

ASPECT AND ASSERTION IN MANDARIN CHINESE

ABSTRACT. Chinese has a number of particles such as *le*, *guo*, *zai* and *zhe* that add a particular aspectual value to the verb to which they are attached. There have been many characterisations of this value in the literature. In this paper, we review several existing influential accounts of these particles, including those in Li and Thompson (1981), Smith (1991), and Mangione and Li (1993). We argue that all these characterisations are intuitively plausible, but none of them is precise. We propose that these particles serve to mark which part of the sentence's descriptive content is asserted, and that their aspectual value is a consequence of this function. We provide a simple and precise definition of the meanings of *le*, *guo*, *zai* and *zhe* in terms of the relationship between topic time and time of situation, and show the consequences of their interaction with different verb expressions within this new framework of interpretation.

1. INTRODUCTION

Aspect, or aspect marking, has received a great deal of interest in Chinese linguistics in the last thirty years.¹ This interest might be due to the fact that markers of aspect are the only kind of morphology-like devices in the language. In Chinese, there is no inflectional morphology to express tense, number, gender, or case. Hence, aspect is a special grammaticalised category in Chinese.

Most analyses of Chinese aspect in the literature focus on four aspect markers: *le*, *guo*, *zhe*, and *zai*. In a sentence, the first three markers follow the verb, while the last one precedes the verb. Despite the immense interest and the numerous studies devoted to Chinese aspect, the precise function of each of these markers is still under considerable debate. There is agreement that they do not relate the situation described by the sentence to the time of utterance but express various perspectives on the situation; hence, they express various aspect rather than tense relations, and are often called aspect particles or markers (Li and Thompson 1981). There is also agreement that *zhe* and *zai* somehow characterise the situation as 'imperfective', 'progressive' or 'durative' whereas *le* and *guo* express a

¹ A conservative estimate is that over two hundred articles have been published on the linguistic analyses of aspect markers in Chinese.



‘perfective’ (or perhaps ‘perfect’) aspect. Detailed linguistic analyses of these particles vary considerably from author to author. In this introduction, we first present a standard version of the functions of aspect particles on the basis of standard analyses such as those espoused by Chao (1968) and Li and Thompson (1981). We then point out some problems with such analyses and our plan to proceed with a new analysis.

1.1. *The Perfective Aspect Markers*

The particle *le* is generally considered a perfective marker: according to traditional analysis, it presents a situation in its entirety, as an event bounded at the beginning and the end, and without reference to its internal structure.² *Le* has often been characterised as marking completion (see Chao 1968). However, some researchers emphasise its perfectivity and argue that *le* does not by itself indicate a completed event or action (e.g., Li and Thompson 1981): the meaning of completion often comes from the meaning of the verb with which *le* occurs. For example, when the verb encodes a situation with a clear temporal boundary, *le* indicates that the situation comes to its natural endpoint, that is, it is completed, as illustrated in (1). But when the verb encodes a situation with no natural boundary, *le* signals the termination rather than completion of a situation, as in (2) (see Li 1990; Shih 1990; Smith 1991).

- (1) Qi-chi zhuang-dao -le fangzi.
car hit-break -LE house
 The car knocked down the house.
- (2) Xiao yazi you -le yong.
duckling swim-LE stroke
 The duckling swam.

The example in (1) contains a so-called ‘resultative verb construction’ (RVC; see section 4.3) that encodes a telic, resultative endpoint (i.e., the

² There is also a sentence-final *le* whose relation to the verb-final *le* is a matter of dispute in the literature. A clear demarcation of, or even the existence of, the two kinds of *le* has been difficult to prove in the literature (see Thompson 1968; Rohsenow 1976, 1978; Li 1990), especially when we are concerned with examples like *Zhansan pang-le*, in which *le* is both at the end of the sentence and at the end of the verb. Our discussion of the perfective *le* is relevant primarily to the verb-final *le* (including *le* that is both verb-final and sentence-final). Similarly, we ignore some of the complications associated with *zai* because of its function as a locative preposition (see Li 1993).

break-down of the house), where the perfective *le* indicates that the end result has been achieved (i.e., the event is completed). In contrast, (2) contains an atelic activity verb *you-yong* 'swim' that encodes no natural endpoint, and *le* indicates that the event took place and terminated at some indefinite point. Finally, in traditional analyses (e.g., Chao 1968; Rohsenow 1976), *le* can also indicate the inception or inchoativity of a situation, for example, as in *Zhangsan pang le* (Zhangsan = fat LE) 'Zhangsan became fat'.

Another perfective particle, *guo*, has been generally characterised as an 'experiential marker': it indicates that an event has been experienced at some indefinite time, usually in the past,³ and that the resultant state no longer obtains at the time of speech. As a perfective marker, it is concerned with the external, rather than the internal structure of the situation. According to some authors, *guo* is more of a 'perfect' than a 'perfective' marker, given that it involves two distinct times, reference time and speech time, and its indefiniteness characteristic (Smith, 1991). Examples (3a–b) illustrate the differences between *le* and *guo*.

(3)a. Lisi da-po -le yi-ge beizi.

Lisi hit-break -LE one-CL⁴ cup

Lisi broke a cup.

b. Lisi da-po -guo yi-ge beizi.

Lisi hit-break -GUO one-CL cup

Lisi once broke a cup.

In (3a), the sentence refers to a situation in which the broken pieces of the cup may be still laying on the ground; *le* indicates a completed action of breaking. In contrast, in (3b), the sentence is appropriate only when referring to an experience that Lisi had – that she has once broken a cup (at some indefinite time in the past), and that the resulting state of breaking no longer holds true at the time of utterance. This last characteristic of *guo* – the resulting state no longer obtains – distinguishes *guo* not only from *le*, but also from the English perfect; the English perfect conveys a 'current relevance' meaning whereas *guo* does not (*Mary has broken a cup* is a more appropriate translation for (3a) than for (3b)). This characteristic

³ Because *guo* is frequently associated with the past, it has sometimes been considered as having a tense function (cf. Chao 1968). However, it does not by itself indicate pastness: an explicit reference time in the future can be provided and *guo* can be used to indicate that the event will be experienced at some indefinite time in the future.

⁴ CL stands for classifiers.

of *guo* is what Chao (1968) and Smith (1991) called the “discontinuity” meaning of *guo*.

Finally, Li and Thompson (1981, p. 192) stated that *le* and *guo* differ in “definiteness”: *le* not only indicates boundedness but also marks a “specific or definite event”, whereas for *guo* it suffices that some event of the type described by the sentence has occurred sometime. This point has also been made elsewhere, for example, in Mangione and Li’s (1993) compositional analysis of *le* and *guo* (see section 2.2.2): “. . . *le* marks a specific event time, which is ordered before and closely to its sentences reference time, while *guo* can be taken as providing an existential quantification over times which are earlier than the *guo* sentence’s reference time” (1993, p. 68). Thus, this difference, in whichever precise form it is couched, reflects a common intuition about the function of these two particles.

1.2. *The Imperfective Aspect Markers*

The particle *zai* has had a long historical development, appearing first as a verb, then as a locative preposition, and only recently as an imperfective aspect marker (see Li 1988, 1993, for discussion).⁵ As a preposition, *zai* can occur both preverbally and postverbally, while as an aspect marker it can occur only preverbally (Zhu 1981; Li 1990, 1993). Its main function as an aspect marker is to indicate that an action or event is in progress, hence the title of progressive marker. The particle *zhe* indicates that a situation is viewed as enduring or continuing (i.e., durative), often as a backgrounding information, for example, in V + *zhe* + V constructions (e.g., *xiao-zhe shuo* ‘smile-ZHE speak ‘speaking with a smile’).

According to traditional analyses, the two imperfective markers differ in the verb types to which they can be applied: *zai* cannot be used with stative verbs that indicate fully homogeneous states, whereas *zhe* can be used with verbs that indicate at least some homogeneous states but normally not ‘dynamic’ events. For example, if a verb can have either a dynamic or a static reading, then the former is brought out by the use of *zai*, as in (4a), whereas the latter is usually brought out by the use of *zhe*, as in (4b).⁶

⁵ Historically, progressive aspect has an intimate relationship with locative expressions in many languages (Comrie 1976, p. 99; Bybee et al. 1994). One can still find historical traces in expressions like English *asleep*, which comes from *at sleep* (cf. Vlach 1981). The Chinese *zai* is a locative verb in origin, and it is therefore not surprising that it could develop into a progressive aspect marker.

⁶ In the Beijing dialect, *zhe* can be used on both the static and the dynamic meaning of such verbs, especially when the particle *ne* is added to the sentence (see 6.5; Ma 1987).

(4)a. Lisi zai chuan yi-jian qunzi.

Lisi ZAI put-on one-CL skirt

Lisi is putting on a skirt.

b. Lisi chuan-zhe yi-jian qunzi.

Lisi wear-ZHE one-CL skirt

Lisi wears a shirt.

Along this line, Smith (1991) proposed that *zai* has a dynamic meaning, while *zhe* has a static meaning (see section 2.2.1). It would appear, however, that dynamicity or stativity comes from the verb to which the particles apply, rather than from the particles themselves, in sentences (4a–b) as well as in other cases. Such interactions between particles and inherent meanings of verbs also seem to be true with other particles, for example, the interpretation of *le* with different types of verbs (see sections 1.1 and 6.2.1; see also Li and Shirai 2000 for a general discussion of such interactions in Chinese, English, Japanese, and child language).

So far, the most careful and comprehensive exposition of the various uses of Chinese aspect particles is found in Li and Thompson (1981, pp. 185–237):

A. The verbal aspect suffix *le* expresses perfectivity, that is, it indicates that an event is being viewed in its entirety or as a whole. An event is viewed in its entirety if it is bounded temporally, spatially, or conceptually.

B. The aspect suffix *guo* means that an event has been experienced with respect to some reference time. When the reference time is left unspecified, then *guo* signals that the event has been experienced at least once at some indefinite time which is usually in the indefinite past.

C. In Mandarin there are two aspect markers that signal the durative nature of an event: the word *zai* and the suffix *zhe*. The usage of the durative markers in a sentence depends on the meaning of the verb.

In a more recent systematic treatment, Smith (1991) gives the following characterisations (again, these characterisations only cover the basic functions, depending on context and on the particular verb to which the particle applies):

A'. *Le* spans the initial and final points of the situation (p. 344) and perfective *le* presents closed non-stative situations (p. 347).

B'. The second perfective in Mandarin is indicated by the verbal suffix *guo*; the viewpoint presents a closed situation and also conveys that the final state of that situation no longer obtains (p. 348).

C'. Mandarin has two imperfective viewpoints: *zai* and *zhe*. *Zai* is a typical progressive; *zhe* has a static meaning (p. 356).

These and similar characterisations more or less reflect the *opinio communis* on these four particles. We believe that this view is intuitively plausible, but we also think that it suffers from a number of inadequacies. In this paper, we will advance a somewhat different view. This new view uses the general temporal framework of Klein (1994), according to which aspect expresses a temporal relation between the time at which the situation described by the sentence obtains, on the one hand, and the time for which an assertion is made by this sentence, on the other. We will argue that the main function of the particles in Chinese is to impose specific temporal constraints on the assertion made by the particular utterance in which they occur. This new analysis is not incompatible with the previous idea that these particles have a particular aspectual value. In fact, we will show that the basic intuitions in previous studies about the functions of the four particles, as well as a number of other empirical facts, follow naturally from the analysis that we suggest here.

This paper is organised as follows. In section 2, we discuss four substantial problems that previous analyses of Chinese aspectual particles face. Some of these problems have to do with the general definition of aspect, whereas others are specific to the case of Chinese. One of those is the observation, noted by several authors (see sections 2.2 and 6.2.1), that the presence or absence of aspectual particles in Chinese affects the ‘assertive status’ of the utterance – what is understood to be asserted and what is just inferred from context. This observation, which cannot be accounted for by existing approaches, is the point of departure for our new analysis. This section also includes a discussion of two current formal accounts of Chinese aspectual particles. In section 3, we argue that the proper analysis of tense and aspect requires a distinction between the time at which some situation (process, state, event) obtains, on the one hand, and the time about which something is asserted by the sentence, on the other. The traditional notion of aspect as different ways to ‘view’ a situation can be reconstructed as a purely temporal relation between these two time intervals. In section 4, we discuss how this time-relational perspective of aspect is related to the inherent temporal properties of the proposition which is used to describe the situation; in particular the distinction between ‘1-phase contents’ and ‘2-phase contents’. In section 5, we show how the general idea can be spelled out for different languages and illustrate it briefly with English, thus preparing the basis for a comparative analysis of the Chinese aspectual particles *le*, *guo*, *zhe*, *zai*, and zero marking (i.e., no explicit marking). In section 6, we present our analysis for Chinese and, in section 7, we conclude how it accounts for the various problems raised in section 2.

2. PROBLEMS WITH ASPECT AND ASPECTUAL PARTICLES

Most existing analyses of Chinese aspectual particles are based on what one might call the ‘canonical notion’ of aspect – the idea that aspect reflects different views on a situation. This notion of aspect can be found in comprehensive descriptive grammars such as Chao (1968) and Li and Thompson (1981) as well as specific treatments of aspectual particles, as Li (1990), Smith (1991), and Yang (1995). In what follows, we shall first discuss this traditional approach and point out a number of serious problems with it (section 2.1). We will then discuss Smith’s (1991) attempt to give the classical analysis a more precise shape (section 2.2.1). We will finally examine Mangione and Li’s (1993) analysis, a compositional analysis which departs from the classical approach (section 2.2.2).

2.1. *Four Problems with the Classical Notion of Aspect*

An aspectual analysis in traditional terms is well illustrated by Li and Thompson’s characterisation of the particle *le* quoted above, according to which it “indicates that an event is being viewed in its entirety or as a whole”. This definition is very much in accordance with common characterisations of perfective aspect found in the literature, for example Comrie (1976, p. 3): “Aspects are different ways of viewing the internal temporal constituency of a situation”. The situation may be presented as a whole, without specific reference to its inner constituency, in which case we are said to use the perfective aspect, or it may involve a reference to the inner constituency, in which case we are said to use the imperfective aspect. There are also various ways of viewing the inner constituency, and accordingly, we have different subtypes of the imperfective. Much of the same idea, though with a slightly different focus, is found in Smith (1991): “Sentences with a perfective viewpoint present a situation as a single whole. The span of the perfective includes the initial and final endpoints of the situation: it is closed informationally” (p. 103) and “imperfective viewpoints present part of a situation, with no information about its endpoints. Thus, imperfectives are open informationally” (p. 111).

This definition of aspect, found in varying formulations, is well established. It is very suggestive, and very useful for descriptive as well as pedagogical purposes. But on closer inspection, it raises a number of substantial problems.

2.1.1. *Problem A: The Definition is Entirely Metaphorical*

If it is said that aspects are different ways of ‘viewing’ a situation, then it is not at all clear what ‘viewing’ means here. It cannot have its literal meaning: events, states, processes, in short, situations are not like houses or little dogs which you can ‘view’ – they are abstract entities which have something to do with time, and you cannot see them at all. Thus, at best we are using the word ‘view’ only metaphorically. This metaphor of ‘viewing something’, intuitively appealing as it might be, is in need of explanation. What does it mean that, for example, in the English simple form, the situation is seen, viewed, or presented ‘in its entirety’, ‘as a whole’, or ‘without reference to inner constituency’? What does it mean that in the progressive, the situation is not seen in its entirety, without boundaries, or with reference to inner constituency? Again, these metaphors may have some intuitive plausibility in cases such as *John read a book* vs. *John was reading a book*, but they are not very suggestive in other cases such as *They hoped for a better future* vs. *They were hoping for a better future* or *He stood on his toes* vs. *He was standing on his toes*.

2.1.2. *Problem B: Perfectivity Does Not Reflect the ‘Boundaries’ or the ‘Boundedness’ of the Situation*

A core element in the definition of perfective and imperfective are the notions of ‘boundary’ and, not identical but related, ‘boundedness’. They are found not only in the various definitions discussed above but also in a great deal of the aspect literature (see, for example, Dahl 1985 for a crosslinguistic study along these lines and Binnick 1991 for a comprehensive historical discussion). But this idea is problematic in many ways. The first problem is that it fails to distinguish between the properties of the situation itself and what the sentence makes explicit about this situation. It is often said, but simply not true, that verbs such as *sleep*, *watch* and *walk* typically refer to unbounded situations, whereas *die*, *run a mile*, and *bake a cake* refer to bounded situations. In reality, with very few exceptions, all situations are bounded, or have some temporal boundaries (see more discussion in section 4.1). Hence, it is at best misleading to speak about ‘bounded’ and ‘unbounded’ situations as situation types. Now, one could argue that independent of what the situation itself is like, it may be presented, viewed or described, as bounded. But then, we are back to the problem of what ‘viewed’ or ‘presented’ means. In particular, what does it mean to present a situation as unbounded if it is bounded, or vice versa? This brings us to the second problem.

It is easy to see that imperfective aspect (‘viewed without boundaries’) is compatible not only with a situation that has boundaries but also with

the explicit specification of these boundaries. In English, for example, it is possible to say *George was living in London for seven years*, *Chris was working from two to five*, *I will be teaching from now till lunchtime*, etc. In Russian, even these sentences have to be in the imperfective aspect. In French, one can say *Jean travaillait de cinq à six seulement* 'Jean worked from 5 to 6 only' and *Le bureau était fermé pendant deux heures* 'The office was closed for two hours'. In all of these languages, the imperfective variant of the particular verbal system is entirely appropriate if not better than the perfective, or, as in Russian, even the only one that is possible. In these cases, not only is it true that the situation has boundaries, but they are explicitly indicated. One might argue that aspectual marking concerns only the verb, and has nothing to do with the marking of boundaries by other devices such as adverbials. But it would be clearly odd to say that the aspect presents the situation as unbounded, whereas at the same time, the adverbials explicitly mark it as bounded. This seems a clear contradiction, but there is nothing contradictory or odd in these sentences.

Interestingly, there is also the opposite case: a situation marked as perfective without any clear boundary. In French, there is a clear difference between the 'imperfective' *Il était gros* and the 'perfective' *Il fut gros*. In neither case is there a clear boundary of his being fat. The perfective variant expresses rather a kind of inchoativity of the state. Similarly, the Chinese equivalent of the French perfective sentence, *ta pang-le* 'he fat-LE', indicates neither boundedness nor that the situation is viewed as a whole. The meaning shade that *le* adds is best rendered by 'he got fat', in contrast to 'he was fat' (Li and Thompson 1981).

Our discussion so far has been concerned with the received characterisations of aspect such as 'viewed as a whole', 'with boundaries', 'without reference to the inner constituency of the situation'. These characterisations communicate valuable intuitions, but they are surely not what one could call theoretical terms. Therefore, they should be replaced by precisely defined terms of a linguistic theory that are able to capture these intuitions. Some authors are already aware of this problem. For example, although Smith (1991) regularly used formulations as "makes the endpoint visible", "presents a non-closed situation", she discussed in detail a more precise characterisation of these notions (see discussion of her formalisation in section 2.2). In our analysis, boundedness of an event can be precisely captured by how the time span of assertion falls into or includes the time of situation (see sections 3.1 and 3.2).

We now turn to two specific problems with the aspectual differentiation in Chinese.

2.1.3. *Problem C: Boundedness and the Redundancy of le*

In an early study of the function of *le*, Thompson (1968) argued that the central meaning of *le* is to mark an event boundary. Li and Thompson (1981, pp. 185–202) gave a very careful list of factors which make an event (or, more generally, a situation) bounded: a definite object, a measure expression, the fact that the sentence is the first in a series, and others (including, sometimes, merely contextual factors). Only when these factors are available can *le* be added. The function of *le* has been defined as indicating that an event is being viewed in its entirety or as a whole, in other words, bounded (as discussed earlier). But if this is the function of *le*, why should it be added to a sentence if the boundedness of the situation is already indicated in one way or another? Thus, this particle seems to have no independent functional value: it marks a situation as bounded which is already marked as bounded, or presents it with its boundaries when the boundaries are already indicated. This would make sense only under the assumption that we deal here with different types of boundaries which a situation can have.

It would also follow from this analysis that constructions with and without *le* should be functionally equivalent. In fact, this is often felt to be the case for the so-called resultative verb constructions, when used in context (out of context, most sentences without any aspectual particle sound somewhat odd). Thus, the following pair of sentences are often considered to be semantically equivalent:

- (5)a. Zhangsan xie-wan zhe-feng xin.
Zhangsan write-finish this-CL letter
 Zhangsan finished writing the letter
- b. Zhangsan xie-wan-le zhe-feng xin.
Zhangsan write-finish-Le this-CL letter
 Zhangsan finished writing the letter.

But there are many other examples where this is not the case, for example:

- (6)a. *Zhangsan si.
Zhangsan die
- b. Zhangsan si-le.
Zhangsan die-LE
 Zhangsan died.

Sentence (6a) will sound odd even with context, whereas (6b) is perfect. Hence, the function of *le* cannot just be to indicate something as bounded.

2.1.4. *Problem D: 'Realization of the Situation' and le*

If the function of *le* cannot be adequately described by the established characterisation, then what is its function?

It has repeatedly been noted that *le* influences the meaning of the utterance in a way which, at first, seems to have nothing to do with its aspectual function. Thus, in his detailed empirical investigation of the various usages, Spanos (1979, p. 81) noted that *le* is used when people feel that it is "necessary to explicitly state the realization of a given action", especially the realization of a closed (i.e., bounded) situation.

Li and Thompson (1981, pp. 196–197) noted that inherently bounded verbs such as *si* 'die' and *wang* 'forget' generally occur with the perfective aspect marker *le*. But interestingly, these verbs can describe situations in a so-called irrealis mood when combined with modal verbs, such as in *ta yao si-le* (he will die LE): *yao si* (will die) by itself is incompatible with the traditional definition of perfective aspect. Thus, it appears that the crucial point is not whether the event is viewed in its entirety, but whether the event is 'presented as real'. Along this line, some researchers argue that *le* seems to convey a modal, rather than an aspectual meaning; for example, Chu and Chang (1987) suggested that *le* is a marker of 'realis' rather than perfective aspect. This is seen in a sentence like *wo lai-le* 'I come LE', where *le* indicates that the speaker has not yet but is about to come: *le* does not indicate that the situation is viewed in its entirety, but rather that the realisation of the event is imminent.

Yong (1997) made a similar observation concerning the realisation-of-situation meaning of *le*. He argued that without *le*, the sentence often denotes a habitual meaning, such as in *ta (xingqitian) xi yifu* (he (Sunday) wash clothes) 'he washes clothes (on Sundays)'; with *le*, the sentence shows that the situation has actually happened, such as in *ta xi-le yifu* (he wash LE clothes) 'he (has) washed clothes'. Finally, according to Chu (1976), in a sentence like *ni kan zheben shu, wo kan neiben* 'you read this book, I read that', in which there is no *le*, the persons involved "may or may not actually read or attempt to read the books concerned. When they do the actual reading, they may or may not finish reading" (p. 47). If Chu is correct, then this utterance in a way only 'mentions' the possibility that 'you read this book and I read that one', without explicitly asserting that any part of what is expressed, be it the activity or its result, was really achieved.⁷

⁷ A possible, and in fact very natural, way to interpret this utterance is that it expresses a kind of weak imperative, roughly as in English: (*We must read these two books.*) *You*

In marking what was really the case, the particle *le* plays a crucial role: it indicates that the action and/or the goal are actually achieved:

- (7) Wo xie-le xin, keshi mei xie-wan.
I write-LE letter but not write-finish
 I did letter-writing but did not finish the letter.
- (8) Ta zi-sha-le san-ci.
he self-kill-LE three-times.
 He tried to kill himself three times.

In both cases, it is marked that the activity as such – the action that leads to a written letter or to be dead, respectively – is ‘real’. Thus, with *le*, the action is asserted as having actually occurred. Although it is the standard assumption that the goal is also achieved from the first part of these sentences, this is not asserted, as is shown by the fact that sentence (7) is in no way contradictory. The impression that the event is actualised becomes stronger when a specific resultative component is added to the verb, such as *xie-wan* ‘write-finish’ in (7).⁸ This leads us to the following patterns (adapted from Chu 1976, p. 50):

(9)		action ‘real’	goal ‘real’
action	(sha)	open	open
action + LE	(sha- <i>le</i>)	yes	open
action + result	(sha-si)	open	open
action + result + LE	(sha-si- <i>le</i>)	yes	yes

What these observations demonstrate is the fact that the addition of the particle *le* somehow indicates that the situation, or part of the situation, is, was, or will be ‘real’: the particle affects the ‘assertion status’ of what is

read this one and I read that. But it is not really asserted that this double action is the case or will be the case; instead, it is interpreted as something which ought to be the case. This interpretation is only inferred from the previous utterance, or context in general, and it is not the only possible interpretation.

⁸ According to Chu (1976), even in the RVCs, the meaning of the realisation of result can be cancelled; see the following table. Native speakers seem to disagree on this particular point; for example, Tai (1984) regards such a cancellation as impossible.

expressed by the utterance.⁹ A satisfactory account of the function of *le* must explain this fact.

2.2. *Two Formal Accounts*

The first two problems discussed above result from conceptual unclarity of the canonical notion of aspect, under which an aspect is a particular way 'to view' or 'to present' a situation. In what follows, we shall examine two accounts which, in different ways, try to overcome these problems. Smith (1991) adopted the traditional notion but attempted to give it a more precise shape, whereas Mangione and Li (1993) approached the problem from a very different perspective.

2.2.1. *Smith's 'Two Parameters Theory of Aspect'*

Fundamental to Smith's comprehensive treatment of universal and language-specific properties of aspect is the distinction between 'viewpoint aspect', such as Perfective and Imperfective, and 'situation type', such as State, Activity, Accomplishment, Achievement, and Semelfactive (i.e., what is traditionally called 'Aktionsart'). They are defined independently, but are brought together in a full sentence and then give rise to a particular temporal interpretation of this sentence. The interaction between the two types of aspect may be constrained; the English variant of the Imperfective, the progressive, for example, is in general not compatible with the situation type State. Our following discussion will be confined to the two situation types Activity and Accomplishment and their interaction with the two viewpoint aspects Imperfective and Perfective, a constellation which is found in many languages, including English and Chinese.

An activity, such as the one described by *The child walked*, is a situation which involves some internal dynamism (this distinguishes it from stative situations), and it has an 'arbitrary final point', whereas an accomplishment such as *John built a house*, which is process-like, has a 'natural final point'. Thus, both activities and accomplishments have boundaries, but they differ in that activities simply stop at some arbitrary point, whereas accomplishments end because the nature of the event requires this; after their final point, the 'resultant state' begins. This informal characterisation is made more precise by Smith as follows (some notations: I is an interval,

⁹ There are good reasons to assume that similar phenomena can be observed in many other languages (Ikegami 1985); see, for example, the so-called 'conative usage' of the Russian imperfective (Forsyth 1970). In fact, the English progressive, as in *John was building a house* (in contrast to *John built a house*) may be interpreted in this way: the activity is said to be real, but not the 'resultant state'.

which is made up of instants t_i ; the situation type S has an initial point S_I and an arbitrary final point $S_{F(A)}$ or a natural final point $S_{F(N)}$):

Activity: Situation S obtains at interval I , with the condition that for some $t_i \dots t_n$, included in I , S does not obtain at t_{i-1} , S_I obtains at t_i ; and for t_n following t_i $S_{F(A)}$ obtains at t_n and S does not obtain at t_{n+1} .¹⁰

Accomplishment: Situation S obtains at interval I , with the condition that for some $t_i \dots t_n$, included in I , S does not obtain at t_{i-1} , S_I obtains at t_i and for t_n following t_i , $S_{F(N)}$ obtains at t_n ; Resultant State R obtains, and S does not obtain, at t_{n+1} . (Smith 1991, p. 170)

These definitions indeed avoid Problem B discussed in section 2.1.2: irrespective of viewpoint aspect, the situations by themselves have boundaries, and the question is only whether a particular viewpoint makes these boundaries ‘visible’ or not. But they raise other problems. Situation types are defined in terms of what obtains at some temporal points within some interval I – the interval at which the situations are located (Smith 1991, p. 170). It is not clear whether this interval I is the time of the situation itself or some time which (properly or improperly) contains the situation. According to the definitions, it should be the latter; but this leads to the undesirable result that if a situation S obtains at some time I , for example, yesterday at four, then this situation also obtains at any interval I' which contains I . This is so because the conditions are naturally met by any superinterval of I , for example, the entire week which contains yesterday at four; in fact, it would entail that if a situation ever obtains, it obtains forever. This is clearly not what is intended. It appears, therefore, that the interval I must be interpreted as the ‘time of the situation’ and t_{i-1} as well as t_{n+1} cannot be contained in I .

In a sentence, the situation aspect is combined with a particular viewpoint aspect. Its role has been informally characterised, in line with the classical notion of aspect, as “an independent lens on the situation talked about ... makes visible all or part of a situation, without obscuring the conceptual properties of the situation type” (p. 171). Its formalisation starts with the idea that viewpoints are something that is related to particular intervals, and the intervals are specified independently of situation types. “For each sentence we specify an interval that occurs at a particular time, and a viewpoint located at that time. The viewpoint focuses on the situation as it unfolds in time” (pp. 171–172). How does this viewpoint then relate to the situation; in other words, what does it mean that it focuses on the situation in a particular way, or that it makes visible all or part of the

¹⁰ There seem to be two obvious misprints in the original definition of activities: “and for t_n following t , $S_{F(A)}$ obtains at t_i and ...”; this would mean, however, that the arbitrary final point obtains at the initial point of the interval, instead of at its final point t_n .

situation? For the two viewpoints Imperfective and Perfective, Smith gives these formal characterisations:

The viewpoint Imperfective is located at interval I; with the condition that for all times t in I, an interval of the situation S obtains, and there is no time at which the endpoints of S obtain.

The viewpoint Perfective is located at interval I; with the condition that the situation S obtains at I, and there are times t_i, t_n included in I at which the endpoints of S obtain; and at times t_{i-1}, t_{n+1} included in I the endpoints do not obtain. (Smith 1991, pp. 172–173)

Such definitions of perfective and imperfective aspect avoid Problem A discussed earlier: aspect is defined by viewpoints, and viewpoints are located in terms of intervals that obtain at specific times. These definitions also rest crucially on the notion ‘interval’. However, it is not clear from these definitions how the ‘viewpoint interval I’ is related to the ‘situation interval I’. It seems that they should not be the same interval, because if they were, the definition for the imperfective viewpoint would become contradictory: I would contain (as in situation I) and not contain (as in viewpoint I) the initial point and the final point. Indeed, it seems that the situation interval I is simply irrelevant when viewpoint aspect is applied to situation aspect, for example, Perfective viewpoint to Activity in English: “Perfective (S) presents a situation at interval I, with the properties of S; and the condition that for t_i, t_n , included in I, S does not obtain at t_i ; and for t_n following t_i , $S_{F(A)}$ obtains and does not obtain at t_{n+1} ” (Smith 1991; p. 174).

The source of the problem appears to be that viewpoint aspect as well as situation aspect are defined by means of the notion ‘S obtains at interval I’. But then the I cannot be the same in both definitions, or the S cannot be the same, or the distinction between the two aspects is irrelevant. The latter two options can be ruled out; hence, a rigid distinction should be made between a ‘situation time I_S ’ and a ‘viewpoint time I_V ’, and it should be explained how these two intervals are related to each other.

In an earlier part of her book, Smith suggests a somewhat different interpretation of what “make part of the situation visible” means: “Only what is asserted is made visible” (Smith 1991, p. 99). This interpretation is not resumed in the formal definitions discussed above, but it is fully compatible with our definition of aspect. In section 3, we will propose an analysis which follows exactly this line. Before we proceed, however, we will highlight Smith’s formal analysis of the Chinese aspectual particles *le*, *zai* and *zhe* (*guo* is not given a formal definition, though informally treated in her analysis).

According to Smith, the perfective *le* differs from the English perfective in that it presents Accomplishments with an arbitrary final point:

Accomplishment: Perfective (S) presents a situation S at interval I, with the properties of S, and with the condition that for some $t_i \dots t_n$ included in I, S does not obtain at t_{i-1} , S_I obtains at t_i ; for t_n following t_i , $S_{F(A)}$ obtains at t_n , S does not obtain at t_{n+1} . (Smith 1991, p. 175)

This characterisation would mean, however, that in Chinese, Accomplishments have an arbitrary, rather than a natural, final point, and thus fall under the definition of Activities; or else the Perfective aspect changes the properties of the situation. But the latter is explicitly excluded, here in the clause “with the properties of S”: viewpoints cannot turn Activities into Achievements, or vice versa. In fact, by doing so one would undermine the entire system of the two-aspect theory.

In Smith’s analysis, perfective *le* in Chinese is confined to non-stative situations: “*Le* appears only in dynamic sentences. When stative constellations occur with this morpheme, they have a shifted interpretation. One shift is inchoative: the focus is on the coming about of a situation” (p. 346). This analysis avoids Problem B (i.e., boundedness of *le*), but for the price that *le* no longer has a uniform function: there are now two verb-final *le* that differ only by the fact that one applies to stative sentences and the other to non-stative sentences (see more discussion in 6.2.1 on ‘shifted interpretation’).

As for the two Chinese imperfective particles, Smith’s definition of *zai* is similar to that of the English progressive; her definition of *zhe* follows the viewpoint schema of the ‘resultative imperfective’: “The resultative presents a situation S with $S_{F(N)}$ at an interval I. There is no time t in I at which S_I obtains or S_F obtains. For all times t in I, $S_F < t$ ” (p. 177). These definitions capture the common observation that the two particles differ in the verb types to which they can apply: *zai* does not go with statives, whereas *zhe* is in general compatible with all verb types. The definition of *zhe* emphasizes that the situation in question is in its resultant state at the interval I. However, this definition is problematic for sentences such as (10):

- (10) Zhangsan xie-zhe yi-feng xin.
 Zhangsan write-ZHE one-CL letter
 Zhangsan is/was writing a letter.

This sentence means that Zhangsan is or was writing a letter, not that the letter-writing situation is or was in its resultant state.

To summarize, Smith’s formal analysis avoids Problems A and B discussed in section 2.1, but it suffers from other inherent problems such as the definition of ‘interval’: crucial to the definition of viewpoint aspect

and situation aspect is the notion of ‘S obtains at interval I’, for which there are two possible I’s, but it is not clear how they are related in the two-component aspect theory. Moreover, it does not adequately capture the functions of the Chinese particles, for example, with respect to Problems C and D – the fact that the aspectual particles are not redundant with lexical contents of verbs and that they somehow affect the assertion status. Thus, while Smith’s formal account is indeed a substantial step beyond traditional accounts of aspect and Chinese aspectual particles, it runs into considerable conceptual and empirical problems.

2.2.2. *A Compositional Analysis of Aspectual Particles*

Mangione and Li (1993) follow a quite different approach to analyse the Chinese aspectual particles. They analyse aspectual particles as sentence operators (on a par with, for example, negation particles) that take the underlying sentence and add a particular meaning component to it.¹¹ Hence, they first consider the conditions under which an ‘atomic’ sentence (i.e., without an aspectual particle) is true, and then, what the addition of the particle changes.

As for the underlying atomic sentences, two verb types, called transitional and non-transitional, are distinguished. Roughly speaking, the semantics of the transitional, but not the non-transitional verbs includes a resultant state. An atomic sentence ϕ with a non-transitional verb is true if and only if it is true at E, where “E is a contextually or structurally established event time” (p. 80). An atomic sentence ϕ with a transitional verb is true if and only if (a) it is true at E, (b) E is a subinterval of some contextually or structurally established interval I, (c) E precedes another contextually or structurally established subinterval of I, called RES (‘result time’), and (d) there is at least one sentence δ which is necessarily true if ϕ is true and which is true at all subintervals of RES. In a nutshell, atomic sentences are true at some interval E; in the case of sentences with transitional verbs, it is additionally required that some other sentence (which logically follows from the atomic sentence) is true throughout the ‘result time’.

According to this account, the function of the particles *le* and *guo* is to relate the atomic sentences in one way or another to the ‘reference time’; more precisely, they relate them to ‘a contextually or structurally given reference time containing unit’ called REF. The particular effect of *le* is to

¹¹ Mangione and Li’s technical treatment of these sentence operators, cast in the spirit of (extensional) truth functional semantics, is quite different from what is normally done in this field. In what follows, we shall not dwell on the formal side of their analysis, but rather explain informally what is intended.

mark that some ‘contextually or structurally established interval’ I contains both E and REF, such that E precedes REF. The particular effect of *guo* is to mark that some indefinite time interval T precedes REF, where T is equated with E (for non-transitional sentences) and with I (for transitional sentences). In other words, for a sentence with *guo* to be true, the atomic sentence must be true, and ‘its full time’, which is either E, or E and result time, must precede the REF (and, consequently, the reference time itself).

Since this analysis does not use notions such as ‘seen in its entirety, with or without boundaries’, it indeed avoids Problems A–C discussed in section 2.1. But it faces Problem D, namely, it does not capture the ‘realisation of situation’ aspect of the *le* function. In addition, it has many other problems which are no less substantial. The first of these has to do with the truth conditions of atomic sentences, in particular those with ‘transitional’ verbs. There is always a sentence delta which is necessarily true if phi is true and which is true throughout the result time, for example the sentence ‘two plus two is four’. Hence, this condition, as stated here, is irrelevant, and there is no difference between the transitional and non-transitional sentences. This problem is a notorious one, and it is not easy to overcome. Dowty’s (1979) notion of ‘inertia worlds’ is an elaborate, but still arguable, way to solve it (for a recent discussion and a highly suggestive proposal on how it might be overcome in model theoretical semantics, see von Stechow 1996).

As a consequence, the functions of *le* and *guo*, respectively, are reduced to this:

le: E before REF and E and REF belong to I
guo: T before REF

where E, I and REF are ‘contextually or structurally established time units’ and T is just some time unit, thus reflecting the ‘indefinite’ character of *guo*. But as soon as *guo* is applied to the atomic sentence, T is identified with E of this sentence (it is said to be coreferential; Mangione and Li 1993, p. 99 and *passim*). Consequently *guo*-sentences are no less specific with respect to their event time than *le*-sentences. Hence, the specific-existential distinction also disappears, so that the only difference between *le* and *guo* is that for *le*, E and REF must belong to the same specified time unit I. Therefore, Mangione and Li’s analysis essentially says the following: (a) Atomic sentences have an event time, but no reference time; (b) Sentences with *le* and *guo* have an event time and a reference time, the former preceding the latter; the difference *le* and *guo* is that for *le*, the event time is closely related to the reference time (they are in the same interval), but for *guo* there is no such condition.

Point (b) does not really cover what is known about the function of these particles (cf. section 2 above and Mangione and Li's informal description in their section 1). Point (a) is no less problematic. What is the reference time? As defined here (Mangione and Li 1993, p. 88 and *passim*), it is a time which is contained in a larger interval of a contextually or structurally specified time unit REF, and furthermore, it is said that there is only one such time in REF. Thus, it cannot directly be equated with Reichenbach's (1947) 'point of reference', which, anyway, is not clearly defined either (e.g., see Hamann 1987). Without further specification, it is difficult to say what REF and reference time are in simple cases like:

(11)a. Zuotian, ta xie-wan-le zhe-feng xin.
Yesterday, he write-finish-LE this-CL letter
 He finished writing this letter yesterday.

b. Zuotian, ta si-le.
Yesterday, he die-LE
 He died yesterday.

Even if the notion of reference time is equated with REF, there is considerable doubt as to whether the difference between the particle-free atomic sentences and those with *le* or *guo* is simply the presence of such a contextually or structurally established temporal interval. This analysis cannot explain, for example, why a sentence such as (5a) (see section 2.1 3) seems fine, whereas (6a) is odd. More important, this analysis does not solve Problem D: the difference with respect to 'event realisation' cannot be explained by the presence *versus* absence of a reference time.

Despite these objections, we believe that there is a number of important insights in Mangione and Li's account. In what follows, we will suggest an analysis which reconciles these insights with more traditional accounts in terms of 'perfective' and 'imperfective' aspect, and with Smith's notion that the 'visibility function' of the viewpoint aspect is linked to what is asserted in a sentence.

3. A TIME-RELATIONAL DEFINITION OF TENSE AND ASPECT

3.1. *'Time of Utterance', 'Time of Situation' and 'Topic Time'*

The characterisation of aspect which we propose here, motivated by considerations of problems A and B, is strictly in terms of temporal relations, such as 'prior to' ($>$), 'contained in' (\subseteq), or 'posterior to' ($<$), between temporal intervals. This analysis, in a way, brings aspect on a par with tense. Tense is generally assumed to be a deictic-relational category. Thus, the past tense form in (12) is said to indicate that the time of the situation described by (Eva be cheerful) precedes the time of utterance (TU):

(12) Eva was cheerful.

It is easy to see, however, that this description cannot be correct: the time of the situation may, but need not, precede TU. What is said by uttering (12) is not false, when Eva is still cheerful at TU, that is, when the time of the situation includes TU, rather than precedes it (a constellation which is normally supposed to be expressed by the present tense). What is claimed by (12), is rather that there is some time span, T, which precedes TU, and that this time T falls entirely into the time of the situation described by the utterance. Whether the time of the situation itself precedes TU or includes it, is simply left open: the speaker makes a commitment only to this subinterval T of the entire situation time (for example, the time of the party yesterday night, when (12) is uttered in response to the question 'How was Eva yesterday at the party?').

Hence, we must carefully distinguish between two types of time spans which are relevant to an utterance: (a) the time span at which the situation obtains; we will call this interval 'time of situation' (abbreviated T-SIT), and (b) time span about which something is said; we will call this interval 'topic time' (abbreviated TT).¹²

In the particular sentences that express an assertion, the topic time is the time about which an assertion is made, and we might speak of 'time of assertion' instead of 'topic time'. Our discussion here will be confined to these assertion sentences. Note that 'time of assertion' in our definition is not a pragmatic notion, but a semantic one. It's not the time 'at which' an assertion is made, but the time 'about which' an assertion is made. However, we will use the more general term 'topic time' here, because

¹² The notion of 'topic time' can be considered to be an interpretation of Mangione and Li's REF (or perhaps the reference time which it contains). Under this interpretation, there is a similarity between our approach and Mangione and Li's, though there remain many differences.

other illocutionary roles are possible. For example, questions do not make an assertion, but there is an assertion ‘at issue’, which is time-bound, and the assertion itself is made in the answer to the question. Thus, the ‘time of assertion’ can be broadly interpreted to include the time for which an assertion is either made or made an issue. Another example is imperatives, for which ‘assertion’ needs a more general account such as ‘speech act function time’ in combination with an assertion operator with certain scope properties (see Klein 1994, for a discussion of how cases other than assertions should be handled). Topic time or time of assertion can be represented in many different ways. It can be explicitly specified by an adverbial in the sentence-initial position, as in *Yesterday at five, I finished the book*; it can be the time of some other situation mentioned in the preceding context, as in the first sentence of *I entered the room. He had left*; or it can be specified by a question, as in *What did you notice when you entered the room? – The light was on.*

3.2. *Tense, Aspect, and Temporal Relations between TT, TU, and T-SIT*

Although T-SIT and TT are separate constructs, they may be fully simultaneous, as in sentence (12). In this case, the ‘classical definition’ of tense comes out correct; but this is only a special case. In general, tense does not express a temporal relation between T-SIT and TU, as in the classical definition; rather, it expresses a temporal relation between TT and TU. If the listener knows anything about how T-SIT is related to the TU, it is by virtue of the fact that T-SIT is temporally related to TT. In (12), for example, TT is understood to be a proper subinterval of T-SIT. Other temporal relations between TT and T-SIT are also possible, for example: TT might be after T-SIT, or (fully or partly) contain T-SIT. It is these relations between TT and T-SIT that aspect is concerned with. Thus, a speaker might want to make an assertion about some time span in the future (e.g., tomorrow at ten), and state that this TT follows T-SIT. English expresses such a constellation by a combination of future tense and perfect aspect:

(13) Tomorrow at ten, John will have left.

Under this view, both tense and aspect indicate temporal relations between different temporal intervals: (a) Tense indicates a temporal relation between TT and TU; (b) Aspect indicates a temporal relation between TT and T-SIT.

Temporal relations are supposed to obtain between time spans. Let R be the real interval $[0,1]$ with the usual topology and the order relation $<$ between its elements. A time span (or temporal interval) is any subinterval of $[0, 1]$. Temporal relations between time spans can be defined in the

usual way, for example, $[r_1, r_2]$ BEFORE $[r_3, r_4]$ iff $r_2 < r_3$, and so on. In the present context, the following three relations are particularly important (S and T are time spans, e.g., $[r_1, r_2]$ or $[r_3, r_4]$):

- a. S AFTER T: last interval of T precedes first interval of S
- b. S IN T: S is a proper subset of T
- c. S OVL T: S and T have a subinterval in common (i.e., they ‘overlap’)

A particular aspect in language can then be described as a Boolean combination of temporal relations, for example, ‘S AFTER T OR S IN T’ or ‘S NOT OVL T’. In principle, any Boolean combination of temporal relations is possible, but only some of these possibilities are realised in natural languages. In other words, languages vary in the way in which they choose to grammaticalise the Boolean combinations. For example, one form of aspect marking could indicate that TT is properly included in T-SIT, whereas another form could indicate that this is not the case (i.e., perfective) – in the latter, TT may follow, precede, or contain T-SIT, except that it cannot be properly included in T-SIT. Another possibility is that it may have an entirely ‘neutral’ aspect form which is compatible with all temporal relations, and a ‘marked’ form for the relation T-SIT fully included in TT; this is sometimes claimed to be the case for Russian, where the imperfective is considered to be the unmarked, while the perfective the marked form. Still another possibility is the distinction between (a) imperfective: TT properly included in T-SIT, (b) perfective: T-SIT contained, properly or improperly, in TT, and (c) perfect: TT after T-SIT. There are still other possible ways to cluster temporal relations (including to have one form for everything), but it should be clear that ‘perfective aspect’ in one language is not necessarily the same as ‘perfective aspect’ in another language (see Klein 1995, for details). As we shall see, Chinese ‘perfective’ and English ‘perfective’ are similar in many ways, but they also differ in some respects. The time-relational analysis of aspect allows a precise definition in each case and a comparison of the ‘corresponding’ aspect.

In addition to the temporal relations between TT and T-SIT, languages also vary in the way in which they treat different kinds of T-SIT. Because this variation affects the way TT is related to T-SIT, we now take a closer look at it.

4. TIME OF SITUATION AND INHERENT TEMPORAL FEATURES OF THE LEXICAL CONTENT

4.1. *Two Sources of Confusion*

Ever since Aristotle, it has been assumed that there are different types of situations whose properties are roughly reflected in different types of expressions (see Binnick 1991, chapter 6, for a good survey). Nothing seems more natural than to derive the properties of the latter from those of the former. But this practice has been a permanent source of confusion (see Li 1990, Li and Shirai 2000 for a discussion). Vendler's (1967) well-established categories of "state, activity, accomplishment and achievement", for example, actually target at 'time schemata', but often they have been applied to the meaning of expressions, such as verbs, verb phrases, or full sentences (it seems that even Vendler himself was not entirely sure whether time schemata should refer strictly to the temporal properties of events/situations or to the semantic properties of verbs, or to both). This practice has led to many substantial problems, and Problem B discussed in section 2.1.2 is a case in point.

The confusion between what is part of the lexical content (i.e., semantic properties of lexical expressions) and what is part of the situation is the first confusion we are concerned with. For example, the following sentence refers to a situation which, according to standard assumptions about English tense, obtains in the past:

(14) Adam slept.

This situation has many properties, for example, a location, a beginning, and an end point, hence a duration, among others. But only some of these properties are described by the 'lexical content' of (14) – by the meaning of the individual words contained in (14) and the way in which they are put together. Here we designate the lexical content of a constituent by its infinitival form placed between angled brackets. Thus, the lexical content of (14) is denoted by ⟨Adam sleep⟩, and the lexical content of *slept* by ⟨sleep⟩. The lexical content of a sentence which refers to some situation is a selective description of this situation: the speaker chooses some features which she wants to make explicit, and leaves out others. In (14), place and endpoints of the situation are left implicit, although the perfective aspect asserts part of the time after the state of sleeping while the content of that time period is not lexically specified (see the perfective definition below). It would be easy to make them explicit by enriching the lexical content, for example, by adding *from two to four*, *for two hours*, or *in the basement*. In all of these cases, the real-life situation which is described is the very same

– but the lexical content is richer, and hence more features of the situation are made explicit. In the process of sentence comprehension, the lexical content of the sentence can also be enriched by all kinds of information available to the listener from other sources – deictical, anaphorical, general world knowledge, and so on.

There is also a common confusion between what is asserted by the lexical content of a sentence and what is implicated by it, which is the second confusion we are concerned with. For example, all situations, with very few exceptions, have a beginning and an end, and hence are bounded; certainly (14) implies a bounded event, unless one assumes that Adam sleeps forever. But what is unclear from (14) is where the boundaries are and how they are related to the utterance time. Consider now a lexical content that includes an explicit specification of a boundary, as in:

(15) Adam slept from two to four.

Here, the situation is just as well bounded as in (14), but in contrast to (14), there is an explicit boundary specification. If (15) is true, does this imply that Adam no longer slept after four (or did not sleep before two)? This seems to be a natural assumption, but it need not be the case at all. All that is asserted by (15) is the fact that during that time, Adam slept, and nothing is said about what he did before or after that time. Anything else is only a – perhaps very strong – implicature. Without any contradiction, (15) could be continued by *in fact, from one to seven*. A contradiction would arise if the lexical content were something like ⟨Adam sleep until four and then not sleep⟩, in other words, if the lexical content had included first some state or activity and then the opposing state or activity. Such a lexical content is expressed, for example, by *Adam woke up*. Similarly, *Adam fell asleep* contains the two opposing states, but in reverse order, ⟨Adam not sleep and then sleep⟩. We shall shortly return to the notion of ‘two-phase expressions’, in contrast to ‘one-phase expressions’ such as ‘sleep’ in (14) and (15).¹³

Thus, the two sources of confusion we attempt to identify here involve (a) the confusion between what is included as part of the lexical content and what is not, and (b) that between what is asserted and what is implied by the sentence. To avoid these confusions, we need to understand more clearly the different types of lexical contents, which brings us to the next section.

¹³ In Smith’s (1991) analysis of situation types, this distinction is captured by the difference between ‘natural final point’ and ‘arbitrary final point’ (see section 2.2.1). We believe, however, that the distinction concerns less the nature of the final point but the question of whether one phase or two phases belong to the lexical content.

4.2. *Types of Lexical Contents*

The term ‘lexical content’ applies to all sorts of linguistic expressions (i.e., words, phrases, clauses, and full sentences); in the present context, we are mainly interested in the lexical content of simple and complex verbs.

There are verb contents which, when applied to some argument(s) at some time T , are supposed to apply to the argument(s) at any other time T' as well. For instance, a number can be odd or even, but if it is odd at some time, then it is odd at any time. Properties of this type are often called ‘atemporal’ or ‘individual level predicates’ (Carlson 1978). In contrast, for some verb contents this is not the case: if they are true for some argument(s) at some time T , then it is assumed that there is a ‘contrasting time T' ’ at which they are not true, as in *to sleep*, *to be hungry*, *to work*. We call the latter ‘1-phase contents’, and the former ‘0-phase contents’ (of verbs, phrases, sentences). Situations described by 1-phase contents are always bounded, whereas situations described by 0-phase contents are the only ones that do not have boundaries: if they obtain at all, they obtain without temporal limits.¹⁴

This distinction is straightforward, because it is based on a simple criterion – behaviour with respect to time span at which it can be true (or not true). But for at least three reasons, it is too crude. First, some lexical contents describe situations which, when true at some time T_i , are also true at any time T_{i+1} , but may not be true at T_{i-1} , for example, ⟨John be dead⟩ and ⟨the sabre tooth tiger be extinct⟩. One might call them one-sided 1-phase contents: they have a pretime T_{i-1} at which they are not true, but no ‘posttime’ T_{i+1} at which they are not true. Second, it is often a matter of belief to which category an expression might belong (if you believe in resurrection, then ⟨be dead⟩ does not last forever, and might not be true at T_{i+1}). Third, phases can be further differentiated, for example, on the basis of whether they are homogeneous or dynamic. Sometimes a verb can even characterise a phase either as homogeneous or as dynamic, such as the English verbs *think* and *love* and the Chinese verbs *chuan* ‘put on/wear’ and *na* ‘take/hold’ (see further discussion in section 6.2.3). These three

¹⁴ ‘0-phase contents’ and ‘1-phase contents’ were called ‘0-state contents’ and ‘1-state contents’ in our previous studies. The new terminology is adopted here because of the possible confusion that the term ‘state’ may lead to. In addition, we would like to point out that although our study is concerned particularly with verbs due to the nature of aspect, our discussion of lexical contents also applies to other parts of speech. For example, in most cases, adjectives are 1-phase expressions - there are arguable cases of some lexicalised participles like *broken* and *closed* that one might want to consider as 2-phase expressions. See discussion on 2-phase expressions below.

considerations, however, do not affect our principled distinction which has many consequences in syntax and semantics.¹⁵

A situation that is (selectively) described by a 1-phase content has a beginning and an end, although nothing may be said about what precisely these boundaries are. The time span during which the situation obtains, T-SIT, is preceded and followed by time spans during which it does not obtain. In contrast to this situation a speaker might also want to talk about a time span, within which such a situation first obtains and then, still within the same time span, does not obtain (or vice versa). In this case, there is a 'change of state' within the same span. Such a change of state is encoded by a '2-phase content' in language. Languages provide their speakers with very different possibilities to express such a change from 'yes' to 'no' (or 'no' to 'yes') within the same time span. Minimally, they collapse these two opposing states in one lexical morpheme, typically a verb stem as *arrive* in *John arrived*. Maximally, they express the two phases by two different adjacent (and temporally ordered) sentences, as in *First, John was not here, and then, he was here*. Both methods express two subsequent phases and, as in the examples, they are characterised by two different positions of John. Their meaning is quite similar, but obviously they are in different ways accessible to adverbial modification and other syntactic operations. Between these two extremes of '2-phase' expressions are a number of constructional possibilities, for example, verb stem plus prefix, as in German *erstechen* vs. *stechen* ('to kill by stabbing' vs. 'to stab') or *erblühen* vs. *blühen* ('to become flowering' vs. 'to flower'), verb stem plus detachable particle, as in English *to wake up* or in German *hochziehen* ('pull up'), or two consecutive verb stems, as in Chinese *ti-dao* ('kick-fall').

These and many other constructions reflect various ways in which a change of state can be lexicalised – from the most dense 'packaging' into a single morpheme to no lexicalisation at all. At the very least the constructions must somehow express what the two opposing phases are; other meaning components can be included, for example, information about the 'path', the 'manner', the temporal nature of the transition, or factors such as causation or intentionality. Note that if the two phases are packed into one word (as in ⟨to arrive⟩), then the two phases cannot be expressed independently of each other; they are lexically connected, no matter what other (causal or intentional) relation may obtain between them. This does not

¹⁵ In what follows, we shall not consider 0-phase contents further since they play no particular role for the problems at hand. Note, however, that they may play a role for aspectual differentiation. For example, they do not admit the perfect, as in **the book has been in Chinese* (one has to say *the book was in Chinese*).

exclude, however, that they can be selectively addressed by adverbials and other types of modification. As we shall see in section 6 below, this fact is also important for the use of aspectual particles in Chinese.

In what follows, the first phase in such a change-of-state expression shall be called the source phase, and the second phase, the target phase. A simple or complex expression whose lexical content includes a source phase and a target phase will be called a ‘2-phase expression’. The crucial factor for this distinction is not whether the situation described by the expression involves boundaries, or whether the situation is bounded (cf. section 4.1). For example, ⟨John be in London from Friday to Monday⟩ does not involve two phases – it is a 1-phase lexical content with explicitly specified initial and final points. But ⟨John be in London and then not⟩ and ⟨John leave London⟩ are 2-phase contents, because they (minimally) include a phase and its opposite. Thus, the utterance *John was in London from Friday to Monday*, if true, does not necessarily imply that he was not in London afterwards (though there may be a strong implicature to this effect), whereas *John left London* necessarily implies a phase where he was not in London after having been there.

4.3. *Two-phase Expressions in Chinese*

Chinese has an extremely transparent system to express source phase and target phase. This system is the so-called ‘resultative verb construction’ (RVC), in which the two phases are separately described by two consecutive verb stems, such as *xie-wan* ‘write finish’, *fang-xia* ‘put-down’, and *ti-dao* ‘kick-fall’. This is the most common pattern for expressing change of state: almost any verb can be followed by another verb that marks the target phase. But there are also some simple verbs in which the two phases are projected into one morpheme, for example, *dao* ‘to arrive’; in such cases, both phases are simultaneously expressed, in contrast to RVCs whose first component may be used in isolation (i.e., expressing source phase only). Examples (16a–c) show one verb expressing a source phase only, an RVC expressing two phases, and a simple verb expressing two phases, respectively.

- (16)a. Zhangsan zai sha yi-tou niu.¹⁶
Zhangsan ZAI kill one-CL cow
 Zhangsan is killing a cow.

- b. Zhangsan sha-si-le yi-tou niu.
Zhangsan kill-die-LE one-CL cow
 Zhangsan killed a cow.
- c. Zhangsan dao jia-le
Zhangsan arrive home-LE
 Zhangsan arrived home.

The first component in an RVC can include all kinds of information about the source phase, which by itself is a 1-phase content, for example, it may (a) include an agentive component, such as *chi* in *chi-wan* ‘eat-up’, (b) be goal-oriented, such as *sha* in *sha-si* ‘kill-die’, and (c) be entirely static, such as *xiang* in *xiang-dao* ‘think-get’. But RVCs are usually classified according to the particular meaning of their second component. The three most important types of the second component are: (a) simply to indicate that the target phase is reached (e.g., *wan* ‘finish’, *cheng* ‘complete’), (b) to give some qualitative characterisation of the target phase (e.g., *diao* ‘empty’, *po* ‘broken’), and (c) to give a locative specification – the target place (e.g., *shang* ‘up’, *xia* ‘down’). Although the formal structures of RVCs are more complicated than indicated here, our brief sketch will suffice for the present purposes (for a detailed analysis, see Chao 1968, pp. 435–480; Li and Thompson 1981, pp. 54–68; or more recently, Li 1995, 1999; Yong 1997).

5. ASPECTUAL SYSTEMS AND THE ENGLISH ASPECT

5.1. *Two Dimensions of Variation*

Languages vary in the way in which they grammaticalise particular aspects, that is, particular temporal relations between time of assertion (or topic time, TT) and time of situation (T-SIT) (as discussed in 3.2). Languages also vary in the way in which temporal characteristics of situations are encoded in lexical contents. These two types of variations are well reflected in Smith’s (1991) notion of a limited but well-defined ‘parametric variation’ of aspect. Although our analysis differs from Smith’s in many ways, we similarly assume two dimensions of variation in the semantics

¹⁶ The Chinese verb *sha* differs from the English translation equivalent *kill* in that it does not include the target phase of being dead as part of its lexical content. Thus, *sha -le ta san-ci* (kill-LE it three-times) in Chinese is fine, but *killed it three times* in English is odd.

of aspect, and ask (a) which temporal relations between TT and T-SIT are grammaticalised in a language? and (b) how are the different types of T-SIT described in a language? In the preceding two sections we provided a time-relational account of these two questions; in this section, we examine how the interaction of these two dimensions yield a language-specific aspectual system and illustrate it with English.

For 1-phase expressions, T-SIT involves only one interval. A situation described by a 2-phase expression such as ⟨Adam fall asleep⟩ includes two distinct time intervals: a source phase which can be described by ⟨Adam not be asleep⟩, and a target phase which can be described by ⟨Adam be asleep⟩. To which of the two phases is TT related? Languages must select either the source phase or the target phase and treat it on a par with the single phase of a 1-phase expression. This fact is best captured by the notion of distinguished phase. The distinguished phase (DP) is (a) the only phase in the case of 1-phase contents, and (b) either the source phase or the target phase in the case of 2-phase contents. Thus, whether the source phase or the target phase is chosen as DP is the second dimension of variation in the definition of aspect. This variation is determined by the crosslinguistic differences between languages. In English, DP is the source phase, whereas in Chinese, DP is the target phase (see more discussion of this point in 6.2). TT is not related to the different types of T-SIT themselves, but to the time of their distinguished phase. We now illustrate these points with the English aspectual system.

5.2. *The Case of English*

In English, the DP for aspectual marking is: (a) the single phase for 1-phase contents, and (b) the source phase for 2-phase contents. Thus, the temporal relations between TT and T-SIT in English, as grammaticalised in aspect, can be represented by using the notions of T-DP (time of DP) and posttime/pretime of T-DP (the time after/before T-DP), as follows:

- | | | |
|------|---------------|----------------------------------|
| (17) | Imperfective: | TT IN T-DP |
| | Perfective: | TT OVL T-DP and POSTTIME OF T-DP |
| | Perfect: | TT AFTER T-DP |

Normally, these three aspectual relations are encoded by the progressive form, the simple form, and the perfect form, respectively; exceptions exist, such as the copula or verbs like *to know*, *to consider* which do not distinguish ‘Imperfective’ and ‘Perfective’ by morphological forms.

According to our time-relational definition of tense and aspect, a sentence such as *John was sleeping*, a 1-phase expression, has a tense

component and an aspect component. The tense component indicates that the topic time precedes the time of the utterance. The aspect component expresses that the topic time falls within the time of a situation described by ⟨John sleep⟩. Nothing is asserted about the boundaries of this situation, or whether the boundaries are related to the time of utterance. By contrast, a sentence such as *John was falling asleep*, a 2-phase expression, includes a source phase (John is not asleep) and a target phase (John is asleep), about one of which an assertion is to be made. By our above analysis, in English, the distinguished phase to which the topic time is related is the source phase. Thus, the topic time is fully included in this source phase (i.e., TT IN T-DP), and the assertion made is confined to a subinterval of this phase. Nothing is asserted about whether the target phase is actually reached; by default, the listener may be led to assume that John was eventually asleep, but this assumption can be easily cancelled, for example by continuing the sentence with *when he suddenly heard a blast*. Such cancellations are not possible with perfective or perfect forms, as in *John fell asleep* or *John had fallen asleep*; in these cases, TT either overlaps with the posttime of T-DP or is after T-DP, and thus the assertion includes the target phase.

5.3. *Time-relational Aspect versus Aspect as a Particular Way of Presenting a Situation*

The strictly time-relational definition of aspect proposed here operates exclusively with notions that are independently defined – time intervals and temporal relations, on the one hand, and assertion and situation, on the other. Three time intervals play a particular role: TU, the time at which the utterance is made; TT, the time for which an assertion is made; and T-SIT, the time at which some situation obtains. This definition of aspect does not use intuitively suggestive but entirely metaphorical characterisations such as ‘viewed in its entirety, with boundaries, from the inside/outside, with special reference to the inner constituency of the situation’, and so on, but at the same time it naturally captures the intuition behind these characterisations. For example, according to this analysis, the English progressive form marks that the TT is fully included in T-SIT (or more precisely, in T-DP). Therefore, we have the feeling that only part of the situation is ‘presented’ or that the situation ‘is seen from the inside’ or ‘without reference to its boundaries’. Exactly the opposite is the case for the perfective: T-DP and the time afterwards is at least partially included in TT. Hence, we have the feeling that the single phase (in 1-phase expressions) or the source phase (in 2-phase expressions) is presented as ‘completed’, ‘with boundaries’, or ‘as a whole’. Finally, in the case of perfect, TT is after T-DP, whence the feeling that the single phase or the source phase are ‘over’

at the time about which something is said; if there is no proper ‘time after’, the perfect sounds odd, as in *John has been dead*.

6. THE CHINESE ASPECTUAL SYSTEM

Much of our previous discussion has been on problems associated with traditional analyses of aspect and of aspectual particles in Chinese. We attempted to overcome these problems with a new framework of time-relational definition of aspect. Since this framework is developed not just for English, Russian, or other Indo-European languages, it should apply equally well to Chinese and should help us to explain some of the difficult puzzles in the analysis of Chinese aspect. We have shown above that the new framework solves the general problems with aspectual characterisations, the problems A and B (see sections 2.1.1 and 2.1.2). In this section we shall see how it can overcome problems C and D, the specific problems with the Chinese aspectual particles.

6.1. *Aspect and What is Asserted*

Let us begin with a brief recapitulation. A lexical content such as ⟨Adam sleep⟩, ⟨Eva fall asleep⟩ or ⟨Cain wake up⟩, is a selective description of a situation. The lexical content by itself does not specify when, for which time, and how often such a situation obtains. The lexical content does not make a claim, either, about whether such a situation obtains at all. To specify that the situation obtains, all Indo-European languages, for example, choose a particular variant of the finite verb to mark that a particular time span, the topic time TT (a) precedes, follows, or contains the time of utterance, and (b) precedes, follows, includes, or is included in the time of a situation with the properties indicated by the lexical content. In this view, the finite variant in (a) corresponds to the tense function, and that in (b) to the aspect function.

Chinese does not have finite verbs. But the finiteness function can be expressed by optional particles; in the case of aspectual particles, they assert that TT precedes, follows, includes, or is included in the time of a situation described by the sentence. The position of TT on the time line (as well as its duration), however, must be marked by adverbials or left to the context; in other words, aspectual particles do not mark tense in Chinese. In contrast to finiteness marking in Indo-European languages, aspectual particles may be omitted, in which case no assertion is marked, and as a consequence, the sentence may sound awkward if not interpreted in an appropriate context. The absence of aspectual markers and its consequence

remind us of Problem D (see section 2.1.4, to which we shall shortly return): without a particle, the sentence does not make an assertion about whether the situation, or part of it, is realised (not that it could not be real). Let us now turn to the concrete functioning of the individual particles.

6.2. *The Four Particles*

The four aspectual particles in Chinese can be roughly summarised as follows in our time-relational analysis of aspect:

- | | | |
|--------|-----------|------------------------------|
| (18)a. | <i>le</i> | TT OVL PRETIME T-DP AND T-DP |
| | b. | <i>guo</i> TT AFTER T-DP |
| | c. | <i>zai</i> TT IN T-DP |
| | d. | <i>zhe</i> TT IN T-DP |

In the following, we will see how this framework of analysis accounts for the use of the four particles as described in descriptive grammars and briefly summarized in sections 1 and 2 above. But first, we should note again that Chinese differs from English in its treatment of the distinguished phase DP (see section 5.2. on English). In English, the DP is (a) the single phase for 1-phase contents, and (b) the source phase for 2-phase contents; in Chinese, the DP is (a) the single phase for 1-phase contents, and (b) the target phase for 2-phase contents. This analysis of the difference between English and Chinese with respect to DP is based on the analysis that English is more 'action-oriented' while Chinese is 'result-oriented' (Chu 1976, Li 1990, Yong 1997). In Chinese, the particular emphasis on result is reflected in the use of a language-specific construction, the RVC (see section 4.3). In the following we shall see how this analysis of DP in Chinese yields correct predictions about the aspectual system of the language.

6.3. *le*

The traditional analysis as discussed earlier (sections 1 and 2) states that *le* presents a situation as (a) specific and (b) as viewed in its entirety or as a whole; in some cases, it may also mark the coming-about of a situation. These functions, as well as the assertive role of *le* can be precisely reconstructed by the definition in (18a). This definition states that TT overlaps with the distinguished phase as well as part of the time before the distinguished phase. The definition can be best illustrated with some simple diagrams. In what follows, +++++ indicates the distinguished

phase, ----- the source phase of 2-phase expressions, and [] the assertion time TT. Let us first consider the 1-phase expressions, in which the distinguished phase is a single phase. In this case, TT must include some time before this phase, and at least the beginning part of the phase. It is left open where it closes; in particular, it can, but need not, include the end point – therefore, it is not contradictory to say the two clauses in (19) (note that the English translation sounds odd).

- (19) Ta xie-le xin, keshi mei xie-wan. [++++++]+++++
she write-LE letter but not write-finish
 She wrote a letter, but did not finish writing it.

This definition also explains the ‘inchoative flavour’ which is often found with *le*, as in (20) – in our definition, inchoative reading is part of the perfective aspect and comes naturally as a function of the assertion.

- (20) Ta pang-le. [++++++]+++++
she fat-LE
 She became fat.

In (19), *le* with the verb *xie-xin* (write-letter) asserts that the activity of letter writing took place (and terminated), and the scope of assertion closes at a time prior to the end point of the event. In (20), *le* with the verb *pang* (be fat) asserts that the state of being fat has become true, and that the scope of assertion closes at some arbitrary point during this state – hence, we get the reading that she has become fat and she is still fat, precisely an inchoative reading (one can draw the diagram in (20) differently, such that the closure is at a different point – in other words, it is unknown when she will stop being fat). This inchoative reading is absent in (19) because the closure of the scope of assertion implies that the letter-writing activity already terminated (although it was not completed). The difference between (19) and (20) seems to suggest that the inchoative reading is a function of the inherent meaning of verbs used in the sentence. Some authors suggest just that: the inherent meanings of the verb might contribute to whether *le* conveys an inchoative meaning. For example, Shih (1990) argued that *le* indicates inchoativity when combined with atelic verbs, but completed-action meaning when combined with telic verbs. Comrie (1976) showed that, in many languages, the combination of perfective aspect with stative but not process verbs indicates an inchoative meaning. Finally, Smith (1991) suggested that the perfective *le* can be used only with dynamic verbs; when it is used with stative verbs, it has the so-called ‘shifted interpretation’: inchoative meaning is the result of such a shift (see also discussion in section 2.2.1).

Although the inherent meaning of the verb seems important in this case, it is unlikely to be the only explanation for determining the inchoativity of *le*, since inchoative readings can also arise when *le* is combined with a typical non-stative activity verb in some cases, as in (21):

- (21) Zhangsan xiao-le, erqie xiao-de hen kaixin.
Zhangsan laugh-LE and laugh-DE very happily
 Zhangsan started to laugh, and he laughed very happily.

Moreover, stative verbs with *le* do not have to be interpreted with an inchoative reading. For example, sentence (22) shows that a quantification after the verb can release the inchoative meaning and give the sentence a normal perfective reading in which TT covers the entire T-DP.¹⁷

- (22) Zhangsan bing-le liang tian.
Zhangsan sick-LE two day
 Zhangsan was sick for two days.

In Smith's (1991) analysis, such a quantification triggers another shifted interpretation, in which the focus changes from the initial point to the final point, or changes out of the state (p. 347). Our analysis does not involve such shifts or switches of interpretation. We assume that these differences arise due to the scope differences of TT; for example, the assertion can

¹⁷ Some authors will be tempted to say that there are two kinds of *le* involved here: (22) has a verb-final *le*, and thus it does not convey an inchoative meaning; if the quantification phrase is removed from the sentence, it has a sentence-final *le*, and thus conveys the inchoative meaning. But this is hardly a principled account, given that the differences between (i-a) and (i-b) cannot be explained in this way.

- (i)a. Zhangsan zhidao-le.
Zhangsan know-LE
 Zhangsan knew (about it).
- b. Zhangsan zhidao-le zhe-jian shi.
Zhangsan know-LE this-CL matter
 Zhangsan knew about this matter.

The verb *zhidao* 'know', in this case, is also a stative verb, but the meaning in these two sentences does not change as a function of whether *le* ends the sentence: in both cases, the sentence indicates Zhangsan's coming into possession of the knowledge of something ([++++]++++, diagrammatically).

close at different points during the phase of the event. All the interpretations are within the possible variations of a perfective meaning, as defined by the relations between TT and T-DP.¹⁸

One significant difference between Chinese and English in aspect marking, according to Smith (1991), is that Chinese separates the notion of completion from that of simple closure. This was somewhat puzzling, since accomplishments in traditional analyses carry a clear endpoint, yet the perfective *le* in Chinese, unlike perfective aspect in English, does not indicate the endpoint (or completion). Smith illustrated this puzzle with example (23):

- (23) Zhangshan xue-le Fawen, keshi hai mei xue-hui.
Zhangshan learn-LE French but still not study-know
 Zhangsan studied French but he never actually learned it.

Smith showed that it was difficult to translate the same verb *xue* in the two clauses with the same English verb, unless one renders it with an imperfective aspect as ‘Zhangsan was learning French’. Thus, *xue-Fawen* ‘learn French’ is an accomplishment, but its combination with *le* does not lead to a completion meaning.

This puzzle is naturally explained in our analysis, since *xue-Fawen* belongs to 1-phase expressions, just as *xie-xin* ‘write-letter’ does, whereas *xue-hui* ‘study-know’ belongs to 2-phase expressions. The difference between *xue* and *xue-hui* in (23), and the aspectual meaning differences therein, is captured by how TT marks the DP, and what the DP is in each case. This brings us now to 2-phase expressions in Chinese.

For 2-phase expressions in Chinese, the target phase is the distinguished phase DP, and as a consequence, the source phase is the pretime of DP. By the definition of (18a), *le* indicates that T-DP as well as its pretime are included within TT. The most common type of 2-phase expressions are RVCs, as *xue-hui* ‘study-know’ in (23) or *xie-wan* ‘write-finish’ in (24).

- | | | | | | |
|------|--|------|---------------------|------------|------------|
| (24) | Zhangsan xie-wan-le | xin. | -----[-----+++++++] | source | target |
| | <i>Zhangsan write-finish-LE letter</i> | | | <i>xie</i> | <i>wan</i> |
| | <i>Zhangsan finished writing the letter.</i> | | | | |

In (24), the source phase is the activity of writing a letter, and the target phase is that this activity, during which the letter is written, is finished.

¹⁸ We would like to note, however, that our definition does not rule out the role of factors such as finer distinctions of inherent verb meanings (e.g., state *versus* process) in the aspectual interpretations of a sentence. These factors, including contextual information and world knowledge, currently are not part of the core definition in our aspectual analysis.

Both phases overlap with TT and hence are within the scope of assertion as marked by *le*, which is illustrated by the diagram next to the sentence. Therefore, the ‘result’ cannot be cancelled as in (7) or (19); this is in full agreement with the observations discussed earlier, such as that made by Chu (1976) (see section 2.1.4).

This analysis works in the same way for all types of RVCs (see discussion in section 4.3). That is, the use of *le* marks an assertion for (a) the completion of the event (e.g., *wan* ‘finish’), (b) the qualitative characterisation of the target phase (e.g., *si* ‘die’, *po* ‘broken’), or (c) the locative specification, the target place (e.g., *shang* ‘up’, *xia* ‘down’). Without *le*, it is not asserted that any of the target phases is actually realised.

The same analysis also works for monomorphemic 2-phase verbs. For example, (25) asserts that the target phase of being at home is reached; the lexical content of *dao* ‘arrive’ incorporates both the source phase and the target phase, and the function of *le* is to relate the scope of assertion to the T-DP, the time of the target phase, plus its pretime, part of the source phase.

(25)	Zhangsan zhongyu dao-le jia.	-----[-----+++++++]	source	target
	<i>Zhangsan finally arrive-LE home</i>		<i>not at home</i>	<i>at home</i>
	<i>Zhangsan finally arrived home.</i>			

The definition of *le* given here is simple and uniform, and it accounts for most of the empirical observations about the usage of this form. The key point here is that we treat aspectual particles as assertion markers, and this treatment releases us from all of the problems discussed earlier (sections 2.1.1 to 2.1.4). Although our assertion analysis of aspectual particles is a new approach, assertion is not entirely an unfamiliar notion in the discussion of Chinese aspect. Smith (1991, pp. 345–346), for example, indirectly calls for the notion of assertion in her analysis of the perfective *le* with RVCs. Discussing examples like (23) and (24), she remarked that a sentence like (24) “cannot be conjoined with an assertion that the situation continues” such as in (7); in other words, what is asserted in (24) is that the letter-writing situation is completed, in contrast to that in (7).

Our time-relational analysis of aspectual particles in Chinese also naturally explains some of the intuitions suggested by traditional metaphorical analyses. For example, as discussed in section 1, Li and Thompson (1981) and Smith (1991) both considered that the function of *le* is to indicate that the event is being viewed with both initial and final boundaries as a single whole. Chao (1968), on the other hand, proposed that *le* conveys the meaning of ‘completed action’. Chao (1968) and Rohsenow (1976, 1978)

also assigned the ‘coming about’ or inchoative meaning to *le* (and more recently as one of ‘shifted interpretations’ in Smith’s 1991 analysis). All of these characterisations, according to our analysis, are not part of the meaning of *le* itself, but are reflected by how the topic time relates to the time of situation. In other words, these meanings may be the emergent properties of the assertion marking on the time of situation during the process of sentence interpretation. Thus, because the use of *le* indicates that TT always includes the target phase for 2-phase expressions, and often by default for 1-phase expressions, one may thus get the sense of a complete boundary of the event. The ‘completed action’ sense emerges when one considers the 2-phase expressions such as RVCs combined with *le*, in which case the TT marks that target phase has been reached. Finally, one may also get a ‘coming about’ or inchoative meaning because *le* can mark an assertion for only the initial part of T-SIT, as in 1-phase expressions.

What remains to be explained, though, is the ‘definite’ or ‘specific’ flavour that goes with *le* (in contrast to *guo*; see Li and Thompson 1981, Chao 1968, and discussions in sections 1 and 2). This flavour seems to result simply from the fact that T-SIT, the time of situation, must overlap with TT in the sense specified in (18). Hence, TT ‘fixates’ on T-SIT: if there is a specific assertion time, there must also be a specific situation time that matches with it. Note that TT itself is not localised in temporal order by *le*, because aspectual particles do not express tense. Thus, if TT is to be further specified in relation to TU, this information must come from adverbials or from the general context.

6.4. *guo*

According to traditional analyses (Chao 1968; Li and Thompson 1981, Smith 1991), *guo* marks that the situation must have obtained at least once, and that its resulting state no longer obtains. In contrast to *le*, it has an ‘indefinite’ or ‘experiential’ flavour. How does the definition in (18b) reconstruct these facts?

Our definition of *guo* is very simple: *guo* indicates that the time about which something is asserted falls into the posttime of the distinguished phase. Thus, it is defined in the same way as the English perfect (see (17) in section 5.2), but with one important difference for 2-phase contents: English chooses the source phase whereas Chinese chooses the target phase as the distinguished phase. Therefore, *guo* behaves like the English perfect for 1-phase contents but not for 2-phase contents. In English, the TT of the perfect is after the source phase, and thus it normally falls into the target phase. In Chinese, because the distinguished phase is the target phase, the TT of *guo* is a time at which the ‘result’ of the target phase is past already.

unless you believe in resurrection, this does not make much sense. This analysis naturally explains what is often said of *guo* – that the use of *guo* requires a situation to be repeatable to guarantee an indefinite reading (cf. Smith 1991, pp. 350–351).

This analysis is further confirmed if we look at sentence (30), in which the same verb *si* does occur with *guo*, because the verb conveys the meaning of ‘out of order’ rather than ‘being dead’.

- (30) Zhe jiqi si-guo hao ji-ci huo.
this machine die-GUO very several-CL fire
 This machine was out of order several times.

Since the machine can be ‘dead’ and then ‘resurrect’ (i.e., be repaired), it is perfectly okay to use *si* with *guo* in this context. In fact, sentence (29), when modified by the adverbial phrase *hao ji-ci* ‘several times’ (i.e., *Ta si-guo hao ji-ci*), can be used in a novel way to refer to a situation in which a patient is not really dead but fainted several times and almost died each time.

Given this analysis of *guo* and *si*, why is it perfectly okay to say sentence (31), in which the RVC indicates clearly a 2-phase content, but not (29), in which the main verb is the same as the second component of the RVC in (31)?

- (31) Zhangsan da-si-guo yi-ge ren.²⁰
Zhangsan hit-dead-GUO one-CL person
 Zhangsan once killed a person.

Although the person involved is dead, and the sentence does not convey any meaning of Zhangsan’s resurrection, the use of *guo* in this sentence is perfectly okay. The important difference, however, is that in (29) the main verb applies to the experiencer, Zhangsan, the only argument of the sentence, whereas in (31) the main verb (i.e., the RVC) applies to the agent, Zhangsan; and the experiencer of death, or the patient, is someone else (i.e., *yi-ge ren* ‘one person’), the object of the sentence. Thus, it is perfectly possible that Zhangsan, the agent, will *da-si* ‘kill’ another time, but it is not possible for Zhangsan, the experiencer, to *si* ‘die’ another time, given the constraint that TT marks the assertion after the entire time of the situation.

Finally, how do we explain the ‘indefinite’ or ‘existential’ flavour, a property often assigned to *guo* in the literature in comparison with *le*? Our

²⁰ We owe this example to an anonymous reviewer.

analysis of *le* was that TT overlaps with and thus fixates on a particular T-SIT. Because TT fixates on T-SIT, if there is a specific assertion time, there must also be a specific situation time that matches with it. This is where the ‘definite’ or ‘specific’ flavour of *le* comes from. In contrast, *guo* leaves open the precise position of T-SIT in relation to TT: it only says that T-SIT, or more precisely, T-DP, somehow precedes TT. This condition is satisfied by any situation time, or set of situation times, of the required type before TT.²¹ Our comparison of *le* and *guo* is clearly seen in sentences (32a–b), where (32a) indicates that the target phase ⟨Zhangsan be out of country⟩ currently obtains because TT covers the DP, i.e., target phase, while (32b) indicates that the target phase no longer obtains because TT is entirely preceded by the DP. Hence, the definite-indefinite distinction between *le* and *guo* need not be stipulated, but naturally follows from our definitions in (18).

- (32)a. Zhangsan chu-le guo. -----[-----+++++]
Zhangsan leave-LE country source target
Zhangsan has been to other countries. *be in country be out of country*
- b. Zhangsan chu-guo guo. -----+++++[]
Zhangsan leave-GUO country source target
Zhangsan has been to other countries. *be in country be out of country*

6.5. *zai* and *zhe*

Both particles are traditionally assigned the function of imperfective markers. Our analysis is consistent with this view. Under the definition in (18c–d), they both indicate that the time to which the assertion is confined is fully included in the distinguished phase. Hence, they express the same imperfective aspect. For example, the same situation is described in (33a) and (33b), in which the main verb *xiang* ‘think’ is a 1-phase expression.

- (33)a. Zhangsan zai xiang nei-jian shi. ++++[++++]++++
Zhangsan ZAI think that-CL matter
Zhangsan is thinking about the matter.

²¹ Note that this definition does not exclude the possibility of a specific or definite reading of *guo*: as noted by Chao (1968) and Smith (1991), a specific or definite reading of *guo* may be obtained by the use of contextual information or pragmatic knowledge.

- b. Zhangsan xiang-zhe nei-jian shi. ++++[++++]++++
Zhangsan think-ZHE that-CL matter
 Zhangsan is thinking about the matter.

The exact distribution of *zai* and *zhe* has been under intense debate, as discussed earlier (see section 1.2). The difference between *zai* and *zhe* is further complicated by other factors of pragmatics and dialectal variation. For example, the use of *zhe* is much more common in written than in spoken language, whereas *zai* is more common in spoken than in written language. *Zhe*, as compared to *zai*, is frequently used to indicate background events. Finally, the borderline between these two particles has become blurred, especially in northern dialects; in some dialects, *zai* and *zhe* can be combined together even in a single sentence (Chen 1978). This picture can get even more complicated when we consider a third particle, *ne*, which often co-occurs with *zai* and *zhe* in speech. Some authors consider *ne* as an imperfective marker. For example, Chan (1980) mentioned that *ne* encompasses the functions of both *zai* and *zhe*. Ma (1987) argued that in the Beijing dialect, *ne* is actually the main device for imperfective aspect. In this article we do not discuss *ne* as an imperfective marker, on grounds that it is largely restricted to the Beijing dialect and that its imperfective function is restricted to answers to questions in colloquial dialogues (Liu 1985). All of these levels of complication lead us to believe that our core definition of their aspectual functions should not include their distributional differences.

But there is one perplexing ‘distributional’ fact for which our analysis does suggest a partial explanation: neither *zai* nor *zhe* can occur with RVCs, the resultative verb constructions. For example, sentences (34a) and (34b), which contain a standard RVC, are ungrammatical with *zai* and *zhe*, respectively:

- (34)a. *Zhangsan zai chi-wan nei-dun fan.
Zhangsan ZAI eat-finish that-CL rice
 Zhangsan is finishing eating that meal.
- b. *Zhangsan chi-wan-zhe nei-dun fan.
Zhangsan eat-finish-ZHE that-CL rice
 Zhangsan is finishing eating that meal.

In an analysis of verb types in Chinese, Tai (1984) argued that RVCs in Chinese express only the result and not the duration, even though the first component is an explicit durative verb. This lack of durativity of RVCs,

according to Tai, is what prevents *zai* from being used. Tai's analysis, however, does not account for the fact that RVCs can occur with adverbials that indicate durativity of the action denoted by RVCs, in sentences like (35).

- (35) Zhangsan hua-le liang-ge xiaoshi chi-wan nei-dun fan.
Zhangsan spend-LE two-CL hour eat-finish that-CL rice
 Zhangsan spent two hours finishing eating that meal.

Under the present analysis, neither *zai* nor *zhe* can apply to the first component of RVCs, which indicates the source phase, because in Chinese the distinguished phase is the target rather than the source phase. In contrast, a comparable structure in English is perfectly acceptable (e.g., *John is eating up his apple*), because in English the distinguished phase is the source phase and the imperfective marking applies to the source phase. We can similarly explain why *zai* and *zhe* cannot be used with monomorphemic 2-phase expressions like *dao* (as in *dao-jia* 'arrive home') whereas the progressive *-ing* can be used with the English equivalents like *arrive*. For both *dao* and *arrive*, the source phase is ⟨not be home⟩, indicating a stage prior to the target phase of ⟨be home⟩. In English, the imperfective marking of *John is arriving home* applies to the source phase, which can be diagrammatically represented as --[- - -]-- + + + +. This analysis is compatible with Smith's (1991) view that progressives with achievement verbs indicate preliminary stages of the event rather than the process of the event itself, if we consider 'preliminary stage' on a par with 'source phase'. In Chinese, however, neither **Zhangsan zai dao jia* nor **Zhangsan dao-zhe jia* 'Zhangsan is arriving home' can be interpreted in a similar way, because an imperfective marking on the source phase is unavailable.

Our analysis, in principle, does not exclude the possibility that *zai* and *zhe* could be applied to the target phase in RVCs and monomorphemic 2-phase expressions. So why is it, in practice, that we never use *zai* and *zhe* with RVCs and verbs like *dao* to mark the imperfectivity of the target phase? We currently do not have a perfect answer to this question, but one speculation is that the nature of the target phase in these 2-phase expressions somehow prevents the imperfective marking by *zai* and *zhe*. The target phases like *wan* ⟨be done⟩, *shang* ⟨be up⟩, and *po* ⟨be broken⟩ in RVCs all seem to indicate states that result from the source-phase actions (i.e., change of state). It might be that explicit imperfective markings are blocked in these cases because the resulting states by themselves are instantaneous (e.g., we cannot talk about the duration of *po* ⟨be broken⟩), while imperfective marking requires a duration of event.

6.6. *Zero Marking*

In contrast to tense-aspect marking in Indo-European languages, which are realised by finite forms of the verb, aspectual particles are not obligatory in Chinese. We term these sentences as ‘zero marking’ sentences. There are two consequences to ‘zero marking’. First, the sentence may sound incomplete or odd, especially when uttered in isolation. Second, as we discussed throughout the paper, aspectual particles are temporal assertion markers, and therefore when such particles are absent the description of a sentence is not linked to any particular time about which something is asserted. The illocutionary status of the sentence will depend completely on pragmatic or contextual factors. For example, in a narrative discourse in which one event is reported after another, it is clear that the descriptions indicate events that have occurred. A sentence without a particle can also be interpreted as a kind of imperative, as discussed earlier (section 3.1). Finally, such a sentence can also be used to indicate a habitual meaning. Compare the following two examples from Yong (1997), as discussed in section 2.1.4.

(36)a. Ta (xingqitian) xi yifu.
he (Sunday) wash clothes
 He washes clothes (on Sundays).

b. Ta xi-le yifu.
he wash-LE clothes
 He (has) washed clothes.

(36a) is easily understood to mean that he regularly or typically washes his clothes on Sundays. No assertion is made with respect to any particular interval, though, as would be the case in (36b) when *le* is added.

We shall not follow up the various contextual factors that invite or even impose a particular interpretation on zero marking sentences. But the optionality of aspectual particles has one interesting consequence on the interpretation of RVCs and related constructions. Compare again the following two sentences:

(37)a. Ta xi-ganjing yifu (jiu zou-le).
he was-clean clothes (then go-LE)
 He washed clothes clean (and then left).

b. *Ta xi yifu (jiu zou-le).
he wash clothes (then go-LE)
 He washed clothes (and then left).

Sentence (37a), which has a standard RVC, sounds perfectly normal if followed by the clause in parentheses (or in similar contexts). In contrast, sentence (37b), which lacks the second component of the RVC, is distinctly odd in the same context. In both sentences, *le* modifies the verb in the second clause that serves as the context. Whereas this *le* is sufficient for the specific TT to which the first clause in (37a) can be related, it is not enough in (37b); another *le* has to be added to the first clause in (37b) to make the sentence grammatical: *Ta xi le yifu (jiu zou -le)*. This discrepancy shows that the seeming redundancy of *le* with RVCs, discussed as Problem C in section 2.1.3, stems from the fact that RVCs specify a clear target phase, and the TT of *le*, which marks that a second phase is reached in the second clause, is highly compatible with, and easily accessible to the target phase, as in (37a). When no target phase is incorporated into the lexical content of the expression, as in (37b), then the omission of *le* makes the sentence incomplete with respect to the status of assertion (and the scope of further assertion does not apply to it).

Smith (1991) proposed that sentences without aspectual morphemes have a neutral aspect, a default value of aspect that allows for more than one interpretation depending on the context and world knowledge. Our above analysis is compatible with the notion of neutral aspect, but differs from it in one crucial way. Neutral aspect assigns an overly flexible interpretation to a given sentence, and assumes that both perfective and imperfective interpretations can arise with the same sentence. Our analysis assumes that it is rarely the case that the same sentence can have both a perfective and an imperfective reading: discourse or situational contexts almost always disambiguate the two interpretations. In many cases, it is even obligatory to use the aspectual particles to make the assertion status clear, as in (37b). In fact, Smith's Chinese example of neutral aspect (Smith 1991, p. 121) is problematic:

- (38) Zhangsan dao jia de shihou, Mali xie gongzuo baogao.
Zhangsan arrive home DE time, Mali write work report

Smith interpreted this sentence as indicating both a closed (perfective) reading (Mali began writing the report when Zhangsan arrived) and an open (imperfective) reading (Mali was writing when Zhangsan arrived). However, the main clause of the sentence cannot stand as it is in (38): an aspect marker, *le* or *zai/zhe*, has to be present on the verb to achieve the supposed perfective or imperfective reading. What is most interesting about this example is that the zero marking in the subordinate clause carries a perfective reading, which asserts that Zhangsan arrived home (i.e., *dao jia* equal to *dao-le jia*). This is because the backgrounding event *dao*

jia ‘arrive home’ is a 2-phase expression, and the conjunctive phrase *de shihou* ‘the time’ indicates a time at which the target phase is reached. When the backgrounding event is a 1-phase expression, however, *de shihou* ‘the time’ will result in an imperfective reading, as in (39) where the order of the two clauses in (38) is reversed.

- (39) Mali xie gongzuo baogao de shihou, Zhangsan dao
Mali write work report DE time, Zhangsan arrive
jia-le.
home-LE.
 When Mary was writing the work report, Zhangsan arrived home.

In this case, *le* is obligatory for the main clause, given that the backgrounding clause provides a different aspect. The subordinate clause does not have any aspectual particles, as the main clause in Smith’s original sentence, but it is confined to an imperfective reading. In any case, these examples show that the range of neutral aspect in Chinese is severely limited, and the aspectual vagueness due to the omission of particles can be compensated by other linguistic devices or by discourse factors.

7. CONCLUSION

The characterisation of Chinese aspectual particles has been notoriously difficult for several decades in Chinese linguistic research. These particles have been studied in many different perspectives, and have been assigned many different functions. Our purpose in this article is not to give an exhaustive account of all the functions of these particles. Instead, we attempt to provide a simple but precise picture of the particles in an alternative framework of analysis. We reviewed several existing influential accounts of aspectual particles in Chinese, in particular, Li and Thompson (1981), Mangione and Li (1993), and Smith (1991). We discussed four problems, some general, some specific, associated with these accounts. We argued in particular that all these characterisations are intuitively plausible, but none of them is precise.

The analysis of Chinese aspectual marking we proposed here operates exclusively with notions that are independently defined – time intervals and temporal relations, on the one hand, and assertion and situation, on the other. This time-relational analysis does not use intuitively suggestive but entirely metaphorical characterisations in traditional definitions of aspect,

but it captures the intuition behind their characterisations. For example, for the imperfective aspect the assertion is a confined time span which is fully included in the time of the situation, and thus we often have the impression that only part of the situation is presented, or that the situation 'is seen from the inside' or 'without reference to its boundaries'. Thus, this analysis reconstructs these informal characterisations in terms of normal temporal relations between temporal intervals. Our analysis presents a simple and precise account of the functions of the Chinese particles *le*, *guo*, *zai* and *zhe* in terms of which part of the sentence's descriptive content is asserted.²²

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²² The time-relational analysis we presented in this paper applies not only to Chinese or English, but also to many other languages. For a discussion of how this analysis works in Russian, see Klein (1995). For a discussion of how this analysis works in German, see Klein (in press). These analyses indicate that our framework is not restricted to particular languages, but has general implications for the study of aspect.

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