

Feng-hsi Liu

L2 acquisition of the progressive marker *zai* in Mandarin Chinese

Abstract: Two studies on L2 acquisition of the progressive marker *zai* in Mandarin Chinese by native English speakers were conducted to investigate the interaction between L1 influence and the congruence of lexical aspect and tense-aspect morphology, as formulated in the aspect hypothesis. The two factors make opposite predictions with respect to the early stage and the acquisition process. The findings from a judgment task and a production task show that the observed pattern is neither predicted by the aspect hypothesis alone nor entirely conditioned by L1 influence. Rather, it is the result of both forces at work. At the early stage *zai* is associated with activities and accomplishments involving goal or distance. In the acquisition process, both widening and narrowing of predicate types are observed. The findings also show that the L1 effect does not disappear at the same time, but proceeds in stages. In the case of *zai* marking, the L1 effect weakening process is governed by the strength of event ending that is part of the meaning of the predicates.

Keywords: Mandarin Chinese, aspect, progressive, L1 influence, aspect hypothesis

1 Introduction

The progressive aspect is an imperfective aspect. It indicates ‘a situation in progress’ (Comrie 1976: 19), or ‘a happening in progress at a given time’ (Quirk et al. 1985: 188). In Mandarin Chinese (henceforward Mandarin), the progressive aspect is marked by *zai*, which is one of the two imperfective markers in the language (Chan 1980, Li and Thompson 1981, Smith 1991, 1997), the other marker being *-zhe*. While *-zhe* is stative, *zai* is dynamic. Its most prominent characteristic is that it signals the process of an event and its scope excludes the endpoints (Li and Thompson 1981: 218; Smith 1997: 212). In contrast, the English progressive marks a variety of verb classes and its scope includes endpoints as well as preliminary stages of an event. Comrie (1976: 33) notes that the English progressive is unusually wide in its range when compared with other languages. Given the difference between the two languages, a study of L2 acquisition of *zai* by English native speakers will shed light on a number of issues on the acquisition of tense-aspect morphology, including what the early stage is like, what the acquisition

order is, and what the extent of L1 influence is. These issues have received much attention in the literature; however, to date, we do not have a full picture.

A well-known hypothesis in studies on acquisition of tense-aspect markers is the aspect hypothesis (Andersen and Shirai 1994, 1996; Bardovi-Harlig 1999, 2000), which highlights the congruence relationship between the lexical aspect of verb classes and tense-aspect markers. It makes use of the four-way distinctions of aspectual verb classes of Vendler (1967): states, activities, accomplishments and achievements. Of the four generalizations subsumed under the hypothesis one is concerned with the progressive aspect, as follows:

In languages that have progressive aspect, progressive marking begins with activity verbs, then extends to accomplishment and achievement verbs. (Andersen and Shirai 1996: 533)

The hypothesis has two parts, covering early stages and later stages respectively. Applying it to *zai* acquisition, we would make two predictions: Learners initially would associate the progressive marking with verbs that denote process (activity verbs) only. They would later expand the verb classes that occur with *zai* to telic verbs.

It is also well-known that L2 acquisition is influenced by the learners' first language. If we consider L1 influence, taking the contrast between L1 (English) and L2 (Mandarin) as its source (see section 3.2), we would make different predictions. At the early stage, the learners would attach *zai* to a wide range of verbs in Mandarin, mapping *zai* directly to *be V-ing*. The effect would eventually fade away as learners become more advanced. The two considerations, the congruence between verb semantics and grammatical aspect and L1 influence, make opposite predictions on how learners would start out. It is also possible that both forces are at work and learners would start with somewhere in between, attaching *zai* to verbs wider than activity verbs, but narrower than the verb classes that are compatible with *be V-ing* in English. Thus a first question for this study is: What verb classes is *zai* attached to in the early stage?

Another area where the aspect hypothesis and L1 influence make different predictions concerns the acquisition process. The former predicts a process of widening, whereby the group of verbs marked by the progressive marker is extended as learners become more advanced. In contrast, from the perspective of L1 influence, there would be a narrowing process whereby the groups of verbs that *zai* is attached to gets smaller in the acquisition process. Given that the Mandarin *zai* is restricted and is incompatible with most telic predicates (see next section), we would expect that the second part of the aspect hypothesis does not have an effect on *zai* acquisition and the verb classes marked by *zai* would not expand in the acquisition process. On the other hand, from the perspective of L1 influence,

we would expect the verb classes to undergo a narrowing process. Thus another issue for this study is whether the acquisition process involves a widening or a narrowing of predicate types.

2 Previous studies

To date there have been no studies that specifically look at L2 acquisition of *zai*; studies that consider *zai* also investigate the other three aspect markers: *-le*, *-guo* and *-zhe*. Jin and Hendriks (2005), on the basis of picture story descriptions, report that at all three proficiency levels the progressive marker *zai* was not used much and when it was used, it was mostly used to mark activity verbs. No developmental trend is observed. Fan (2005) finds that the participants at the intermediate level overwhelmingly used *zai* on activities in compositions and written editing tasks. In Ming's (2008) study, participants were asked to supply an aspect marker in given spaces in a retold Pear story (Chafe 1980) as well as individual sentences whenever they felt necessary. Each of the participants also wrote a frog story in Chinese based on Meyer's (1969) picture book. A high error rate is found at the elementary level: 71.28% (67/94), which drops to 28.26% (13/46) at the intermediate level, and further down to 5.6% (2/36) at the advanced level. On the basis of these studies, the findings concerning *zai* acquisition are inconsistent.

Beyond Mandarin, there have been a number of studies that investigate L2 acquisition of the progressive. Several studies support the aspect hypothesis, showing that the dominant use of the progressive in L2 at the early stage is with activities where actions are in progress. Supporting cases include Chinese speakers learning Japanese *te-i-(ru)* (Shirai 1995, Shirai and Kurono 1998), speakers of five L1 background – Arabic, Korean, Japanese, Spanish and Mandarin – learning the English progressive (Bardovi-Harlig 1998), and English speakers learning Korean *-ko iss-* (Kim and Lee 2007). There have also been several studies that look into the possible influence of L1 on L2 acquisition of the progressive. Not all L1s have a progressive marker, and for those that do, the scope of the marker may be wider or narrower than its counterpart in L2. Thus a number of patterns have emerged.

First, a few studies find no L1 effect. These studies involve comparisons of L1s that differ on the existence or scope of the progressive marker. Kleinmann (1977) investigates the acquisition of the English progressive marker by L1 speakers of Arabic and L1 speakers of Spanish/Portuguese, the former does not have a progressive marker, while the latter does. The results show that the two groups behaved comparably. Giacalone-Ramat (2002) also finds no evidence of L1 influence on the acquisition of L2 Italian by speakers of English and German, the latter has

no progressive marker. Collins (2004) compares Japanese-speaking and French-speaking learners of English. In Japanese the progressive marker has the progressive meaning when occurring with activities and the resultative meaning when occurring with achievements. Therefore, if L1 effect is present, the Japanese speakers might map the progressive marker to English achievement verbs which often occur in the past tense. However, Collins finds that the Japanese speakers did not over-extend *be V-ing* to the past tense. Collins suggests that L1 effect does not take precedence over lexical aspect¹.

There are also studies which argue for the presence of L1 influence, which shows up in two circumstances. The first occurs when the progressive marker in L1 has a broader scope than its counterpart in L2. Rocca (2002) conducts a bi-directional study on children with L2 English and L1 Italian and children with L2 Italian and L1 English. The English progressive is similar to the Italian imperfective past except that the latter has a wider scope, covering states as well. It is found that L2 English children overused *be V-ing* by attaching it to stative verbs, while L2 Italian children used activities mostly in imperfective past. Rocca suggests that this can be explained if L1 has an effect on the children's performance. In particular, over-extension of *be V-ing* follows from a wider scope of the Italian imperfective past, which led L2 English/L1 Italian children to mark states with *be V-ing*.

The second type of L1 influence is observed when the L1 does not have a progressive marker. In languages with a progressive marker, there is strong association between activities and the progressive marker; progressive marking occurs mostly with activities and less with telic verbs. This has been used as evidence for the prototype hypothesis (Andersen and Shirai 1996) as well as an explanation for the aspect hypothesis. If a language does not have a progressive marker, however, such an association may not exist and the speakers may attach the marker to other types of verbs when they learn an L2. One of such languages is German. Rohde (1996) examines how speakers of German learn English. It is found that besides marking *be V-ing* on activities, the participants also used it on achievements. This may be due to the lack of the progressive marker in German. Sugaya and Shirai (2007) investigate how the Japanese imperfective marker *te-i(ru)* is acquired by speakers of L1 English, which has a progressive marker, and speakers of L1 German and Russian, which do not have a progressive marker. The results show that the association between the imperfective marker and activities was

¹ Collins (2002) makes the same conclusion, on the basis of data from French speakers learning English simple past tense. In particular, she finds that the tendency of supplying the perfect form when simple past is required occurred mostly with telic verbs. Thus L1 influence occurs within the prediction of the lexical aspect, and does not deviate from it.

preferred by both types of speakers and across proficiency levels to a large extent, in support of the aspect hypothesis. There is one exception, however – in the oral task of picture descriptions low-level participants with L1 German and Russian did not show the preferred association. According to Sugaya and Shirai, these findings suggest that L1 influence has some effect, being responsible for the exception, but it does not explain the general trend.

In short, previous studies of acquisition of the progressive largely support the aspect hypothesis by demonstrating a strong connection between the progressive marker and activities at the early stage, and with respect to L1 influence they are primarily concerned with whether there is L1 effect, and where it is manifested. However, there is still much we don't know. In particular, what happens when L2 does not allow progressive marking on accomplishments or achievements while L1 does? Would learners at the early stage make a distinction between activities, which are compatible with the progressive marker in the target language, and other predicates, which are incompatible with the progressive marker? In terms of L1 influence, how does the L1 influence decrease or eventually disappear? Do all aspects of L1 influence disappear at the same time? To date these issues have not yet been explored mainly because there has been no data available. The L2 acquisition of the Mandarin progressive marker *zai* by L1 English speakers provides useful data needed to address these issues. In this study I will explore the role of L1 influence on the acquisition of *zai* by analyzing data from an acceptability judgment task and a picture description task. The research questions are as follows:

1. What verb classes are marked by *zai* in the early stage? Does the evidence support the aspect hypothesis?
2. What is the range of L1 influence? How persistent is it?
3. What is the acquisition process? Does it involve a widening or narrowing of predicate types in comparison to the early stage?

3 The progressive marker *zai*

3.1 *Zai* and lexical aspect

I will begin with a description of *zai*'s aspectual properties. A first question regarding *zai* is what verbs it can and cannot occur with and how its distribution can be characterized. Smith (1997: 271) considers *zai* a 'typical progressive' marker. According to her, '*zai* presents an internal interval of a durative situation and often has the connotations of activity associated with events.' On this basis

we can hypothesize *zai* to be dynamic, durative and non-completive. This characterization does not distinguish *zai* from *be V-ing* in English; in fact, it fits the universal definition of the progressive (e.g. Comrie 1976: 19). However, as we will see, the way *zai* satisfies these features, in particular, the non-completive feature, is not shared with the progressive marking in English. First, (1) illustrates that *zai* does not occur with stative predicates, while (2) shows that it does not occur with predicates with no duration:

(1) **Ta zai gaoxing*
 He PROG happy
 ‘He is being happy.’

(2) **Laowang zai si*
 Laowang PROG die
 ‘Laowang is dying.’

The third characteristic, non-completive, is less straightforward. Consider first the examples from Smith (1997: 264):

- (3) a. *Tamen zai daqiu*
 they PROG play-ball
 ‘They are playing balls.’
 b. *Zhangsan zai xie yifeng xin*
 Zhangsan PROG write one-CL letter
 ‘Zhangsan is writing a letter.’

The predicate in (3a), *daqiu* ‘play ball’ is an activity, whereas in (3b), *xie yifeng xin* ‘write a letter’, is an accomplishment². Thus the well-formedness of (3b) seems to suggest that not only does *zai* mark a situation with no endpoints, it is also compatible with situations with endpoints. But *zai* does not mark telic predicates in general. The predicate *xie yifeng xin* ‘write a letter’ in (3b) is not representative of accomplishments or telic predicates; in fact, it is a special case. Other types of

² This can be shown by a test that distinguishes between activities and accomplishments, the *almost*-test, first offered by Dowty (1979), and adopted for Mandarin by Smith (1991, 1997) and Chen & Shirai (2010). If a predicate occurring with *chayidianr* ‘almost’ is ambiguous, having both the reading of not starting the action and the reading of having started the action but not completed the action, it is an accomplishment.

accomplishments or telic predicates, including ones with goal, path, or result, are incompatible with *zai*, as illustrated below:

- (4) a. **Xiaozhang zai pao dao gongyuan*
 Xiaozhang PROG run DIR park
 ‘Xiaozhang is running to the park.’
- b. **Ta zai zou yi quan xiaoyuan*
 he PROG walk one round campus
 ‘He is taking a tour of the campus (Lit: He is walking a round of the campus)’
- c. **Xiaoli zai xiewan gongke*
 Xiaoli PROG write-finish homework
 ‘Xiaoli is finishing his homework.’

The predicates in (4) all have an inherent endpoint, and they are all telic according to the tests diagnostic tests offered in Smith (1991, 1997), Jin and Hendriks (2005) and Chen and Shirai (2010). How can we distinguish these predicates from *xie yifeng xin* ‘write a letter’?

This is where the completive feature comes in. *Xie yifeng xin* ‘write a letter’ is non-completive, even though an endpoint is included; in contrast the predicates in (4) are completive. The two types can be distinguished by the test of whether completion is entailed when they occur in the perfective viewpoint, with *-le*. Completion is entailed for the predicates in (4), as in (5), but not necessarily for *xie yifeng xin* ‘write a letter’, as in (6):

- (5) a. *Xiaozhang paodao-le gongyuan*
 Xiaozhang run-RES-PERF park
 ‘Xiaozhang ran to the park.’
- b. *Ta zou-le yiquan xiaoyuan*
 he walk-PERF one-round campus
 ‘He walked a round of the campus.’
- c. *Xiaoli xiewan -le gongke*
 Xiaoli write-finish -PERF homework
 ‘Xiaoli wrote and finished his homework.’
- (6) *Zhangsan xie -le yifeng xin*
 Zhangsan write -PERF one-CL letter
 ‘Zhangsan wrote a letter.’

Smith (1997: 264–265) shows that (6) can be followed by a conjunct which asserts the failure of completion, without incurring a conflict, as in (7):

- (7) *Zhangsan xie -le yifeng xin, keshi mei xiewan*
 Zhangsan write -PERF one-CL letter but not-PERF write-finish
 ‘Zhangsan wrote a letter, but didn’t finish it.’

Smith takes this to mean that *-le* does not signal completion, but only termination. But the well-formedness of (7) could also mean that *xie yifeng xin* ‘write a letter’ describes an event with a weak endpoint. In contrast, if we do the same for the sentences in (6), which contains strong endpoint predicates, the results are all unacceptable, as in (8):

- (8) a. **Xiaozhang pao dao -le gongyuan, keshi mei paodao*
 Xiaozhang run RES -PERF park but not-PERF run-RES
 *‘Xiaozhang ran to the park (and arrived), but he didn’t get there.’
- b. **Ta zou -le yiquan xiaoyuan, keshi mei zou*
 he walk -PERF one-round campus but not-PERF walk
yiquan
 one-round
 *‘He walked a round of the campus, but he didn’t do a round.’
- c. **Xiaoli xiewan -le gongke, keshi mei xiewan*
 Xiaoli write-finish -PERF homework but not-PERF write-finish
 *‘Xiaoli wrote and finished his homework, but he didn’t finish it.’

This is expected: since completion is asserted in the first conjunct, by *dao* ‘arrive’ in (8a), *yiquan* ‘a round’ in (8b), and *wan* ‘finish’ in (8c), it cannot be canceled. Thus completive predicates entail completion in perfective, while non-completive predicates do not.

In short, *zai*’s distribution does not quite follow the distinctions made along the lines of lexical aspect. While some accomplishments occur with *zai*, others don’t. I have suggested that the former predicates are non-completive in the sense that they do not necessarily entail completion. It is on this interpretation that *zai* is dynamic, durative and non-completive.

3.2 Comparison between *zai* and *be V-ing*

To have an understanding of the possible extent of L1 transfer, it will be useful to compare *zai* with the English progressive marker *be V-ing*. *Zai* and *be V-ing* differ on two dimensions, comparable to the two components of an aspectual system Smith (1991, 1997) proposes, namely, lexical aspect and viewpoint aspect. First,

in terms of lexical aspect, of the three features of dynamicity, durativity and completion, the marker *be V-ing* is durative, but flexible on the other two features. Consider completion first. While *zai* only occurs with accomplishments that are non-completive, as discussed above, *be V-ing* occurs with all types of accomplishments, illustrated in (9):

- (9) a. *Bill is reading a book.*
 b. *He is running to the park.*
 c. *Liz is taking a tour of the campus.*

As for dynamicity, while *zai* is excluded from stative verbs in general, as in (10), *be V-ing* occurs with many, although not all, stative verbs, as illustrated in (11). When it does, it refers to a temporary situation (Comrie 1976: 36–37):

- (10) a. **Xiaoli zai zhidao daan*
 Xiaoli PROG know answer
 *‘Xiaoli is knowing the answer.’
 b. **Ta zai gaoxing*
 he PROG happy
 ‘He is being happy.’

- (11) a. **Sam is knowing the answer.*
 b. *Liz is being happy.*

This difference also accounts for why *zai* is not compatible with verbs of state-location such as posture verbs, but *be V-ing* is not:

- (12) **Xiaowang zai zuozai shafa shang*
 Xiaowang PROG sit-at sofa on
 ‘Xiaowang is sitting on the sofa.’

- (13) *Bill is sitting on the sofa.*

Verbs of posture, in the sense of maintain position (Levin and Rappaport-Hovav 1995), are stative predicates that describe a temporary state³.

³ This can be shown by two tests. First, Jackendoff (1983) offers a test that distinguishes stative predicates from non-stative predicates: the latter occurs in the context of *what happened/occurred/took place was*, while the former does not. Applying this test to both English and Mandarin, we arrive at (i):

The second dimension on which *zai* and *be V-ing* differ concerns the viewpoint, namely, how much of an event structure is in the scope of the progressive marker. While *zai*'s scope is strictly internal, *be V-ing* also covers preliminary stages that lead up to a change of state, a difference also noted in Shirai (1998)⁴. This is responsible for the difference in meaning between the two markers: *zai* only has the meaning of action in progress, whereas *be V-ing* has both the meaning of action in progress as well as preliminary stages before a change of state, depending on the verb. Consider the contrast in (14–15):

- (14) **Nage bingren zai si*
 that-CL patient PROG die
 'That patient is dying.'

- (15) *That patient is dying.*

(14) is usually used to demonstrate that *zai* is durative and does not occur with achievements, but they can also be used to demonstrate that *zai*'s scope does not include the stages before a change of state.

The comparison between *zai* and *be V-ing* is summarized in Table 1. Of the eight types of predicates, *zai* and *ing* differ on the last five. These are potential areas where L1 transfer effect could be observed.

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- (i) a. **Gangcai fansheng de shi Xiaowang zuozai shafa shang*
 just-now happen DE be Xiaowang sit-at couch on
 'What just happened was that Xiaowang was sitting on the couch.'
 b. **What happened was that Bill was sitting on the couch.*

Neither sentence is well-formed. This shows that *sit on the couch* and *zuo zai shafa shang* are stative. A further test of *there*-insertion (Kratzer 1995) shows that they are stage-level predicates, describing a temporary situation:

- (ii) a. *You yige ren zuo zai shangfa shang*
 there-is one-CL person sit at couch on
 'There is a person sitting on the couch.'
 b. *There is a man sitting on the couch.*

⁴ Shirai (1998) compares the three languages, Chinese, English and Japanese with respect to the scope of the progressive marker. He shows that while *be V-ing* can look backward, covering the stages before the initial point; the Japanese progressive marker *te-i-(ru)* can look forward, covering stages after the final endpoint, which gives rise to the resultative interpretation.

	<i>zai</i>	<i>V-ing</i>
watch TV kan dianshi	yes	yes
write a letter xie yifeng xin	yes	yes
know the answer zhidao daan	no	no
run to the park pao qu gongyuan	no	yes
write and finish the homework xiewan gongke	no	yes
take a tour of campus zou yiquan xiaoyuan	no	yes
sit on the couch zuozaishiafa shang	no	yes
die si	no	yes

Table 1: Compatibility of *zai* and *V-ing* with various predicates

4 The study

4.1 Participants

65 native speakers of English participated in the experiment. They were recruited from two universities in the US. At the time of the experiment, all of the participants were in a Mandarin class, ranging from beginning of second year to fourth year. They were recruited through class announcements and advertisements that were posted on course websites. Participation was entirely voluntary, and participants did not receive payments for their participation. At one school data was collected in class, while at the other school the data was collected outside of class. Participants were allowed to ask questions, including vocabulary items. Most of the words that might be unknown to low level participants were provided with English glosses in the questionnaire. At both schools the progressive marker *zai* is introduced in the second semester. In addition to the learners, 23 native Mandarin speakers, (15 from China, 8 from Taiwan), who were graduate students at a US university, also participated in the study. They served as the control group.

Data was collected in the US, and at the time of collection, these speakers had been in the US for no more than three years. Each participant performed two tasks on a questionnaire, sentence judgment, followed immediately by picture description. Neither task was timed; the participants were allowed as much time as needed to complete the questionnaire.

The participants were divided into three proficiency levels on the basis of their performance on the test items that were used as fillers in the judgment task. These filler items came from a placement test. 20 sentences were selected, half grammatical and the other half ungrammatical. As described in 4.2.1 participants were asked to judge each sentence and decide whether it is (a) good, (b) so-so, (c) bad, or (d) not sure. Different coding systems were used for filler sentences and test items; the latter is discussed in the next section. For the fillers, the coding reflects how well the learners performed – higher number reflects higher proficiency. Each of the grammatical sentences receives a score of 1 (if judged to be good), 0.5 (if judged to be so-so) or 0 (if judged to be bad or not sure), and each of the ungrammatical sentences also receives a score of 1 (if judged to be bad), 0.5 (if judged to be so-so) or 0 (if judged to be good or not sure). The range of scores obtained from all of the non-native speakers was 8 to 18. A score of 8–11 was assigned to Level 1, a score of 11.5–14.5 to Level 2 and a score of 15–18 to Level 3. The division was also made with an intention to keep the number of participants in the three levels relatively similar. Table 2 gives the number of participants in each group.

	Level 1	Level 2	Level 3	control group
# of subjects	22	25	18	23

Table 2: Number of subjects at each level

4.2 Judgment task

Procedure. In the judgment task, 43 sentences were included, of which 23 were test sentences and they were all marked with *zai*. The sentences were presented in characters, and the participants had a choice of the traditional version or the simplified version. English glosses were provided for some of the words. For each sentence, participants were asked to decide whether it is (a) natural, (b) so-so, (c) unnatural, or (d) not sure. Two examples are given in (16):

- (16) a. 小李在看一本书
b. 她在喜欢中文课

No English gloss was provided for these two sentences, as they are first year-level sentences. The gloss and translations are provided in (17):

- (17) a. *Xiaoli zai kan yiben shu*
 Xiaoli PROG read one-CL book
 ‘Xiaoli is reading a book.’
 b. **Ta zai xihuan zhongwen ke*
 she PROG like Chinese class
 ‘She is liking the Chinese class.’

In the coding, a scale of 1 to –1 is used, 1 corresponding to ‘natural’, 0 to ‘so-so’, and –1 to ‘unnatural’. The choice ‘not sure’ is not on the scale and is not assigned a score; it is eliminated from analysis. Thus if a predicate type, e.g. activity, is represented by three sentences (see below) and a learner chose ‘not sure’ for one of the sentences, the average rating for that predicate type by this participant is obtained from his answers on the other two sentences. In addition, one of the test sentences, *ta zai zhuangman shui* ‘She is filling (the bottle) with water,’ received 59% (13/22) of ‘unsure’ among level 1 participants. The sentence was eliminated from analysis. Therefore, 22 test sentences were analyzed and the ratio of ‘unsure’ answers is low: 3.5% (17/484) at level 1, 0.9% (5/550) at level 2, and 0.5% (2/396) at level 3.

The 22 sentences are grouped into 10 predicate types (the entire list is given in appendix 1) in terms of four features: dynamicity, durativity, completion, and types of ending, as given in Table 3, where each type is illustrated with an example. The distinctions are made finer than the four-way classification of lexical aspect in order to capture potential distinctions within an aspectual class made by the participants. The feature of type of ending (goal, duration, distance) is relevant only if a predicate is completive. As discussed above, predicates such as *kan yiben shu* ‘read a book’ are non-completive, and no ending is specified for them. The number of sentences in each type ranges from one to four, indicated in parenthesis after each example.

Results. First, eight of the ten predicate types have more than one member; to find out if members of a type are homogeneous, five paired t-tests and three repeated measures ANOVAs were performed at each proficiency level. Altogether 32 tests were carried out (8 for each proficiency level). The results are given in Appendix 2. In 31 tests the effect was non-significant. This means for each of the 31 groups, its members are homogeneous and can be considered together. For each type, a mean was taken of all members for each participant such that there is one score for each sentence type for each participant. The only exception is achievement

Predicate type	Example	Dynamic	Durative	Com- pletive	Type of ending
activity	kan dianshi (3) 'watch TV'	yes	yes	no	–
non-completive (accomplishment)	read a book (2) 'read a book'	yes	yes	no	–
change with no result	manman shenggao (2) 'slowly goes up'	yes	yes	no	–
achievement	si (2) 'die'	yes	no	yes	–
result	xiewan kongke (2) 'finish homework'	yes	yes	yes	result
goal (accomplishment)	fei qu Beijing (3) 'fly to Beijing'	yes	yes	yes	goal
duration (accomplishment)	xue liangnian zhongwen 'learn2 years of Chinese' (1)	yes	yes	yes	duration
distance (accomplishment)	pao yili lu (1) 'run a mile'	yes	yes	yes	distance
state-location	shui zai dishang (2) 'sleep on the floor'	no	yes	no	–
state	xihuan zhongwen ke (4) 'like the Chinese class'	no	yes	no	–

Table 3: Ten predicate types in the judgment task

verbs at level 1. The two verbs *si* 'die' in **Nage laoren zai si* 'The old man is dying,' and *hao* 'be done' in *Tade bing zai hao* 'His disease is being done/over' showed significant effect. This could be because *hao* 'be done' has a basic meaning of 'be good, be nice', and participants at level 1 did not quite know that it also has the resultative meaning of being done, which is the appropriate meaning in the context of disease. At level 1, then, only *si* 'die' was included to represent achievements, while at level 2 and level 3, the mean score of *si* 'die' and *hao* 'be done' was used to represent achievements in the analysis.

Of the 10 predicate types, three of them can be marked by *zai*, while the others are incompatible with *zai*. The former will be referred to as positive contexts; while the latter as negative contexts. The mean score of participants' judgments at each proficiency level for each of the 10 types is given in Table 4, for positive contexts, and Table 5, for negative contexts. They are also represented in graph form in Figures 1 and 2. I will discuss the results in two dimensions: comparison across proficiency levels with respect to predicate types, and comparison by aspectual features with respect to proficiency levels. The first will allow us to observe developmental trends, while the second will inform us on whether aspectual distinctions are made at a given proficiency level.

	Level 1		Level 2		Level 3		Native	
	mean	SD	mean	SD	mean	SD	mean	SD
activity	0.53	0.49	0.84	0.22	0.87	0.28	0.96	0.15
non-completive	0.57	0.68	0.86	0.34	0.72	0.46	0.85	0.32
change and no result	0.43	0.62	0.34	0.53	0.76	0.36	0.76	0.36

Table 4: Mean scores and standard deviation of three predicate types that are positive contexts at each proficiency level

	Level 1		Level 2		Level 3		Native	
	mean	SD	mean	SD	mean	SD	mean	SD
achievement	-0.09	0.81	-0.46	0.52	-0.75	0.49	-0.91	0.25
result	0.09	0.61	-0.20	0.63	-0.64	0.51	-1	0
goal	0.21	0.54	0.03	0.49	-0.20	0.49	-0.72	0.40
duration	-0.09	0.87	-0.56	0.65	-0.67	0.59	-0.96	0.21
distance	0.39	0.78	0.41	0.80	0.41	0.62	-0.78	0.52
state-location	-0.45	0.53	-0.52	0.65	-0.69	0.39	-0.98	0.10
state	-0.27	0.59	-0.55	0.41	-0.81	0.36	-0.99	0.05

Table 5: Mean scores and standard deviation of seven predicate types that are negative contexts

Comparison by proficiency level. In comparisons across proficiency levels, the purpose was to find out for each sentence type, whether participants at a given level have acquired native-like knowledge with respect to the association of *zai* with various predicates. It will also offer information on development trends. A one-way ANOVA was conducted on each of the ten predicate types; the between

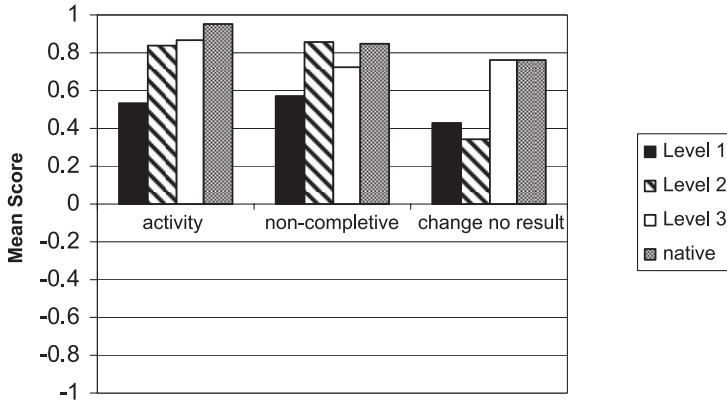


Fig. 1: Comparison of subjects' mean scores in three positive contexts

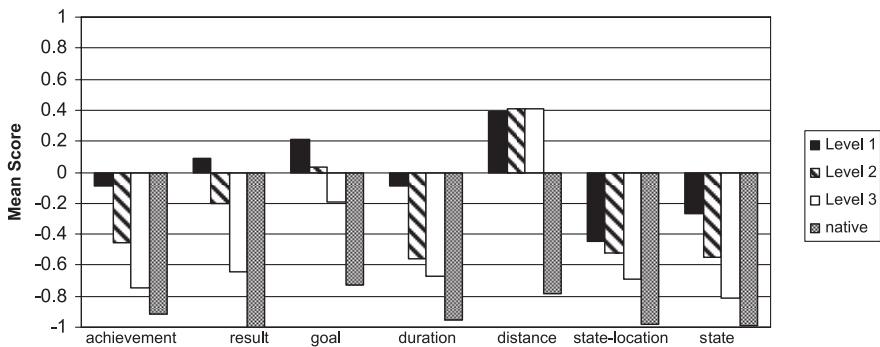


Fig. 2: Comparison of subjects' mean scores in seven negative contexts

participant variable is the proficiency level (level 1, level 2, level 3, native), and the dependent variable is sentence judgment (1, 0, -1). The overall results are given in Table 6.

Table 6 shows that of the ten sentence types, all except for non-completive accomplishment, reveal a significant effect of proficiency level. Results of post-hoc tests are given in Table 7, which shows where the effect lies.

On the basis of Table 6 and Table 7, we can identify a developmental trend. Non-completive accomplishments, e.g. *kan yiben shu* 'read a book', were acquired first among the ten predicate types, as even level 1 participants have reached the level of native speakers. The next group of predicates was acquired at level 2, and it includes activities and accomplishments with duration. As Table 7 shows, for

Predicate type	F	p
activity	7.96	<.0001
non-completive (accomplishment)	1.94	.1294
change with no result	3.26	.0255
achievement	9.35	<.0001
result	20.24	<.0001
goal (accomplishment)	16.05	<.0001
duration (accomplishment)	7.36	.0002
distance (accomplishment)	15.38	<.0001
state-location	5.55	.0016
state	13.24	<.0001

Note: for all, $df = 3, 84$

Table 6: Results of one-way ANOVAs on 10 sentence types

these two predicates there is no significant difference between level 2 and the native, or between level 3 and the native. The third group of predicates was acquired at level 3, and it includes five types: achievements, change with no result, predicates with result, states-location and states. Finally, two predicate types did not reach native-like stage at level 3, and they are accomplishments with goal and accomplishments with distance. The developmental trend is summarized in Table 8.

Table 8 provides information on how *zai* is acquired in both positive contexts and negative contexts. It shows that accepting *zai* in positive contexts is acquired in stages, moving from non-completive accomplishments, to activities, to change with no result. In contrast, the participants were less successful in learning when not to accept *zai*. The negative contexts were acquired later; none of them were rejected in native-like fashion at level 1, and four types reached native-like stage at level 3. Two types, accomplishments with goal and distance, remained problematic at level 3.

Comparison by aspectual properties. The second aspect about the judgment task we would like to find out is the following: In judging a sentence, did the participants at each level make a distinction between dynamic and stative, durative and non-durative, ongoing stage and preliminary stage, completive and non-completive, and among different types of boundaries? An answer to this question will tell us at what level the aspectual distinctions were made. Results from the previous section show that at an early stage most of the predicates were not used by the learners in a target-like way; nonetheless, it does not mean that the learners did not distinguish between, for example, dynamic and stative predicates at an

Predicate type	Groups that show significant difference	p
activity	Level 1 vs. Level 2	<.01
	Level 1 vs. Level 3	<.01
	Level 1 vs. native	<.01
change with no result	Level 2 vs. native	<.05
achievement	Level 1 vs. Level 3	<.01
	Level 1 vs. native	<.01
	Level 2 vs. native	<.05
result	Level 1 vs. Level 3	<.01
	Level 1 vs. native	<.01
	Level 2 vs. Level 3	<.05
	Level 2 vs. native	<.01
goal	Level 1 vs. Level 3	<.05
	Level 1 vs. native	<.01
	Level 2 vs. native	<.01
	Level 3 vs. native	<.01
duration	Level 1 vs. Level 3	<.05
	Level 1 vs. native	<.01
distance	Level 1 vs. native	<.01
	Level 2 vs. native	<.01
	Level 3 vs. native	<.01
state-location	Level 1 vs. native	<.01
	Level 2 vs. native	<.05
state	Level 1 vs. Level 3	<.01
	Level 1 vs. native	<.01
	Level 2 vs. native	<.01

Table 7: Results of Tukey HSD tests on 9 predicate types

early stage. At each level, four repeated measures ANOVAs were conducted, each comparing three to five predicate types. The between participants variable was the aspectual feature (dynamic or stative, durative or non-durative, completive or non-completive, and types of ending), and the dependent variable was the judgment score (1, 0, -1). The samples for the between participants variable for each of the four ANOVAs are given in Table 9.

The results for dynamicity are clear: at all four levels, the effect is significant: level 1: $F(3, 63) = 21.97, p < .0001$; level 2: $F(3, 72) = 87.59, p < .0001$; level 3: $F(3, 51) = 114.6, p < .0001$; native: $F(3, 66) = 791.66, p < .0001$. The follow-up tests

Native-like level	Predicate type	Context
Level 1	non-completive	positive
Level 2	activity duration	positive negative
Level 3	change with no result achievement result state state-location	positive negative negative negative negative
not yet acquired	goal distance	negative negative

Table 8: Developmental trend: The levels where learners show target-like performance on 10 types of predicates

Feature	# of samples	Predicate types
dynamicity	4	activity, non-completive, state-location, state
durativity	3	activity, non-completive, achievement
completion	4	activity, non-completive, change with no result, result
completion	5	activity, result, goal, duration, distance

Table 9: Predicate types included as samples for the between subject variable of 4 ANOVAs

reveal that as expected, the significance is found in four pairs, between the dynamic predicates and the stative predicates, $p < .01$ for all pairs. This means that participants at all four levels distinguished between dynamic and stative predicates in the usage of *zai*. The results for durativity are also straightforward: level 1: $F(2, 42) = 7.76$, $p = .0013$; level 2: $F(2, 48) = 104.47$, $p < .0001$; level 3: $F(2, 34) = 65.52$, $p < .0001$; native: $F(2, 44) = 437.47$, $p < .0001$. The Tukey HSD tests show that the significance lies in two pairs: between the two durative predicates and the single non-durative predicate, $p < .01$ for both pairs. This means that the participants at each level also distinguished between durative and non-durative predicates. It also means the learners, just like the native speakers, were sensitive to the scope of *zai*'s viewpoint, making a distinction between the ongoing stages of an event, such as an activity, and the preliminary stages of an event, such as an achievement.

On the distinction between completive and non-completive, two analyses were carried out. The first analysis was intended to see whether the participants

made a distinction among events of no change (and no result), change with no result, and change with result. Four predicate types were included in the analysis: activities, non-completive accomplishments, change with no result and result. The results were all significant: level 1: $F(3, 63) = 3.79, p = .0145$; level 2: $F(3, 72) = 29.35, p < .0001$; level 3: $F(3, 51) = 52.07, p < .0001$; native: $F(3, 66) = 336.74, p < .0001$. The Tukey HSD tests further show that significant effect was found in the pairs in Table 10.

Level	Predicate types that show significant difference		p
Level 1	activity	vs. result	<.05
	non-completive	vs. result	<.05
Level 2	activity	vs. change with no result	<.01
	activity	vs. result	<.01
	non-completive	vs. change with no result	<.01
	non-completive	vs. result	<.01
	change with no result	vs. result	<.01
Level 3	activity	vs. result	<.01
	non-completive	vs. result	<.01
	change with no result	vs. result	<.01
Native	activity	vs. change with no result	<.05
	activity	vs. result	<.01
	non-completive	vs. result	<.01
	change with no result	vs. result	<.01

Table 10: Results of Tukey HSD tests on four predicate types with respect to the complete vs. non-completive distinction

At level 1, the participants only made a two-way distinction, between no change no result, represented by *kan dianshi* ‘watch TV’ and *kan yiben shu* ‘read a book’, and result, represented by *xiewan gongke* ‘write and finish homework’. Change with no result, represented by *manman shangsheng* ‘slowly go up’, was treated in between, neither different from no change no result, nor different from result. At level 2, the participants treated all three types of predicates differently. At level 3, the participants went back to a two-way distinction, but not exactly the same as level 1, treating result differently from the other three types. Finally, the native speakers made a three-way distinction, separating result from the other three types, similar to level 3, while at the same time distinguishing activities from change with no result. Thus in all four levels a clear distinction was made between result and the other predicates, but there was a variation on how change with no result was treated.

The second analysis on completion was intended to find out whether the participants distinguished between predicates with no ending and predicates with different types of endings. Five types of predicates were included: activities, result, goal, duration, and distance. Once more, the effect is significant at all three levels: level 1: $F(4, 84) = 3.05$, $p = .0212$; level 2: $F(4, 96) = 21.64$, $p < .0001$; level 3: $F(4, 68) = 35.65$, $p < .0001$; native: $F(4, 88) = 227.85$, $p < .0001$. The follow-up Tukey HSD tests reveal that significant effect is found in the pairs given in Table 11.

Level	Predicate types that show significant difference		p
Level 1	activity	vs. duration	<.05
	activity	vs. result	<.05
Level 2	activity	vs. result	<.01
	activity	vs. goal	<.01
	activity	vs. duration	<.01
	activity	vs. distance	<.05
	result	vs. distance	<.01
	goal	vs. duration	<.01
	duration	vs. distance	<.01
Level 3	activity	vs. result	<.01
	activity	vs. goal	<.01
	activity	vs. duration	<.01
	result	vs. distance	<.01
	goal	vs. duration	<.05
	goal	vs. distance	<.01
	duration	vs. distance	<.01
Native	activity	vs. result	<.01
	activity	vs. goal	<.01
	activity	vs. duration	<.01
	activity	vs. distance	<.01
	result	vs. goal	<.01
	goal	vs. duration	<.05

Table 11: Results of Tukey HSD tests on five predicate types involving the complete vs. non-completive distinction

Two observations can be made on Table 11. First, focusing on the pairs that include activity, at level 1, two predicate types was distinguished from activity – duration and result; at level 2, all four predicate types with ending were distinguished from it, and at level 3, three of the four types remained distinct from

activity, while distance was treated the same as activity, as in level 1. And as expected, the native speakers distinguished activities from all four predicate types. Therefore, the learners did not have a good control of predicates with distance. Second, the results also show that the participants became more sensitive to different event endings as they progressed. At level 1, all endings were treated the same among themselves. At level 2, distance was separated from both result and duration, and duration was also separated from goal. At level 3, one more distinction was added, that between distance and goal. The native speakers, on the other hand, made fewer distinctions; they only distinguished goal from result and duration. Notably, they did not distinguish distance from any of the other endings. The findings of aspectual distinctions are given in Table 12.

		Level 1	Level 2	Level 3	native
dynamic	vs. stative	yes	yes	yes	yes
durative	vs. non-durative	yes	yes	yes	yes
ending by result	vs. no ending	yes	yes	yes	yes
ending by duration	vs. no ending	yes	yes	yes	yes
ending by goal	vs. no ending	no	yes	yes	yes
ending by result	vs. change and no result	no	yes	yes	yes
activity	vs. change and no result	no	yes	no	yes
ending by distance	vs. no ending	no	no	no	yes
on-going stage	vs. preliminary stage	yes	yes	yes	yes

Table 12: Aspectual distinction and the level at which they were made

To summarize, in the judgment task, the non-native speakers were better at accepting *zai* in positive contexts than rejecting it in negative contexts. Of the three positive contexts, one (non-completive) was acquired at level 1, another (activities) at level 2, and the third (change with no result) at level 3. Of the seven negative contexts, one (predicates with duration) was acquired at level 2, four (achievements, predicates with result, states with location, states) at level 3, and two (predicates with goal and predicates with distance), were still not acquired at the target level by level 3. In terms of aspectual and viewpoint distinctions, most of them were made by level 2. The learners had difficulty with ending marked by distance, treating it more like activities than predicates with other endings. This predicate type continued to pose a challenge even at level 3.

4.3 Production task

Procedure. In the prediction description task, 20 pictures were presented in the questionnaire. The participants were asked to write a one-sentence description of each picture. The description could be given in characters or in Pinyin. Two examples were first provided to illustrate what an appropriate description is like. To help participants with the description, key vocabulary items were provided for each picture. 12 pictures are related to this study, including five event types. Due to constraints of the nature of the task, not all types of events that were tested in the judgment task could be included. The five types are: ongoing activity (4 pictures), state of maintaining a position (2 pictures), physical state (2 pictures), punctual event about to happen (2 pictures), and event with a goal (2 pictures), as illustrated in Figure 3, together with the key words provided. (18) illustrates a typical description of the 5 pictures by native speakers.

(18) Picture 1: Ongoing activity

ta zai kan shu
she PROG read book
'She is reading (a book).'

Picture 2: State of maintaining a position

ta zuo zai shafa shang
he sit at sofa on
'He is sitting on a sofa.'

Picture 3: Physical state

ta tou teng
she head ache
'She has a headache.'

Picture 4: Punctual event about to happen

ta zhengyao likai
she about-to leave
'She is about to leave.'

Picture 5: Event with a goal

ta pao xiang huochezhan
he run towards train-station
'He runs towards the train station.'

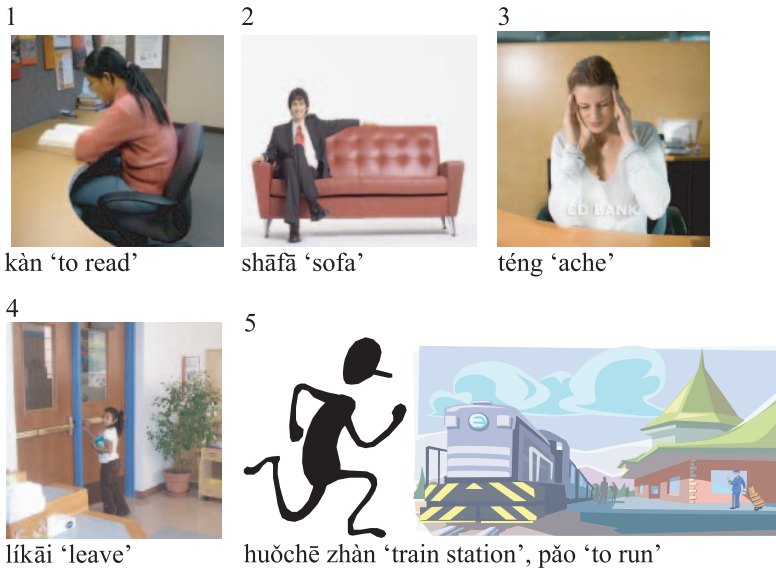


Fig. 3: Examples of five types of events depicted in the pictures

Of the five pictures, *zai* is only appropriate for picture 1, which describes an ongoing activity. The other four pictures depict events expressed by states (pictures 2 and 3), achievement (picture 4) and goal (picture 5). These are negative contexts, where *zai* is not supposed to occur.

In the coding, each sentence produced received a score of either 1 or 0. A sentence with an occurrence of *zai* was coded as 1, and each non-occurrence of *zai* was coded as 0. *Zai* is also a locative marker, as used in picture 2 of (18). Only the progressive *zai* is coded as 1, not the locative *zai*. Since the issue of concern here is whether the use of *zai* is conditioned by event types, a sentence is coded solely by the presence or absence of *zai*, regardless of whether the rest of the sentence is well-formed. This scoring method encodes the number of *zai* that was used directly – the obtained score is the number of occurrences of *zai*. The score, therefore, does not reflect whether the use (or non-use) of *zai* is correct or not. There were actually very few errors in activities, states of maintaining a position and physical states; what was more common was avoidance, e.g. describing picture 1 as *Ta xihuan kan shu* 'She likes to read'. Such sentences were coded as 0. There were more errors in describing punctual events about to happen and events with a goal, but even in these cases the errors were limited because in both types of pictures essential words were provided, including the verb. A common error is omission of a directional complement *qu* 'to' at the end of the predicate, e.g. **Ta*

zai paodao huochezhan ‘He is running to the train station’, which is problematic both for being marked by *zai* and for missing the complement *qu* at the end. Such sentences were coded as 1.

Results. At each level repeated-measures ANOVA and four paired t-tests were conducted on the five event types to see if the members within each type are homogeneous. Altogether four ANOVAs and 16 paired t-tests were carried out. The results are given in Appendix 3. None of the tests showed significant effect. Therefore, the mean score was taken of the members of each event type produced by each participant. Each participant received five scores, representing the five types of events. The overall results are given in Table 13, and graph represented in Figure 4.

	Level 1		Level 2		Level 3		Native	
	mean	SD	mean	SD	mean	SD	mean	SD
activity	0.44	0.41	0.52	0.41	0.75	0.34	0.96	0.10
state-location	0.02	0.11	0.04	0.14	0.03	0.12	0	0
state	0.04	0.15	0.08	0.24	0	0	0	0
achievement (about to happen)	0.14	0.32	0.14	0.27	0.08	0.19	0.04	0.14
goal	0.23	0.42	0.21	0.31	0.25	0.35	0	0

Table 13: Mean and Standard deviation of five event types in picture description at each level

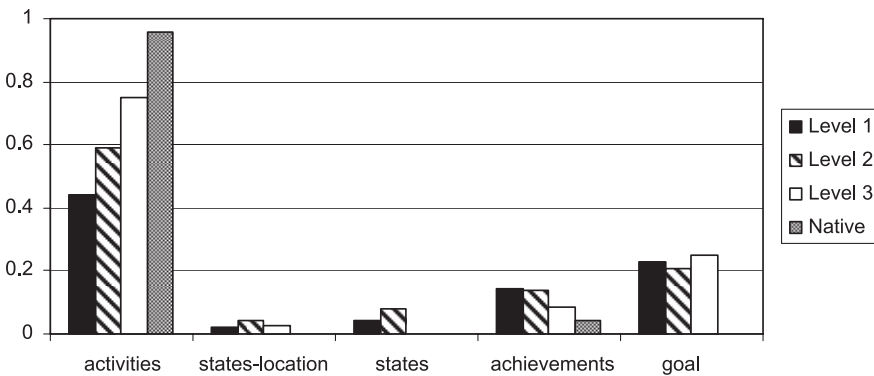


Fig. 4: Comparison of mean scores at four proficiency levels on five event types

The scores were entered into ANOVAs for analysis. As in the judgment analysis, I will discuss the results in two dimensions: comparison by proficiency levels with respect to each predicate type, and comparison by aspectual features with respect to a proficiency level.

Comparison by proficiency levels. In comparisons across proficiency levels the purpose was to find out whether the (non)production of *zai* by the learners is similar to that by the native speakers. Five Kruskal-Wallis tests were conducted on the five types of events. The results of the five event types, represented by predicates used for the above pictures, are given in Table 14 and Table 15, the latter showing the pairs where significant difference was found.

Event type	Test statistic	df	Asymptotic sig
activity	25.50	3	<.0001
state-location	.23	3	.9726
state	.77	3	.8566
achievement (about to happen)	.89	3	.8278
goal	10.353	3	.016

Table 14: Results of 5 Kruskal-Wallis tests on event types

Event type	Groups whose difference is significant	p
activity	Level 1 vs. native	<.001
	Level 2 vs. native	<.001
goal	Level 2 vs. native	.042
	Level 3 vs. native	.039

Table 15: Kruskal-Wallis Pairwise comparisons on activities and events with goal

occurrences of <i>zai</i>	Level 1	Level 2	Level 3	native
0	9	8	1	0
1	0	0	3	0
2	5	6	1	0
3	3	4	3	4
4	5	7	10	19

Table 16: Frequency of *zai* in descriptions of the four pictures of on-going events

Consider positive contexts first, which are only found in one event type, on-going activities. Table 15 shows that, by level 3 the participants behaved similarly to native speakers, as the difference between the two groups was not significant. But this does not tell the whole story. Table 16 gives the breakdown of the frequency of *zai* usage, and it shows that there is a major difference between the native speakers and level 3 participants. While a large percentage of the native speakers (82.6%, 19/23) described all four pictures as an on-going event, with *zai*, only about half of the level 3 participants (55.5%, 10/18) did so. Thus although in the judgment task the learners accepted *zai* with activities as early as level 2, the production results show that the marking of *zai* on activities is developed slowly. The results also reinforces the discrepancy that has been commonly observed between comprehension and production in second language acquisition. Learners may have the knowledge that *zai* is a progressive marker, but they did not use it much at earlier stages – 40.9% (9/22) of level 1 participants and 32% (8/25) of level 2 participants completely avoided it.

The other four event types are negative contexts. Tables 14–15 show that on one of the four types, events with a goal, there is a significant effect between non-native speakers and native speakers. While none of the native speakers used *zai*, learners at all three levels show a slight tendency to mark such events with *zai*. This tendency is actually weaker than the tendency to use *zai* in positive contexts (activities), but at level 2 and level 3 it is sufficiently strong to cause an effect when compared with the complete lack of *zai* usage among native speakers. On the other three event types (state with location, physical state and punctual event about to happen) learners at all levels behaved similarly to native speakers in that *zai* was mostly not used. This does not mean that the non-native speakers have learned not to use *zai* in these contexts; rather, it suggests that they did not associate progressive marking with these verbs in the first place. The lack of association between *zai* and these predicate types, i.e. states and achievements (punctual events about to happen), can be explained by a prototype analysis along the lines of Shirai and Andersen (1995). Prototypical features of *zai* are dynamic and durative, whereas states and achievements have exactly the opposite features, hence the learners' strong tendency not to use *zai*.

The development trend of the five events is summarized in Table 17.

Comparison by aspectual properties. As with the judgment task, in comparison by aspectual properties, we hope to find out whether in their usage of *zai* the learners at each level distinguished between dynamic and stative, between durative and non-durative, ongoing stage and preliminary stage, and between no-ending and goal-ending. Is there a developmental pattern with respect to these features? At each level a repeated measures ANOVA was carried out on the five predicate

Native-like level	Predicate type	Context
Level 1	achievement	negative
	state	negative
	state-location	negative
Level 2	–	
Level 3	activity	positive
not yet acquired	goal	negative

Table 17: Developmental trend with respect to five event types

types. The between participants variable is aspectual properties (dynamicity, durativity, ending), while the dependent variable is the use or non-use of *zai* (1, 0). The results are all significant: level 1: $F(4, 80) = 9.58, p < .0001$; level 2: $F(4, 96) = 16.68, p < .0001$; level 3: $F(4, 68) = 40.66, p < .0001$; native: $F(4, 88) = 710.64, p < .0001$. The follow-up tests reveal that significant effect is found in the pairs given in Table 18.

Proficiency level	Predicate types that show significant difference		p
Level 1	activity	vs. state-location	<.01
	activity	vs. state	<.01
	activity	vs. achievement	<.01
	state-location	vs. goal	<.05
Level 2	activity	vs. state-location	<.01
	activity	vs. state	<.01
	activity	vs. achievement	<.01
	activity	vs. goal	<.01
Level 3	activity	vs. state-location	<.01
	activity	vs. state	<.01
	activity	vs. achievement	<.01
	activity	vs. goal	<.01
	state-location	vs. goal	<.05
	state	vs. goal	<.01
native	activity	vs. state-location	<.01
	activity	vs. state	<.01
	activity	vs. achievement	<.01
	activity	vs. goal	<.01

Table 18: Results of Tukey HSD tests on five types of predicates at each level

Table 19 shows that the participants made all of the required distinctions except for one: that between activities and predicates with goal at level 1. This means that in deciding whether to use *zai* or not, the learners were sensitive to the distinction between dynamic and stative, between durative and non-durative, and at level 2 and 3, the distinction between no ending and goal-ending. They showed a tendency to use *zai* on dynamic predicates, but not stative predicates, on durative predicates, but not non-durative predicates, and on predicates with no ending rather than predicates with goal-ending. On the other hand, level 1 and level 3 learners also made distinctions not made by native speakers, e.g. between state-location and goal. This is due to the learners' tendency to mark goal predicates with *zai*, as discussed in the previous section, in contrast to stative predicates. Besides comparisons in terms of lexical aspect, a comparison of how the learners described an ongoing event and an about-to-happen event showed that as early as level 1 they also made the distinction between the viewpoint of ongoing stages and the viewpoint of preliminary stages.

	Level 1	Level 2	Level 3	native
dynamic vs. stative	yes	yes	yes	yes
durative vs. non-durative	yes	yes	yes	yes
no ending vs. goal-ending	no	yes	yes	yes
on-going stage vs. preliminary stage	yes	yes	yes	yes

Table 19: Aspectual and viewpoint distinctions and the level at which they were made

In short, in production, the learners demonstrated slow but steady development of using *zai* in activities. Avoidance is observed among level 1 and level 2 participants. Level 3 participants as a whole showed target-like behavior, but a closer look reveals a qualitative difference between level 3 participants and the native speakers – fewer of them used *zai* in all four pictures. In negative contexts, two patterns were found. On one hand, the learners had a tendency to mark *zai* on events with goal, which was completely lacking among the native speakers. On the other hand, the learners, similar to the native speakers, did not use *zai* to describe stative events or punctual events about to happen. This could be due to the effect of lexical aspect on grammatical aspect – stativity and punctuality are the exact opposite of the core features of *zai*. In terms of making aspectual distinctions on dynamicity, durativity, ending vs. no-ending and on-going vs. about-to-happen, the learners made all the desired distinctions except for one between activity and goal-ending at level 1.

5 Discussion

On the basis of results from the two tasks, we can now consider the research questions posed at the beginning of the study, repeated below:

1. What verb classes are marked by *zai* in the early stage? Does the evidence support the aspect hypothesis?
2. What is the range of L1 influence? How persistent is it?
3. What is the acquisition process? Does it involve a widening or narrowing of predicate types in comparison to the early stage?

5.1 Early stage

First, consider the early stage of acquisition. The two tasks give comparable results on how level 1 participants performed. In judgments, as shown in Table 14, the participants made some, but not all, of the aspectual distinctions necessary for the acquisition of *zai*. In particular, predicates with goal or distance were treated like activities, there being no significant difference between the two, and both were accepted when marked by *zai*. Similarly, in picture description, level 1 participants significantly distinguished predicates in terms of dynamicity and durativity, but not in terms of goal-ending vs. no ending. Thus while avoiding *zai* in stative or non-durative events, the participants did use *zai* to describe pictures including a goal, e.g. someone running to the train station, in a way similar to the way they described activities. Together the results tell us that at the initial stage the learners treated activities the same as predicates with goal and predicates with distance in their use of *zai*. The data therefore does not support the aspect hypothesis.

This finding shares some similarities with the findings in Ming (2008). As mentioned in section 2, his study finds a high error rate at the elementary level: 71.28% (67/94), which drops to 28.26% (13/46) at the intermediate level, and further down to 5.6% (2/36) at the advanced level. Focusing on the early stage, this means out of 94 instances where *zai* was used or should have been used (obligatory contexts not supplied or used), only 27 were target-like uses, while 67 were errors of overuse or underuse. Ming does not provide a breakdown of the errors; however, he notes that the participants made both types of errors. Overuse happens when *zai* was attached to states or achievements, while underuse is seen in lack of marking on activities. Thus Ming's findings also do not support the aspect hypothesis. However, while in Ming's study the overuse errors lie in *zai* being attached to states and achievements, in this study the overgeneralization at level 1

comes from *zai* being used with accomplishments involving goal or distance. The difference between the two studies may be partly due to the design and methods of the experiments. For example, Ming's picture story does not include a scene involving goal or distance. In addition, difference in the nature of the tasks also contributes to difference in results. Nonetheless, it is of significance that the two studies share the finding that at the early stage *zai* is not restricted to activities only.

5.2 L1 influence

The next question concerns influence from L1. There has been a large body of research on L1 transfer, interference or influence in L2 acquisition. There is now a consensus that learners draw on their L1 in L2 development, and L1 influence manifests itself in a number of ways, including facilitation, errors, and avoidance (e.g. Ellis 1994, Gass and Selinker 1983, Larsen-Freeman and Long 1991). Research has also shown that not all differences between L1 and L2 will transfer, and there are constraints on when and what features of L1 are more likely to be transferred (e.g. Odlin 1989, Zobl 1980, Eckman 1977, Kellerman 1979, 1986). In addition, some of the features of L2 are developmental, shared by all learners, and others may reflect interactions between L1 influence and language development. Thus it is not always clear whether aspects of L2 performance are indications of L1 influence or a universal developmental stage. To rule out the latter possibility, two things can be done. One is to show that the performance does not occur in L1 acquisition, but only in L2 acquisition; the other is to show that the performance only occurs among speakers of a particular L1, but not speakers of other L1s (Odlin 1989). The first task is carried out below; however, the second task is beyond the scope this study. Therefore, the L2 performance discussed here is a candidate of L1 influence, but further work will be necessary to establish that they cannot be traced to any other sources.

First, we consider how *zai* is acquired as a first language. The rationale is that if associations between *zai* and certain predicates types are only found among the English learners, but not among Chinese children, they are likely to be due to the influence of English. Several studies have examined L1 acquisition of *zai*, including Erbaugh (1982), Li and Bowerman (1998), Jin and Hendriks (2005), and Chen and Shirai (2010). In general, it is found that in natural production children use *zai* only on activities (Erbaugh 1982), or overwhelmingly on activities (Chen and Shirai 2010). In experimental conditions, however, children mark *zai* on

stative posture verbs (Li and Bowerman 1998, Jin and Hendriks 2005). Notably, none of the studies report the use of *zai* by children on achievements or accomplishments with result, goal, or distance. I will therefore take associations of *zai* with these four types of predicates by the learners in this study as signs of influence from English. Essentially they represent two aspectual properties that differ between Mandarin and English – inclusion of preliminary stages, and completion.

The first property is found in achievements, which was included in both the judgment task, e.g. *si* ‘die’, and the production task, e.g. *likai* ‘leave’. The learners demonstrated target-like behavior at level 3 in the judgment task and at level 1 in the production task. As mentioned in Section 4, the latter could be because these predicates are usually used to describe punctual events, and such events have features opposite of what *zai* is associated with prototypically. Thus L1 influence is not persistent in these predicates, although there may be some L1 influence in the judgment task at level 1 and level 2.

The second property that contributes to L1 influence is completion, and it is found in three types of predicates: predicates with result, goal and distance. Predicates with result, e.g. *xiewan gongke* ‘finish homework’, were only used in the judgment task. They show a similar pattern to the achievement verbs in that the learners’ understanding of the predicates was target-like at level 3. Therefore, L1 effect may be present in level 1 and level 2. Predicates with goal appeared in both the judgment and the production tasks. In both tasks, the learners’ behavior was not yet target-like at level 3. This means the L1 effect is stronger and more persistent in these predicates. Finally, predicates with distance only appeared in the judgment task. It is the most difficult predicate type for the learners, as it was treated like activities at all three levels.

To summarize, learners’ performance on four types of predicates are likely to be due to L1 influence, and it appears that these predicates impose different degrees of influence, having a weaker effect on achievements and predicates with result, but a stronger effect on predicates with goal, and the strongest effect on predicates with distance. How can we explain the differences? I suggest they come from different event endings, as result, goal and distance reflect different degrees of strength of event endings.

I will evaluate the strength of event ending in terms of two features: (i) whether an ending is specified or implied, and (ii) whether a result is specified. An event ending with a resultative state is a stronger type of ending than an ending unspecified with a result, because the former entails the latter but not vice versa. Similarly, an event ending that is specified is a stronger ending than one that is not specified but implied. Thus the three types of ending form a hierarchy with respect to its strength, as given in Table 20.

		Result specified	Endpoint specified
strong	result	yes	yes
	goal	no	yes
weak	distance	no	no

Table 20: Hierarchy of endings

If the learners were sensitive to the hierarchy, the differences in L1 effect follow straightforwardly. Given the contrast between *zai* and *be V-ing*, a major task for the English speakers is learning that *zai* is incompatible with any predicates that are complete. As demonstrated earlier, these are predicates that entail completion in the perfective aspect. Assuming that predicates with a stronger sense of completion will be learned earlier, we expect predicates with result will be acquired before predicates with goal, which in turn will be acquired before predicates with distance. The findings certainly support Table 20 as far as result being the first predicate type to break away from *zai*. Although we don't have data on when the other two predicate types are disassociated, it does point to the order of goal followed by distance. This is because the participants made a distinction between goal-ending and no ending at level 2, as shown in Table 12 and Table 19, but they have not made a distinction between distance-ending and no ending.

The fact that the learners continuously treated predicates with distance in the same group as activities suggests that an implied, but not specified, ending presents an additional hurdle for the learners. This raises the issue of at what level the learners will eventually acquired the incompatibility between *zai* and such predicates, and it also touches on a broader issue of how L2 learners acquire implicational meanings. These are issues for future studies.

5.3 Developmental sequence

The third issue concerns the developmental sequence of acquisition of *zai*. This was summarized in Table 8 and Table 17 for the judgment task and the production task respectively. A comparison of the two tables reveals that the findings from the two tasks do not match entirely; the differences may be due to the different nature of the two tasks, and reflect the uneven ability of the learners between judgment and production. But the two findings also share some similarities, which reflects the general trend. First, learners' performance on achievements, states and states-location, which are all negative contexts, was similar. Second, predicates with goal were problematic for the learners in both tasks, confirming that the learners did not have the knowledge yet.

Both widening and narrowing of predicate types is observed in the developmental sequence. Widening is observed in positive contexts of the judgment task, from non-completive accomplishments and activities to predicates implying change but no result. This can be explained by the aspect hypothesis. Narrowing of predicate types occurs in negative contexts of both tasks, where a range of predicate types, including predicates with duration, achievements, states, states-location and predicates with result, were gradually disassociated with *zai*. Predicates with goal and predicates with distance were still associated with *zai* at level 3. However, to date there does not seem to be a theory that addresses the issue of L1 effect weakening process. What is the principle that governs how learners go from a large set of verbs to a small set of verbs in their acquisition of *zai*?

The findings suggest two things are at work. First, disassociation of the two L1 properties that are likely to interfere, i.e. inclusion of preliminary stages and completion, started at the same stage. For both properties the relevant distinctions were made at level 1, as shown in Table 12. Second, disassociation of *zai* from overt marking precedes disassociation from non-overt marking and disassociation from a strong ending on the hierarchy Table 20 precedes disassociation from a weak ending. This is seen in how different completive predicates were gradually separated from *zai*. As suggested in 5.2, the process proceeded in the way outlined in Table 20, from ending by result, to ending by goal and ending by distance. Thus although the process of dissociation from completion started at the same time as the process of dissociation from inclusion of preliminary stages, the former takes longer and is not yet complete at the time of level 3.

Previous studies have shown that when L2 has a narrow scope than L1, learners have difficulty restricting themselves to the narrow scope; difficulty persists for many years since there is no evidence in the input to tell them otherwise. This has been demonstrated in argument structure, e.g. acquisition of the dative construction in French by English speakers (White 1987, 1991), and acquisition of the directional complement in Japanese by English speakers (Inagaki 2001). The findings here show that the same is observed in acquisition of aspect, but they also show that the learners do not treat all of the disallowed structures the same. Just as expanding the range of verb types in positive contexts does not come in one step, reducing the range of verbs types in negative contexts also proceeds in stages.

6 Conclusion

This study demonstrated a case of interplay between two forces in L2 acquisition of tense-aspect morphology: congruence between lexical aspect and grammatical aspect and the effect of L1 when the latter has a broader scope than L2. The two

factors make opposite predictions on the L2 acquisition of the Mandarin progressive marker *zai* by L1 English speakers, as can be seen in two areas: the early stage and the acquisition process. The findings from a judgment task and a production task suggest that the observed pattern is neither predicted by the aspect hypothesis alone nor entirely conditioned by L1 influence. Rather, it is the result of both forces at work. At the early stage *zai* is associated with activities and accomplishments with goal or distance. In the acquisition process, both widening and narrowing of predicate types are observed, the former in positive contexts, and the latter in negative contexts.

The findings show that lexical aspect does not take precedence over L1 influence, contra Collins' (2002, 2004) studies. The learners started out associating *zai* with a wider range of verbs than activities. On the other hand, L1 influence does not override lexical aspect either. The learners made distinctions on dynamicity, durativity, result ending and the scope of *zai*'s viewpoint as early as level 1. From a comparative perspective, this suggests that lexical aspect interacts with L1 influence in a variety of ways, depending on how L1 differs from L2 and how lexical aspect and grammatical aspect interact in the languages in question.

The findings also show that the L1 influence is not uniform, having a weaker effect on achievements and predicates with result, but a stronger effect on predicates with goal, and especially on predicates with distance. I suggested that this has to do with the strength of the event ending that is part of the meaning of a predicate. Since for English speakers learning *zai* requires learning to disassociate it from predicates with endpoints, the stronger the ending, the easier it is to break the association. Predicates with distance are ones with a weak ending, which is neither resultative nor specified. Therefore it was not obvious to the learners these predicates have an ending. This explains why L1 transfer continued to exert its influence on these predicates at level 3. But there are still aspects of L1 influence that are not answered yet. First, when does the L1 effect finally disappear? Second, between predicates with goal and predicates with distance, which one will be disassociated from *zai* first? For the second question, the findings suggest that the former will break away from *zai* first, since the distinction between goal-ending and no ending was made at level 2 and level 3, whereas the distinction between distance-ending and no ending was not made at any of the three levels. To answer both questions, it will require data from more advanced learners.

In follow-up studies, more verbs of the same predicate type should be tested. In future research it is also important to find out if L1 effect is weakened in stages in other areas of tense-aspect morphology, and if so, what principles govern the weakening process. This study suggests that one principle that is at work is whether the relevant meaning component is overtly expressed or not. It will be interesting to see what other principles also play a role.

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Appendix 1

List of 22 predicates used in the judgment task.

Predicate type	Target predicates	English translation
activity	kan dianshi	'to watch TV'
	xue zhongwen	'to study Chinese'
	zhao Xiaoli	'to look for Xiaoli'
non-completive (accomplishment)	kan yiben shu	'to read a book'
	chi yige pingguo	'to eat an apple'
change with no result	manman shenggao	'to slowly go up'
	yizhi zengjia	'to grow continuously'
achievement	si	'to die'
	hao	'to be done'
result	xiewan kongke	'to write and finish homework'
	chiwan pingguo	'to eat and finish an apple'
goal (accomplishment)	fei qu Beijing	'to fly to Beijing'
	zou dao xuexiao	'to walk to school'
	tiao dao zhuoshang	'to jump to the table'
duration (accomplishment)	xue liangnian zhongwen	'to learn 2 years of Chinese'
distance (accomplishment)	pao yili lu	'to run a mile'
state-location	shui zai dishang	'to sleep on the floor'
	zhu zai Beijing	'to live in Beijing'
state-individual-level	xihuan zhongwen ke	'to like the Chinese class'
	zhidao najian shi	'to know that thing'
-stage-level	you ganmao ⁵	'to have the flu'
	gaoxing	'to be happy'

⁵ This predicate is not well-formed regardless of whether it is marked by *zai*; it is a direct translation from English 'have the flu'.

Appendix 2

Results of paired-t tests and repeated measures ANOVAs comparing judgments on members of each of the eight predicate types at each proficiency level:

ANOVA results

activity	Level 1	$F(2, 42) = 0.13$	$p = .88$
	Level 2	$F(2, 46) = 1$	$p = .38$
	Level 3	$F(2, 34) = 1.18$	$p = .32$
	Native	$F(2, 44) = 0$	$p = 1.0$
goal (accomplishment)	Level 1	$F(2, 38) = 0.29$	$p = .75$
	Level 2	$F(2, 48) = 0.38$	$p = .69$
	Level 3	$F(2, 34) = 1.96$	$p = .16$
	Native	$F(2, 44) = 0.49$	$p = .62$
state	Level 1	$F(3, 54) = 0.78$	$p = .51$
	Level 2	$F(3, 69) = 2.14$	$p = .10$
	Level 3	$F(3, 51) = 0.34$	$p = .80$
	Native	$F(3, 66) = 1$	$p = .40$

t-test results

	Level 1		Level 2		Level 3		Native	
	t	p	t	p	t	p	t	p
non-completive (accomplishment)	0.37	0.71	1.0	0.33	0	1.0	0.57	0.57
change with no result result	1.45	0.16	0.21	0.83	1.46	0.16	1.7	0.10
achievement	1.07	0.30	1.19	0.25	0.37	0.71	NA [†]	NA [†]
state-location	4.37	0.0004*	1.99	0.06	0	1.0	1.7	0.10
	0	1.0	0	1.0	0.44	0.67	1.0	0.33

[†] Note: This is a case of perfect match where the participants uniformly rejected all of the sentences. The t-test cannot compute such cases. $p = 1.0$

* $p < .001$

Appendix 3

Results of repeated measures ANOVAs and paired-t tests comparing members of each of the five event types at each proficiency level in the production task:

ANOVA results

activity	Level 1	$F(3, 63) = 0.66$	$p = .58$
	Level 2	$F(3, 72) = 1$	$p = .40$
	Level 3	$F(3, 51) = 1.10$	$p = .36$
	Native	$F(3, 66) = 0.66$	$p = .58$

t-test results

	Level 1		Level 2		Level 3		Native	
	t	p	t	p	t	p	t	p
state-location	1.0	0.33	0	1.0	1.0	0.33	0	1.0
state	1.0	0.33	1.0	0.33	0	1.0	0	1.0
achievement	0.57	0.58	0.43	0.66	0.32	0.58	2.1	0.16
goal (accomplishment)	1.0	0.33	0.37	0.71	0.19	0.67	0	1.0