

# Aspect is Result: Mandarin Resultative Constructions and Aspect Incorporation

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## 0 Introduction

Aspect and resultative constructions have been treated as distinct phenomena in the linguistic literature. Viewpoint aspect encodes ways of viewing the “internal temporal constituency of a situation;” in particular, it provides information about completion and boundedness that is superimposed on verb phrases (Comrie 1976:3). It takes place at a functional position *above* the verb phrase. A sentence with simple past tense like (1) describes an action that occurred prior to the speech time. The perfective aspect phrase *have V* in (2) emphasizes the completion and experience of this action. Aspect is therefore seen as additional information that modifies the telicity of a verb phrase.

(1) I saw him in the park.

(2) I have seen him in the park twice.

Resultatives on the other hand are taken as information *within* the verb phrase. They typically involve at least two events—a causative event followed by a resultative state, which is denoted by a small clause embedded under the main verb (Hoekstra 1989). For instance, the verb phrase *wipe the slate clean* involves the action of wiping and the final state of the slate’s being clean. The resultative state is embedded under the verb phrase, governed by the causative verb head.

This paper explores the possibility of an alternative account for viewpoint aspect. Instead of viewing aspect as a functional head *above* verb phrases, I attempt to associate aspect with resultative predicates and claim that (at least part of) aspect should be base generated *below* the verb phrases like resultatives. I argue that the syntactic and semantic similarities between resultative constructions and aspect suggest that viewpoint aspect in Mandarin is in fact resultative.

Section 1 of this paper introduces viewpoint aspect and how it has been treated as a functional projection above the verb. The challenges that Mandarin aspect poses to this hypothesis will be discussed. Section 2 explores the resultative property of Mandarin aspect. I adopt Folli and Ramchand’s (in press)

framework to account for two Mandarin resultative constructions. I will show that the same framework can account for the selectional restrictions among different aspect markers in a sentence, and that resultative constructions and aspect are closely associated if not identical. Section 3 summarizes and concludes the paper.

## 1 Viewpoint aspect in Mandarin

Two kinds of aspect should be distinguished: situation aspect and viewpoint aspect (Smith 1991). Situation aspect is the telicity information internal to the verb phrase. It refers to the traditional Vendlerian event types (i.e. activity, achievement, accomplishment, and state) that a verb denotes which can further be modified by other elements within the verb phrase, such as the object and the adverbial adjunct. For example, as the verb *ate* in (3) is atelic, it can be modified by *for two hours*, but not by *in two hours*. A countable object in (4) delimits the action, making it a telic event (Dowty 1991, Jackendoff 1996, Tenny 1994).

- (3) a. John *ate* for two hours. [atelic]  
 b. \* John *ate* in two hours.
- (4) a. John *ate three apples* in two hours. [telic]  
 b. \*John *ate three apples* for two hours

This paper is mainly concerned with viewpoint aspect—the kind of aspect that is external to and superimposed on the verb phrase. As Smith (1991:91) defines it, aspectual viewpoints are “like the lens of a camera”; they “make visible the situation talked about in a sentence.” They encode how speakers view the internal temporal structure of verbal events, and structurally occur above the verb phrases. In European languages, the fact that viewpoint aspect predominantly precedes verb phrases suggests that aspect phrases (AspPs) are above verb phrases.

In such structure, AspPs are base generated above vPs and cast a semantic scope over the internal temporal structure denoted by the verb phrases. Such an analysis accounts for aspect in Indo-European languages such as English, German and French, as given in (5-8). The perfective or imperfective aspect in these languages predominantly makes use of an auxiliary verb *have* or *be* that occur prior to the past/present participle of the main verb.

- (5) John *has* arrived. [English perfective]  
 (6) John *is* eating an apple. [English imperfective]  
 (7) Hans *ist* weggegangen. [German perfective]  
 Hans is left  
 ‘Hans has left.’
- (8) Paul *a* arrivé. [French perfective]  
 Paul has arrived  
 ‘Paul has arrived.’

However, such a generalization based on the Indo-European aspect phrases, cannot account for aspect markers which appear at a postverbal rather than preverbal position in languages such as Mandarin (as in (9) & (10)).

(9) Wo xie *le* yi feng xin [Mandarin perfective]  
I write ASP<sup>1</sup> one CL letter

'I wrote a letter.'

(10) Ta zhan *zhe*. [Mandarin imperfective]

He stand ASP

'He's standing.'

Some Chinese linguists (e.g. Wang 1965, Chiu 1995, among others) adopt the same framework to account for Mandarin aspect, in which aspect markers are base generated at the aspect head position. In order to derive the correct word orders, two routes can be taken. The verb should adjoin to the left of the aspect head or the aspect head should be lowered to a postverbal position. The latter approach is unlikely, since lowering has not been accepted in a general syntactic theory. With regards to the first approach, adjunction of the main verb to the left of the aspectual head is not satisfactory either, since besides theoretical necessity, it received no language-internal support. Namely, the only reason why the verb has to adjoin to the left of the aspectual head is to get the correct word order in Mandarin based on the theoretical assumption that an aspect phrase has to be above the verb.

## 2 The resultativeness of viewpoint aspect

In this section, I present syntactic and semantic arguments for the hypothesis that Mandarin aspect markers are base generated below the verb like resultatives. I first provide a unified syntactic analysis for resultative constructions in Mandarin, and argue that this analysis can be extended to account for aspect in Mandarin. Such an argument suggests that aspect in Mandarin resembles resultatives, which are small clauses embedded within verbs. Aspect is therefore *below* rather than above the verb.

### 2.1 Resultative constructions in Mandarin

Mandarin has two types of resultative constructions. The first type, as illustrated in (11), is called Resultative Verb Compounds (RVCs). RVCs are constructed by compounding two verbal morphemes. The first morpheme denotes the cause; the second morpheme, the result. The second type, given in (12), is the V-DE-V construction. Again, the first verb here is the cause, and the second verb is the result. The cause and the result are separated by a functional element DE, and the second verb is a verb phrase that can appear within a clause with its own subject.

(11) **Resultative Verb Compounds (RVCs)**

V1-V2

CAUSE-RESULT

Ta jiao-xing didi

he call-awake brother

‘He called and as a result awakened his brother.’

(12) **V DE V Construction**

V1 DE ... V2

CAUSE RESULT

Wo qi de toupi fa ma

I angry DE head-skin (scalp) get numb

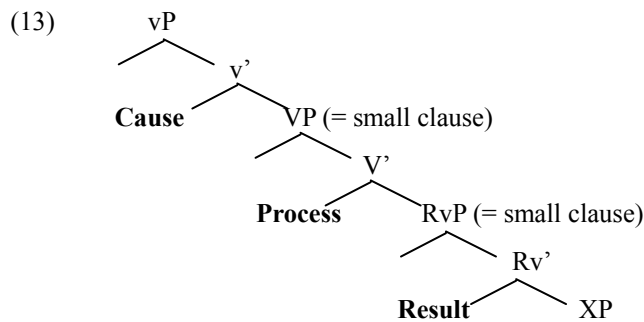
‘I was angry to the point that my scalp got numb.’

These two resultative constructions have been treated as independent from each other. RVCs are compound words. The V-DE-V construction is taken as a verb phrase with a functional phrase, DE-P, embedded in it. However, the construct of DE-P as an independent functional phrase is still controversial.

Instead of treating these two resultative constructions as distinct, I argue that they are in fact different realizations of identical structures. That is, resultative constructions have the same basic structures underlyingly; it is the numeration (with or without DE), and later, movement of the resultative head that produce different word orders and thus seemingly different structures. In the following, I first introduce the framework that Folli and Ramchand (in press) proposed for resultative constructions. I will show that their analysis offers a basic framework for a unified analysis of Mandarin resultative constructions.

2.1.1 *Folli's (2001) three-level analysis of resultatives*

Folli (2002) and Folli and Ramchand (in press) argue that in resultative constructions, in addition to the causing and resultative events, there is an intermediate event denoting the *process*. Thus, a prototypical resultative construction involves three levels—the cause, the process, and the result—as is illustrated in (13).



One of the evidences that the process should be separate from the cause and the

result is exemplified by (14), where the adverbial phrase modifies different parts of the event within a resultative. The adverbial *very fast* can modify the cause to mean that his action of causing the ball to roll was very fast. It can also mean that the action of the ball rolling was very fast, in which case it is modifying the rolling process of the ball before reaching the wall. Given that the cause and process of the action can be modified, it is reasonable to postulate that these three subevents should be represented separately within the syntactic structures. In the three-level analysis of resultatives, the process and resultative events are seen as small clauses embedded within the main causative event.

- (14) He rolled the ball to the wall very fast.  
 a. He very quickly rolled the ball so that it reaches the wall. (cause)  
 b. He pushed the ball so that it rolls to the wall very fast. (process)

### 2.1.2 Resultative Verb Compounds (RVCs)

RVCs are common in Chinese. They are made of two verbal morphemes  $V_1$  and  $V_2$ , which hold a causal relationship. In (15), for example, the first verbal morpheme *jiao* ‘to call’ denotes an event that causes the second event denoted by the morpheme *xing* ‘to be awake’ to happen. Note that the whole resultative event involves two participants, him and his brother. Here, *ta* ‘he’ is the subject of *jiao* ‘call’, thus the causer, and *didi* ‘his brother’ is both the object of *jiao* ‘call’ and the subject of *xing* ‘to be awake’, the causee.

- (15) Ta jiao-xing didi  
 he call-awake brother  
 ‘He called his brother awake.’

Even though the word order for RVCs goes like (16), I propose that the second verb actually moves above the object from below. That is, the base generated word order is like (17), where the first event is followed by the second event with its own subjects and verbs. The derivation is given in (18).

- (16)  $N_1 V_1-V_2 N_2$   
 (17)  $N_1 V_1 N_2 V_2$   
 (18) RVCs:  $S V_1 O V_2 \implies S V_1 V_2 O t$

This proposal is evidenced by relevant word orders in classical Chinese, where the causing event and the resultative event are kept apart like the base-generated structure in (17). Sentence (19) from A.D. 425 demonstrates the word order SVOV, where the second verb stays below the object. It is therefore not unreasonable to postulate that the head verb of the resultative predicate stayed in situ in classical Chinese, while it moves upwards in Modern Chinese.

- (19) Huan Jiang-lang jue! (*Shishuoxinyu*, A.D. 425; Shi (2002))  
 call Jiang-lang awake  
 ‘(You) call Jiang-lang and make him awake!’

In Modern Chinese, the resultative heads are moved past the specifier of the resultative predicate to adjoin to the process V. In (15), for example, the resultative head *xing* ‘awake’ moves to the process head, which is empty in

RVCs. This is why it appears adjacent to the causative head *jiao* ‘call’.

It is also possible to have intransitive RVCs with the external DP as the subject of both verbal morphemes. In (20), for instance, *ta* ‘he’ is the subject of both eating and getting fat. Its structure is given in (21), where the resultative head *pang* ‘fat’ moves to the empty process head. As the specifiers of vP and VP co-index, the DP that is base-generated in RvP is bound by the spec of vP.

(20) Ta chi-pang le  
 He eat-fat ASP  
 ‘He ate himself fat.’

(21) Ta<sub>i</sub> chi pang<sub>j</sub> [sc pro<sub>i</sub> t<sub>j</sub>]

In summary, RVCs are made of two verbal morphemes that are not as tightly connected (or fossilized) as commonly perceived. I propose that the resultative head moves into the empty process head, thus becoming adjacent to the causative head. Below in V-DE-V construction, I will show more convincing evidence for the existence of the intermediate process phrase in resultative constructions.

### 2.1.3 VDE V construction

The other resultative construction in Chinese is the V-DE-V construction (also called *resultative complement constructions* by Huang 1988). DE is a peculiar lexical item in Chinese syntax. It is usually taken as a function word that heads a predicate (e.g. J. Lin 2002); the exact nature of DE, however, remains mysterious. In this paper, I focus on the resultative function of DE, seeing it as heading the process phrase (VP). This is a reasonable hypothesis, since crosslinguistically the verbs *get* and *obtain* often grammaticalize to mean the process of change. (see Hein & Kuteva 2002: 144-145).

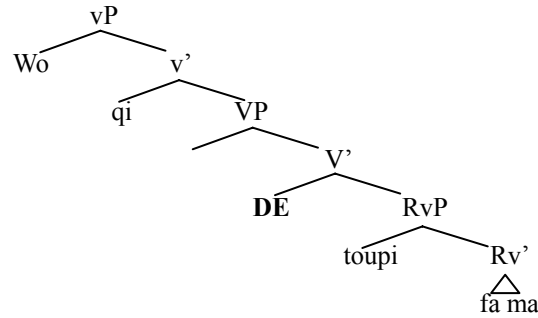
The fact that the process head is filled by the function word DE in Mandarin keeps the resultative head from moving as in RVCs. DE can therefore be seen as intermediate between the cause and the more salient resultative predicate that follows it. As a process, it can be seen as a result of V<sub>cause</sub>, and further leading to V<sub>result</sub>. Sentence (12), repeated below, is a typical V-DE-V resultative. In this sentence, the fact that I was angry got to the extent that my scalp became numb. DE indicates a process between my anger and the physical reactions. The tree diagram in (22) shows that the process head is filled by DE and every word stays in situ. In (23) where the subjects of the causative and resultative clauses are identical, the pro at the spec of RvP is bound by the pronoun at the spec of vP.

(12) Wo qi de toupi fa ma  
 I angry DE head-skin (scalp) get numb  
 ‘I was angry to the point that my scalp got numb.’

In summary, in the V-DE-V construction, the first verb serves as the cause and the second verb, the result. The existence of DE is strong evidence supporting the claim that there is an intermediate process between the cause and the result. This process head DE keeps resultative heads from moving upwards as those of

RVCs do.

(22)



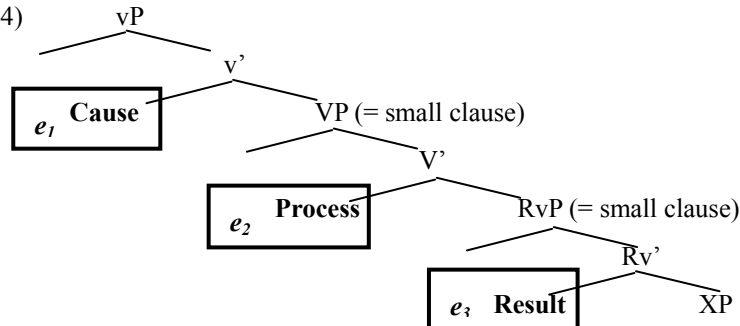
Wo qi **de** toupai fa ma  
 I angry DE head-skin (scalp) get numb  
 'I was angry to the extent that my head got numb.'

(23) Ta gaoxing de he bu long zui  
 He happy DE close not tight mouth  
 'He was so happy that he cannot close his mouth.'

#### 2.1.4 The semantics of resultative constructions

An advantage of this analysis using the multiple resultative embeddings and small clauses is that the eventive semantics of the resultative constructions can be directly read from the syntactic structure. The structure in (13) can be labeled with three subevents  $e_1$ ,  $e_2$ , and  $e_3$  as given in (24).

(24)



The semantics of (11), *Ta jiaoxing didi* 'he called and as a result awakened his brother,' can be represented as (25), where the causative interpretation is derived from the temporal relationship BEFORE ( $e_1$ ,  $e_2$ ) and BEFORE ( $e_2$ ,  $e_3$ ), and the three subevents correspond to the three-level clauses. The process head holds the temporal function between the preceding event ( $e_1$ ) and the resultative event ( $e_3$ ).

(25)  $\exists e_1 e_2 e_3$  [called (he, his brother,  $e_1$ ) & PROCEED ( $e_1$ ,  $e_2$ ) & awake (his brother,  $e_3$ ) & BEFORE ( $e_1$ ,  $e_2$ ) & BEFORE ( $e_2$ ,  $e_3$ )]

The semantics for (20) *ta chipang (le)* ‘He ate himself fat’ is represented as (26):

- (26)  $\exists e_1 e_2 e_3$ [ate (he,  $e_1$ ) & PROCEED ( $e_1$ ,  $e_2$ ) & fat (he,  $e_3$ ) & BEFORE ( $e_1$ ,  $e_2$ ) & BEFORE ( $e_2$ ,  $e_3$ )]

Similarly, V-DE-V constructions have their semantics mapped out from the structure. The semantics of sentences (22) and (23) can be represented as (27) and (28):

- (27)  $\exists e_1 e_2 e_3$ [angry (I,  $e_1$ ) & PROCEED ( $e_1$ ,  $e_2$ ) & numb (head,  $e_3$ ) & BEFORE ( $e_1$ ,  $e_2$ ) & BEFORE ( $e_2$ ,  $e_3$ )]

- (28)  $\exists e_1 e_2 e_3$ [happy (he,  $e_1$ ) & PROCEED ( $e_1$ ,  $e_2$ ) &  $\neg$ close (he, mouth,  $e_3$ ) & BEFORE ( $e_1$ ,  $e_2$ ) & BEFORE ( $e_2$ ,  $e_3$ )]

## 2.2 Mandarin viewpoint aspect markers *le*, *zhe*, *guo*

Mandarin has a rich aspectual system. The elements contributing to the outer viewpoint of a verbal event (called *aspect markers*) consist of one that appears preverbally (*zai*) and three that appear postverbally (*le*, *guo*, *zhe*). In this article, I focus exclusively on the three post-verbal aspect markers *le*, *guo*, and *zhe*.<sup>2</sup>

The three aspect markers impose different telicity information on the verb. As perfective aspect markers, LE indicates the completion of an action, and GUO focuses more on the past experience of an action or state. ZHE, on the other hand, is taken as a durative aspect marker that indicates an imperfective event. In this section, I show that these Mandarin aspect markers are resultative-like. I provide three arguments for the resultativeness of these aspect markers: (A) Syntactically, the three-level analysis I used for resultative constructions in 2.1 can also accommodate the word orders for aspect markers. Similar to resultative predicates, aspect markers occur postverbally. The restrictions on the co-occurrence of more than one aspect markers also suggest that the aspect markers are taking different positions in the structure. (B) With regard to eventive semantics, aspect is also like resultatives. It unequivocally denotes an ending state of an action. (C) Historically, aspect markers used to be main verbs that can serve as resultative predicates below the verbs. Even though they are highly grammaticalized in Modern Chinese, the semantic and syntactic residuals are still very salient. In the following, I provide further evidence for these arguments.

The perfective marker LE highlights a change of state, profiling the boundaries of an event either at the starting point or at the endpoint. If the event itself is telic, LE profiles the endpoint of the event. In (29), where the main verb is already a resultative compound, LE imposes an endpoint to the event, stressing the completion of the event. When LE follows an atelic static verb, such as in (30), it profiles the inception of a state, and is therefore taken as an inchoative. With either usage, LE co-occurs with verbs that involve a change of state, where the old event has reached an end, while the new event is being initiated.

- (29) Wo xie-wan **le** yi feng xin (completive)  
 I write-complete LE one CL letter  
 'I completed a letter.' [I am no longer writing.]
- (30) Ta bing **le** (inchoative)  
 he sick LE  
 'He's sick. (He has become sick.)' [He is still sick.]

As shown above, LE is resultative semantically, given that it indicates a change of state—whether it ends a previous state, or initiates another state. The fact that it follows the main verb strongly suggests that it is a resultative predicate embedded under the main event. LE heads a resultative predicate (a small clause) that is base generated below all other small clauses.

The semantics of sentence (20) *ta chipang le* 'he ate himself fat' can be represented as (31), where *le* refers to the bounded/completive portion of the preceding verbal event.

- (31)  $\exists e_1 e_2 e_3 e_4$  [eat (he,  $e_1$ ) & PROCEED ( $e_1$ ,  $e_2$ ) & fat (he,  $e_3$ ) & BOUNDED ( $e_3$ ,  $e_4$ ) & BEFORE ( $e_1$ ,  $e_2$ ) & BEFORE ( $e_2$ ,  $e_3$ ) & BEFORE ( $e_3$ ,  $e_4$ )]

The historical development of LE also suggests that LE should be a resultative predicate that is base-generated below the verb. LE is phonetically reduced from the verb LIAO, which means "to complete" in (32).<sup>3</sup> The serial verb construction of "Verb Object LIAO" in (33) became so common that LIAO got reanalyzed as an aspect marker meaning the completion of an action. It got moved to the position right after the verb. This suggests that LE should be taken as a verb-like element generated below, not above, the main verb.

- (32) Ta caocao **liao** shi  
 he sketchily finish business  
 'He finished business without paying much attention.'
- (33) Tian se wei **liao**. (*Lushan yuangong hua*, A.D.800; Shi 2002)  
 fill color not complete  
 '(Someone) has bit completely filled in the color.'

The other perfective verbal suffix, *-guo*, indicates that an action has been experienced and completed. While *le* highlights the boundary of an action (initiation of the action *going* in 70), *guo* packs the whole action as a past experience with absolute completion. Syntactically, *guo* serves as the process head, the reason being that LE and GUO can co-occur in a sentence with restricted word orders (34)-(35). That GUO always has to precede LE suggests that it should be a process head, which occurs at a higher position than LE.

- (34) Wo chi **guo le** wufan  
 I eat GUO LE lunch  
 'I have had lunch.'
- (35) \*Wo chi **le guo** wufan  
 I eat LE GUO lunch  
 'I have had lunch.'

The semantics of (34) is given in (36), where *guo* as a process head indicates the experiencing of an event, and *le* as a resultative head indicates the boundary of another event.

- (36)  $\exists e_1 e_2 e_3$  [eat (I, lunch,  $e_1$ ) & EXPERIENCED ( $e_1$ ,  $e_2$ ) & BOUNDED ( $e_2$ ,  $e_3$ ) & BEFORE ( $e_1$ ,  $e_2$ ) & BEFORE ( $e_2$ ,  $e_3$ )]

Analyzing GUO as a process head can also be motivated by the fact that as a content word, GUO means 'to cross, to go past' in (37) and 'to experience' in (38). It is thus reasonable for *guo* to be extended (grammaticalized) to indicate a state of having experienced and having gone through an event.<sup>4</sup>

- (37) **Guo** he chai qiao [idiom]  
 Cross river tear bridge  
 'Tear the bridge after crossing the river. (not being grateful)'
- (38) Renzhen **guo** rizi  
 Serious live day  
 'Live your days seriously.'

Semantically, *V-guo* is like a resultative as well. It indicates that the action denoted by the verb has arrived at a state where that action is not only completed but also fully experienced in the past. This section shows that GUO is not only a resultative predicate embedded under the main verb, but more precisely, a process head, that appears above the resultative head, LE.

The last aspect marker is the durative *zhe*. It denotes the continuous state of an imperfective event. Klein, Li, and Hendricks (2000: p. 726) describe it as marking the "background" information by focusing on the "enduring, or continuing" state. In (39) and (40), ZHE as a verbal suffix directs attention to the durative state of the main verb.

- (39) Men kai **zhe**  
 Door open ZHE  
 'The door is open.'
- (40) Ta chuan **zhe** xizhuang  
 He wear ZHE suit  
 'He's wearing a suit.'

Consideration of collocations among GUO, ZHE, and LE from (41) to (44) suggests that ZHE is a resultative head like LE. Since ZHE and LE are taking the same position in the structure and both add a resultative state to the verbal event, they should be considered taking the same spot.

- (41) \*Men kai **zhe** **le**<sup>5</sup>  
 Door open ZHE LE
- (42) \*Men kai le **zhe**  
 Door open LE ZHE
- (43) \*Men kai guo **zhe**  
 Door open GUO ZHE
- (44) \*Men kai **zhe** guo  
 Door open ZHE GUO

The semantics of sentence (39) is represented as (45):

(45)  $\exists e_1 e_2 [\text{open}(\text{door}, e_1) \ \& \ \text{EXTENT}(e_1, e_2) \ \& \ \text{BEFORE}(e_1, e_2)]$

Seeing ZHE as a resultative may initially seem counter-intuitive. However, this is not the first time such a claim is made. Sybesma (1997: 248) also argues that ZHE like LE is a resultative predicate:

(46) "[ZHE] stativizes the event; it halts the action and indicates that the resulting state remains. ... ZHE is a *resultative predicate*, which asserts that the action has been conducted successfully and that the state which results after the successful performance persists. [italics mine]"

Historically, ZHE used to be a main verb meaning 'to reach, to attach', pronounced as *zhuo* or *zhao* (Sun, 1998). Sentence (47) from 550 B.C. illustrates such usage. In Modern Chinese, ZHE is phonetically reduced into neutral tone and predominantly used as a postverbal aspect marker indicating "attaching to an event", and thus 'the extension of an event'.

(47) Feng xing er **zhuo** yu tu. (*Zuozhuan, Zhuanggong*, 550 B.C.)  
wind move and attach to soil  
'Wind moves and attaches to soil.'

### 3 Final remarks

In this article, I showed that all three postverbal aspect markers, *le*, *zhe*, and *guo*, are semantically and syntactically similar to resultatives. They either denote a resultative state or a process state of an action. Semantically, *le* indicates a resultative state where an action is bounded at either the starting point or the endpoint; *guo* indicates a resultative state where an action has been finished and fully experienced; *zhe* indicates a resultative state where an action is retained and extended. Syntactically, the limitations on their relative linear order in co-occurrences motivate their situations at different event positions (process VP, or resultative RvP) in a resultative hierarchy. *Guo* is a process head; *le* and *zhe* are resultative heads. A three-level analysis for resultative constructions can accommodate aspect markers equally well. I have also shown that the eventive semantics of these so-called aspect markers can be mapped out from the syntactic structure in the same way as resultative constructions. Historically, these aspect markers used to be full verbs that appear as the second verb in a serial verb construction. Their existence at postverbal positions in Modern Chinese suggests that their use as resultative predicates is very much retained. These evidences show close resemblances between resultative constructions and aspectuality in Mandarin. Previous analyses of these two as independent from each other may not be adequate.

## Notes

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<sup>1</sup> Abbreviations for transliterations throughout this paper: ASP = aspect marker, CL = classifier.

<sup>2</sup> The preverbal aspect marker *zai* 'at' indicates the progressive aspect. Its syntactic behaviors are more similar to those of a main verb than an aspect marker. I therefore see it as belonging to a different verb class than the postverbal aspect markers.

<sup>3</sup> The relationship between LE and LIAO is obvious in that in Modern Chinese, they are still taking the same orthographical form, even though pronounced differently. They are homographs.

<sup>4</sup> There are two GUOs in Mandarin. The first GUO is the locative/temporal comparative, meaning 'past'. Examples are *pao-guo* 'run-past', and *duo-guo* 'more than'. The second GUO is the aspect GUO that indicates the packaging of a past experience. This paper focuses on the second sense of GUO.

<sup>5</sup> This sentence is acceptable when LE is a sentential particle. However, if LE is an aspect marker, it cannot co-occur with ZHE.

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