

## On the Temporal Meaning of the Verbal *-le* in Chinese\*

Jo-wang Lin

*National Chiao Tung University*

This paper gives a unifying temporal analysis of the distribution of the verbal *-le* in Mandarin Chinese within a framework of model-theoretic truth-conditional semantics. I argue that syntactically, *-le* must raise from Asp to Tense at LF and semantically, it requires that the initial subinterval of the target state of its containing proposition precede a pragmatically determined reference time. Thus, *-le* not only contributes an aspectual meaning to the sentence but also is a relative past tense marker. The result of this study implies that it might be wrong to claim that Chinese is a completely tenseless language as the common assumption holds.

Key words: Chinese, *-le*, model-theoretic, truth-conditional, temporal

### 1. Introduction

The Chinese verbal suffix *-le*, whose use is illustrated in (1), has received much attention in the Chinese literature (Li and Thompson 1981, Liu 1988, Heinz 1990, Jing 1993, Huang 1988, among many others).<sup>1</sup>

- (1) Wo mai-le yi-ben shu  
I buy-Asp one-Cl book  
'I bought a book.'

Traditionally, most authors have treated *-le* as an aspect marker, focusing on what kind of aspect it expresses. Some other authors such as Magione and Li (1993), Dai (1994) and Xing (1996), on the other hand, have paid a great attention to the temporal meaning of *-le*. However, as far as I know, few people have tried to explain how and why the temporal meaning of *-le* may fit with past, on-going and future situations, as illustrated by (2), (3) and (4b-d), while at the same time excluding examples like (4a).

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<sup>1</sup> Chinese has another *le*, which occurs in sentence-final position. In this paper, I will focus on only the verbal suffix *-le*.

- (2) Past situations
- a. Zhangsan da-le Lisi  
Zhangsan hit-LE Lisi  
'Zhangsan hit Lisi.'
  - b. Zhangsan xie-le yi-feng xin  
Zhangsan write-LE one-CL letter  
'Zhangsan wrote a letter.'
- (3) Present situations
- a. Zhangsan yang-le yi-tiao yu  
Zhangsan breed-LE one-CL fish  
'Zhangsan is breeding/has been breeding a fish.'
  - b. Meng-ko zuo-le yi-ge xiaohai  
door-mouth sit-LE one person  
'A child is sitting in front of the door.'
  - c. Ni kan, meige ren dou xiao-wan-le yao e  
you look everyone all laugh-bend-LE waist PAR  
'Look. Everyone is laughing to such an extent that he is bending his waist.'
  - d. Zhe-shuang xie da-le yi dianr  
this-CL shoe big-LE one inch  
'This pair of shoes is a little bit bigger (than what is required).'
- (4) Future situations
- a. \*Zhangsan mintian (zhege shihou) likai-le nanjing  
Zhangsan tomorrow this moment leave-LE Nanking  
'Zhangsan leaves Nanking (at this moment) tomorrow.'
  - b. Zhangsan mintien (zhege shihou) (yinggai) yijing likai-le nanjing  
Zhangsan tomorrow this moment should already leave-LE Nanking  
'Zhangsan should have already left Nanking by (this moment) tomorrow.'
  - c. Yaoshi Lisi dang-le zongtong, wo yiding quanli fuzuo ta  
if Lisi serve-LE president I definitely all-effort assist him  
'If Lisi is selected as president, I will definitely assist him with all my effort.'
  - d. Ni zou-le yihou, jiu mei ren zhaogu ni ma le  
you leave-LE after then no person take-care you mother PAR  
'After you leave, there will be no one to take care of your mother.'

The goal of this paper is to give a unifying temporal analysis for *-le* in all contexts within a framework of formal model-theoretic semantics and discuss its implications for the tense system in Chinese. I will show that *-le* not only contributes an aspectual meaning to the sentence containing it but also behaves like a relative past-tense marker

which must be raised to T(ense) node at LF.

This paper is organized as follows. Section 2 and section 3 lay out the syntactic and semantic assumptions that I will be assuming. Section 4 reviews previous studies of *-le*. Section 5 provides a temporal meaning of the verbal suffix *-le* within a framework of model-theoretic truth-conditional semantics. I show that this approach can nicely account for all of the data in (2)-(4). Section 6 offers several arguments in support of the raising of *-le* to Tense. Finally, section 7 is a summary of this article.

## 2. Syntactic assumptions

I will assume that Chinese has the following phrase structure:

- (5) [TP...[AgrsP...[ModalP...[AspP...[AgroP...[VP...]]]]]]

TP is a projection of Tense. AgrsP and AgroP are projections of the agreement heads Agr<sub>s</sub> and Agr<sub>o</sub> as in Chomsky (1995). ModalP is a projection headed by a modal word like *yinggai* ‘should’, *hui* ‘will’, etc., and AspP is headed by an aspect marker such as the verbal suffix *-le*. Although this structure is slightly different from what Chomsky has proposed for English structure, the difference is not important for the purpose of this paper.<sup>2</sup> So I will assume the above structure without further argumentation. I also adopt the VP-internal Subject Hypothesis (Koopman and Sportiche 1991, Kitagawa 1986, among others), though this again is not crucial.

I will also assume with Chomsky (1993, 1995) that syntactic movement is the last resort driven by morphological/lexical features. These features need to be checked in their checking domain and eliminated for Full Interpretation. Moreover, features can be either strong or weak, forcing overt or covert movement, respectively.

With this much as background, now consider the following sentences.

- (6) a. ta sheng-le yi-chang bing  
       he fall-Asp one-Cl sick  
       ‘He fell sick.’  
       b. ta xie-le yi-feng xin  
       he write one-Cl letter  
       ‘He wrote a letter.’

<sup>2</sup> For example, Chomsky assumes that Agr<sub>s</sub>P is higher than TP, while I assume the reverse.

- (7) a. ta zai shuijiao  
       he at sleep  
       ‘He is sleeping.’  
       b. ta zai xie yi-feng xin  
       he at write one-Cl letter  
       ‘He is writing a letter.’

Observe that (6a) and (6b), whose aspect marker is *-le*, have a past-tense like interpretation, whereas (7a) and (7b), whose aspect marker is *zai*, have a present-tense like interpretation. At first glance, this seems to suggest that *-le* contributes the past-tense interpretation of a sentence, whereas *zai* contributes the present-tense interpretation. Reasonable though this suggestion may sound, evidence suggests that it cannot be wholly correct. Compare the sentences in (8) with those in (9).

- (8) a. ta san dian de-shihou zai shuijiao  
       he three o'clock when at sleep  
       ‘He was sleeping at three o’clock.’  
       b. ta (san dian de shi-hou) hui (hai) zai shui-(zhe) jiao ma?  
       he three o'clock when will still at sleep-Asp sleep Q  
       ‘Will he be (still) sleeping at three o’clock?’  
       (9) a. \*ta mingtian xie-le yi-feng xin  
       he tomorrow write-Asp one-Cl letter  
       b. \*ta hui xie-le yi-feng xin  
       he will write-Asp one-Cl letter

The two sentences in (8) show that when a time adverbial or a modal auxiliary occurs with *zai* ‘at’, the temporal reference of the sentence is shifted to that of the time adverbial or the modal. This indicates that *zai* is a pure aspect marker which does not have its own tense interpretation, namely, it does not say anything about when the action denoted by the VP takes place. Therefore, the present-tense interpretation of (7a) and (7b) must be determined by something else.

In contrast, the aspect marker *-le* seems to shift the temporal reference of the sentence to the past. Therefore, (6b) is compatible with a past time adverb as in (10) but is not compatible with a future time adverb as in (9a) or a future modal as in (9b).

- (10) Zhangsan zuo wan xie-le yi-feng xin  
       Zhangsan last night write-Asp one-Cl letter  
       ‘Zhangsan wrote a letter last night.’

In this sense, the verbal suffix *-le* is much more like a past-tense marker than *zai* is like a present-tense marker. In fact, I will argue later that *-le* is a relative past tense marker.

Given the above considerations, it seems reasonable to say that the verbal suffix *-le*, as opposed to the aspect marker *zai*, has a formal weak tense feature. Therefore, *-le*, which is located under Asp, has to move to the head of TP to check and eliminate its tense feature. Accordingly, when a sentence contains the verbal suffix *-le*, its LF will look something like (11) below.

$$(11) \ [TP \dots [T \text{ le}_i \ [AgrsP \dots [ModalP \dots [AspP \ [Asp \ t_i \ [AgroP \dots [VP \dots ]]]]]]]]]]$$

I will provide more arguments for the raising of *-le* to T later.

### 3. Semantic assumptions

In this section, I briefly outline the semantic assumptions that I adopt.

Following Needham (1975) and Ogihara (1996), I will incorporate the existential quantifier, time variables into the logical language (See also Davidson (1967)). Thus, a sentence like (12) has a notation like (13).

(12) John cried.

(13)  $\exists t[t < \text{now} \ \& \ \text{cry}'(j')(t)]$

Apart from the above notational system, I will assume with Stump (1985) that sentences translate as ‘temporal abstracts’, i.e., sets of intervals at which the sentences are true, represented as  $\lambda t[\dots t \dots]$ . With the introduction of time variables to the argument structures of verbs, I need to assume that in addition to the normal semantic types *e* (entity) and *t* (truth value), there is a semantic type *i*, standing for intervals. These types will enter recursive definition of semantic types so that if  $\alpha$  and  $\beta$  are any types, then  $\langle \alpha, \beta \rangle$  is a type.

In addition, following Stump (1985) and Ogihara (1996), I assume that a general existential closure rule introduces an existential quantifier to close the temporal abstract. This is achieved by means of Truth Definition as is stated below.

(14) Truth Definition: An expression of type  $\langle i, \langle i, t \rangle \rangle$  that serves as a translation of a matrix sentence is true in the context *c* iff there is a time  $t \in T$  and another time  $c_T \in \{T: T \text{ is contextually salient}\}$  such that  $\|\phi\|^{M,c,W,gc}(c_T)(t) = 1$ .

The exact content of (14) will become clear later.

Finally, following Dowty (1979), Ogihara (1996), I assume that time adverbials such as *yesterday*, *1993*, etc., serve as a restriction upon time variables in logical representations. They denote functions from properties of time intervals to sets of time intervals.<sup>3</sup>

$$(15) \text{ zuotian} \Rightarrow \lambda P_{\langle i, t \rangle} \lambda t [t \subseteq \text{yesterday}' \ \& \ P(t)]$$

$$(16) \text{ in 1998} \Rightarrow \lambda P_{\langle i, t \rangle} \lambda t [t \subseteq 1998' \ \& \ P(t)]$$

#### 4. Previous studies of *-le*

It has been pointed out in many places that *-le* marks a relation between a reference time and an event time (Magione and Li (1993), Dai (1994) and Xin (1996)). For example, Xin (1996) has arrived at the following generalization for the function of *-le*.

- (17) ‘了<sub>1</sub>’ 表現一個情狀的完全態。這個情狀的發生時間可能是 1) 包含在一個明確參照時間內，或者 2) 在不明確參照時間之前。不明確參照時間在簡單句中即是發話時間；在複合謂語中則是第二個動作行為。

(Xin 1996:58)

[*-Le* presents the perfective aspect of a situation. The time at which the situation happens could be 1) included within a specific reference time or 2) before a nonspecific reference time. The nonspecific reference time is the utterance time in simplex sentences but the time of the second action in complex sentences.]

To illustrate, consider the following sentences.

- (18) a. Ta zuotian xie-le yi-feng xin  
he yesterday write-Asp one-Cl letter  
‘He wrote a letter yesterday.’  
b. Ta xie-le yi-feng xin  
he write-Asp one-Cl letter  
‘He wrote a letter.’  
c. Ta xie-le xin cai zou  
he write-Asp letter CAI leave  
‘He left only after he wrote the letter.’

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<sup>3</sup> Later I will argue that time adverbials are actually ambiguous.

(18a) contains a time adverb, i.e., *zuotian*, so the action of writing must be included within the interval denoted by *zuotian*. In contrast, (18b) does not contain any time adverb, so the action of writing must take place before the utterance time. Finally, in (18c), the action of writing must occur before the action of leaving.

I agree with Xin (1996) that the above generalization is essentially correct, but it seems not precise enough to account for all relevant data. For example, although Xin has observed that *-le* may not occur with future time adverbials as in (19), it is not clear how the generalization in (17) predicts this fact.

- (19) \*ta mingtian xie-le xin  
he tomorrow write-Asp letter

According to the generalization in (17), (19) should have a meaning according to which the action of writing is included within the interval denoted by *mingtian* but this is false. Also, it is not clear how the generalization in (17) predicts that the examples in (3), as opposed to those in (2), describe an on-going situation rather than a past situation. Finally, the meaning of *le*<sub>1</sub> as stated in (17) seems not general enough. It will be more desirable if one can capture the meaning of the verbal *-le* within one single statement rather than with several statements.

## 5. A formal approach to the temporal meaning of *-le*

Magione and Li (1993) have observed that a simplex sentence with *-le* but without a time adverb would sound incomplete to some speakers when presented to them outside of context that has an understood reference time. This use of *-le* is quite analogous to the ‘deictic’ use of the English past tense observed by Partee (1973).<sup>4</sup> In view of this, I would like to propose that *-le* translates as (20).

- (20) Preliminary translation of *-le*  
 $le \Rightarrow \lambda P_{\langle t, t \rangle} \lambda t' \lambda t [t < t' \ \& \ P(t) \ \& \ t \subseteq t_R]$

In (20), *t* is the event time, *t'* is a time which the event time must precede, and *t<sub>R</sub>* represents the understood reference time mentioned by Magione and Li (1993). The

<sup>4</sup> Partee (1973) points out that examples like *I didn't turn off the stove* must refer to a specific past time understood in the context. Otherwise, almost any past time will satisfy the truth conditions.

translation essentially says that the event time  $t$ , which is included within some pragmatically determined reference time  $t_R$ , must precede another time  $t'$ .  $t'$  is a time that will be replaced by a contextually salient time  $c_T$ , as the truth definition requires. Such a treatment of *-le* is equivalent to saying that *-le* is a relative past tense marker; namely,  $t$  is past relative to  $t'$ .

### 5.1 Past situations

On the analysis of *-le* in (20), (18b) should translate as (21) and (18a) as (22).

- (21) LF: [le [Zhangsan xie yi-feng xin]]
1.  $le \Rightarrow \lambda P_{\langle i, t \rangle} \lambda t' \lambda t [t < t' \ \& \ P(t) \ \& \ t \subseteq t_R]$
  2. **Zhangsan xie yi-feng xin**  $\Rightarrow \lambda t \exists x [\text{letter}'(x) \ \& \ \text{write}'(x)(\text{Zhangsan}')(t)]$
  3. **le Zhangsan xin yi-feng xin**  $\Rightarrow \lambda t' \lambda t [t < t' \ \& \ \exists x [\text{letter}'(x) \ \& \ \text{write}'(x)(\text{Zhangsan}')(t) \ \& \ t \subseteq t_R]]$
  4.  $\lambda t' \lambda t [t < t' \ \& \ \exists x [\text{letter}'(x) \ \& \ \text{write}'(x)(\text{Zhangsan}')(t) \ \& \ t \subseteq t_R]] (c_T) = \lambda t [t < c_T \ \& \ \exists x [\text{letter}'(x) \ \& \ \text{write}'(x)(\text{Zhangsan}')(t) \ \& \ t \subseteq t_R]]$  Truth Definition
  5.  $\exists t [t < s^* \ \& \ \exists x [\text{letter}'(x) \ \& \ \text{write}'(x)(\text{Zhangsan}')(t) \ \& \ t \subseteq t_R]]$  Truth Definition
- (22) LF: [le [Zhangsan zuotian xie yi-feng xin]]
1. **Zhangsan xie yi-feng xin**  $\Rightarrow \lambda t [\exists x [\text{letter}'(x) \ \& \ \text{write}'(x)(\text{Zhangsan}')(t)]]$
  2. **zuotian**  $\Rightarrow P_{\langle i, t \rangle} \lambda t [t \subseteq \text{yesterday}' \ \& \ P(t)]$
  3. **Zhangsan zuotian xie yi-feng xin**  $\Rightarrow \lambda t [t \subseteq \text{yesterday}' \ \& \ \exists x [\text{letter}'(x) \ \& \ \text{write}'(x)(\text{Zhangsan}')(t)]]$
  4. **le Zhangsan zuotian xie yi-feng xin**  $\Rightarrow \lambda P_{\langle i, t \rangle} \lambda t' \lambda t [t < t' \ \& \ P(t) \ \& \ t \subseteq t_R] (\lambda t [t \subseteq \text{yesterday}' \ \& \ \exists x [\text{letter}'(x) \ \& \ \text{write}'(x)(\text{Zhangsan}')(t)]]]$
  5.  $\lambda t' \lambda t [t < t' \ \& \ t \subseteq \text{yesterday}' \ \& \ \exists x [\text{letter}'(x) \ \& \ \text{write}'(x)(\text{Zhangsan}')(t) \ \& \ t \subseteq t_R]]$
  6.  $\lambda t' \lambda t [t < t' \ \& \ t \subseteq \text{yesterday}' \ \& \ \exists x [\text{letter}'(x) \ \& \ \text{write}'(x)(\text{Zhangsan}')(t) \ \& \ t \subseteq t_R]] (c_T)$  Truth Definition
  7.  $\lambda t [t < c_T \ \& \ t \subseteq \text{yesterday}' \ \& \ \exists x [\text{letter}'(x) \ \& \ \text{write}'(x)(\text{Zhangsan}')(t) \ \& \ t \subseteq t_R]]$
  8.  $\exists t [t < s^* \ \& \ t \subseteq \text{yesterday}' \ \& \ \exists x [\text{letter}'(x) \ \& \ \text{write}'(x)(\text{Zhangsan}')(t) \ \& \ t \subseteq t_R]]$  or  $\exists t [t < \text{yesterday}' \ \& \ t \subseteq \text{yesterday}' \ \& \ \exists x [\text{letter}'(x) \ \& \ \text{write}'(x)(\text{Zhangsan}')(t) \ \& \ t \subseteq t_R]]$  Truth Definition



Since (18b) does not contain any time adverbial, the speech time, indicated as  $s^*$ , is the most salient time made available by the context. So  $c_T$  in (21) is replaced by  $s^*$  and the truth conditions say that there is a time  $t$  before  $s^*$  and Zhangsan wrote a letter at  $t$ . Furthermore, the time  $t$  must fall within some contextually determined reference time  $t_R$ . This gives (18b) a past-tense like reading, which is correct. In contrast, (18a) does contain a time adverbial *zuotian* ‘yesterday’. Therefore, uttering (18a) will make two times salient in the context: the speech time and the time denoted by the time adverb *zuotian* ‘yesterday’. Accordingly,  $c_T$  can refer to either the speech time or the time denoted by *zuotian*. If  $c_T$  is replaced with the time denoted by *zuotian*, a contradiction arises between “ $t < \text{yesterday}$ ” and “ $t \subseteq \text{tomorrow}$ ”, leading to no interpretation. However, if  $c_T$  refers to  $s^*$ , the truth conditions say that there is a time  $t$  before  $s^*$  and  $t$  is included within yesterday such that Zhangsan wrote a letter at  $t$ . In this case,  $t_R$  is equivalent to yesterday. Thus, (18a) also has a past-tense like interpretation. The above analysis correctly predicts that (18b) and (18a) are about past events.

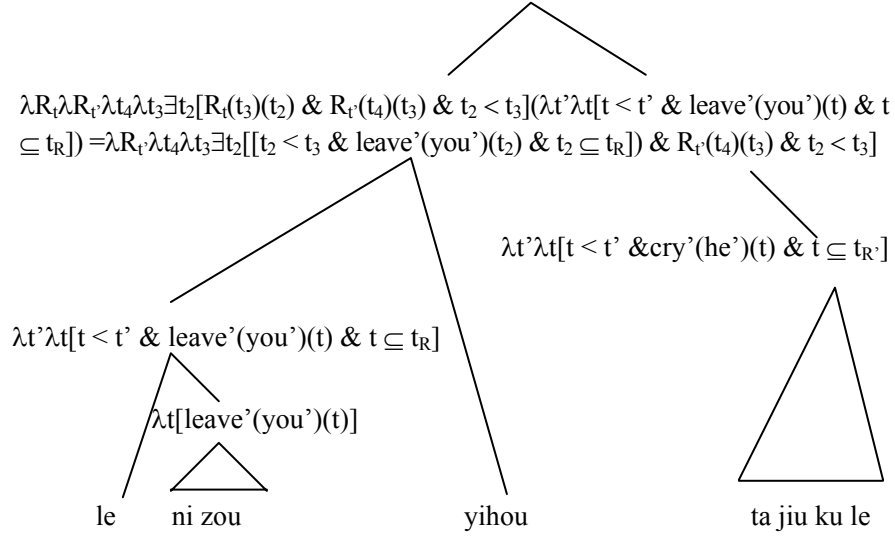
## 5.2 Complex structures

Now consider (4d), reproduced as (23).

- (23) Ni    zou-le        yihou, ta    jiu    ku    le  
       you leave-Asp after    he then cry LE  
       ‘After you left, he cried.’

Recall that examples like (23) require the first action described by the adverbial clause take place before the reference time of *-le*, which is the time of the second action described by the main clause. This fact can be nicely captured by the analysis of *-le* in (17). To show this, I need to first show what *yihou* ‘after’ translates. Intuitively, *yihou* indicates that the main clause event is located after the adverbial clause event. I will assume with Ogihara (1996) that such expressions translate as (24). Thus, the computation of (23) is (25).

- (24)  $\lambda R_t \lambda R_{t'} \lambda t_4 \lambda t_3 \exists t_2 [R_t(t_3)(t_2) \& R_{t'}(t_4)(t_3) \& t_2 < t_3]$   
 (25)  $\lambda R_{t'} \lambda t_4 \lambda t_3 \exists t_2 [[t_2 < t_3 \& \text{leave}'(\text{you}') (t_2) \& t_2 \subseteq t_R]] \& R_{t'}(t_4)(t_3) \& t_2 < t_3] (\lambda t' \lambda t [t < t' \& \text{cry}'(\text{he}') (t) \& t \subseteq t_{R'}]) = \exists t_3 \exists t_2 [t_2 < t_3 \& \text{leave}'(\text{you}') (t_2) \& t_2 \subseteq t_R \& t_3 < s^* \& \text{cry}'(\text{he}') (t_3) \& t_3 \subseteq t_{R'}]$



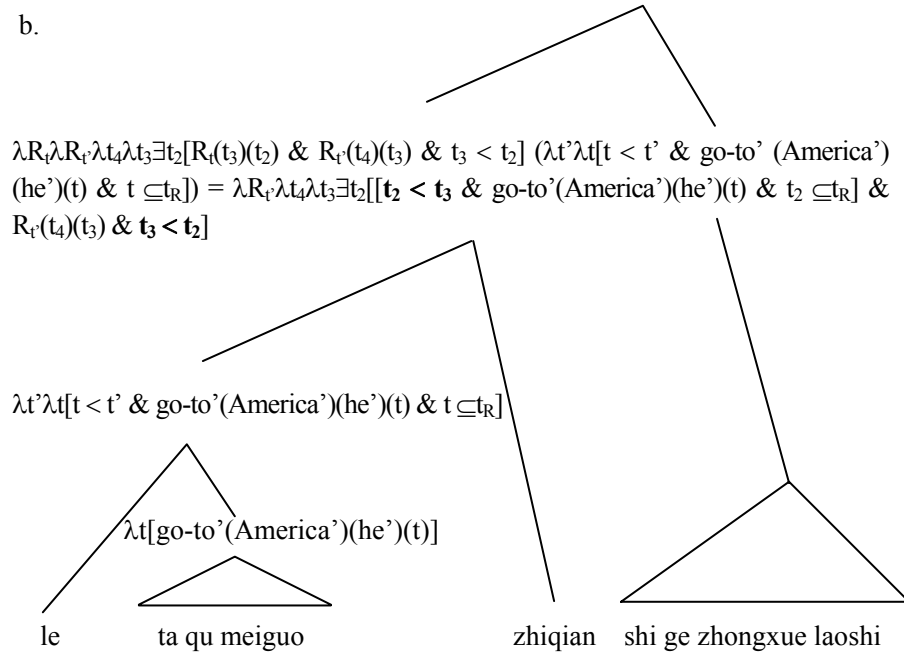
The bold-faced part in (25) is the final translation of (23). There,  $t_2$  represents the time of leaving and  $t_3$  the time of his crying. The translation requires that  $t_2$  be included within some reference time  $t_R$ --the reference time that Magione and Li have mentioned. Suppose that the discourse is about some time in the past, say yesterday, then  $t_R$  refers to yesterday. Accordingly, the event described by the adverbial clause is about a past event. And this past event must precede the interval denoted by the action described in the matrix clause, i.e.,  $t_2 < t_3$ . Turning to  $t_3$ , we observe that it must be included within some reference time, i.e.,  $t_{R'}$ , just like  $t_2$  because of the presence of *-le*. Here, a quite natural candidate for  $t_{R'}$  again can be yesterday. Moreover, the interval of his crying must precede some contextually salient time. Since the sentence does not contain a time adverb, the speech time can serve as the contextually salient time. It follows that his crying took place before the speech time, and your leaving took place before his crying. This result seems to be intuitively correct.

It is interesting to point out that not every adverbial subordinator may occur with *-le*. *Zhiqian* 'before' may not; nor can *de-shihou* 'when'. The case of *zhiqian* is illustrated in (26). Intuitively, the ungrammaticality of (26a) with *-le* is as follows. The semantics of *zhiqian* 'before' requires that the adverbial clause event occurs after the main clause event but this requirement happens to be contradictory to the semantics of

*-le*, which makes an opposite claim. The contradiction is shown by the two bolded faced parts in (26b).

- (26) a. Ta qu-(\*le) meiguo zhiqian, shi ge zhongxue laoshi  
 he go-Asp America before be CI high-school teacher  
 ‘Before he went to America, he was a high school teacher.’

b.



Similar remarks apply to examples with *de-shihou* ‘when’, which expresses an identity relation between the event time of the adverbial clause and that of the main clause. Its translation is given in (27b).

- (27) a. Wo ma-(\*le) ta de-shihou, ta (dou) hen bu-gaoxing  
 I scold-Asp him when he DOU very not-happy  
 ‘When I scold(ed) him, he is/was always not happy.’  
 b. **de-shihou**  $\Rightarrow \lambda R_t \lambda R_t' \lambda t_4 \lambda t_3 \exists t_2 [R_t(t_3)(t_2) \& R_t'(t_4)(t_3) \& t_3 = t_2]$

The identity relation expressed by *de-shihou* is contradictory to the precedence relation expressed by *-le*. So (27a) with *-le* is uninterpretable.

### 5.3 Future situations

Many authors have pointed out that *-le* cannot occur with a future time adverbial as is shown by (28). However, Dai (1994) has observed that in examples like (29), *-le* may occur with a time adverbial.

- (28) Wo mingtian likai-(\*le) nanjing  
 I tomorrow leave-Asp Nanjing  
 ‘I will leave Nanjing tomorrow.’
- (29) Zhangsan mingtian (zhege shihou) yinggai yijing likai-le nanjing  
 Zhangsan tomorrow this moment should already leave-Asp Nanjing  
 ‘Zhangsan should have already left Nanjing by (this moment) tomorrow.’

The question is why there is a contrast between (28) and (29) and how this contrast should be accounted for.

The ungrammaticality of (28) is quite straightforward. The LF and translation of (28) are as follows.

- (30) LF: [le [wo mingtian likai nanjing]]
1. **wo mingtian likai nanjing**  $\Rightarrow \lambda t[t \subseteq \text{tomorrow}' \ \& \ \text{leave}'(\text{Nanjing}')(I')(t)]$
  2. **le wo mingtian likai nanjing**  $\Rightarrow$   
 $\lambda P_{\langle i, t \rangle} \lambda t' \lambda t[t < t' \ \& \ P(t) \ \& \ t \subseteq t_R] (\lambda t[t \subseteq \text{tomorrow}' \ \& \ \text{leave}'(\text{Nanjing}')(I')(t)] = \lambda t' \lambda t[t < t' \ \& \ t \subseteq \text{tomorrow}' \ \& \ \text{leave}'(\text{Nanjing}')(I')(t) \ \& \ t \subseteq t_R])$
  3.  $\lambda t[t < c_T \ \& \ t \subseteq \text{tomorrow}' \ \& \ \text{leave}'(\text{Nanjing}')(I')(t) \ \& \ t \subseteq t_R]$
  4.  $\exists t[t < s^* \ \& \ t \subseteq \text{tomorrow}' \ \& \ \text{leave}'(\text{Nanjing}')(I')(t) \ \& \ t \subseteq t_R]$  or  
 $\exists t[t < \text{tomorrow}' \ \& \ t \subseteq \text{tomorrow}' \ \& \ \text{leave}'(\text{Nanjing}')(I')(t) \ \& \ t \subseteq t_R]$

In (30), there are two contextually salient times, the speech time and the time denoted by *mingtian* ‘tomorrow’. However, whether one replaces  $c_T$  with the speech time or the time denoted by *mingtian* ‘tomorrow’, there is a contradiction between “ $t < c_T$ ” and “ $t \subseteq \text{tomorrow}'$ ”. Therefore, examples like (28) have no interpretation.

Next consider (29). Notice that the interpretation of the time adverbial *mingtian* ‘tomorrow’ in (29) seems different from that of the same time adverbial in (28). While *mingtian* ‘tomorrow’ in (28) is interpreted as an interval within which the event takes place, i.e., it modifies the event time, the same adverbial in (29) is understood as a reference point before which the event takes place. It seems obvious that the latter interpretation is related to the aspectual adverb *yijing* ‘already’.

Another interesting thing about (29) is concerned with the relative position between the time adverbial and the modal verb. When the time adverb in (29) is placed after the modal verb, the sentence becomes ill-formed. This is shown by (31).

- (31) \*Zhangsan yinggai mingtian (zhege shihou) yijing likai-le nanjing  
 Zhangsan should tomorrow this moment already leave-Asp Nanjing  
 ‘Zhangsan should have already left Nanjing by (this moment) tomorrow.’

Notice that time adverbials can actually appear after modal verbs as (32) below shows. However, in such examples, the time adverbial is construed as modifying the event time rather than serving as a reference point.

- (32) Zhangsan yinggai mingtian likai nanjing  
 Zhangsan should tomorrow leave Nanjing  
 ‘Zhangsan should leave Nanjing tomorrow.’

So the conclusion seems to be the following: In Chinese, when a time adverbial is interpreted as a reference time before which an event occurs, it must be attached to a position higher than a modal verb.

Very interestingly, the above conclusion has a correlation with Thompson’s (1994) discovery that time adverbs in English, depending on their adjunction sites, modify different parts of the tense structure of a clause. She has provided many convincing arguments to show that when the time adverb modifies the event point, it is adjoined to VP, and when it modifies the reference point, it is adjoined to AspP. For example, when (33), which is ambiguous, is paraphrased as (34a), *at 3 p.m.* is adjoined to VP but when it is paraphrased as (34b), *at 3 p.m.* is adjoined to AspP.

- (33) The secretary had eaten at 3 p.m.  
 (34) a. The time that the secretary actually ate was 3 p.m.  
 b. The secretary had already eaten by 3. p.m.

On the basis of the above discussion, I propose that time adverbials such as *mingtian (zhe-ge shihou)* ‘(this moment) tomorrow’ are ambiguous between two readings. They may denote either intervals<sup>5</sup> or functions from properties of time intervals to sets of time intervals. This proposal is actually not a novel one. Stump (1985) has already

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<sup>5</sup> More precisely, I should say that they denote sets of intervals, because they don’t have fixed reference.

argued for a similar analysis of time adverbs. I will use bold-faced type letters to represent interval-denoting time adverbs.

In order to compute (29), we need to know what *yijing* translates. Intuitively, what a formula of the form **yijing**( $\phi$ ) asserts is that  $\phi$  is true before a certain time  $t$ . This can be formalized as (35).

$$(35) \text{ yijing} \Rightarrow \lambda P_{\langle i, t \rangle} \lambda t' \lambda t [t < t' \ \& \ P(t)]$$

Now suppose that *-le* in (29) is raised to T and the time adverb denotes a function from properties of time intervals to sets of time intervals as is usual. Then the LF and the translation of (29) will be (36), (if one ignores the modal verb).

$$(36) \text{ LF: } [\text{TP le } [\text{AgrSP Zhangsan}_1 [\text{ModalP mingtian (zhege shihou) } [\text{AspP yijing } [\text{VP t}_1 \text{ likai nanjing}]]]]]$$

1. VP  $\Rightarrow \lambda t \text{leave}'(\text{Nanjing}')(x_1)(t)$
2. AspP  $\Rightarrow \lambda P_{\langle i, t \rangle} \lambda t' \lambda t [t < t' \ \& \ P(t)] (\lambda t [\text{leave}'(\text{Nanjing}')(x_1)(t)]) =$   
 $\lambda t' \lambda t [t < t' \ \& \ \text{leave}'(\text{Nanjing}')(x_1)(t)]$
3. ModalP  $\Rightarrow \lambda P_{\langle i, t \rangle} \lambda t [t \subseteq \text{tomorrow}' \ \& \ P(t)] (\lambda t' \lambda t [t < t' \ \& \ \text{leave}'(\text{Nanjing}')(x_1)(t)])$       Function Application fails

At the third step of (36), the computation crashes because there is a type mismatch between the translation of *mingtian* ‘tomorrow’,  $\lambda P_{\langle i, t \rangle} \lambda t [t \subseteq \text{tomorrow}' \ \& \ P(t)]$  of type  $\langle \langle i, t \rangle, \langle i, t \rangle \rangle$  and the translation of AspP,  $\lambda t' \lambda t [t < t' \ \& \ \text{leave}'(\text{Nanjing}')(x_1)(t)]$  of type  $\langle i, \langle i, t \rangle \rangle$ , no matter which serves as the functor and which as the argument. So function application cannot apply. The problem arises, because we have analyzed the time adverbial as modifying the event time but what the time adverbial in (36) should actually contribute is an interval that serves as a reference time. So let us now check how the second reading of *mingtian* ‘tomorrow’ works.

If *mingtian* ‘tomorrow’ in (36) denotes an interval, which is the following day of the day containing the speech time, then it can serve as an argument of a function of type  $\langle i, \langle i, t \rangle \rangle$ . The computation of (36) then becomes:

$$(36) \text{ 3. ModalP} \Rightarrow \lambda t' \lambda t [t < t' \ \& \ \text{leave}'(\text{Nanjing}')(x_1)(t)](\text{Tomorrow})$$

$$= \lambda t [t < \text{Tomorrow} \ \& \ \text{leave}'(\text{Nanjing}')(x_1)(t)]$$

$$\text{4. AgrSP} \Rightarrow \lambda x_1 \lambda t [t < \text{Tomorrow} \ \& \ \text{leave}'(\text{Nanjing}')(x_1)(t)](\text{Zhangsan})$$

$$= \lambda t [t < \text{Tomorrow} \ \& \ \text{leave}'(\text{Nanjing}')(\text{Zhangsan}')(t)]^6$$

<sup>6</sup> I am assuming here with Cresti (1995) and Heim and Kratzer (1998) that if a structure  $\alpha$  has the form  $[XP_1 [YP]]$ , then  $\alpha$  is rebracketed as  $[XP [i [YP]]]$ , and  $[i [YP]]$  translates  $\lambda v_i \beta$ , where  $\beta$  is the translation of YP and  $v_i$  is the same variable that translates  $t_i$  inside YP.

5. TP  $\Rightarrow \lambda P_{\langle i, t \rangle} \lambda t' \lambda t [t < t' \ \& \ P(t) \ \& \ t \subseteq t_R] (\lambda t [t < \textbf{Tomorrow} \ \& \text{leave}'(\text{Nanjing}')(\text{Zhangsan}')(t)])$   
 $= \lambda t' \lambda t [t < t' \ \& \ t < \textbf{Tomorrow} \ \& \text{leave}'(\text{Nanjing}')(\text{Zhangsan}')(t) \ \& \ t \subseteq t_R]$
6.  $\lambda t [t < c_T \ \& \ t < \textbf{Tomorrow} \ \& \text{leave}'(\text{Nanjing}')(\text{Zhangsan}')(t) \ \& \ t \subseteq t_R]$
7.  $\exists t [t < s^* \ \& \ t < \textbf{Tomorrow} \ \& \text{leave}'(\text{Nanjing}')(\text{Zhangsan}')(t) \ \& \ t \subseteq t_R]$  or  
 $\exists t [t < \textbf{Tomorrow} \ \& \ t < \textbf{Tomorrow} \ \& \text{leave}'(\text{Nanjing}')(\text{Zhangsan}')(t) \ \& \ t \subseteq t_R]$  Truth Definition

When  $c_T$  is replaced by the speech time  $s^*$ , a contradiction arises between “ $t < s^*$ ” & “ $t < \textbf{Tomorrow}$ ”. So  $c_T$  cannot be the speech time. On the other hand, when  $c_T$  is replaced by **Tomorrow**, we have two occurrences of “ $t < \textbf{Tomorrow}$ ”. As mentioned, this does no harm, because one of them can be deleted without affecting the truth conditions. Therefore  $c_T$  in (36) must refer to the interval **Tomorrow** and (29) asserts that there is a time  $t$  such that  $t$  is before tomorrow and Zhangsan leaves Nanjing at  $t$ , which is exactly the reading that we want.

#### 5.4 On-going situations

Recall that *-le* may sometimes occur in on-going situations as the examples in (3) show. (3a) and (3b) are reproduced below.

- (3) a. Zhangsan yang-le yi-tiao yu  
 Zhangsan breed-LE one-CL fish  
 ‘Zhangsan is breeding/has been breeding a fish.’
- b. Meng-ko zuo-le yi-ge xiaohai  
 door-mouth sit-LE one person  
 ‘A child is sitting in front of the door.’

In neutral contexts, (3a) and (3b) have a present-tense like interpretation. Such an interpretation raises a very interesting question. If *-le* is a relative past tense marker, as I have suggested, how do examples like (3a) and (3b) obtain their present-tense like interpretations? On the proposed analysis of *-le* in (20), (3a), for example, should translate as (37).

- (37)  $\exists t [t < c_T \ \& \ \exists x [\text{fish}'(x) \ \& \text{breed}'(x)(I')(t) \ \& \ t \subseteq t_R]]$

Since there is no time adverb in (3a),  $c_T$  in (37) must refer to the speech time. Consequently, (37) means that there is a time  $t$  before now such that I breed a fish at  $t$  and  $t$  is included within a reference time  $t_R$ . In other words, (3a) must be about a past event, similar to cases like (2a) or (2b). Clearly, this is a wrong result.

What distinguish examples like those in (3) from those in (2) then? I believe that the answer lies in a subclassification of verb types which manifest different meanings. To show this, however, I want to first detour to Parson's (1990) notion of target states, which will prove very important to a correct understanding of the meaning of the verbal *-le*.

Parson (1990) has differentiated two kinds of states of events--target states and resultant states. He says

It is important not to identify the Resultant-state of an event with its 'target' state. If I throw a ball onto the roof, the target state of this event is the ball's being on the roof, a state that may or may not last for a long time. What I am calling the Resultant-state is different; it is the state of my having thrown the ball onto the roof, and it is a state that cannot cease holding at some later time. (Parsons 1990:235)

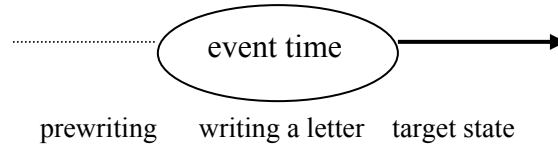
Further illustrating Parson's notion of target states, Kratzer (1994) has cited many examples to show that different predicates may impose different requirements on the target states of the events they classify.

- |                               |  |
|-------------------------------|--|
| (38) The sacs are unloaded.   | The state comes into existence as soon as the sacs have been unloaded and lasts for a little while.      |
| (39) The theorem is proven.   | The state comes into existence as soon as the theorem has been proven and lasts for ever.                |
| (40) The door is bolted.      | The state comes into existence as soon as the door has been bolted and lasts until it is unbolted again. |
| (41) The lobster is consumed. | The state comes into existence as soon as the lobster is gone, and lasts for God knows how long.         |

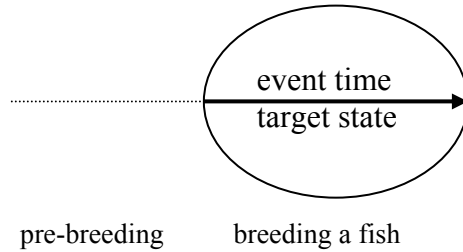
With this much as background, I can now distinguish the two kinds of predicates in (2a) and (3a) as follows:



- (42) a. Write a letter: The target state comes into existence as soon as a letter is written and will last for God knows how long.



- b. Breed a fish: The target state comes into existence as soon as the event of breeding begins and will last for some time until the breeding ends.



As we can see from the above two diagrams, the target state of *write a letter*, represented by the bold-faced arrow, will come into existence only when the whole event is completed, whereas the target state of *breed a fish* will come into existence as soon as the event of breeding starts and will end any time when the breeding stops.

Having discussed what target states are, I am in a position to revise the semantics of the verbal suffix *-le*. Recall that the original semantics of *-le* requires that the event time precedes a contextually salient time and is included within another pragmatically determined reference time. Now I would like to suggest that what actually precedes the contextually salient time is not the event time itself but the initial subinterval of the target state. The notion of ‘initial subintervals’ is defined in Bennet and Partee (1978:12) as follows.

- (43) Let  $I'$  be a member of  $[T]$ .  $I$  is a (PROPER SUBINTERVAL OF  $I'$  if and only if  $I \in [T]$  and  $I \subseteq I'$  ( $I \subseteq I'$  and not  $I = I'$ ).  $I$  is an INITIAL SUBINTERVAL OF  $I'$  if and only if  $I$  is a subinterval of  $I'$  and there do not exist  $t' \in I' - I$  and  $t \in I$  such that  $t' < t$ .

Besides the notion of ‘initial subinterval’, I also need to define two functions:  $f_{\text{initial}}$  and  $f_{\text{target}}$ . The first function,  $f_{\text{initial}}$ , when applied to an interval  $I$ , yields the initial subinterval of  $I$ ; the function  $f_{\text{target}}$ , on the other hand, assigns (the temporal abstract of)

the target state to (the temporal abstract of) any event in its domain. I will also follow Krifka (1989) in making use of temporal trace functions, represented as  $\tau$ . These are functions which map events, states or processes onto their ‘running times’, i.e., the times at which they occur.

With the above definitions in mind, the translation of *-le* can be revised as (44), which essentially requires that the initial subinterval  $t$  of the target state of the event  $P$  precede a pragmatically determined reference time  $t'$ .

- (44) Final translation of *-le*  
 $\lambda P_{\langle i, t \rangle} \lambda t' \lambda t \exists t'' [\text{t} < \text{t}' \ \& \ \text{t} = \text{f}_{\text{initial}}(\text{t}'') \ \& \ \text{t}'' = \tau(\text{f}_{\text{target}}(\text{P})) \ \& \ \text{P}(\text{t}'') \ \& \ \text{t}'' \subseteq \text{t}_R]$

The reader should be able to see that the revised translation of *-le* in (44) differs from the original one in (20) only with regard to what precedes the time  $t'$ . In (20), it is the event time that precedes  $t'$  but in (44) it is the initial subinterval of the target state of the event that precede  $t'$ . As for the event time itself, it still has to be included within a reference time  $t_R$  as in the old version.

We now can retranslate (2a) as (45) and (3a) as (46).

- (45)  $\exists t \exists t'' \exists t''' [\text{t} < \text{c}_T \ \& \ \text{t} = \text{f}_{\text{initial}}(\text{t}'') \ \& \ \text{t}'' = \tau(\text{f}_{\text{target}}(\lambda t''' \exists x [\text{letter}'(\text{x}) \ \& \ \text{write}'(\text{x})(\text{Zhangsan}')(\text{t}''')]) \ \& \ \exists x [\text{letter}'(\text{x}) \ \& \ \text{write}'(\text{x})(\text{Zhangsan}')(\text{t}''')]) \ \& \ \text{t}''' \subseteq \text{t}_R]$   
 (46)  $\exists t \exists t'' \exists t''' [\text{t} < \text{c}_T \ \& \ \text{t} = \text{f}_{\text{initial}}(\text{t}'') \ \& \ \text{t}'' = \tau(\text{f}_{\text{target}}(\lambda t''' \exists x [\text{fish}'(\text{x}) \ \& \ \text{breed}'(\text{x})(\text{Zhangsan}')(\text{t}''')]) \ \& \ \exists x [\text{fish}'(\text{x}) \ \& \ \text{breed}'(\text{x})(\text{Zhangsan}')(\text{t}''')]) \ \& \ \text{t}''' \subseteq \text{t}_R]$

Consider (45) first. Suppose that  $c_T$  refers to the speech time, then this means that the target state of Zhangsan’s writing a letter must come into existence before the speech time. This in turn entails that the whole event of writing a letter must took place in the past. For as we saw in (42), when the target state of writing a letter comes into existence, the whole event must be already completed. It follows that  $t_R$  in (45) must also refer to a past time such as *zuotian* ‘yesterday’. Indeed, this is what native speakers feel how (2a) is interpreted.

Next consider (46). Like (45), let us suppose that  $c_T$  denotes the speech time. Then the target state of Zhangsan’s breeding a fish must come into existence before the speech time. From this, however, it does not follow that the event of breeding a fish must end before the speech time. For as we saw in (42b), the initial point of the target state of the predicate *breed a fish* is also the initial point of the breeding event itself.

Therefore, after the target state of Zhangsan's breeding a fish comes into existence before the speech time, the event of Zhangsan's breeding a fish can still go on for some time after the speech time. Consequently, one cannot infer that (3a) is about a past event.

Now we have to determine what  $t_R$  in (46) stands for. If (3a) is uttered out of blue, then  $t_R$  cannot refer to any previously mentioned time. The only time available is the speech time. However, if we take  $t_R$  to be the speech time, a problem arises. Speech times are usually very short. But predicates like *breed a fish* are usually true of a long interval.

Despite the aforementioned problem, it is a short step from the notion of the speech time to the notion of 'now'. It has been customary for linguists to identify the speech time with 'now'. It is seldom mentioned, however, that the interpretation of 'now' is more flexible than the speech time, because the length of time that *now* denotes may flux, depending upon the actual contexts it appears in. Consider the following examples.

- (47) a. Ni xianzai jiu gei wo zou  
           you now JIU give I leave  
           'You leave now.'  
       b. Wo xianzai duzi hao e  
           I now stomach very hungry  
           'I am very hungry now.'  
       c. Ta xianzai shi ge xuesheng  
           he now be CL student  
           'He is a student now.'

In (47a), *xianzai* 'now' can be understood as a moment of time; in (47b), the length of time that *xianzai* 'now' denotes seems to be longer than minutes; finally in (47c), *xianzai* 'now' must denote an interval that can last for even longer, perhaps years. No matter how long the time adverb *xianzai* 'now' denotes, it always includes the moment of speech.

Given the close link between the speech time and the notion 'now', I want to suggest that along with the speech time, another interval equivalent to what the time adverb *now* denotes is introduced to the context when a sentence is uttered. This time can then serve as a candidate for  $t_R$  in (46). On this analysis, (46) can be equivalent to (48).

- (48)  $\exists t \exists t'' \exists t''' [t < s^* \ \& \ t = f_{\text{initial}}(t'') \ \& \ t'' = \tau(f_{\text{target}}(\lambda t''' \exists x [\text{fish}'(x) \ \& \text{breed}'(x)(\text{Zhangsan}')(t''')))) \ \& \ \exists x [\text{fish}'(x) \ \& \text{breed}'(x)(\text{Zhangsan}')(t''')] \ \& \ t''' \subseteq \text{now}']$

If  $t_R$  is equivalent to what *now* denotes, then the meaning of (3a) is the same as (49). Since *now* can denote a long interval, the problem that we saw in (47) no longer exists. Also, because the interpretation of *now* always includes the moment of speech, (3a) has a present-tense like interpretation, even though the breeding event actually starts before the speech time.

- (49) Wo xianzai yang-le yi-tiao yu  
I now breed-Asp one-Cl fish  
'I now breed a fish.'

The present-tense like interpretation of (3a) is therefore explained.

## 6. Arguments for Asp-to-T raising

I have so far shown that there is much evidence for treating *-le* as denoting a relation between two times. More precisely, *-le* seems to behave like a relative past tense marker which raises from Asp to Tense at LF. In this section, I would like to provide three arguments in favor of the LF raising of *-le* to Tense.

### 6.1 Unwanted interpretations

Consider (50).

- (50) \*Wo mingtian (zhege shihou) likai-le nanjing  
I tomorrow this moment leave-Asp Nanjing

Suppose that *-le* stays at Asp rather than moving to T at LF. Then two derivations are possible for (50), depending upon which interpretation of the time adverb *mingtian* 'tomorrow' one chooses. If *mingtian* is construed as modifying the event time, then the semantic derivation of (50) is (51). (I use the old translation of *-le* to simplify the matter.)

- (51) LF 1:  $[_{TP}[_{AgrsP} \text{ wo}_i [_{ModalP} [_{AspP} \text{ le } [_{VP2} \text{ mingtian } [_{VP1} \text{ t}_i \text{ likai nanjing}]]]]]]]$
1.  $VP_1 \Rightarrow \lambda t \text{leave}'(\text{Nanjing}')(x_i)(t)$
  2.  $VP_2 \Rightarrow \lambda t[t \subseteq \text{tomorrow}' \ \& \ \text{leave}'(\text{Nanjing}')(x_i)(t)]$
  3.  $AspP \Rightarrow \lambda P_{\langle i, t \rangle} \lambda t' \lambda t[t < t' \ \& \ P(t) \ \& \ t \subseteq t_R] (\lambda t[t \subseteq \text{tomorrow}' \ \& \ \text{leave}'(\text{Nanjing}')(x_i)(t)])$   
 $= \lambda t' \lambda t[t < t' \ \& \ t \subseteq \text{tomorrow}' \ \& \ \text{leave}'(\text{Nanjing}')(x_i)(t) \ \& \ t \subseteq t_R]$
  4.  $AgrsP/TP \Rightarrow \exists t[t < c_T \ \& \ t \subseteq \text{tomorrow}' \ \& \ \text{leave}'(\text{Nanjing}')(Zhangsan')(t) \ \& \ t \subseteq t_R]$

However, the final translation in (51) always leads to a contradiction, whether  $c_T$  is replaced by the speech time or by the time denoted by *tomorrow*.

Next, consider (52), where *mingtian* is construed as denoting an interval.

- (52) LF 2:  $[_{TP}[_{AgrsP} \text{ wo}_i [_{ModalP} \text{ mingtian } [_{AspP} \text{ le } [_{VP1} \text{ t}_i \text{ likai nanjing}]]]]]]]$
1.  $VP \Rightarrow \lambda t \text{leave}'(\text{Nanjing}')(x_i)(t)$
  2.  $AspP \Rightarrow \lambda P_{\langle i, t \rangle} \lambda t' \lambda t[t < t' \ \& \ P(t) \ \& \ t \subseteq t_R] (\lambda t[\text{leave}'(\text{Nanjing}')(Zhangsan')(t)])$   
 $= \lambda t' \lambda t[t < t' \ \& \ \text{leave}'(\text{Nanjing}')(x_i)(t) \ \& \ t \subseteq t_R]$
  3.  $ModalP \Rightarrow \lambda t' \lambda t[t < t' \ \& \ \text{leave}'(\text{Nanjing}')(x_i)(t) \ \& \ t \subseteq t_R] (\textbf{Tomorrow})$   
 $= \lambda t[t < \textbf{Tomorrow} \ \& \ \text{leave}'(\text{Nanjing}')(x_i)(t) \ \& \ t \subseteq t_R]$
  4.  $AgrsP/TP \Rightarrow \exists t[t < \textbf{Tomorrow} \ \& \ \text{leave}'(\text{Nanjing}')(Zhangsan')(t) \ \& \ t \subseteq t_R]$

Unlike the final translation in (51), the final translation in (52) makes a perfect sense. It says that there is a time  $t$  before tomorrow such that Zhangsan will leave at  $t$ , which is included within a pragmatically determined reference time  $t_R$ . This result is undesirable, however, because (50) is an ill-formed example which has no interpretation whatsoever.

Similar remarks apply to examples like (18a), reproduced below.

- (18) a. Ta zuotian xie-le yi-feng xin  
 he yesterday write-Asp one-Cl letter  
 'He wrote a letter yesterday.'

If *-le* in (18a) stays in Asp rather than moving to T, (18a) will have a translation like (53) when *zuotian* denotes an interval.

- (53)  $\exists t[t < \textbf{Yesterday} \ \& \ \exists x[\text{letter}'(x) \ \& \ \text{write}'(x)(Zhangsan)(t) \ \& \ t \subseteq t_R]$

(53) says that there is a time  $t$  before yesterday such that Zhangsan writes a letter at  $t$ . However, this is an interpretation which (18a) does not have.

I conclude that if *-le* does not raise from Asp to T, some unwanted interpretations will be generated. This constitutes an argument for the raising of *-le* to T.

## 6.2 Generic tense and *-le*

Another argument for treating *-le* as a relative past tense marker comes from the fact that *-le* is incompatible with adverbs like *zongshi* ‘always’, *changchang* ‘often’, *meitian* ‘every day’, etc., (Lü 1981). Consider the following examples.

- (54) a. \*Zhangsan zongshi kan-le yi-ben shu  
Zhangsan always read-Asp one book  
‘John always read a book.’  
b. \*Zhangsan changchang chang-le yi-shou ge  
Zhangsan often sing-Asp one-Cl song  
‘Zhangsan often sang a song.’  
c. \*Zhangsan mei tian dou xi-le zao  
Zhangsan every day all take-Asp bath  
‘Zhangsan took a bath every day.’

Expressions like *zongshi* ‘always’, *changchang* ‘often’, *mei tian* ‘every day’, induce a generic interpretation. Thus, the Tense node of the above examples should contain a generic Tense operator. Now if the verbal *-le* is a relative past tense operator which must move from Asp to T, it follows that the examples in (54) are ill-formed, because one single Tense node cannot be occupied by two different Tense operators with different interpretations.

## 6.3 Individual-level predicates and *-le*

It is often pointed out that *-le* may not occur with predicates like *ai* ‘love’, *hen* ‘hate’, *xiang* ‘resemble’, *rende* ‘recognize’, *xing* ‘last name’, *xihuan* ‘like’, etc., (Lu 1994, Lü 1980), as is shown by the following examples.

- (55) \*Zhangsan xihuan-le Lisi  
Zhangsan like-Asp Lisi  
‘Zhangsan liked Lisi.’

Such predicates are what Carlson (1977) calls individual-level predicates that ascribe tendentially permanent properties to their arguments. Chierchia (1995) has argued that individual-level predicates are inherent generic polarity items and hence must be licensed by a generic operator. Suppose that Chierchia is correct and that generic operator must occupy the Tense node. Then it follows that individual-level predicates cannot occur with the verbal *-le*, because one single Tense node cannot be simultaneously filled by a relative past tense operator and a generic operator. This constitutes another piece of evidence that *-le* must raise from Asp to Tense.

## 7. Concluding remarks

I have argued that *-le* expresses a temporal relation between two times, which requires that the initial subinterval of the target state of an event precede some contextually determined reference time. Furthermore, the event time must be included within another pragmatically determined reference time. This analysis of *-le* has a very interesting implication. It indicates that *-le* cannot be a pure relative tense marker, because the semantics of *-le* has to mention the notion of target states, which is in all likelihood a notion of aspect. This seems to conform to the traditional treatment of *-le* as an aspect marker. However, as I have argued in detail in the text, it also cannot be denied that *-le* expresses the meaning of ‘relative past’, which is more a notion of tense than a notion of aspect. Indeed, I have offered many arguments showing that *-le* must be raised to Tense at LF. If the arguments are correct, they suggest that *-le* must contribute a tense meaning as well as an aspectual meaning, a conclusion which is also endorsed by Jin (1998) and Zhang (1998), though our considerations are different. This in turn implies that it might be wrong to claim that Chinese is a completely tenseless language, as the common assumption holds.

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Department of Foreign Languages and Literature  
National Chiao Tung University  
1001 Ta-Hsueh Rd.  
Hsinchu 300, Taiwan  
jowang@cc.nctu.edu.tw