

PERFECTIVE MARKING IN L2 MANDARIN: AGREEMENT WITH INHERENT LEXICAL ASPECT OR THE DERIVED SENTENTIAL ASPECTUAL CLASS?*

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Abstract

This study evaluates the differing claims of the Aspect Hypothesis (Anderson & Shirai 1996) and the Sentential Aspect Hypothesis (Sharma & Deo 2009) for perfective marking by L1 English learners of Mandarin. The AH predicts a narrow focus on inherent lexical aspect (the verb and predicate) in determining the use of the perfective marker *le*, whilst the SAH suggests that – subject to L1 influence – perfective marking agrees with the final derived aspectual class of the sentence. To test these claims data were collected using a controlled *le*-insertion task, combined with oral corpus data. The results show that learners' perfective marking patterns with the sentential aspectual class and not inherent lexical aspect (where these differ), and that overall the sentential aspectual class better predicts learners' assignment of perfective marking than lexical aspect.

1. Introduction**1.1. Models of aspect**

Following Vendler's (1967) categorisation of verb types, treatments of aspect began to consider the compositional nature of aspect (notably explored by Verkuyl 1972) and the fact that elements beyond the verb can crucially contribute to aspectual derivation. This fed usefully into a number of second language (L2) acquisition studies in the subsequent decades, which initially considered only the role of verbal arguments (e.g. Slabakova 1999), with other elements – like adverbials – not coming into focus until more recently (e.g. Baker and Quesada 2009). In fact, because the vast majority of research into the acquisition of aspect has investigated the Aspect Hypothesis (AH) (Anderson & Shirai 1996), which is characterised by an exclusive focus on inherent lexical aspect (the verb and predicate), the fully compositional nature of aspect represented in theoretical models has yet to be seriously unpacked in terms of its implications for acquisition. An important advancement, though, came from the Sentential Aspect Hypothesis (SAH) (Sharma & Deo 2009), which proposes that learners' aspect marking patterns with the sentential aspectual class (the final aspectual derivation) rather than with the verbal predicate alone, and that the AH's findings concerning lexical aspect are an epiphenomenon of sentential agreement.

The term aspect denotes the 'internal temporal constituency of a situation' (Comrie 1976: 3), and describes how eventualities unfold in time, whilst tense is deictic, locating a situation in relation to the speech time as past, present or future. Treatments of aspect can be divided into two main camps: two-component models that distinguish lexical from grammatical aspect, and unitary models, which do not. The AH is rooted in Vendler's (1967) verb classification and in a two-component model of aspect, whilst the SAH emerges from the unitary approach of the semantics literature (e.g. de Swart 1998). In the former approach,

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grammatical aspect morphology provides ways of viewing a situation (e.g. as having internal duration or as a completed event), whilst lexical aspect (sometimes called *aktionsart*, ‘kinds of action’) pertains to the inherent properties of situations themselves, defined using binary features (e.g. telic/atelic, stative/dynamic, durative/punctual). Lexical aspect is derived from verbs and predicates, as in Vendler’s (1967) verb categorization (discussed in Section 2.2). Representative of the two-component approach is Smith’s influential model (1997) and that of Xiao & McEnery (2004). In such models, grammatical perfective/imperfective viewpoint markers express the dichotomy between viewing situations as a single whole (with endpoints) as opposed to referencing their internal duration (and excluding endpoints). For example, *He walked to school* and *He was walking to school* respectively express the perfective and imperfective viewpoint on the same telic situation (*walk to school*).

Of direct relevance to this study (and specifically to the Sentential Aspect Hypothesis) is the fact that these models account for aspectual shifts performed by elements beyond the verbal predicate. Thus in Smith’s model, Vendler’s fourway ontological categorisation is applied to the sentence-level. Similarly, Xiao & McEnery (2004) show how sentential aspect is derived through mappings between three levels: the predicate, the predicate and its arguments, and the sentence. In these models, universally invariant situation types are derived lexically and subjected to fine-grained aspectual viewpoints encoded by language-specific grammatical markers. However, alternative treatments of aspect have emerged which accomplish this without utilizing a distinction between lexical situation types and viewpoint markers.

The semantics literature (e.g. Mourelatos 1978, Dowty 1986, Krifka 1989) has given rise to unitary models in which both lexical and grammatical devices can act as aspectual operators, modifying the derived aspectual class of the sentence through their basic mereological properties (see de Swart 1998). Three ontological eventuality types are distinguished – states, processes and events – which differ according to whether they are homogenous or quantized, and stative or dynamic. In this framework, states and processes are homogeneous, denoting divisive reference (subintervals of *being happy* equal *being happy*) and cumulative reference (*reading plus reading* is simply *reading*), whilst events are non-homogeneous and quantized (subintervals of *eat an apple* are not equal to the whole, and unlike states and processes, events can be counted).

On this approach atelic verbs (e.g. *know*), habitual adverbials (e.g. *everyday*) and traditional aspect markers like the English progressive are all homogeneous. Correspondingly, cardinally quantified adverbials (e.g. *for five years*), telic verbs (e.g. *recognise*) and traditional perfective markers are all quantized. Crucially, then, both two-component and unitary approaches emphasise the compositionality of aspect and the role played by elements beyond the verbal predicate (e.g. Dowty 1986: 43, Xiao & McEnery 2004: 80). Moreover, both approaches can be applied to acquisition studies, as the AH and the SAH respectively demonstrate, although to date relatively little research has been done on non-European languages, leaving a gap in our understanding of how languages which are typologically different may show effects of transfer within either approach. Hence, this paper addresses the issue of the acquisition of aspect by English learners of Mandarin, given that the two languages are often held to differ in being a tense vs. aspect language respectively.

Having now summarised the main approaches to aspect, a more detailed discussion of the key concepts is provided in the following sections, which are organized as follows. The next section defines telicity and reviews Vendler’s (1967) verb classification. Section 3 considers differences in aspectual derivation in English and Mandarin, as well as Mandarin perfective *le*. Section 4 examines the AH and the SAH, evaluating problems with the claim – which underpins the research questions of this study – that inherent lexical aspect exclusively conditions learners’ aspect marking. The following sections then provide details of our

methodology (Section 5), results (Section 6), discussion (Section 7) and conclusions (Section 8).

2. Composition of aspect

This section explores the concept of telicity and reviews Vendler's (1967) verb classification, which underlies the Aspect Hypothesis.

2.1. Telicity

Telicity is central to the discussion of aspect, and in the broadest sense denotes boundedness (cf. Jackendoff 1996). However, Garey (1957: 105), who introduced the term to the field of aspect, posited an entailment test to identify inherent verbal telicity: if one was *verbing*, and was interrupted while *verbing*, has one *verbed*? The answer for telic verbs, such as *drown*, is no, whilst for atelic verbs (e.g. *swim*), the answer is yes. This definition of telicity thus concerns eventuality structure, with telicity involving the notion of completion and the attainment of a *telos* (goal/endpoint). But the semantics literature has also given rise to mereological definitions, which pertain to the relation between parts and the whole.

Thus telicity has been defined as the lack of the subinterval property (i.e. Krifka's (1998) notion of quantization) such that a telic sentence (e.g. *He walked to the school*) is not true at any subinterval of the interval for which the proposition holds; atelic sentences (e.g. *He walked*), on the other hand, have the subinterval property, being equally true at any subinterval of the interval for which they are asserted. However, not all bounded predicates are quantized or even telic in the sense of having an inherent endpoint in eventuality structure (a *telos*, in Garey's original sense). For example, some (e.g. *study a quantity of books*) have a *telos* (i.e. when the books have been studied) and are bounded but yet are not quantized because they possess the subinterval property (i.e. a subpart of *a quantity of books* is still *a quantity of books*) and cumulative reference (cf. Krifka 1998: 220-4). Likewise, other expressions are quantized, and hence yield sentences which are 'perfective' in the SAH account but not telic in the sense of Vendler (1967) or the AH (e.g. *wait 2 hours*). Both, however, are bounded in a general sense. This shows that the definitions of aspect adopted in the AH and the SAH do not fully overlap and moreover certain boundedness phenomena are not captured in either account.

Additionally, in contrast to the mereological approach which can be applied across syntactic levels, telicity has also been treated as a fundamentally spatial property (e.g. Xiao & McEnery 2004), such that its primary application is to nominals (only secondarily creating boundedness in eventuality structure). This fact prompted Xiao & McEnery to observe that 'spatial delimitedness [i.e. of an NP argument] always implies temporal boundedness [a 'telic' situation type] but the reverse is not true' (Ibid. 188). This has been illustrated for incremental theme predicates like *eat a cake* (Dowty 1991), in which an endpoint in eventuality structure and in the temporal dimension are both derived from spatial delimitedness (i.e. the endpoint of the activity arises from the bounded nature of the argument). Having now considered telicity, Vendler's aspectual classification based on the semantics of verb types will be briefly outlined.

2.2. Verb-based aspectual classes

Inherent lexical aspect, central to the Aspect Hypothesis, has as its basis Vendler's (1967) classification of verbs into states, activities, accomplishments and achievements, according to their telicity/atelicity, whether they denote a point-in-time or a duration (i.e. are punctual/durative) and whether they are dynamic or stative (i.e. whether or not they involve change). The four verb types can be summarized as follows (cf. Croft 2009: 6):

States: stative, durative and atelic (*be American, love*)

Activities: dynamic, durative and atelic (*sing, dance*)

Achievements: dynamic, punctual and telic (*shatter, discover, reach [the summit]*)

Accomplishments: dynamic, durative and telic (*cross [the street], read [the book]*)

Thus *love* (stative) and *sing* (activity) are atelic, with no terminative point, whilst *read the book* (accomplishment) and *discover* (achievement) are telic, both involving endpoints – although differing in that accomplishments are intrinsically durative with a point of completion whilst achievements are instantaneous. The classification is limited to verbs, incorporating the predicate level mainly to define accomplishments (e.g. *run to school*, in which the object provides an endpoint). This thus assumes that verbs come pre-specified with aspectual features, but does not adequately account for the role of arguments and other sentential elements. In the next section, we will consider how perfective marking is used in Mandarin against the backdrop of differences in aspectual derivation in English and Mandarin.

3. Boundedness marking in English and Mandarin

Aspectual derivation in English and Mandarin will now be contrasted to clarify the influence of learners' L1 upon Mandarin *le* acquisition, transfer being predicted by the SAH but not by the AH (these hypotheses are set out in full in Section 4).

3.1. Parametrized differences in telic eventualities

We focus here on a crucial parameterized difference in the means of deriving telic eventualities, namely that English relies mainly upon nominal devices, whilst Mandarin makes greater use of verbal devices (cf. the cross-linguistic generalization, stated in Kabakciev 2000: 156 and discussion of the distinction in Slabakova 1999). It should be pointed out that despite Mandarin sometimes being considered an 'aspect language' and English a 'tense language' (i.e. without grammatical perfective marking) (e.g. Xiao & McEnery 2004: 2), the aspectual function of bounding associated with perfective marking is accomplished nominally in English by corresponding grammatical devices (e.g. the definite article).¹ In fact, definite/indefinite marking and perfective/imperfective marking respectively can be regarded as 'equivalent techniques of quantification in the nominal and verbal domain' (Leiss 2007: 1), with perfective marking creating definiteness and imperfective marking creating indefiniteness. This suggests that the task of learners of Mandarin with a nominal-marking L1 (e.g. English) is not the acquisition of a new grammatical category, but rather to reset the locus of boundedness marking to the verbal domain (something which the learners in this study appeared to achieve; see Section 6 and 7). Next, the nature of *le* as a boundedness marker will be considered.

3.2. Perfective marking in Mandarin

In Mandarin, verbal-*le*² is a perfective marker that occurs after the verb and indicates an event viewed as a bounded whole, whether 'temporally, spatially or conceptually' (Li & Thompson 1989: 185). On this view, *le* is therefore distinct from (past) tense. Li & Thompson mention

¹ This is connected to the typological generalization that 'aspect languages [e.g. among others, Mandarin, Russian, and the Slavic languages] avoid article systems, and article languages [e.g. English] avoid aspect systems' (Leiss 2007: 87).

² Hereafter, simply *le*, since sentence-final *le*, a marker that denotes a 'currently relevant state' (Li & Thompson, 1989) is not examined in this study.

four types of boundedness that typically lead to *le* usage: quantified events, definite/specific events, events in which the verb's semantics contain a bound (e.g. *fall asleep*) and events that are first in a sequence. Example (1) shows *le* being triggered by quantification, namely through the boundedness arising from the duration adverbial *sanshi fenzhong* ('thirty minutes') which bounds the verb in the second instance (whilst the first use of the verb is aspectually neutral):

- (1) Zhangsan zai bowuguan men kou **deng** Lisi, **deng le** sanshi fenzhong
 Zhangsan at museum door mouth wait Lisi, wait PFV thirty minute
 'Zhangsan waited for Lisi at the museum entrance for 30 minutes.' (Ibid.: 189, emphasis added)

Also, the quantification triggering *le* can be spatial (i.e. material) rather than temporal, as (2) below shows:

- (2) Ta chi le san ge pingguo
 he ate PFV three CL apples
 'He ate 3 apples.'

In (2) the boundedness arises through a cardinally quantified object NP. This technique for deriving telicity (i.e. through object-marking) is used extensively in English, with VP telicity mostly being derived in accomplishment and activity predicates through nominal quantizing devices that delimit the object and thereby provide an endpoint to the eventuality (cf. Slabakova 1999).

Examples (3), (4) and (5) below illustrate the other types of boundedness that Li and Thompson say lead to *le* usage: a definite or specific object, an inherently bounded verb and the first event in a sequence (examples from Ibid. 192, 197, 199):

- (3) Wo pengdao le Lin Hui
 I encounter PFV Lin Hui
 'I ran into Lin Hui.'
- (4) Gaizi diao le
 lid fall PFV
 'The lid fell off.'
- (5) Ta kai le men, ni jiu jin qu
 he open PFV door, you then in go
 'When he opens the door, you go in.'

Next, the acquisition of aspect morphology as predicted by the Aspect Hypothesis and the Sentential Aspect Hypothesis will be discussed.

4. The acquisition of aspect

In this section the Aspect Hypothesis and the Sentential Aspect Hypothesis will be examined more closely, and limitations of the AH discussed to justify the need for a fully compositional account that does not stop short at the predicate level. The findings of Sharma & Deo's (2009) study of sentential aspect effects among Hindi learners of English – the methodology of which is reflected in the *le*-insertion task in the present study – will then be discussed. After that, we

will consider the role of temporal adverbials, which are excluded from the AH's lexical aspect account but included in the SAH (and central to the present study).

4.1. The Aspect Hypothesis

The claims of the Aspect Hypothesis are shown below (quoted from Andersen & Shirai 1996: 533), and this study is concerned with claim 1. They are formulated for L1 acquisition, but are also argued to hold in L2 acquisition:

1. Children first use past marking (e.g. English) or perfective marking (Chinese, Spanish etc.) on achievement and accomplishment verbs, eventually extending its use to activity and stative verbs.
2. In languages that encode the perfective-imperfective distinction, imperfective past appears later than perfective past, and imperfective past marking begins with stative verbs and activity verbs, then extending to accomplishment and achievement verbs.
3. In languages that have progressive aspect, progressive marking begins with activity verbs, then extends to accomplishment or achievement verbs.
4. Progressive markers are not incorrectly overextended to stative verbs.

The AH regards the aspectual class of verbs (classified according to Vendler's (1967) four-way categorization) as universally determining the emergence of grammatical aspect markers, such that morphological marking appears in a fixed order determined by verb type: first on achievement verbs, then on accomplishments, and only thereafter on activity verbs and (finally) on stative verbs (cf. Li & Shirai 2000: 50). Grammatical aspect marking is thus posited as patterning with lexical aspect (verbs and predicates, represented by Vendler's four idealized situation types). The fact that the AH predicts agreement with lexical aspect, so defined, means that other elements that perform aspectual shifts (such as temporal adverbials) are not predicted to affect learners' assignment of aspect markers and do not influence coding. The claims above are hypothesized to hold cross-linguistically, precluding L1 transfer and the influence of properties of the L2.

A significant number of SLA studies broadly support the above claims (e.g. for English, Bardovi-Harlig et al. 1998; for Spanish, Cadierno 2000), although claim 4 is the most tenuous (contradicted, for example, by the occurrence of *-ing* on stative verbs in Robison 1990). Studies on non-European languages are relatively few, but corroborating findings have been found, for example, for Japanese (Shirai 1995; Shibata 1999) and Mandarin (e.g. Jin & Hendriks 2005, Duff & Li 2002). However, at the same time, other studies have yielded contradictory findings (e.g. Dietrich, Klein & Noyau 1995, Salaberry 1999, Rohde 1996, Rocca 2002), whilst others provide evidence of transfer (e.g. Slabakova 1999, Laleko 2008, Gabriele 2009) or highlight the role of temporal adverbials (e.g. Salaberry 2013), which constrains the universality of the AH's claims. Therefore to move forward it is necessary to more precisely determine how L1/L2 factors and other sentential elements (e.g. adverbials) delimit the patterning of aspect marking with inherent lexical aspect.

4.2. Critiques of the Aspect Hypothesis

This section will briefly discuss three factors that delimit the AH's universalist claims. These are L1 transfer, the internal incoherence of the Vendlerian view of aspect, and its exclusion of temporal adverbials (further critiques can be found in Sharma & Deo 2009: 5-6).

Firstly, the AH's claims are tempered by findings showing the effects of the L1 upon the acquisition of tense/aspect morphology. This has many manifestations, but one example is

that because languages differ in where aspectual information is located, where learners initially look for aspectual information has been shown to be conditioned by their L1. Thus Slabakova (1999) observes that in English, telicity is encoded by the cardinality of nominal arguments (e.g. *eat cakes* is atelic; *eat two cakes* is telic), but in Slavic a preverb is used (cf. Slabakova 2005). She found that beginning Slavic learners tended to interpret English telic sentences as atelic because they are not sensitive to the object's cardinality, and so aspect marking reflects the absence of a verbal telicity marker. Thus in such cases beginning learners are not sensitive to the predicate's aspectual class (as predicted by the AH) because of L1 transfer.

Secondly, the AH conflates the inherent aspect of verbs with VP aspect, a confusion which stems from Vendler's original classification. Thus the AH states that 'learners will initially be influenced by the inherent semantic aspect of *verbs or predicates* in the acquisition of tense and aspect markers' (Andersen & Shirai 1994: 1, emphasis added). But this is problematic because these do not always correspond. That is, this prediction does not elucidate familiar cases such as the activity verb *run* which can yield an activity predicate or an accomplishment predicate depending on its arguments: *run miles* (activity; atelic); *run a mile* (accomplishment; telic). A similar situation arises with Mandarin resultative verb compounds (RVCs), which combine an activity verb with a resultative complement (a further verb or adjective) to yield achievement predicates. In these cases the predicate's aspectual class differs from that of the main verb (e.g. *shuo-wan* 'speak-finish'). This approach effectively works backwards from the predicate's aspectual class, which is compositionally derived (e.g. *run a mile* = accomplishment VP and *run miles* = activity VP), in order to assign individual verbs to an aspectual class (or sometimes more than one) and hypothesize that aspect marking agrees with these verb types. But this approach is flawed because it misses the compositional nature of the aspectual derivation.

Thirdly, with direct relevance to the present study (and in particular to the *le*-insertion task), the aspectual function of temporal adverbials in acquisition studies calls for closer attention (cf. Salaberry 2013: 207), as it appears that they can have a strong influence on learners' selection of aspect markers (cf. Slabakova & Montrul 2008). They emerge before both tense and aspect morphology and initially substitute for morphological marking (e.g. Noyau 2002: 107, Starren 2006). Thereafter, they play a role in aiding the assignment of tense/aspect morphology, although tense markers have been the focus of most studies (e.g. Musumeci 1989), and relatively few have considered the impact of temporal adverbials on aspect marking.

Temporal adverbials alter the aspectual class of the base predicate, and it has been found that learners are sensitive to these effects. For instance, Salaberry (2013: 210) notes the role of duration adverbials in triggering perfective marking in Spanish. Moreover, the learners of Spanish in Slabakova & Montrul's (2008) study demonstrated a strong sensitivity to the aspectual effects of completive and duration adverbials. Additionally, in Baker and Quesada's (2009) study, temporal adverbials conditioned learners' use of preterit and imperfective marking, particularly helping intermediate learners to use these aspect markers accurately. However, problematically, aspect shifts produced by temporal adverbials are excluded from coding in AH studies. Hence Shirai (2013: 298) notes that in both of the following examples *hid in the attic* is an activity predicate i.e. ignoring the fact that at the sentential level (6) is temporally bounded whilst (7) can be construed as an achievement because of the punctual adverbial:

- (6) He hid in the attic for an hour.
- (7) He hid in the attic when the sheriff arrived.

The above findings (which corroborate those of the present study) suggest an important role for temporal adverbials during the acquisition of aspect and call for a unified account of

aspect that incorporates their effects as well as those of the verb and predicate. To that end, the next section examines Sharma & Deo's Sentential Aspect Hypothesis.

4.3. The Sentential Aspect Hypothesis

The Sentential Aspect Hypothesis (2009) attempts to offer a more complete account of the acquisition of aspect that incorporates the effects of lexical aspect by positing that learners are sensitive to sentential aspectual class (to which the verb and predicate contribute) and that the L1 and the L2 also play a role in determining the nature of the emergent system. Thus, the SAH claims that, conditioned by the L1,

Learners hypothesize that morphological marking is a form of agreement with the aspectual class of the sentential predication (not narrowly with lexical aspect alone) (Sharma & Deo 2009: 7).

Sharma & Deo (2009) tested Hindi speakers to see whether they retained sensitivity to sentence-level imperfectivity, present in their L1, or whether their acquisition of English was guided solely by the aspectual class of the L2 English verbs/predicates (as the AH predicts). In Hindi (but not English), all past eventualities must be marked morphologically as perfective or imperfective; whilst in English, the past tense marker *-ed* is compatible with both aspects: *I lived in Bombay three years ago* can denote a bounded, completed eventuality (perfective) or one that still holds (unbounded, imperfective) (Ibid. 8). They coded production data for predicate and sentential aspect, and it was found that sentential perfectivity was a significantly stronger trigger of past tense marking than VP-level telicity.

Additionally, cases of misalignment between inherent lexical aspect and sentential aspect were considered in order to clarify the nature of learners' aspectual sensitivity. Sharma & Deo found that perfective sentences containing atelic predicates overwhelmingly triggered past tense marking (84.6%), contrary to the predictions of the AH that aspect marking always follows inherent lexical aspect. The AH predicts that past tense marking should be low frequency with atelic verbs and predicates, irrespective of subsequent aspectual operations. This generally held true, because as (8) below illustrates, sentential aspect is normally the same as predicate aspect. However, (9) and (10) show how sentential operators can shift the aspectual class from that of the base predicate, here causing a dramatic increase in learners' use of past tense morphology and revealing a sensitivity to sentential aspect rather than VP aspect alone (examples all have past time reference and are from Ibid. 18):

- (8) Lexical aspect: *Activity* Sentential aspect: *Imperfective*
 a. I work with the French people, no?
 b. I study in Punjab also, I study in Delhi also. Because of moving.
- (9) Lexical aspect: *State*; Sentential aspect: *Imperfective* → *Perfective*
 a. **For first 12 year** I was there because my father was posted there.
 b. **Six months** I was there in the kitchen.
- (10) Lexical aspect: *Activity*; Sentential aspect: *Imperfective* → *Perfective*
 a. I worked **for 14 years**. That's enough.
 b. So we did the schooling over there **and then moved**.

The duration adverbials in (9) and (10) (shown in bold) (as well as the second clause in (10b)) bound the atelic eventualities, and derive sentences that are quantized (perfective); the

increase in past tense marking here is predicted by the SAH but not the AH. Likewise, in sentences containing telic predicates, the presence of an imperfectivizing sentential operator dramatically reduced past tense marking (to only 13.3%), whereas when the telicity of the VP was unmodified by higher operators, past tense marking remained high frequency (75.9%).

Given the competing claims of the AH and SAH, this study therefore examined how L1 English learners of Mandarin used the perfective marker *le*. Our research questions were:

- 1) Does learners' perfective marking pattern with inherent lexical aspect (i.e. to confirm the AH) or with sentential aspect (i.e. to confirm the SAH)?
- 2) How does perfective marking show evidence of development over time, measured before and after a period spent studying abroad in China?

5. Methodology

A controlled experimental task was combined with longitudinal corpus data to examine how L1 English learners of Mandarin used the perfective marker *le*. The experimental task honed in on how two types of temporal adverbials affect perfective marking and the latter free speech data provided a window on developmental changes for a specific group of individual learners.

5.1. *Le*-insertion task

5.1.1. Participants

Ten English learners of Mandarin (the majority of whom were Chinese language students at Newcastle University), completed the *le*-insertion task, which contained sentences prepared in collaboration with a native Chinese speaker. A control group of eight native Mandarin speakers provided a baseline for *le* usage. The learners self-reported their proficiency from beginner to low intermediate (with two advanced) and in most cases it was possible to second-check this via informal discussion prior to completing the questionnaire.

5.1.2. The task

The aim of both Part One and Two of this task was to test whether the AH or the SAH more accurately predicted learners' perfective marking – namely whether learners' perfective marking patterned with inherent lexical aspect or the final sentential aspectual class. Therefore, aspectually mismatched sentences were presented (in a randomized order) to test the effects of habitual frequency and duration adverbials respectively. Learners were instructed to decide whether the sentences were OK as presented, or whether they should insert *le*, and tokens of the perfective marker were totalled and compared across type (1) and type (2) sentences.

All sentence pairs presented had past time reference, indicated by a locative time adverbial (e.g. *shang ge yue* 'last month') and/or by the simple past tense translation beneath each sentence. This eliminated the confounding factor of tense and enabled comparison of aspectual effects, because learners may transfer the past tense value to the perfective marker, and so be biased against marking non-past tense sentences perfectly (cf. Wen 1995).

Tokens of *le* were counted verb-finally only, discounting incorrectly placed tokens (i.e. if *le* was placed sentence-finally rather than verb-finally, this was not counted, because sentence-final *le* is often regarded as a distinct morpheme denoting a 'currently relevant state' (Li & Thompson, 1989: 296) and is not studied in this paper. Where *le* was simultaneously verb-final and sentence-final (due to the verb being sentence-final), following Li and Thompson's criteria these tokens were counted because in this case they unambiguously denoted a perfective event (due to the simple past tense English translation provided beneath

the test sentences). Examples of the sentences used are included below for both parts of the *le* insertion test (and the full list is provided in appendix B).³

5.1.3. Part one: imperfectivizing adverbials

In Part One, sentence pairs containing telic verbs were presented, with and without a habitual frequency adverbial (e.g. *meitian* ‘everyday’) that modifies the sentential aspectual class from that of the telic verb and yields an imperfective sentence.⁴ This is a stative mapping (deriving sentences with divisive and cumulative reference from quantized VPs). In each pair, sentence (1) was telic at the level of the lexical verb and the sentence level (because no further operators apply), and so these sentences are predicted to trigger perfective marking according to both the Aspect Hypothesis (AH) and the Sentential Aspect Hypothesis (SAH). These cases provide a baseline value for learners’ use of the perfective marker with these verbs. Sentence (2) contains the same telic verb but is imperfective at the sentence level through the addition of a habitual temporal adverbial, which leads to perfective marking being predicted by the AH but not by the SAH in these cases. The AH predicts no difference in the use of perfective marking between these sentence types, because only lexical aspect is considered relevant, whilst the SAH predicts a difference based on their differing sentential aspectual classes. The examples below illustrate the different sentence types:

(1) *Lexical aspect (telic) = sentential aspect (perfective)*

Shang ge yue wo **dapo** yi ge beizi
last CL month I **break** one CL glass
‘Last month I broke a glass.’

(2) *Lexical aspect (telic) → sentential aspect (imperfective)*

Shang ge yue wo **meitian dapo** yi ge beizi
last CL month I **everyday break** one CL glass
‘Last month I broke a glass everyday.’

(1) *Lexical aspect (telic) = sentential aspect (perfective)*

Ta **dasi** yi tiao chongzi
he **kill** one CL insect
‘He killed an insect.’

³ Since completing this study, it has come to our attention that some native speakers do not find some of the sentences used in the *le*-insertion task to be fully natural. This is partly due to the existence of real variation in native speakers’ grammaticality judgements, but can also be attributed to the fact that the sentences were presented in isolation without the context of a following clause (e.g. the sentence, *ta shangci deng ni* ‘Last time he waited for you’, would be more natural with a following clause i.e. *ta shangci deng ni, zheci ye hui deng ni* ‘Last time he waited for you, and this time he will also wait for you’). However, by presenting the sentences in isolation, we removed the confounding factor of the aspectual effect of a following clause, which is crucial because in Sharma & Deo’s (2009) account these are regarded as aspectual operators cf. Section 4.3 example (10b). We also note that the learners who completed the task did not show any awareness of this unnaturalness (the majority being beginners/low intermediate level), and so this is unlikely to have influenced their *le* usage. The results therefore remain valid concerning the conditioning effect of sentential aspectual class on *le* marking in learners’ interlanguage.

⁴ The terms *perfective* and *imperfective* are used here to describe the sentential aspectual class, whilst *telic* and *atelic* are reserved for the lexical aspectual class, following Sharma & Deo (2009). Both *telic* and *perfective* denote quantized predications, whilst *atelic* and *imperfective* denote homogeneous predications (cf. discussion of these terms in Section 1.1).

(2) *Lexical aspect (telic) → sentential aspect (imperfective)*

Ta **meizhou** **dasi** yi tiao chongzi
 he **every week** **kill** one CL insect
 ‘Every week he killed an insect.’

5.1.4. Part two: perfectivizing adverbials

In Part Two, the type (1) sentences are atelic at the lexical level and this is unaltered by higher aspectual operators, whilst the type (2) sentences are atelic at the lexical level but perfective at the sentential level through the addition of a duration adverbial, which acts as a perfectivizing operator by providing a temporal bound (cf. Moens 1987, de Swart 1998: 357).⁵ As in Part One, the type (1) sentences provide a baseline value for perfective marking, this time with stative verbs. Neither the AH nor the SAH predict perfective marking in these cases because they are atelic at the lexical level and imperfective at the sentential level. However, the type (2) sentences yield contrasting predictions. The AH predicts perfective marking with neither sentence type, because both contain atelic verbs and perfective marking is hypothesized to be conditioned solely by the lexical aspectual class. However, the SAH predicts that perfective marking will occur in the type (2) sentences because they are sententially perfective due to the temporal bound.

(1) *Lexical aspect (atelic) = sentential aspect (imperfective)*

Qunian ta zai nali zhu
 last year he at there live
 ‘Last year he lived there.’

(2) *Lexical aspect (atelic) → sentential aspect (perfective)*

Qunian ta zai nali zhu liang ge yue
 last year he at there live two CL months
 ‘Last year he lived there for 2 months.’

(1) *Lexical aspect (atelic) = sentential aspect (imperfective)*

Shangci ta zhan zai nar
 last time he stand at there
 ‘Last time he stood there.’

(2) *Lexical aspect (atelic) → sentential aspect (perfective)*

Shangci ta zai nar zhan ji ge xiaoshi
 last time he at there sat several CL hour
 ‘He stood there for several hours.’

The next section presents the methodology for the corpus component of the study.

⁵ These sentences can be seen to contain atelic verbs because the lexical aspect approach uses compatibility with duration adverbials as a test for atelic verbs (Vendler 1967: 101); the subsequent quantizing mapping performed by the duration adverbial is itself ignored by the AH (Andersen & Shirai 1996: 530-1; also see Section 4), but is incorporated into the SAH account.

5.2. Corpus data

5.2.1. Participants

Longitudinal oral corpus data was collected from eight ab initio English learners of Mandarin on a full-time Chinese language course at Newcastle University; at the first time of testing (Time One) they had completed two years of their course and were intermediate level or below (approximating to A2-B1 level in the CEFR).

5.2.2. Data collection

Learners took a ten-minute oral exam at the end of their second year, repeated at the start of their fourth year of study, involving four tasks, conducted one-to-one with their Chinese teacher; the exam data were collected before and after their Study Abroad year in China, providing a longitudinal set of data to enable developmental comparison between Time One and Time Two following immersion in the target language country. The tasks included a planned talk about everyday activities, an unplanned picture description task, a planned role-play and an open discussion about life in China. These conversations were recorded and transcribed by a native speaker using the CLAN (Computerized Language Analysis) software program.

5.2.3. Data analysis

Utterances containing the perfective marker *le* were coded for inherent lexical aspect (achievement, accomplishment, activity and state) using standard diagnostic tests adapted for Mandarin by Chen & Shirai (2010) (reproduced in Appendix A) and as sententially perfective or imperfective (quantized or non-quantized) (following Sharma & Deo, 2009). Uses of *le* not encoding perfectivity were excluded (47 tokens); for example, learners made extensive use of *le* as a mood marker (e.g. *tai gui le* ‘too expensive!’, *hao le* ‘good!’, *cuo le* ‘wrong!’, *hao duo le* ‘a lot better!’, *jiu hao le* ‘then it’s better!’) and in formulaic chunks with a frozen meaning (e.g. *wei le* ‘for’, *chu le* ‘apart from’, *zenme le* ‘what’s wrong?’).

Next, the results will be presented for each part of the study outlined above, beginning with the *le*-insertion task.

6. Results

6.1. *Le*-insertion task

6.1.1. Part one: imperfectivizing adverbials

From the results of Part One of the *le*-insertion task (and in Part Two below), we can see the difference in the rate of perfective marking between type (1) sentences, which contain no temporal adverbial, and type (2) sentences, which contain a temporal adverbial (see Sections 5.1.3-4 above).

Table 1. Learner perfective marking with and without habitual frequency adverbials

Context	Rate of <i>le</i> marking
(1) No habitual frequency adverbial	57.5%
(2) Habitual frequency adverbial	17.5%

Table 2. Control group perfective marking with and without habitual frequency adverbials

Context	Rate of <i>le</i> marking
(1) <i>No habitual frequency adverbial</i>	75.0%
(2) <i>Habitual frequency adverbial</i>	6.0%

The AH predicts no difference in the rate of perfective marking between these sentence types because the lexical aspectual class, predicted to determine learners' assignment of grammatical aspect markers, remains telic in each case. However, as Table 1 shows, learners demonstrated a strong sensitivity to the stative mapping effected by the habitual frequency adverbials *meitian* ('everyday'), *tiantian* ('everyday') and *meizhou* ('every week'). The presence of these operators strongly precluded perfective marking, despite the telicity of the verb, in line with the predictions of the SAH but contrary to the predictions of the AH.

Sentences of type (1), which are telic at the lexical level and perfective at the sentence-level (i.e. lexical aspect was not modified by a higher operator) triggered perfective marking, as predicted by both accounts: *le* was used in 57.5% of cases. However, when a habitual adverbial was added in the type (2) sentences, perfective marking fell to only 17.5%. This demonstrates the incompleteness of the AH account because it shows that learners' aspect marking is strongly influenced by operators beyond inherent lexical aspect. That is, in the type (2) sentences, where VP aspect differs from sentential aspect, learners' perfective marking reflects the final sentential aspectual class and not that of the verbal predicate. Learners show sensitivity to the aspectual mapping performed by habitual sentence adverbials, with the low rate of perfective marking reflecting the imperfectivity of the sentence despite the telicity of the verbal predicate.

As Table 2 shows, native Mandarin speakers almost did not use *le* at all (a rate of 6%) in imperfective sentences, despite the fact that these sentences contain telic verbs (e.g. resultative verb compounds). Learners' rate of perfective marking here is also low (only 17.5%), revealing an almost native-like knowledge of the impermissibility of perfective marking in imperfective sentences, despite their L1 (English) lacking grammatical perfective marking (cf. discussion in Section 3.1).

6.1.2. Part two: perfectivizing adverbials

Table 3. Learner perfective marking with and without duration adverbials

Context	Rate of <i>le</i> marking
(1) <i>No duration adverbial</i>	28%
(2) <i>Duration adverbial</i>	48%

Table 4. Control group perfective marking with and without duration adverbials

Context	Rate of <i>le</i> marking
(1) <i>No duration adverbial</i>	10.0%
(2) <i>Duration adverbial</i>	92.5%

The results for the aspectually mismatched sentences in Part Two corroborate the above findings, showing this time that learners are sensitive to the perfectivizing mapping performed by duration adverbials. In the baseline type (1) sentences (atelic at the lexical level and sententially imperfective due to the absence of higher operators), learners used the perfective marker in a minority of cases (28%). Both hypotheses predict a low rate of perfective marking in these cases. However, learners' rate of perfective marking increased to 48% in the type (2) sentences which contain a duration adverbial (i.e. atelic at the level of inherent lexical aspect but perfective at the sentence-level), showing that perfective marking is substantially influenced by sentential aspect.

Overall, learners' sensitivity to the aspectual mappings performed by temporal adverbials resemble, to a fair extent, that of native speakers. Their relatively greater use of perfective marking with duration adverbials (48%) in Part Two (compared to 28% without), irrespective of the unchanged atelic (stative) lexical aspectual class, corresponds to the even more decisive increase in the use of *le* by the control group when a duration adverbial is present (from 10% to 92.5%).

6.2. Corpus data

The results from the corpus data at Time One – namely that perfective marking occurs more with activity verbs than achievement/accomplishment verbs (a rate of 54.5% compared to 36.3% and 9% respectively) – are contrary to the predictions of the AH, which predicts the occurrence of perfective marking first on achievement and accomplishment verbs, and only afterwards on activity and stative verbs.

Table 5. Patterning of perfective marking with inherent lexical aspect

Lexical aspect	Time 1	Time 2	Total
<i>ACH</i>	36.3% (4)	83.3% (15)	65.5% (19)
<i>ACC</i>	9% (1)	0%	3.4% (1)
<i>ACT</i>	54.5% (6)	11.1% (2)	27.6% (8)
<i>STA</i>	0%	5.6% (1)	3.4% (1)
<i>Total</i>	11	18	29

Note: The parentheses show the token frequency. ACH = achievement; ACC = accomplishment; ACT = activity; STA = state.

Table 6. Patterning of perfective marking with sentential aspectual class

Sentential aspect	Time 1	Time 2	Total
<i>Perfective</i>	100% (11)	94.4% (17)	96.6% (28)
<i>Imperfective</i>	0%	5.6% (1)	3.4% (1)

However, these instances of perfective marking on activity verbs are predicted by the SAH account: despite their inherent lexical aspect being atelic, the derived aspectual class of these sentences is perfective because of the quantizing bound provided by duration adverbials.

The tokens of *le* on activity verbs at Time One all occurred in sentences with the following structure (either with the verb *xue* ‘study’ or *zuo* ‘do/make’):

- (17) wo xue zhongwen xue le **san nian**
 I study Chinese study PFV **three year**
 ‘I studied Chinese for three years.’

Learners used the verb copying construction, in which the verb occurs again before the duration adverbial (shown in bold). Here the inherent lexical aspect of *xue zhongwen* (‘study Chinese’) is atelic, and so perfective marking is not predicted by the AH. However, the bound provided by the duration adverbial directly triggers the perfective marker in these instances (cf. Li & Thompson 1989: 189) in the same way that it does in sentences without verb copying (e.g. *wo xue le san nian* ‘I studied for three years’). Therefore in these instances learners’ perfective marking, like that of native speakers, is directly conditioned by aspectual operators beyond lexical aspect.

Likewise, at Time Two, the patterning of perfective marking with the final (sentential) aspectual derivation rather than inherent lexical aspect in mismatched cases is also apparent. Thus, the occurrence of *le* with the stative predicate *zhu nabian* ‘live there’ is not predicted by the AH, but it is predicted by the SAH because the duration adverbial *shi ge yue* ‘10 months’ provides a bound that perfectivizes the sentence:

- (18) Wo zhu le nabian shi ge yue⁶
 I live PFV there ten CL month
 ‘I lived there for 10 months.’

Hence, across Time One and Two, the corpus data uniformly supports the results of the *le*-insertion task in showing that in mismatched cases, learners assign the perfective marker according to the final aspectual derivation of the sentence, rather than inherent lexical aspect. Overall, considering all tokens, *le* marking patterns with sentential perfectivity at a rate of 96.6%, compared to patterning with lexical telicity (achievement and accomplishment predicates) at a rate of 68.9%.⁷ This supports the proposal of the SAH that – whilst inherent lexical aspect does substantially condition perfective marking – nevertheless agreement with inherent lexical aspect is subsumed within sentential agreement. That is, all cases of agreement with inherent lexical aspect also entail agreement with sentential aspect, but the converse is not true. In a significant minority of cases (7/29 tokens in this data, or 24.1%), inherent lexical aspect differs from sentential aspect because of subsequent mappings performed by temporal adverbials, and in these cases perfective marking always patterns with the final (sentential) aspectual derivation.

Additionally, certain semantically conditioned patternings are also evident. For instance, by Time Two, the perfective marker particularly patterned with a subtype of achievement verbs, resultative verb compounds (RVCs) – an association that has been found in a number of previous studies (e.g. Wen 1995, Fan 2005, Ma 2006). Every occurrence of a RVC (in which a verb or adjective follows an atelic verb to indicate the resultant state) triggered perfective marking, constituting one third (5/15) of achievement verbs marked with *le* at Time Two. Learners used a range of resultative complements to derive telic predicates from atelic

⁶ Note that, as pointed out by a reviewer, this example from a learner contains an error. The correct sentence would be *wo zai nabian zhu le shi ge yue* (i.e. with the location adverbial *nabian* preceding the verb, and introduced by the preposition *zai* ‘at’).

⁷ With regard to the small drop in *le* usage across Time One and Two from 100% to 94.4%, this is assumed to be statistically insignificant.

lexical verbs (e.g. *shuo-wan* ‘speak-finish’, *kan-dao* ‘look-see’, *chi-huai* ‘eat-sick’), showing the productivity of such complements as perfectivizing operators (performing a process → event mapping). This supports Wen’s findings (1995, 1997) which showed that the resultative verb complement *wan* ‘finished’ consistently triggered perfective marking even where only optional, as well as Ma’s results (2006: 103), also for intermediate learners, in which RVCs substantially triggered perfective *le* (along with cardinally quantified eventualities). In the following discussion it will be suggested that the use of *le* with all RVCs (combined with the overuse found in previous studies) suggests that learners’ perfective marking is conditioned by the prototypicality of the derived *telos*, which encodes a stronger notion of result/completion with RVCs than other achievement verbs.

7. Discussion

Our research questions examined evidence in two types of data (experimental and longitudinal oral corpora) to see if *le* usage by learners of Mandarin showed the patterning predicted by the AH or by the SAH, and if any changes were evident over time. The results of Part One and Two of the *le*-insertion task, in which sentences were presented containing aspectual mismatches between inherent lexical aspect and sentential aspect, show that learners were not constrained by lexical aspect alone when assigning perfective marking (as predicted by the AH), but consistently attend to the derived sentential aspectual class (following the SAH). This was shown using a range of sentence-level temporal adverbials that perform aspectual mappings in both directions: deriving imperfective sentences from telic predicates and perfective sentences from atelic predicates.

In particular, the strong aspectual effect of habitual frequency adverbials was found to condition perfective marking despite a very high degree of telicity at the predicate-level. In Part One, the telic VPs presented were composed of achievement verbs – predicted by the lexical aspect account to be the verb type that most strongly triggers perfective marking. Moreover resultative verb compounds were included in the test sentences, which as well as being achievement ‘verbs’ (cf. Chang 2013: 13), particularly trigger perfective marking among L2 learners (e.g. Wen 1995, 1997). However, despite the strength of verbal telicity, learners still overwhelmingly ignored inherent lexical aspect and their non-use of perfective marking was conditioned by the derived atelic sentential aspectual class.

These results (the rate of perfective marking being 40% lower with habitual adverbials and 20% higher with duration adverbials) confirm the the sentential aspect hypothesis for an L1 without verbal perfective marking, pointing towards a sensitivity to sentential aspect even in the absence of direct L1 transfer. Sharma & Deo (2009) suggested that sensitivity to sentential aspect may be constrained to learners with positive L1 transfer, concluding that verbal morphology in Indian English is sensitive to sentence-level perfectivity and imperfectivity because this is marked overtly in Hindi. However, in this study, speakers of English – which lacks verbal perfective morphology – nevertheless assigned L2 perfective markers according to sentential aspect. This sensitivity may be partly due to the interlingual equivalence of temporal adverbials, which perform the same perfective → imperfective mappings (or vice versa) in both languages, and which learners can therefore use to accurately trigger perfective marking. However, it is important to remember that although English lacks verbal perfective marking, it is not the case that English is without devices that mark boundedness. As was noted in Section 3, these are simply concentrated in the nominal rather than the verbal domain, and so learners may benefit from indirect L1 transfer when acquiring perfective marking.

Perfective marking in the corpus data also patterned strongly with specific (cardinally quantified) bounds. Overall, 38% of tokens of *le* (11/29) occurred with quantified bounds, and

90.1% (10/11) of these were specific (i.e. cardinally quantified) bounds; only one was vague (*hen duo shijian* ‘a long time’).

Moreover, this patterning was particularly clear at Time One (when 72.7% of perfective marking (8/11 tokens) occurred with quantified objects/duration adverbials, all but one of which was cardinally as opposed to vaguely quantified). Accordingly, a development is evident from nominal means of deriving telic eventualities at Time One to verbal means (e.g. resultative verb compounds) at Time Two.

Over one third (34.5%) of learners’ total *le* usage was triggered by cardinal quantification, either of duration adverbials or objects, and this same triggering role is discernable in other Mandarin studies. Thus Duff & Li (2002: 443) found that cardinally quantified bounds were the dominating context for accurate suppliance of *le* in their written editing task, whilst in Ma’s (2006: 104) production data, cardinal quantification of frequency adverbials was one of the main triggers of perfective *le* from intermediate level. As noted above, cardinal quantification triggers perfective marking because English does not mark the perfective aspect verbally, so boundedness is often derived nominally and learners initially transfer their L1 technique for deriving telic VPs to the L2 (cf. Slabakova 1999). That is, in English most activity/accomplishment predicates are made telic through quantization of the object, by which the eventuality is delimited (Slabakova 2005: 64). Thus it is unsurprising that learners make extensive use of this means of telicizing predicates in the L2.

The other notable trigger of perfective marking, resultative verb compounds, can be explained using a prototype-based model of telicity (cf. Andersen & Shirai 1994: 146) in terms of their greater prototypicality compared with other telic verbs. As well as simply containing a temporal endpoint, RVCs entail the successful completion of the activity, such that a subsequent (resultative) state/phase is initiated – indicated by the resultative complement (e.g. *zuo wan* ‘do-finish’) (cf. Xiao & McEnery 2004: 61).

8. Conclusion

In conclusion, this study has demonstrated the incompleteness of the AH account in that learners’ perfective marking patterns with the final derived aspectual class of the sentence and not inherent lexical aspect, where mismatches occur through the aspectual shifts caused by temporal adverbials. Moreover, the experimental and corpus data converge to show that from the early stages of the emergence of perfective *le*, its use or non-use is directly determined by duration and habitual frequency adverbials, which override inherent lexical aspect and yield perfective and imperfective sentences respectively. These results support the SAH’s claim that learners’ aspect marking agrees with the final sentential aspectual derivation rather than exclusively with lexical aspect (which underdetermines the eventuality’s aspectual class).

Additionally, the patterning of interlanguage perfective marking was subject to L1 influence, a possibility excluded from the AH’s universal template of morphology to verb type mappings. Transfer from English was identified in learners’ progression from, at Time One in the corpus data, an extensive reliance on object-marking to derive telic eventualities from activity verbs – a strategy used in their L1 – to the L2 strategy of using verb-marking at Time Two (supporting similar findings by Slabakova 1999, 2005).

Here, learners who did not directly benefit from positive transfer (i.e. their L1, English, does not contain grammatical perfective marking in the verbal domain) nevertheless adopted the sentential aspectual class as the determining factor in their assignment and non-assignment of the L2 perfective marker. This reliance on sentential aspect is likely to be substantially due to cognitive and linguistic universals, including the cross-linguistic (semantic) equivalence of temporal adverbials. It remains to be seen, though, how far the manipulation of temporal adverbials as a bootstrapping device from the early stages of the acquisition process may be a

learning strategy characteristic of L2 rather than L1 acquisition, as well as how far devices beyond the verbal predicate condition L2 aspectual marking for other aspect markers across other language pairings.

Appendix A: Operational Tests

(quoted from Chen and Shirai 2010)

Predicates are indicated in bold italics.

Step 1: State or nonstate (nondynamic vs. dynamic)

The verb (or verb phrase) cannot have a habitual interpretation without any aspect marker attached, can it?

If it cannot → state (e.g., *Wo ai ni* ‘I love you’ → no habitual reading)

If it can → nonstate (e.g., *Wo tiantian chi mifan* ‘I every day eat rice’ (I eat rice every day) → habitual reading possible) → Go to Step 2

Step 2: Punctual or durative

[If test (a) does not apply, apply test (b)]

(a) Can you say ‘X *kaishi* VP’ (= ‘X begin to VP’) without an iterative interpretation?

— If you cannot → Achievement (e.g. *#Ta kaishi si* ‘he begins to die’) → Go to step 4.

— If you can → Accomplishment (e.g. *Ta kaishi xie yi feng xin* ‘he begins to write a letter’) or Activity (e.g., *Ta kaishi paobu* ‘he begins to run’) → Go to Step 3

(b) Can you say ‘X will VP at Y o’clock (e.g. 2 o’clock) sharp’?

— If you can → Achievement (e.g. *Huiyi hui zai 2 dian zheng kaishi* ‘Lit: meeting will at 2 o’clock sharp begin’ (The meeting will begin at 2 o’clock sharp) → Go to step 4

If you cannot → Accomplishment or Activity → Go to Step 3

Step 3: Accomplishment or Activity/semelfactive (Telic vs. atelic)

[If test (a) does not apply, apply test (b)]

(a) Can ‘X *chadianr* VP *le*’ (= ‘X almost VP *le*’) mean ‘X started V but did not complete it’?

— If it can → Accomplishment (e.g. *Ta chadianr pao dao xuexiao le* ‘Lit: he almost run arrive school *le*’ (he almost ran to the school) can mean that he started running but he didn’t reach the school).

— If it cannot → Activity or semelfactive (e.g. *Ta chadianr pao le bu* ‘he almost ran *le*’ (he almost ran) can only be interpreted as he almost started running) → Go to Step 4.

(b) Can you say ‘X will VP for Y time’ (e.g., 10 min)?

— If you can → Activity (e.g., *Ta hui zuo 10 fenzhong* ‘he will sit for 10 minutes’) or semelfactive (*Ta kesou le 10 fenzhong* ‘he coughed for 10 minutes’).

— If you cannot → Accomplishment (e.g. *#Ta pao dao xuexiao 10 fenzhong* ‘he run arrive school 10 minutes’ (#He ran to school for 10 minutes) → Go to Step 4.

Step 4: Achievement or Semelfactive

Can you say ‘X *zai* VP’ with iterative/repetitive (i.e. iteration on one occasion. Not habitual) interpretation?

— If you can → Semelfactive (e.g. *Ta zai kesou* ‘he *zai* cough’ [he is coughing])

If you cannot → Achievement (e.g. *#Ta zai si* ‘he *zai* die’)

Appendix B: Test Sentences**Habitual frequency adverbials**

- (1) Shang ge yue wo dapo yi ge beizi
last CL month I broke one CL glass
'Last month I broke a glass.'
- (2) Shang ge yue wo meitian dapo yi ge beizi
last CL month I everyday broke one CL glass
'Last month I broke a glass everyday.'
- (1) Shang ge xingqi wo dao chaoshi
last CL week I went supermarket
'I went to the supermarket last week'
- (2) Tiantian wo dou dao chaoshi
everyday I always went supermarket
'I went to the supermarket everyday.'
- (1) Ta dasi yi tiao chongzi
he kill one CL insect
'He killed an insect.'
- (2) Ta meizhou dasi yi tiao chongzi
he every week kill one CL insect
'Every week he killed an insect.'
- (1) Shang ge xingqi wo diu wode qianbao
last CL week I lost my wallet
'Last week I lost my wallet.'
- (2) Shang ge yue wode haizi meizhou diu tade wanju
last CL month my child every week lost his toy
'Last month my child lost his toy every week'

Duration adverbials

- (1) Ta zai nar zuo
he at there sit
'He sat there.'
- (2) Ta zai nar zuo ji ge xiaoshi
he at there sit several CL hour
'He sat there for several hours.'
- (1) Shangci ta zhan zai nar
last time he stand at there
'Last time he stood there.'

- (2) Shangci ta zai nar zhan ji ge xiaoshi
last time he at there stood several CL hour
'Last time he stood there for several hours.'
- (1) Qunian ta zai nali zhu
last year he at there live
'Last year he lived there.'
- (2) Qunian ta zai nali zhu liang ge yue
last year he at there live two CL month
'Last year he lived there for 2 months'
- (1) Ta shangci deng ni
he last time wait you
'Last time he waited for you.'
- (2) Shangci ta deng ni yi huir
last time he wait you a while
'Last time he waited for you for a while.'
- (1) Ta zai chuang shang tang
he at bed on lie
'He lay on the bed.'
- (2) Ta zai chuang shang tang yi huir
he at bed on lie a while
'He lay on the bed for a while.'

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