitivity Hypothesis and the existence of a structure-preserving function. However, only the latter, but not the former, specifies the nature of the argument-predicate correlation: in the case of telic predicates, the argument and the predicate are characterized by the "part of" relation, while in the Finnish progressive, it is partiality that is responsible for low transitivity on both the NP argument and the predicate.

6. Conclusion

In this paper I have discussed the *ba* construction in Chinese from two perspectives, the aspectual analysis, representing the *formal* approach, and the Transitivity

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analysis, representing the *functional* approach. In the aspectual analysis, I suggest that the various constraints on *ba* can be subsumed under two general properties: the *ba* NP is specific, and the *ba* predicate denotes a bounded event. Further, the *ba* NP and the *ba* predicate are related by a homomorphism, and specificity and boundedness are different manifestations of the same property — the "all of" relation inherent in the meaning of the *ba* predicate.

In the Transitivity analysis, I show that *ba* sentences often exhibit high transitivity, on the predicate as well as on the NP argument. The analysis, however, does not cover the full range of *ba* sentences, and I suggest that this is because Transitivity does not have a component that includes both telicity and the perfective/imperfective distinction.

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Despite the empirical problems, the Transitivity analysis is in fact compatible with the aspectual analysis; both stress the correlation between the predicate and the argument. But it is the formal approach that offers an explanation for the correlation. The structure-preserving function explains why the *ba* NP and the *ba* predicate co-vary, and the "all of" relation accounts for the high Transitivity of *ba*. We can further say that in general, if the meaning of a predicate is a structure-preserving function, then the Transitivity Hypothesis is supported, as illustrated by the Finnish progressive and telic predicates in English.

Overall, then, it is the aspectual analysis that adequately explains the complexity involved with *ba*, The *ba* construction is shown to be an example of how aspectual considerations, regulated by a formal property, constrain both the predicate and an NP argument in Chinese.

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Notes

1. Other studies of *ba* in the aspectual approach include Szeto (1988) and Yong (1993).
2. By this I mean verbs such as *xie* 'write', *shuo* 'speak', but not *xie-wan* 'write and finish' or *shuo-qingchu* 'speak clearly'. The latter are complex verbs that are plausibly outputs of a word formation process which combines a basic verb and a verb or adjective expressing a resultative state, traditionally called resultative verb complement, into a complex resultative verb.

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3. I have not included cases like (i), which is not acceptable to most modern Mandarin speakers:
   i. *Ta ba baba si-le*
      he BA father die-ASP
      'His father died on him.'
4. Further, progressives mark successive stages as well as static stages, depending on the predicate. Therefore progressive marking does not always signal static stages.

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