

Aspectual Classification of Mandarin Chinese Verbs: A Perspective of Scale Structure*

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Previous studies of the lexical aspect of verbs following Vendler (1967) cannot account for verbs of degree achievements (Dowty 1979, Hay et al. 1999, among others). Building on recent studies on “scale structure” (Hay et al. 1999, Rappaport Hovav & Levin 2010, among others). We introduce a new aspectual feature [\pm scale] into the traditional Vendler system in order to more comprehensively account for a wider range of verbs. By analyzing verbs/verbal compounds from Mandarin Chinese and following the scalar approach, we propose six aspectual classes that are needed not only to adequately accommodate degree achievements, but also to provide a fuller account of all the verbs. This scalar approach can be applied to the aspectual classification of natural languages in general.

Key words: scale structure, Chinese verbs, aspectual classification

1. Introduction

This study is an investigation of the temporal properties of events represented by verbs or verb clusters. The lexical aspect of verbs/verb clusters (Siewierska 1991, Olsen 1997) is also called “aktionsart” (Agrell 1908) or “situation aspect” (Smith 1997), and is distinguished from aspectual properties expressed by grammatical category, which is often called “viewpoint aspect” (Smith 1997).

Previous studies of the lexical aspect of verbs based on Vendler (1967) often classify verbs with three temporal features, [\pm dynamic], [\pm durative], and [\pm telic] (or equivalent features under different names) (Kearns 2000, Olsen 1994, among others). However, these studies are unable to position into the system a group of verbs that show

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inconsistent telicity (Dowty 1979, Hay et al. 1999, Beavers 2008, among others). In this paper, we follow recent studies of “scale structure” (Hay et al. 1999, Kennedy 2001, Kennedy & Levin 2008, among others) and introduce the feature $[\pm\text{scalar}]$ for the aspectual classification of Mandarin Chinese verbs/verbal compounds, demonstrating how a scalar approach can account for a group of previously unanalyzable verbs and furthermore resolve some of the much-debated problems regarding the aspectual analysis of Mandarin Chinese verbs.

2. Previous studies

In this section, we first introduce previous studies on lexical aspect and show how these studies fall short in providing a full account of the Chinese aspectual system.

Many studies have attempted to classify verbs (predicates, or sentences) according to the internal temporal structure of the events they describe. The most well-known aspectual classification of verbs might be Vendler’s (1967) classes (which was later developed in more detail by Verkuyl 1989, Olsen 1994, Smith 1997, and Kearns 2000, among others). Vendler (1967) classifies verbs into four types, i.e. state, activity, accomplishment, and achievement, in terms of three underlying aspectual notions, i.e. dynamicity, duration, and telicity. States (*know/believe/have*) are non-dynamic and continuous situations that are homogeneous (Dowty 1979, Kearns 1991, McClure 1994). Activities (*run/walk/swim*) are dynamic events that go on continuously, and have no inherent endpoint (Smith 1997). Accomplishments (*draw a circle/run three miles/build a house*) are dynamic and durative events with an inherent endpoint. Achievements (*recognize/arrive/die*) are dynamic and near-instantaneous events with an inherent endpoint.

Beside the four classes, the most commonly acknowledged fifth class is semelfactives (Comrie 1976:42-43, Smith 1997). A semelfactive refers to a single event which occurs “once and once only” as in *cough, knock, wink, hiccup, and pat*, and the event is usually understood as punctual (Comrie 1976:42). In this sense, semelfactives share the same aspectual property with activities in that they are not followed by any result state. In addition, an event described by a semelfactive can be iterated, as in *knock at the door* (a series of repeated knocks), and in such cases, the iterated semelfactives can be understood as a single situation that does not entail any change of state in contrast to iterated telic events. Thus, a semelfactive verb cannot be distinguished from activities through aspectual diagnostics (Levin 1999, cf. Xiao & McEnery 2004).

Vendler (1967) and also Dowty (1979) do not explicitly characterize aspectual classes in terms of binary aspectual features, e.g., $[\pm\text{dynamic}]$, $[\pm\text{durative}]$, $[\pm\text{telic}]$. But a feature-based representation is adopted by some studies such as Kearns (2000) and

Olsen (1994, 1997), because such representation identifies different aspectual classes in a more revealing way and provides a picture of the attested and unattested aspectual classes. We will adopt the feature-based representation for the aspectual system in this paper.

As presented in Table 1, the three binary features [\pm dynamic], [\pm durative], and [\pm telic] give rise to eight types of events, including the above mentioned Vendler's four classes and semelfactive, cf. Olsen (1994, 1997), Xiao & McEnery (2004). The last three types are predicted but unattested feature combinations either because the features are conflicting or impossible in the real world. For example, [+telic] presupposes [+dynamic], thus it follows naturally that an event of [–dynamic, +telic] is not allowed. Also, no event could be [–dynamic, –durative, –telic] in reality.

Table 1: A feature-based representation of aspectual classification

	\pm dynamic	\pm durative	+telic
State (<i>know</i>)	–	+	–
Activity (<i>run</i>)	+	+	–
Accomplishment (<i>draw a circle</i>)	+	+	+
Achievement (<i>recognize</i>)	+	–	+
Semelfactive (<i>cough (once)</i>)	+	–	–
Unattested	–	+	+
Unattested	–	–	+
Unattested	–	–	–

So far, we have introduced the very traditional approach to aspectual classification. The five aspectual classes (Vendler's four classes and semelfactive) are distinguished from each other by the features dynamicity, duration, and telicity.

Regarding the question of whether we are classifying verbs only, entire VPs, or sentences, we follow the position of Verkuyl (1993), Krifka (1989, 1998) and Rothstein (2008), among others, in assuming that verbs can be classified into aspectual classes, and that we can predict the aspectual classification of sentences based on the aspectual class of a head verb because verbs of particular aspectual classes interact with arguments and modifiers in principled ways. In other words, we assume that the same verbs can head VPs with different aspectual properties after the modification by other sentential elements such as argument NPs, adverbial NPs or PPs.

Previously, a variety of important studies has been carried out on topics relevant to the aspectual classification of Mandarin Chinese, including Chao (1968), Teng (1975), Tai (1984), Chen (1988), Her (1990), Smith (1997), Xiao & McEnery (2004), and many others. In what follows, among these works, we review some studies that adopt the

feature-based approach for aspectual classification. These studies share a great deal in common in that their analyses are all based on the traditional aspectual features that we have just introduced, i.e., dynamicity, duration, and telicity, but show variations in the application of features.

2.1 Chen (1988)

Chen’s (1988) study is among the earlier comprehensive works dealing with Mandarin Chinese aspectual classification. Chen argues that the verb in a given sentence determines the potential aspectual class to which the sentence might belong, and then other elements in the sentence (without considering the grammatical aspectual markers) influence the actual aspectual understanding of the sentence.

With substantial natural examples and a set of linguistic diagnostics, Chen utilizes three traditional aspectual features, i.e. dynamicity (or [\pm static]), duration, and telicity, to classify the Chinese aspectual system. Chen’s (1988:407) definition of telicity follows Comrie (1976) in assuming that an event is [+telic] only if the event has a natural endpoint and a gradual process towards the endpoint (cf. Dahl 1981, Jackendoff 1990, and Tenny 1994, among others). Based on these three features, Chen proposes five aspectual classes for Mandarin Chinese sentences. Chen’s classification is summarized in Table 2; an example is given for each class in (1).¹

Table 2: Chen’s aspectual classification (Chen 1988:407)

	static	durative	telic
State	+		
Activity	–	+	–
Accomplishment	–	+	+
Complex change	–	–	+
Simple change	–	–	–

- (1) a. State
 鐵具有金屬的所有特性
Tiě jùyǒu jīnshǔ de suǒyǒu tèxìng
 iron have metal POSS all property
 ‘Iron possesses all properties of metal.’ (Chen 1988:407, ex.(12))

¹ Comrie (1976:45) argues that a telic situation “involves a process that leads up to a well-defined terminal point.” In this sense, [–durative] events cannot be telic.

b. Activity

老周平時常常寫詩

Lǎozhōu píngshí chángcháng xiě shī

Old.Zhou usual.time often write poem

‘Old Zhou often writes poems.’ (Chen 1988:409, ex.(28))

c. Accomplishment

他上個月做了一隻木箱

Tā shàngge yuè zuò-le yìzhī mùxiāng

he last.CLF month make-ASP one.CLF wood.box

‘He made a wood box last month.’ (Chen 1988:410, ex.(36))

d. Complex change

兩國關係在不斷改善

Liǎng guó guānxi zài búduàn gǎishàn

two country relations PROG continuously improve

‘The relations of the two countries are continuously improving.’ (Chen 1988:411, ex.(39))

e. Simple change

鄰居廚房裡的煤氣罐突然爆炸了

Línjū chúfáng-lǐ de méiqìguǎn túrán bàozhà le

neighbor kitchen-inside REL gas.tank suddenly explode ASP

‘The gas tank in our neighbor’s kitchen exploded suddenly.’ (Chen 1988: 413, ex.(47))

As illustrated in Table 2, Chen’s first three classes (state, activity, accomplishment) are, to a large extent, similar to the traditional classification as in Vendler’s (1967); in addition, Chen proposes two new aspectual classes, which he calls “simple change” and “complex change” respectively.

Regarding simple change, Chen argues that an event of a simple change has an inherent endpoint, but does not involve a gradual process proceeding to the endpoint. In other words, the starting point overlaps with the endpoint. Since Chen uses a different definition of telicity from most of the mainstream studies on aspectual classification, he marks verbs of simple change as atelic. However, in most traditional approaches, a verb expressing an instantaneous event with an inherent endpoint would have been treated as an “achievement” and marked as [+dynamic, –durative, +telic]. For example, Chen lists *sǐ* ‘die’, *zuò* ‘(dynamic) sit’, *dǎ-pò* hit-break ‘break’, and *kàn-jiàn* look-see ‘see’ as examples of simple change class, but these verbs are often treated as achievements in previous studies following Vendler’s framework, e.g., Smith (1997).

As for complex change, Chen provides examples such as *biàn-chéng* change-become ‘become’, *gǎi-liáng* change-better ‘improve’, *jiǎn-shǎo* decrease-few ‘decrease’, *zǒu-jìn* walk-enter ‘walk into’, *sòng-huí* send-return ‘return’, *tí-chū* propose-exit ‘propose’, *zhǎng-dà* grow-big ‘grow up’, *lā-cháng* stretch-long ‘stretch’, and *suō-duǎn* shrink-short ‘shorten’. According to Chen, once a complex change starts, the event will proceed towards the result.

Nonetheless, Chen’s class of complex change is inconsistent regarding duration: instead of his claim that all complex changes are [–durative], his examples actually include both [–durative] and [+durative] verbs. For instance, both *zǒu-jìn* ‘walk-enter’ and *èhuà* ‘worsen’ are treated as complex changes by Chen, but the two compounds show a difference in terms of durativity. *Zǒu-jìn* ‘walk-enter’ is incompatible with the progressive marker *zài* (2a), and the *for*-adverbial *yí-ge xiǎoshí* ‘for one hour’ co-occurring with *zǒu-jìn* can only be understood as a duration of the resultant state (i.e. being inside the room) after the agent enters the room (2b). In this sense, *zǒu-jìn* as an action is [–durative]. In contrast, *èhuà* ‘worsen’ is compatible with the progressive marker *zài* (3a), and the *for*-adverbial *yìzhōu* ‘for one week’ co-occurring with *èhuà* can be understood as the process in which the theme becomes worse (3b) (this durative understanding is even more obvious if the adverb *chíxù* ‘continuously’ is added in (3b)). In this sense, *èhuà* is [+durative].

- (2) a. *他們在走進房間
 **Tāmen zài zǒu-jìn fángjiān*
 they PROG walk-enter room
 (Intended) ‘They are walking into the room.’
- b. 他們走進了房間一個小時了
Tāmen zǒu-jìn-le fángjiān yíge xiǎoshí le
 they walk-enter-PERF room one.CLF hour ASP
 ‘It has been one hour since they walked into the room.’
- (3) a. 病情在惡化
Bìngqíng zài èhuà
 sick.condition PROG worsen
 ‘The patient’s condition is getting worse.’
- b. 病情（持續）惡化了一周了
Bìngqíng (chíxù) èhuà-le yìzhōu le
 sick.condition (continuously) worsen-PERF one.week ASP
 ‘The patient’s condition has been getting worse continuously for one week.’

(2)-(3) show that a finer-grained analysis on verbs belonging to Chen's class of complex change is necessary.

In addition, as presented in Table 2, even though both "complex change" and "simple change" are [-durative], Chen (1988) marks the complex change as [+telic] and argues that complex change verbs express non-durative events which might take a slightly longer time than events expressed by simple change verbs. This analysis also contradicts Chen's own definition of telicity which requires an event to be durative.

Finally, Chen (1988:412) observes that complex change verbs containing adjectival elements, e.g., *lā-cháng* stretch-long 'stretch' and *suō-duǎn* shrink-short 'shorten', denote gradable changes on a continuum (e.g., a continuum of length). He points out that such gradable change is a unique aspectual class observed in Chinese and has not been observed and discussed in other languages. While Chen's recognition of such kind of change is correct, his explanation limits such changes to situations that are [-static, -durative, +telic].

In §§3-4, a finer-grained analysis following recent studies (e.g., Kennedy 2001, Rappaport Hovav & Levin 2010) is offered to illustrate that gradable changes can be both [\pm durative] and [\pm telic] in the Chinese aspectual system.

2.2 Smith (1997)

Smith (1997) mainly uses three aspectual features for situational aspect. In addition, she proposes a two-component aspectual model, in which situation aspect (i.e. lexical aspect) and viewpoint aspect (i.e. grammatical aspect) interact with each other. Within Smith's situation aspect classification, sentences rather than lexical verbs are analyzed for their aspectual classes (cf. Vendler 1967). As for Mandarin Chinese sentences, Smith (1997) identifies five situational aspectual classes, including the four traditional classes similar to Vendler (1967)'s and the fifth class semelfactive. An example is given for each class at the sentential level in (4).

- (4) a. Stative
 瑪麗很高興
Mǎlì hěn gāoxìng
 Mary very happy
 'Mary is very happy.' (Smith 1997:292, ex.(73c))
- b. Activity
 我學法文
Wǒ xué fǎwén
 I study French
 'I studied French.' (Smith 1997:285, ex.(56b))

- c. Accomplishment
他們吃飽了
Tāmen chī-bǎo le
they eat-full PFV
'They ate their fill.' (Smith 1997:287, ex.(66a))
- d. Achievement
張三死了
Zhāngsān sǐ le
Zhangsan die PFV
'Zhangsan died.' (Smith 1997:291, ex.(69))
- e. Semelfactive
張三咳嗽了
Zhāngsān késòu le
Zhangsan cough PFV
'Zhangsan coughed.' (Smith 1997:290, ex.(68))

However, there are several shortcomings in Smith's approach. For instance, even though the analysis is claimed to be at the sentential level, Smith is criticized for neglecting the influence of subject NP when calculating the compositional aspect of sentences (see Xiao & McEnery 2004:39-40 for more detailed critique).

Also, some of the Mandarin examples used in Smith need to be reexamined. For example, resultative verb complements (RVCs) such as the verb cluster *chī-bǎo* eat-full 'eat to the extent of being full' in (4c) are treated as accomplishments by Smith, but according to Tai (1984), RVCs such as *chī-bǎo* behave like achievements rather than accomplishments because RVCs only express the result state, i.e. the state of being full, but the process of eating. Evidence supporting Tai's claim can be found in (5) where *chī-bǎo* is not compatible with the progressive adverb *zhèngzài* (5a), and a post-verbal durational phrase co-occurring with *chī-bǎo* can only be understood as describing the time period of the resultant state rather than the time span of the action of eating (5b).

- (5) a. *我正在吃飽
**Wǒ zhèngzài chī-bǎo*
I PROG eat-full
(Intended) 'I am becoming full by eating.'
- b. 我吃飽一個小時了
Wǒ chī-bǎo yíge xiǎoshí le
I eat-full one.CLF hour ASP
'It has been one hour since I became full by eating.'

2.3 Xiao & McEnery (2004)

Similar to Chen (1988) and Smith (1997), Xiao & McEnery's (2004) study of Chinese aspectual classification is not confined to the lexical level, but extends to the sentence level.² But, in contrast to previous studies, Xiao & McEnery (2004) redefine the notion of telicity and add two more endpoint-related features, [\pm result] and [\pm bound]. More specifically, [\pm bound] refers to the temporal endpoint, [\pm telic] refers to the spatial endpoint, and [\pm result] refers to the successful attainment of the spatial endpoint; when an event is [+result], the given event is understood to be [+telic]; and when an event is [+telic], it is understood to be [+bound]. Table 3 presents the aspectual classification at the lexical level by Xiao & McEnery (2004:59).

Table 3: Aspectual classes at the lexical level by Xiao & McEnery (2004:59)

Classes	[\pm dynamic]	[\pm durative]	[\pm bound]	[\pm telic]	[\pm result]
Activity	+	+	–	–	–
Semelfactive	+	–	\pm	–	–
Accomplishment	+	+	+	+	–
Achievement	+	–	+	+	+
Individual-level state	–	+	–	–	–
Stage-level state	\pm	+	–	–	–

According to Xiao & McEnery (2004), incremental theme verbs such as *xiě* 'write' and *chī* 'eat' (which are called accomplishment verbs by Xiao & McEnery (2004), cf. Vendler's treatment of these verbs as activities) are [+telic] but [–result], because these verbs do not guarantee the attainment of the result when they are used without quantified NP objects. In Xiao & McEnery's system, the feature [+telic] is defined as having a potential to obtain the spatial endpoint, so verbs such as *xiě* 'write' and *chī* 'eat' are analyzed as accomplishments that are [+telic, –result]. When these verbs combine with

² In Vendler (1967)'s classification, the same verb heads VPs of different aspectual classes, e.g., *eat* is classified as an activity and *eat an apple* is an accomplishment. Xiao & McEnery (2004) call this phenomenon "the double lexicon entry" problem. In order to avoid such a situation where two aspectual classes share the same verb, they propose six basic aspectual classes at the lexical level and eleven aspectual classes at the sentence level (the six basic classes plus another five derived classes). However, even though their system prevents the same verb from belonging to different classes at a lexical level, the authors eventually allow the same verb to head VPs of different aspectual classes at the sentence level. For example, although both *dǎ yì fēnzhōng* 'beat for one minute' and *dǎ-sǐ* 'beat to death' contain the semelfactive verb *dǎ* 'beat', the former is classified as a derived semelfactive, whereas the latter is an achievement.

quantified arguments, as in *xiě yìfēng xìn* ‘write a letter’ and *chī yìwǎn fàn* ‘eat a bowl of rice’, the aspectual properties shift from [+telic, –result] to [+telic, +result]. Even though they argue that such verbs with features [+telic, –result] behave like activities when appearing without direct objects, Xiao & McEnery (2004) still classify these verbs as accomplishments.

Contrary to the authors, we argue that verbs such as *xiě* ‘write’ and *chī* ‘eat’ cannot be analyzed as accomplishments and cannot have the feature [+telic], but should be treated as activities following Vendler (1967), because these verbs alone do not imply any particular result, and the implication of an attainment of result comes from incremental theme NPs only (Rappaport Hovav 2008, Peck et al. in press).

Furthermore, Xiao & McEnery (2004) assume that an achievement (e.g. *yíngqiú* ‘win a ball game’) is [+result] because it lexically encodes a result. In addition, Xiao & McEnery (2004:60-61) argue that Chinese resultative verbal compounds (RVCs) are achievements; the feature [+result] is obtained when V combines with result phrases and form RVCs, e.g., *xiě-wán* ‘write-finish’, *zhǔnbèi-hǎo* ‘prepare-complete’, *shā-sǐ* ‘kill-die’. Achievement verbs are supposed to also have the feature [–durative] in Xiao & McEnery’s system. However, some RVCs actually show the property of [+durative] in Mandarin Chinese. As illustrated in (6), the fact that the RVC *lā-cháng* ‘stretch-long’ can co-occur with the progressive marker *zài* shows that *lā-cháng* has the feature [+durative].

- (6) 麵團在慢慢拉長
Miàntuán zài mànman lā-cháng
dough PROG gradually stretch-long
‘The dough is stretching longer gradually.’ (Google)

So far, most of the problems that we have found from previous works noted in this section relate to the notion of telicity that has failed to fully explicate the relevant Chinese facts. In what follows, a new aspectual feature [\pm scale] will be introduced in close relation with the notion of telicity. Note that in order to maintain the focus of the paper, our discussion will be limited to the aspectual properties of verbs and verb clusters (verbal compounds such as RVCs), although we assume that the aspectual classification we propose can be applied to verbs, VPs, and to entire sentences.

3. Scale: The new aspectual feature

In this section, we will introduce the type of verbs that cause problems for the traditional Vendler aspectual system, and the notion of “scale” to analyze these verbs following recent studies (Hay et al. 1999, Kennedy & Levin 2008, Rappaport Hovav

2008, and Rappaport Hovav & Levin 2010 among others). More importantly, we will show how the notion of scalar change is linguistically relevant to aspectual classification and that the scalar approach enables us to accommodate all kinds of verbs in Chinese. Also, following the insights from the previous studies with a scalar approach, the traditional aspectual features such as telicity and duration will be viewed in relation to the notion of scale.

3.1 Degree achievement verbs in English and Mandarin Chinese

It has been observed that the so-called “degree achievement” verbs such as *cool*, *widen*, *cook*, *dry*, *lengthen*, and *darken* show dual telicity, and thus do not fit neatly into Vendler’s aspectual system (Dowty 1979, Hay et al. 1999). For instance, while atelic predicates are usually only compatible with *for*-adverbials, and telic predicates are usually only compatible with *in*-adverbial, a degree achievement (hereafter DA) can be found natural with both *in*- and *for*-adverbial, as illustrated in (7) (Hay et al. 1999).

- (7) a. atelic: The soup cooled *for an hour*.
 b. telic: The soup cooled *in an hour*. (Hay et al. 1999:127, ex.(4))

(7a) is natural because there is no inherent endpoint at which the event of cooling is understood to be completed, whereas (7b) is also acceptable if it is assumed by readers that the soup eventually cools down to room temperature; in other words, the de-adjectival degree achievement *cool* is atelic by default, but can behave telically sometimes when listeners can retrieve the unstated endpoint from the context.

In order to explain various aspectual properties of DA verbs, Hay et al. (1999) propose the notion of scale. A scale is “a set of degrees—points or intervals indicating measurement values—on a particular dimension (e.g., height, temperature, cost), with an associated ordering relation” (Rappaport Hovav & Levin 2010:28), cf. Kennedy (2001), Kennedy & McNally (2005), Kennedy & Levin (2008). For instance, the verb *cool* describes a change associated with a scale on the dimension of temperature, and the scale is composed of values in a decreasing order; so the affected argument of *cool* (i.e. the soup) undergoes a change from a higher temperature to a lower one, and such a change is measurable. The change along a particular scale is called “scalar change” (Rappaport Hovav & Levin 2010, Rappaport Hovav 2008). (See more English examples in the original papers.)

However, even though DA verbs like *cool* behave atelically, these verbs still cannot be treated as activity verbs. While DA verbs express scalar change, activities (e.g. *wipe*, *stir*) do not lexicalize changes along a single dimension (Rappaport Hovav 2008, Rappaport Hovav & Levin 2010). For example, the event of wiping a table described by

wipe can result in a clean table, but also a dirty table, or in a dry table, but also a wet table. Therefore, DAs should be distinguished from activities.

In Mandarin Chinese, a group of verbs similar to English DA verbs are also found. Since these verbs cannot be categorized into any existing class within the traditional way of aspectual classification, we will apply the notion of scale to Mandarin Chinese as well to accommodate these verbs. In what follows, we will show how this group of verbs pattern with activities in terms of expressing atelic events, and pattern with accomplishments/achievements in terms of denoting scalar changes.

In terms of telicity, activity verbs such as *chī* ‘eat’ are atelic because they do not entail natural endpoints. Due to this reason, the verb can be followed by an expression implying that the denoted change occurs continuously.

- (8) 她吃了一個小時了，還在繼續吃
Tā chī-le yíge xiǎoshí le, hái zài jìxù chī
she eat-PERF one.CLF hour ASP still PROG continue eat
‘She has been eating for hour, and is still eating.’

In contrast, achievements such as *jìn* ‘enter’ are telic. As these verbs specify an endpoint; once the endpoint is reached, the given event cannot be continued further.

- (9) 她進了房間一個小時了，*還在繼續進
*Tā jìn-le fángjiān yíge xiǎoshí le, *hái zài jìxù jìn*
she enter-PERF room one.CLF hour ASP still PROG continue enter
(Intended) ‘She entered the room for one hour, #and she is still entering.’

Mandarin Chinese DA verbs like *jiàng* ‘descend/decrease’, however, do not lexicalize an endpoint; as illustrated in (10), the first clause describes an event that the temperature decreased, but it does not entail that the decreasing has reached an endpoint; rather, the event can continue as shown in the second clause.

- (10) 氣溫降了三天了，還在繼續降
Qìwēn jiàng-le sān-tiān le, hái zài jìxù jiàng
temperature descend-PERF three-day ASP still PROG continue descend
‘The temperature has decreased for three days, and it is still decreasing.’

(10) shows that the DA verb *jiàng* ‘descend’ is similar to activity verbs rather than accomplishments/achievements in terms of expressing atelic events. Meanwhile, DA verbs are similar to accomplishments/achievements in that the changes denoted by these verbs are associated with a single dimension. Due to this reason, the type of result

phrases that can occur with accomplishments and achievements is restricted. For example, only (11c) is acceptable with the achievement verb *jìn* ‘enter’, where *dào-le fángjiān-lǐ* ‘arrived at the room’ denotes an endpoint on the path dimension.

- (11) a. ??他進房間進累了
 ?? *Tā jìn fángjiān jìn lèi le*
 he enter room enter tired ASP
 (Intended) ‘He became tired as a result of entering the room.’
- b. ??他進房間進丟了鞋子
 ?? *Tā jìn fángjiān jìn-diū-le xiézi*
 he enter room enter-lose-ASP shoe
 (Intended) ‘He lost his shoes as a result of entering the room.’
- c. 他進到了房間裡
Tā jìn-dào-le fángjiān-lǐ
 he enter-arrive-ASP room-inside
 ‘He entered the room.’

(11) shows that the result phrases that appear with accomplishments and achievements must further elaborate on an endpoint implied by the given verb (Rappaport Hovav 2008, Lin & Peck 2011).³

Similar to accomplishments and achievements, changes denoted by verb *jiàng* ‘descend’ are associated with a single dimension of temperature with a decreasing order of values. As illustrated in (12), the result phrases *huài-le wǒ de xīnqíng* ‘my mood ruined’ or *sǐ-le nàkē shù* ‘the tree dead’ in (12a-b) do not further specify any values on the given dimension, and thus are not compatible with *jiàng* ‘descend’; the result phrase *dào-le língxià shí dù* ‘to minus ten degrees’ in (12c) does and thus is allowed to co-occur with *jiàng* ‘descend’.

- (12) a. ??氣溫降壞了我的心情
 ?? *Qìwēn jiàng-huài-le wǒ de xīnqíng*
 temperature descend-bad-ASP I POSS mood
 (Intended) ‘My mood was ruined as a result of the decreasing of the temperature.’

³ Such a constraint arises due to a well-known principle that a VP can have only one phrase that measures out an event, i.e. single-delimiting constraint. See more in Tenny (1994), and also Goldberg (1995), Levin & Rappaport Hovav (1995).

- b. ?? 氣溫降死了那棵樹
 ?? *Qìwēn jiàng-sǐ-le nàkē shù*
 temperature descend-die-ASP that.CLF tree
 (Intended) ‘The tree died as a result of the decreasing of the temperature.’
- c. 氣溫降到了零下 10 度
Qìwēn jiàng-dào-le língxià shí dù
 temperature descend-arrive-ASP zero.below ten degree
 ‘The temperature decreased to minus ten degrees.’

In contrast, as illustrated in (13), activities do not lexicalize a change associated with any particular type of dimension, and thus can combine with a wide range of result phrases (see Rappaport Hovav 2008, Rappaport Hovav & Levin 2010, Lin & Peck 2011).

- (13) a. 她吃飽了
Tā chī-bǎo le
 she eat-full ASP
 ‘She ate until she was full.’
- b. 她吃壞了肚子
Tā chī-huài-le dùzi
 she eat-bad-ASP stomach
 ‘She got a runny stool as a result of the eating.’
- c. 她吃撐了
Tā chī-chēng le
 she eat-stuffed ASP
 ‘She is stuffed as a result of the eating.’

Table 4 displays a summary: the DA verb *jiàng* ‘descend’ is similar to activities in that it is atelic, but similar to accomplishments and achievements in terms of describing changes. In other words, both *jiàng* ‘descend’ and *jìn* ‘enter’ lexicalize a particular dimension.

Table 4: Telicity, scalar change, and verbs of different aspectual classes

	telicity	scalar change
<i>chī</i> ‘eat’ (activity)	–	–
<i>jìn</i> ‘enter’ (achievement)	+	+
<i>jiàng</i> ‘descend’ (DA)	–	+

In the next section, building on previous studies of the scalar approach, we will

introduce the new aspectual feature [\pm scalar] which can be used to analyze Mandarin Chinese DA verbs properly, and also will introduce other traditional aspectual features from the perspective of scale structure of lexical verbs.

3.2 The new aspectual feature [\pm scalar] and traditional features [\pm telic] and [\pm punctual]⁴

In this section, we introduce the new aspectual feature [\pm scalar]. A verb has feature [+scalar] if it lexicalizes a scalar change. For example, as shown in the previous section, accomplishments, achievements and DA verbs are [+scalar], whereas activities are [-scalar].

According to Rappaport Hovav & Levin (2010), verbs with scalar changes can be divided into two types according to whether the associated scale has a natural bound or not. For example, the verb *cool* describes a decrease in terms of temperature, but because it does not lexically specify a minimal or maximal bound for the decrease, the scale lexicalized by *cool* is understood to have no endpoint, i.e. it is an open scale. In contrast, there are verbs lexicalizing scales with a minimal or maximal bound. For instance, in an event of straightening pants described by the verb *straighten*, once the pants reaches a point of being straight, the straightening event comes to an end (Hay et al. 1999, Rappaport Hovav & Levin 2010). Due to this reason, *cool* is naturally compatible with *for*-adverbials, whereas *straighten* is compatible with *in*-adverbials unless interpreted differently under contextual influence. The scalar feature of “open vs. closed” is comparable to the aspectual feature “atelic vs. telic” because both features concern the issue of whether a change has a natural endpoint or not. In other words, a verb with an open scale is [-telic], whereas a verb with a closed scale is [+telic]. Given the contrast between *cool* and *straighten* introduced above, DA verbs without a bound such as *cool*, *lengthen*, *shorten*, and *widen* denote a change on an open scale, i.e. atelic event by default, and DA verbs with a bound such as *dry*, *straighten*, *flatten*, and *empty* denote a change on a closed scale, i.e. telic event by default (Hay et al. 1999, Rappaport Hovav & Levin 2010).

Besides boundedness (or “open vs. closed”), verbs lexicalizing scalar changes can also be divided into two types according to whether the scales are composed of many points (i.e. degrees or intervals with measurement values) or only two points (Rappaport Hovav & Levin 2010, among others). For example, a verb such as *straighten* or *dry* is associated with a closed scale that consists of multiple points, as the property of a theme that undergoes changes should go through multiple points along a scale (e.g., a point of

⁴ This paper uses both “punctual/punctuality” and “durative/duration”. [+punctual] is equivalent to [-durative] and [-punctual] is equivalent to [+durative]. However, when quoting works from others, we will follow the feature name given in the original work.

being very wet to less wet to completely dry). On the contrary, some closed scales consist of only two points, as in a scale lexicalized by a verb such as *die*, whose scale only consists of two values, being ‘alive’ and being ‘dead’, but no other points such as ‘half dead’ (Rappaport Hovav & Levin 2010, Beavers 2008). These two types of verbs can be called “multi-point” scalar change verbs and “two-point” scalar change verbs respectively. Because it usually takes time for a theme to go through multiple points of a scale, a verb with a multi-point scale is [–punctual], and going through a two-point scale (e.g., from ‘not dead’ to ‘dead’) is usually understood as [+punctual] (Beavers 2008), the scalar feature “multi-point vs. two-point” is comparable to the aspectual feature “durative vs. punctual”.

To summarize, compared with the traditional aspectual features, the scalar feature of “open/closed” is equivalent to “atelic/telic”, whereas the feature of “multi-/two-point” is equivalent to “durative/punctual”. In this sense, multi-point closed scale verbs (e.g., *return*, *come*, *kill*) correspond to accomplishments, whereas two-point closed scale verbs (e.g., *enter*, *arrive*, *reach*, *die*) correspond to achievements. As for DAs, the DAs such as *dry*, *straighten*, *flatten*, and *empty* with closed scales are equivalent to accomplishments, whereas the DAs such as *cool*, *lengthen*, *shorten*, and *widen* that cannot be properly classified in traditional Vendler’s system are identified as verbs with open scales, and can be treated as an independent class within the aspectual classification system with the scalar approach.

In the following section, we introduce a new aspectual classification system in which we add the additional aspectual feature [±scalar], and maintain the features [±telic] (open/closed in terms of scale) and [±punctual] (multi/two-point in terms of scale), in order to better analyze Mandarin Chinese verbs/verbal compounds, cf. Beavers (2012).⁵

⁵ Beavers (2012) proposes a predicative model of aspectual classes solely based on the two scalar features: “affectedness types”, i.e. the degree to which a predicate can be specific about the result on the scale, and “the mereological complexity of scales”, which to some extent is comparable to the traditional aspectual feature “duration”. Beavers’s model is claimed to account for seven aspectual classes in English, including all previously recognized dynamic classes (activity, semelfactive, accomplishment, achievement), degree achievements, and two subclasses of semelfactive and activity. However, Beavers’ scalar approach is problematic in at least two aspects. First, as Beavers himself points out, his system is solely based on scalar change and thus cannot accommodate non-dynamic predicates, i.e. states such as *know* and *love*. Second, Beavers distinguishes the *semelfactives* with unspecified affectedness (e.g., *cough (once)*) from the *activities* with unspecified affectedness (e.g., *watch TV*), and the scalar feature used for the distinction is “mereological complexity of scales”. But such a distinction is not justified because both classes of verbs are unspecific about scales, and the scalar feature should not be applicable to them. In other words, an aspectual system solely based on scalar features is not sufficient to account for all verb types.

4. Aspectual classification of Mandarin Chinese verbs with the feature [±scalar]

In this section, we will show how the addition of the feature [±scalar] can provide a more systematic and finer-grained aspectual classification for Mandarin Chinese. Analyzing aspectual classification of Mandarin Chinese verbs with binary features such as [±dynamic], [±scalar], [±telic] and [±punctual] generates total 6 attested classes in Mandarin Chinese; these are state, semelfactive, activity, open scale verb, multi-point closed scale verbs, and two-point closed scale verbs. Table 5 presents our aspectual classification of Chinese verbs and their distinctive properties with regard to aspectual features.

Table 5: Aspectual system with the new feature [±scalar]

Aspectual classes	±dynamic	±scalar	±telic (±closed)	±punctual (±two-point)
State = no change (<i>zhīdào</i> ‘know’, <i>xǐhuān</i> ‘like’, <i>zuò</i> ‘(stative) sit’)	–	–	–	–
Semelfactive = nonscalar punctual change (<i>késòu</i> ‘cough’, <i>zhǎyǎn</i> ‘wink’, <i>tiào</i> ‘jump’)	+	–	–	+
Activity = nonscalar durative change (<i>fēi</i> ‘fly’, <i>tuī</i> ‘push’, <i>chī</i> ‘eat’)	+	–	–	–
Open scale verb (<i>shēng</i> ‘ascend’, <i>shēn-cháng</i> stretch-long ‘lengthen’, <i>gǎi-liáng</i> change-good ‘improve’)	+	+	–	– ⁶
Multi-point closed scale change = Accomplishment (<i>guò</i> ‘cross (a bridge)’, <i>huí</i> ‘return’, <i>mǎi</i> ‘buy’) ⁷	+	+	+	–
Two-point closed scale change = Achievement (<i>sǐ</i> ‘die’, <i>jìn</i> ‘enter’, <i>chuí-gān</i> blow-dry ‘blow to dry’)	+	+	+	+

⁶ Note that an open scale degree achievement is [–punctual] by default (but not mandatory). In *The soup cooled from 60 degrees to 30 degrees*, the change usually takes a certain amount of time and thus is durative; but the change can be instantaneous if the soup only cools very shortly (Beavers 2008, Rappaport Hovav 2008).

⁷ Some previous studies (e.g., Xiao & McEnery 2004, Smith 1997) treat VPs consisting of an incremental theme verb and a quantified object (*chī yìwǎn fàn* ‘eat a bowl of rice’) as accomplishments. In this study, we recognize that such VPs are associated with scales (called “extent scales” by Rappaport Hovav 2008). However, unlike the scalar change verbs discussed in this paper, the scales of those incremental theme VPs are implied by the NP arguments rather than lexicalized by the incremental theme verbs. See Kennedy (2012) for detailed analysis on incremental theme NPs in English. We will discuss the aspectual features of Chinese incremental theme verb phrases in a separate paper (see Peck et al. in press).

In Table 5, [\pm dynamic] distinguishes states from all other classes (cf. Beavers 2012), [\pm scalar] distinguishes semelfactive/activities from the rest of dynamic verbs, [\pm telic] distinguishes open scale degree achievements from the rest of scalar change verbs. Finally, [\pm punctual] distinguishes multi-point closed scale verbs from two-point closed scale verbs. In addition, semelfactives refer to one single action, e.g., one wink or one knock at a door. The feature [\pm punctual] also distinguishes semelfactives from activities. In this sense, only iterated semelfactives, e.g., a series of winks, are treated as activities (cf. Chen 1988).

In the rest of this section, we will show that each aspectual class within the new system is linguistically distinctive in Chinese in terms of its aspectual features. Note that although the aspectual classes are universally true, different tests are sometimes required due to language differences. In this section, we provide diagnostics that are valid and effective for Modern Mandarin Chinese.

4.1 States

In the new system, the distinction between stative and non-stative events remains the same as in the traditional Vendlerian approach and the feature [\pm dynamic] distinguishes states from the rest. Accordingly, a state has [$-$ scale] value, because the feature [\pm scale] is a property of ‘change’ that is only associated with dynamic events. (14) lists some examples of stative verbs in Chinese.⁸

- (14) *ài* ‘love’, *zuò* ‘(stative) sit’, *guà* ‘(stative) hang’, *shǔyú* ‘belong to’,
hǎoxiàng ‘seem’, *děngyú* ‘be equal to’, *xǐhuān* ‘like’, *zhīdào* ‘know’, *tǎoyàn*
‘hate’, *xiāngxìn* ‘believe’, *jùyǒu* ‘possess’, etc.

According to Vendler (1967), stative verbs describe events that are homogeneous and do not have successive stages, thus states are normally not compatible with the progressive (cf. Leech 1971:1-27, Comrie 1976:37, Dowty 1979:184, among others). In Chinese, (*zhèng*) *zài* is a progressive marker. Normally, when a given verb denotes a

⁸ Previous studies such as Chen (1988) and Xiao & McEnery (2004) further classify states into subcategories. For instance, Chen’s states include verbs of property and relationship (e.g., *shǔyú* ‘belong to’, *děngyú* ‘be equal’), psych-verbs (e.g., *xǐhuān* ‘like’, *tǎoyàn* ‘hate’), and posture verbs (e.g., *zuò* ‘(stative) sit’, *guà* ‘(stative) hang’). Xiao & McEnery (2004), following Carlson (1977), propose stage-level states (e.g., *xiàng* ‘resemble’, *chéngshí* ‘honest’) and individual-level states (e.g., *guà* ‘(stative) hang’, *zuò* ‘(stative) sit’). This paper does not discuss the sub-classes of states in detail and provide tests that generally apply to all Chinese state verbs.

dynamic and durative event, it is compatible with (*zhèng*) *zài* (15b), but a stative verb is not, as illustrated in (15a).⁹

- (15) a. *她正在知道這件事
 **Tā zhèngzài zhīdào zhèjiàn shì*
 she PROG know this.CLF event
 (Intended) ‘She is knowing the event.’
- b. 她正在跑步
Tā zhèngzài pǎobù
 she PROG jog
 ‘She is jogging.’

Note that achievements and semelfactives are dynamic and punctual as presented in Table 5. When the event denoted by a semelfactive is understood as iterated, the event is durative and the verb is compatible with the progressive *zài* because it can be understood as an activity, e.g., *tā zài késòu* ‘he is coughing’. However, achievements cannot be distinguished from states by the progressive tests because achievements are not compatible with *zài* either (cf. Xiao & McEnery 2004), e.g., **tā zài sǐ* (intended) ‘she is dying’. Therefore, we need to distinguish states from achievements. As shown in Table 5 above, a state lasts over some period of time, whereas an achievement is punctual. Thus, when a *for*-adverbial co-occurs with a state predicate, the adverbial indicates the period in which the state denoted by the predicate lasts (16a); in contrast, when the same adverbial occurs with an achievement predicate, the adverbial indicates the resultant state brought about by the predicate (16b)¹⁰ and how long the state lasts.

- (16) a. 她坐了五個小時了
Tā zuò-le wūge xiǎoshí le
 she sit-ASP five.CLF hour ASP
 ‘She remained seated for five hours.’

⁹ The progressive test for states is also verified by Xiao & McEnery (2004). According to their corpus study, among 88 instances of verbs that are found with the progressive marker *zài*, 86 of them denote dynamic situations.

¹⁰ Some state predicates in Chinese are not compatible with *for*-adverbials, e.g., *shǔyú* ‘belong to’, *shìhé* ‘to be suitable’. Such predicates are usually understood to denote permanent states, and called “individual-level states” by previous studies as opposed to “stage-level states” which are less permanent (Carlson 1977, Xiao & McEnery 2004, cf. Chen 1988). Such states can still be distinguished from achievements because Chinese achievement predicates are normally compatible with *for*-adverbials.

- b. 她死了五個小時了
Tā sǐ-le wǔge xiǎoshí le
she die-ASP five.CLF hour ASP
'It has been five hours since she died.' (not 'she has been dying for five hours')

In sum, Chinese states are distinguished from two-point closed scale verbs by the different interpretations regarding *for*-adverbials, and states differ from the rest of aspectual classes (semelfactives, activities, open scale degree achievements, and multi-point closed scale verbs) in terms of the compatibility with the progressive marker *zài*.

4.2 Nonscalar change verbs: activities and semelfactives

Among dynamic events, activities and semelfactives are distinguished from the rest of dynamic events by being [-scale]. We first present tests showing that both activities and semelfactives are [-scale], and then provide evidence that can distinguish activities from semelfactives.

As introduced in §3.2, a verb that does not lexicalize scalar changes does not specify the changes in a particular direction on a single dimension and the possible results brought about by the event can be in various directions or dimensions. Thus, such a verb is compatible with a wide range of result phrases, e.g., *chī* 'eat' in (11); in contrast, a verb denoting scalar change is only compatible with a limited range of result phrases which further elaborate on the dimension of the scale lexicalized by the given verb, e.g., *jìn* 'enter' in (12). Here we will show more motion verbs for example. As illustrated in (17)-(18), both the activity *pǎo* 'run' and the semelfactive *tiào* 'jump' are compatible with a variety of result phrases; on the contrary, besides *jìn* 'enter' in (12), *tuì* 'retreat' in (19) also lexicalizes a scalar change on a path dimension, and is only compatible with the result phrases relevant to backward direction on the path.

- (17) a. 她跑累了
Tā pǎo-lèi le
she run-tired ASP
'She is tired as a result of running.'
- b. 她跑丟了鞋子
Tā pǎo-diū-le xiézi
she run-lose-ASP shoe
'She lost the shoes as a result of running.'

- c. 她跑到了學校
Tā pǎo-dào-le xuéxiào
 she run-arrive-ASP school
 ‘She ran to the school.’
- (18) a. 他跳斷了腿
Tā tiào-duàn-le tuǐ
 he jump-break-ASP leg
 ‘His leg was broken as a result of his jumping.’
- b. 他跳出了水坑
Tā tiào-chū-le shuǐkēng
 he jump-exit-ASP puddle
 ‘He jumped out of the puddle.’
- c. 他跳上了舞臺
Tā tiào-shàng-le wǔtái
 he jump-ascend-ASP stage
 ‘He jumped onto the stage.’
- (19) a. ?? 敵人退累了
?? Dírén tuì-lèi le
 enemy retreat-tired ASP
 (Intended) ‘The enemy became tired as a result of retreating.’
- b. ?? 敵人退丟了武器
?? Dírén tuì-diū-le wǔqì
 enemy retreat-lose-ASP weapon
 ‘The enemy lost weapons as a result of retreating.’
- c. 敵人退到了營地
Dírén tuì-dào-le yíngdì
 enemy retreat-arrive-ASP camp
 ‘The enemy retreated to the camp.’

Among nonscalar change verbs, activities, however, are different from semelfactives in that the former are durative, whereas the latter are punctual, as presented in Table 5. In other words, the event denoted by a semelfactive can be understood as a single action but the event denoted by an activity is normally understood as one durative event. In this sense, the verbs of these two classes can be distinguished by looking at the different interpretations of durativity of an event when modified by the iterative adverbial *yíxià* ‘once’. For example, (20a) has the activity verb *pǎo* ‘run’ modified by *yíxià* and the whole sentence means that an event of running lasted for a very short time, but not that

an agent lifted his leg only once; on the contrary, (20b) has the semelfactive *zhǎ yǎn* ‘wink’ modified by *yíxià*, and the whole sentence describes an event where an agent blinked his eyes only once.

- (20) a. 他跑了一下步
Tā pǎo-le yíxià bù
he run-ASP once step
‘He ran a little bit (for a short time).’
- b. 他眨了一下眼
Tā zhǎ-le yíxià yǎn
he wink-ASP once eye
‘He winked once.’

Some examples of activities and semelfactives in Chinese are given in (21) and (22), respectively.

- (21) Activities: *pǎobù* ‘jog’, *chī* ‘eat’, *zǒu* ‘walk’, *kū* ‘cry’, *dú* ‘read’, *xiě* ‘write’, *chàng* ‘sing’, *shuō* ‘speak’, *wèn* ‘ask’, *xué* ‘study’, *huà* ‘draw’, *xǐ* ‘wash’, *chuī* ‘blow’, etc.
- (22) Semelfactives: *qiāo* ‘knock’, *késòu* ‘cough’, *bèng* ‘jump’, *tiào* ‘jump’, *pāi* ‘pat’, *jī* ‘beat’, *dǎ (gǔ)* ‘hit (drums)’, etc.

4.3 Open scale verbs

As presented in Table 5, open scale verbs are distinguished from activities and semelfactives in that they are [+scalar]. Similar to multi-point closed scale verbs (accomplishments) and two-point closed scale verbs (achievements), open scale verbs are only compatible with result phrases that are associated with the scales these verbs lexicalize, as illustrated by *tuì* ‘recede’ in (19). However, open scale verbs are [–telic], i.e. the scale associated with these verbs does not have a bound, and thus differ from multi-point closed scale verbs and two-point closed scale verbs.

The absence of a lexicalized endpoint indicates that the scalar change denoted by an open scale verbs can continuously occur if these verbs appear alone in sentences without any phrase that specifies a bound. In this sense, a predicate with an open scale can be distinguished from a predicate with a closed scale verb by the comparative test (Lin & Peck 2011). Open scale verbs are compatible with the comparative adverb *gèng* ‘more’, but closed scale verbs are not. As illustrated in (23), the balloon can move up higher because there is no maximum on the path of ascending, but the student cannot

move further because the event of returning to the classroom finishes once s/he arrived at the classroom; similarly, in (24), the soup can become cooler but the room cannot become emptier once it has become empty.

- (23) a. 那個氣球升得更高了
Nàge qìqiú shēng de gèng gāo le
 that.CLF balloon ascend MOD more high ASP
 ‘The balloon ascended higher.’
- b. *那個學生回教室回得更遠了
 **Nàge xuéshēng huí jiàoshì huí de gèng yuǎn le*
 that.CLF student return classroom return MOD more far ASP
 (Intended) ‘??The student returned the classroom further.’
- (24) a. 那碗湯更涼了
Nàwǎn tāng gèng liáng le
 that.CLF soup more cool ASP
 ‘That bowl of soup became cooler.’
- b. ?? 那個房間更空了
 ?? *Nàge fángjiān gèng kōng le*
 that room more empty ASP
 (Intended) ‘??The room became emptier.’

Open scale verbs in Chinese can be found in four forms. (25) presents examples for each form; while the first type is relatively straightforward, the other three types are elaborated on in the rest of this section.

- (25) a. Regular verbs/verb compounds: *shēng* ‘ascend’, *jiàng* ‘descend’, *luò* ‘fall’, *rè* ‘heat’, *jiàngluò* descend-fall ‘descend’, *lěngdòng* ‘freeze’, etc.
- b. Deadjectival verbs: *gāo* ‘become tall’, *lǎo* ‘become old’, *hóng* ‘become red’, *è* ‘become hungry’, *huài* ‘become bad’, etc.
- c. RVCs with an open scale complement: *lā-cháng* stretch-long ‘lengthen’, *gǎi-liáng* change-good ‘improve’, *pū-kuān* pave-wide ‘widen (the road)’, *fàng-dà* put-large ‘enlarge’, etc.
- d. Verbs derived from *huà* suffixation: *èhuà* ‘worsen’, *lǎohuà* ‘become old’, *ruòhuà* ‘weaken’, *qiánghuà* ‘strengthen’, *múhuà* ‘enslave’, *guójìhuà* ‘internationalize’, etc.

The second type of open scale verbs can be found in the form of deadjectival verbs.¹¹ There are some deadjectival verbs that describe events without natural endpoints. These verbs are compatible with the comparative adverb *gèng* ‘more’, as in (26).

- (26) a. 他老得更厲害了
Tā lǎo de gèng lihài le
 he age MOD more serious ASP
 ‘He aged so much more.’
- b. 寶寶的脾氣壞得更厲害了
Bǎobao de píqì huài de gèng lihài le
 baby POSS temper worsen MOD more serious ASP
 ‘The baby’s temper worsened so much more.’

The third type of open scale verbs are RVCs where the complement denotes an open scale, e.g., *lā-cháng* stretch-long ‘lengthen’, *gǎi-liáng* change-good ‘improve’, *pū-kuān* pave-wide ‘widen (the road)’. For RVCs that allow the potential markers *de/bu*, e.g., *lā-cháng* stretch-long ‘lengthen’ in *lā-de/bù-cháng* ‘can/cannot be lengthened’, the openness of scale can be tested by the *gèng* ‘more’ comparative test. Specifically, an RVC with an open scale allows *gèng* to occur before the complement naturally, e.g., *lā de gèng cháng* stretch MOD more long ‘lengthen more’, *pū de gèng kuān* pave MOD more wide ‘widen (the road) more’. On the contrary, an RVC with a closed scale does not allow modification by adverb *gèng* ‘more’, as in **bān de gèng kōng* move MOD more empty ‘(intended) make (a room) emptier by moving (things out)’.

For RVCs which are usually not compatible with the potential markers *de/bu*, e.g., *gǎi-liáng* change-good ‘improve’, *zǒu-rù* walk-enter ‘walk into’, *kuò-dà* expand-big ‘expand’, the *gèng* cannot be used in between the morphemes of such RVCs and modify the complements even if the morphemes denote open scales, e.g., **gǎi de gèng liáng* change MOD more good. To test the openness of a scale lexicalized by this type of RVCs, we can apply the comparative tests by adding the comparative adverbial *jìnyìbù* ‘further’ before the RVC: an RVC with an open scale is compatible with *jìnyìbù*, e.g., *jìnyìbù gǎi-liáng* further change-good ‘further improve’, whereas an RVC with a closed scale is not, e.g., **jìnyìbù zǒu-rù* further walk-enter, as in (27).

¹¹ Many of the so-called adjectives in Chinese are treated as verbs (25b) by some previous studies (cf. Chao 1968, Li & Thompson 1981, Tai 1982, Lin 2003, Paul 2005, Tham to appear).

- (27) a. 集團於去年進一步改良生產流程
Jítuán yú qùnián jìnyībù gǎi-liáng shēngchǎn liúchéng
 group at last.year further change-good production process
 ‘Last year, the group further improved the production process.’ (Google)
- b. *他進一步走入房間
 **Tā jìnyībù zǒu-rù fángjiān*
 he further walk-enter room
 (Intended) ‘??He walked and entered the room further.’

The RVC examples which are analyzed as open scale verbs above suggest a very important finding in the study of Mandarin Chinese aspectual classification. In previous works, Mandarin Chinese RVCs were often analyzed as forming a single aspectual class. For example, Tai (1984) and Xiao & McEnery (2004) treat Chinese RVCs as achievements. According to Tai (1984), Chinese RVCs do not denote the action process even though the RVCs consist of an activity verb. Tai’s evidence comes from the fact that the RVCs cannot occur in the progressive aspect just like achievement verbs. In contrast, Smith (1997) analyzes Mandarin Chinese RVCs as accomplishments. Meanwhile, Chen (1988) divides RVCs into two types: complex change verbs and simplex change verbs (§2.1). However, as pointed out in §2.1, Chen’s analysis does not fully reflect the various aspectual properties of RVCs.

While many of the RVCs discussed by Tai (1984) and Xiao & McEnery (2004) correspond to achievements, e.g., *chī-wán* eat-finish ‘finish eating’, *zuò-hǎo* do-complete ‘finish doing’, there are also RVCs that should be analyzed as open scale verbs, as those in (25c). The fact that these RVCs are compatible with the progressive marker *zài* (as in (28) verifies that these verbs are [+durative] and should be distinguished from the RVCs that do actually correspond to achievements.

- (28) a. 麵團在慢慢拉長
Miàntuán zài màn màn lā-cháng
 dough PROG gradually stretch-long
 ‘The dough is stretching longer gradually.’ (Google) (= (6))
- b. 我們的群體在慢慢擴大
Wǒmen de qúntǐ zài màn màn kuò-dà
 we POSS group PROG gradually expand-big
 ‘Our group is expanding gradually.’ (Google)

The fourth type of open scale verbs are verbs derived through *-huà* ‘-ize’ suffixation, where verbs consisting of an open scale adjective are followed by the suffix *-huà*, e.g., *lǎohuà* ‘become old’ and *ruòhuà* ‘weaken’, or a noun suffixed with *-huà*, e.g., *núhuà*

‘enslave’ and *guójìhuà* ‘internationalize’. This type of verb is understood to lexicalize open scalar change if it can be modified by the comparative adverbials *jìnyìbù* ‘further’ or *gèngjiā* ‘more’. A few examples are given in (29).

- (29) a. 空氣污染進一步惡化
Kōngqì wūrǎn jìnyìbù èhuà
 air pollution further worse
 ‘Air pollution is further worsened.’ (Google)
- b. 機器更加老化
Jīqì gèngjiā lǎohuà
 machine more age
 ‘The machine is aging further.’ (Google)
- c. 經濟進一步國際化
Jīngjì jìnyìbù guójìhuà
 economy further internationalize
 ‘The economy is further internationalized.’ (Google)

4.4 Multi-point closed scalar verbs (accomplishments)

Closed scalar change verbs can be further classified into two different classes: multi-point closed scale verbs (accomplishments) and two-point closed scale verbs (true achievements), as in Table 5. In English, degree achievements with closed scales, e.g., *dry*, *empty*, and *straighten*, can be understood as multi-point closed scale verbs because it takes some time for the theme to undergo change to achieve an endpoint. These verbs also behave like typical accomplishments too. For instance, they can be the complements of *finish* that only takes accomplishments as complements (Kearns 2000:214) (30); they are compatible with the progressive (31) and their result cannot be cancelled (32).

- (30) a. Just *finished* drying my hair. This is how it really looks like. (Google)
 b. I *finished* emptying the cupboard. (Google)
- (31) a. Jared *is drying* my hair right now. (Google)
 b. Becks *is emptying* the garage. (Google)
- (32) a. ?? He dried my hair, but my hair is still wet/not dry.
 b. ?? He emptied the garage, but the garage still has stuff in it/is not empty.¹²

¹² We searched the expression “dried * but * not dry” and “emptied * but * not empty” in Google (27/04/2013), but no satisfactory examples could be found. This indicates that the result of *dry* and *empty* cannot be cancelled.

In contrast, whether Chinese has typical accomplishments or not has been controversial among many scholars (Tai 1984, Teng 1985, Lin 2004, Chief 2007, among others). Tai (1984) argues that Mandarin Chinese does not have many verbs/compounds that can be linguistically identified as accomplishments. For instance, while KILL is an accomplishment (a durative process leading to the result of death) in many languages, the Mandarin Chinese *shā* ‘kill’, which is often translated as ‘kill’, does not always entail death and thus is not a typical accomplishment, as illustrated in (33) (Tai 1984, Chief 2007, cf. Teng 1985).

- (33) a. 張三殺了李四兩次，李四都沒死
Zhāngsān shā-le Lìsì liǎngcì, Lìsì dōu méi sǐ
 Zhangsan kill-ASP Lisi twice Lisi all NEG die
 (Intended) ‘Zhangsan killed Lisi twice, but Lisi didn’t die.’ (Tai 1984: 291)
- b. 就像卡斯特羅一樣怎麼殺也殺不死
Jiù xiàng Kǎsītèluó yíyàng zěnmě shā yě shā bù sǐ
 just like Castro same how kill also kill NEG die
 (Intended) ‘It was like Castro; it does not die no matter how you try to kill it.’ (Google)

Meanwhile, for other studies (e.g., Chen 1988, Smith 1997) that do recognize the existence of accomplishments in Mandarin Chinese, they often only identify accomplishments that are derived from verb compounding/phrases, e.g., RVCs or “verb + quantified NPs” (e.g., *xiě yìfēng xìn* ‘write a letter’), but seldom discuss mono-morphemic accomplishments.

However, Mandarin Chinese indeed has a few verbs that are accomplishments both semantically and syntactically; good examples are those verbs that lexicalize multi-point closed scales. These include the motion verbs *guò* ‘cross’ and *huí* ‘return’ (see Lin 2011 for more discussion of *guò* ‘cross’ and *huí* ‘return’), and the change of state verbs *mǎi* ‘buy’, *mài* ‘sell’ (see Chief 2007 for more discussion of *mǎi* ‘buy’ and *mài* ‘sell’). Take an event of crossing a bridge for example. (34a) indicates that the verb *guò* ‘cross’ is compatible with the progressive and does not entail that the subject has crossed the bridge ([+dynamic, –punctual, +telic]); in addition, (34b) indicates that *guò* is [+telic] as it does not allow an event of crossing to occur without limit.¹³

¹³ Note that *guò* ‘cross’ can also be used to describe an event where a very short path, e.g., a police line drawn on the ground, is crossed; in such cases, *guò* behaves like a two-point closed scale verb, i.e. an achievement (see more discussion in Lin 2011). In this sense, *guò* is [+dynamic, ±durative, +telic]. However, given that *guò* is the only verb that has [±durative] value, while

- (34) a. 我在過大橋
Wǒ zài guò dàqiáo
 I PROG cross big.bridge
 ‘I am crossing the bridge (and have not finished it yet).’
- b. 我過了大橋了，*還在繼續過
*Wǒ guò-le dàqiáo le, *hái zài jìxù guò*
 I cross-ASP big.bridge ASP still PROG continue cross
 (Intended) ‘I have crossed the bridge, #and am still crossing it.’

(35) lists some of examples that we identify to be multi-point closed scale verbs (accomplishments) in Mandarin Chinese.

- (35) *guò* ‘cross’, *huí* ‘return’, *mǎi* ‘buy’, *mài* ‘sell’, *zū* ‘rent’, etc.

4.5 Two-point closed scale predicates (true achievements)

Besides multi-point closed-scale verbs (accomplishments), Chinese also has two-point closed scale verbs, which correspond to true achievements in that these verbs have features [+dynamic, +scale, +punctual, +telic] (cf. Smith 1997, Xiao & McEnery 2004, Tai 1984, Chen 1988, among others). Since two-point closed scale verbs denote instantaneous changes, these verbs normally are not compatible with the progressive. In addition, these verbs are [+telic] and thus once the inherent endpoint is reached, a described change cannot continue occurring, as illustrated in (36) and (37).

- (36) a. ?他正在進房間¹⁴
 ?*Tā zhèngzài jìn fángjiān*
 he PROG enter room
 (Intended) ‘He is entering the room.’

other verbs we have examined are either [+durative] or [–durative], we will not discuss in detail about *guò* and leave it for future study.

¹⁴ A reviewer points out that *zhèngzài jìn fángjiān* in (37a) is acceptable and can be found online. Our Google search (27/04/2013) retrieved about 20 tokens, although the frequency is very low compared to durative verbs that occur naturally with *zhèngzài* (e.g., there are 1,170,000 tokens of *zhèngzài pǎo* PROG-run in Google). However, in these examples, *jìn* ‘enter’ is not understood in its literal meaning, i.e. a moving object moves from outside of a region into the inside of a region. Instead, *zhèngzài jìn fángjiān* should be understood as a preparatory phase of entering.

- b. 她進了房間了，*還在繼續進
*Tā jìn-le fángjiān le, *hái zài jìxù jìn*
 she enter-PERF room ASP still PROG continue enter
 (Intended) ‘She entered the room, #and she is still entering.’

- (37) a. ?他正在死
 ?*Tā zhèngzài sǐ*
 he PROG die
- b. 她死了，*還在繼續死
*Tā sǐ le, *hái zài jìxù sǐ*
 she die ASP still PROG continue die
 (Intended) ‘She died, #and is still dying.’

Furthermore, if two-point closed-scale verbs co-occur with a post-verbal *for*-adverbial, the time period can only be understood as the time during which the result state holds, e.g., *jìn* ‘enter’ in (38a), in contrast to accomplishments where the *for*-adverbial has ambiguous interpretations between a process reading and a result state reading, e.g., *guò* ‘cross’ in (38b) (Chen 1988).

- (38) a. 他進了房間一個小時了
Tā jìn-le fángjiān yíge xiǎoshí le
 he enter-PERF room one.CLF hour ASP
 ‘It has been one hour since he was in the room.’
- b. 她們過了那條橋一個小時了
Tāmen guò-le nàtiáo qiáo yíge xiǎoshí le
 they cross-PERF that.CLF bridge one.CLF hour ASP
 ‘They have been crossing the bridge for one hour (and are still in the process of crossing).’
 ‘It has been one hour since they crossed the bridge.’

Chinese two-point closed scale verbs can be found in four forms; (39) presents some examples of each type. Further elaboration on the last three types is provided in the rest of this section.

- (39) a. Regular verbs/verb compounds: *dào* ‘arrive’, *jìn* ‘enter’, *chū* ‘exit’, *sǐ* ‘die’, *yíng* ‘win’, *shū* ‘lose’, *dàodà* ‘arrive’, *bào zhà* ‘explode’, *fāxiàn* ‘discover’, *wàngjì* ‘forget’, etc.
- b. Deadjectival verbs: *gān* ‘become dry, devoid of moisture’, *kōng* ‘become empty’, *píng* ‘become flat’, *zhí* ‘become straight’, etc.

- c. RVCs with a closed scale complement: *shā-sǐ* kill-die ‘kill’, *pǎo-jìn* run-enter ‘run into’, *chuī-gān* blow-dry ‘blow to dry’, *lā-zhí* stretch-straight ‘straighten’, *zá-píng* pound-flat ‘pound to flat’, etc.
- d. Phase RVC, i.e. verb + *hǎo* (lit.) ‘good’ / *wán* (lit.) ‘finish’ / *guāng* (lit.) ‘bare’ / *dào* (lit.) ‘arrive’ / *zhào* (lit.) ‘attach’, etc.: *chī-hǎo* eat-good ‘finish eating’, *zuò-wán* do-finish ‘finish doing’, *shā-guāng* kill-bare ‘kill all’, *zhǎo-dào* find-arrive ‘find successfully’, *cāi-zhào* guess-attach ‘guess correctly’, etc.

The second type of two-point closed scale verbs (39b) comes from deadjectival verbs. Besides the open scale deadjectival verbs introduced in (25b) in §4.3, Chinese also has some deadjectival verbs that lexicalize closed scales, e.g., *gān* ‘become dry, devoid of moisture’, *kōng* ‘become empty’, *píng* ‘become flat’. Unlike their English counterparts that can be used as causative verbs, these verbs usually can only function as intransitive verbs. Furthermore, although these verbs are semantically equivalent to English multi-point closed scale verbs such as *dry* and *empty* (accomplishments, cf. Hay et al. 1999, Dowty 1979, among others), they behave like other true achievements such as *jìn* ‘enter’ and *sǐ* ‘die’ in Mandarin Chinese. For instance, *gān* ‘become dry, devoid of moisture’ and *kōng* ‘become empty’ are [+punctual] in that they are not compatible with the progressive marker *zhèngzài* (40) and the co-occurring *for*-adverbial can only be understood as the time after the event is finished (41); in addition, the two verbs are [+telic] in that their associated result cannot be cancelled (42) and they do not allow the comparative adverb *gèng* ‘more’ (43).

- (40) a. ?衣服正在乾
 ?Yīfú zhèngzài gān
 clothes PROG dry
 (Intended) ‘The clothes is in the process of becoming dry.’
- b. ?房間正在空
 ?Fángjiān zhèngzài kōng
 room PROG empty
 (Intended) ‘The room is in the process of becoming empty.’
- (41) a. 衣服乾了一個小時了
 Yīfú gān le yíge xiǎoshí le
 clothes dry ASP one.CLF hour ASP
 ‘It has been an hour since the clothes was dried.’

- b. 房間空了一個月了
Fángjiān kōng le yíge yuè le
 room empty ASP one.CLF month ASP
 ‘It has been one month since the room was emptied.’
- (42) a. 衣服乾了，*可是還是濕的
*Yīfú gān le, *kěshì hái shì shīde*
 clothes dry ASP but still is wet
 (Lit.) ‘The clothes is dry, # but it is still wet.’
- b. 房間空了，*可是裡面還有東西
*Fángjiān kōng le, *kěshì lǐmiàn hái yǒu dōngxi*
 room empty ASP but inside still have stuff
 (Lit.) ‘The room is empty, # but there is still some stuff inside.’
- (43) a. ?衣服更乾了
 ?*Yīfú gèng gān le*
 hair more dry ASP
 (Lit.) ‘#The clothes is drier.’
- b. ?房間更空了
 ?*Fángjiān gèng kōng le*
 room more empty ASP
 (Lit.) ‘#The room is emptier.’

The third type of two-point closed scale verbs is RVCs such as *shā-sǐ* kill-die ‘kill’ and *pǎo-jìn* run-enter ‘run into’ that consist of a verb followed by a closed-scale complement. These RVCs describe events where a process can exist before the state described by the complement is reached, e.g., the action of *shā* ‘kill’ happens before the patient dies and the process of *pǎo* ‘run’ usually occurs before the moving object enters a region. In this sense, these RVCs are semantically accomplishments (Chief 2007). However, syntactically, these verbs behave like achievements. For instance, like the true achievements *sǐ* ‘die’ and *jìn* ‘enter’ (36)-(37), an RVC with a closed scale complement is [-durative] because it is usually unnatural when occurring with the progressive *zhèngzài* (44), and a post-verbal durational phrase can only be understood as the period where a result state holds (45) (also see Chief 2007:151-175).¹⁵

¹⁵ We do not agree with Chief (2007) that only the complement (V2) of an RVC determines the selection of aspectual modifiers such as *huā-le* X time ‘spend X time’ of the RVC. For RVCs with closed scale complements, examples can still be found where they are compatible with pre-verbal durational phrases, which are modifiers of V1 in the RVCs. As illustrated in (i), the RVCs *chuī-gān* blow-dry ‘blow to dry’ and *bān-kōng* move-empty ‘move to empty’ co-occur

- (44) a. *張三正在殺死李四
 *Zhāngsān zhèngzài shā-sǐ Lǐsì
 Zhangsan PROG kill-die Lisi
- b. ?他正在跑進那個房間裡
 ?Tā zhèngzài pǎo-jìn nàge fángjiān-lǐ
 he PROG run-enter that.CLF room-inside
- (45) a. 張三殺死李四兩天了
 Zhāngsān shā-sǐ Lǐsì liǎngtiān le
 Zhangsan kill-die Lisi two.day ASP
 ‘It has been two days since Zhangsan killed Lisi.’
- b. 他跑進那個房間五分鐘了
 Tā pǎo-jìn nàge fángjiān wǔ fēnzhōng le
 he run-enter that.CLF room five minute ASP
 ‘It has been five minutes since he ran into the room.’

The last type of two-point closed scale verbs in Mandarin Chinese are RVCs whose complements denote the attainment of the result (they are called “phase RVC” by Li & Thompson 1981:65, “attainment resultative” by Sun 2006:52), e.g., *chī-wán* eat-finish ‘finish eating’ and *zhǎo-dào* find-arrive ‘find successfully’. The literal meaning of the complement has been lost historically, and the phase RVCs are understood as achievements. As illustrated in (46)-(47), this type of RVCs are [–durative] in that they are incompatible with the progressive and the post-verbal durational phrases are only understood as the period in which the state holds.

- (46) a. *他正在吃完那碗飯
 *Tā zhèngzài chī-wán nàwǎn fàn
 he PROG eat-finish that.CLF rice

with the preverbal durational phrases *huā-le* X time ‘spend X time’, where the time phrase is used to describe the time spent on the subevent denoted by V1. These examples indicate that the duration denoted by V1 nonetheless affects the selection of aspectual modifiers of the RVCs.

- (i) a. [她們]每一次都要花半小時吹乾衣服
 [Tāmen] měi yíci dōu yào huā bàn xiǎoshí chuī-gān yīfú
 they every one.time all need spend half hour blow-dry clothes
 ‘Every time they need to spend half an hour in blowing the clothes dry.’ (Google)
- b. 他肯花兩小時搬空一間宿舍
 Tā kěn huā liǎng xiǎoshí bān-kōng yìjiān sùshè
 he willing spend two hour move-empty one.CLF dorm
 ‘He is willing to spend two hours in emptying a dorm.’ (Google)

- b. *他正在找到那隻手錶

**Tā zhèngzài zhǎo-dào nàzhī shǒubiǎo*
 he PROG find-arrive that.CLF watch

- (47) a. 他吃完那晚飯一個小時了

Tā chī-wán nàwǎn fàn yíge xiǎoshí le
 he eat-finish that.CLF rice one.CLF hour ASP

‘It has been one hour since he finished eating that bowl of rice.’

- b. 他找到那隻手錶一天了

Tā zhǎo-dào nàzhī shǒubiǎo yìtiān le
 he find-arrive that.CLF watch one.day ASP

‘It has been one day since he found the watch.’

5. Conclusion

In this work, we introduced a new aspectual classification for Mandarin Chinese by adding the feature [\pm scale] to the traditional Vendler-based aspectual features. By adopting this new feature, we contributed to the study on the aspect of Mandarin Chinese as follows.

First, with the notion of scale, we properly classified open scale verbs (DA verbs), a previously-unanalyzable group of verbs, as a new and independent class in the system of situation aspect; the new class includes mono-morphemic verbs such as *shēng* ‘ascend’, *jiàng* ‘descend’, *luò* ‘fall’, *rè* ‘heat’ and multi-morphemic verb compounds such as *jiàngluò* descend-fall ‘descend’, *lěngdòng* ‘freeze’ that are either neglected or classified as achievements by previous works (Chen 1988, Lin 2004). Furthermore, our study expanded the scope of verbs to deadjectival verbs (*gāo* ‘become tall’, *lǎo* ‘become old’, *hóng* ‘become red’, etc.) that are seldom discussed by previous aspectual studies, and identified them as open-scale verbs. In other words, we demonstrated that Chinese verbs fall into six aspectual classes: state, semelfactive, activity, open scale verbs, multi-point closed scale verbs and two-point closed scale verbs. Our new aspectual system not only posits open scale verbs, but also accommodates all other previously recognized classes of Vendler.

Second, while previous studies treat RVCs as accomplishments (Smith 1997), achievements (Tai 1984, Xiao & McEnery 2004), or complex/simple change verbs (Chen 1988), our system showed that Chinese RVCs fall into two aspectual classes, i.e. open scale verbs such as *lā-cháng* stretch-long ‘lengthen’ and *gǎi-liáng* change-good ‘improve’ and two-point closed scale verbs such as *chī-wán* eat-finish ‘finish eating’ and *zhǎo-dào* find-arrive.

Third, regarding accomplishments, previous studies often focus on predicates where activity verbs are combined with measure phrases NP/PPs (*chī yìwǎn fàn* ‘eat a bowl of rice’ and *kàn yìběn shū* ‘read a book’) or activity verbs are followed by resultative complements (*chī-wán* eat-finish ‘finish eating’), whereas mono-morphemic accomplishment verbs were often neglected. With the scalar approach, this study is able to identify a few mono-morphemic verbs such as *guò* ‘cross’, *huí* ‘return’, and *mǎi* ‘buy’ that indeed lexicalize multi-point closed scales.

Finally, we expect that our approach may shed some light on the verbal aspects of natural languages in general.

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層級結構為本的漢語動詞情狀體分類

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以 Vendler (1967) 的動詞情狀體分類系統為基礎的前人研究無法合理地解釋結果程度動詞 (degree achievement verbs) 的句法表現 (Dowty 1979, Hay et al. 1999 等)。在近年“層級結構” (Hay et al. 1999, Rappaport Hovav & Levin 2010 等) 的研究基礎上，本文將 [±scalar] 這個新的情狀特徵引入 Vendler 為基礎的系統中，來更全面系統地對漢語動詞進行情狀分類。本文提出漢語動詞可以分為六類。該六分法不僅將結果程度動詞 (degree achievement verbs) 納入情狀系統中，且不影響前人原有的分類。通過對漢語情狀分類的分析討論，我們預期以層級結構為基礎的情狀分類法也能應用到其他語言中。

關鍵詞：層級結構，漢語動詞，情狀分類