The Syntax of Event-Internal and Event-External Verbal Classifiers*
Niina Ning Zhang
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ABSTRACT
When a classifier occurs with a numeral and an event-denoting expression, it is used as a unit to count events. The classifier is called a verbal classifier if the event-denoting expression is verbal, although the classifier itself is not verbal. This paper argues that a numeral and a verbal classifier have a spec-head relation, and the verbal expression is the complement. The proposal explains a number of syntactic generalizations of verbal classifiers in Mandarin Chinese. Like a frequentative adverb such as *twice*, a verbal classifier expression is either event-internal or event-external. The two types of classifiers have different possible positions in the language. The position contrasts are explained by different heights of the projection headed by a classifier. Theoretically, on the one hand, this research unifies the syntax of nominal and verbal numeral classifiers; and on the other hand, it explores the syntactic distinctions between event-internal and event-external verbal classifiers.

KEYWORDS: verbal classifier, event-internal, event-external, movement, syntax, Chinese

1. Introduction
It is well-known that Chinese has numeral classifiers (CLs), which occur with a numeral. In (1a), for instance, the CL *gè* occurs between the numeral *liǎng* 'two' and the individual-denoting noun *jiǎozi* 'dumpling'. A CL also occurs between a numeral and an event-denoting nominal (Shao 1996; Huang & Ahrens 2003), such as *dun* in (1b) and (1c).[1]

(1) a.   Dàlín bǎ nà   liǎng gè jiǎozi   dōu chī-le.
          Dalin BA that two   CL dumpling all   eat-PRF
          'Dalin ate both dumplings.'
     b.   Dàlín bǎ nà   liǎng dùn jiǎozi   dōu wàng-le.
          Dalin BA that two   CL dumpling all forget-PRF
          'Dalin forgot both of the two dumpling meals.'
     c.   (Nà) liǎng dùn jiaozi   Dàlín dōu yī   gè   rén   chī.
          that two   CL   dumplings Dalin all   one CL person eat
          'Those two meals of dumplings, Dalin ate alone.'

As a counting unit, what is counted by the CL *gè* in (1a) is the entity dumpling, and what is counted by *dùn* in (1b) and (1c) is dumpling meals. (1b) and (1c) say nothing about the number of dumplings in the two meals. Therefore, *dùn* is used to count eventuality times, rather than individuals. We can call CLs such as *dùn* CLeventuality (CLe).

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[1] Abbreviations used in this paper: BA: causative marker; CL: classifier; CLe: event CL; CLn: nominal CL; CLv: verbal CL; DE: modification marker; EXP: experiential aspect; PASS: passive; PRF: perfect aspect; PRG: progressive aspect; PRT: sentence-final aspect particle.

Syntactically, a CLe that occurs with an event-denoting nominal behaves like a CL that occurs with an individual-denoting nominal. In all three cases in (1), the CL and its following noun form a nominal constituent. The constituent can be preceded by a demonstrative, such as *na* 'that' in (1c), as a definite nominal. In (1c), the nominal constituent occurs as a topic.

CLes also occur in verbal structures, similar to the word *time* in a sentence like *Kim read the novel three times*. *Time* in this use is a verbal classifier (e.g., Doetjes 1997: 194; Landman 2004, 2006; Krifka 2007: 39). As a counting unit, it is used to count eventualities. In Mandarin Chinese, a CLe can also be used as a verbal classifier (CLv) (Shao 1996: 108). The word *cì* in (2a) and *quán* in (2b) are both CLvs, although the latter has the same form as the noun *quán* 'fist'. In (2a), the instrument of the beating is underspecified, but in (2b), the instrument is specified by the CLv, i.e., a fist.[2]

(2) a. Dàlín dǎ-le   Yùrú sān **cì**.   b. Dàlín dǎ-le   Yùrú sān **quán**.
         Dalin beat-PRF Yuru three CL   Dalin beat-PRF Yuru three CL^{fist}
         'Dalin beat Yuru three times.'   'Dalin punched Yuru three times.'

CLvs, as unit words for counting actions or states in verbal expressions, are relatively understudied, compared to nominal classifiers (CLns), although its occurrence is obligatory in the presence of a numeral, in both English and Chinese. Some efforts have been made to understand CLvs in Chinese (Ōta 1958 [2003: 153]; Ding et al. 1961; Chao 1968: 615; Lü et al. 1981; Paris 1981, 2013; Fang 1993; Shao 1996; Zhang 2002; Jeong 2002, among others); however, neither the syntactic relation between CLns and CLvs, nor the syntactic relation between the *cì*-type of CLvs (as in (2a)) and the *quán*-type of CLvs (as in (2b)), is clear. In this paper, I will argue that as in a CLn construction, the relation between a numeral and a CLv is a Spec-Head relation of a functional projection, UnitP, that the *cì*-type of CLvs heads a UnitP that is projected above vP, but the *quán*-type of CLvs heads a UnitP that is projected below vP, and that the post-verbal positions of a CLv are derived by the movement of a verbal phrase.

This paper does not discuss the constructions in which only *yī* 'one' or *liǎng* 'two', rather than any other numeral, may occur with a CLv, such as those in (3). In such constructions, *yī* or *liǎng* is not a real numeral; rather, it might be an indefinite marker, and thus the CLv is not used as a counting unit. See Zhang (2013: Sec. 3.5) for a discussion of parallel non-numeral uses of *yī* and non-unit uses of CLns in the language.

(3) a. Dàlín xià-le   Yùrú {yī/*sān} tiào.   b. Dàlín kàn-le Yùrú {liǎng/*san} yǎn.
         Dalin scare-PRF Yuru one/three CL^{jump} Dalin see-PRF Yuru two/three   CL^{eye}
         'Dalin scared Yuru.'   'Dalin took some looks at Yuru.'
     c. Wǒ qù {yī/*sān} xià.
         1SG go one/three CL
         'I'll go there.'
     d. Dàlín {yī/*sān} {cì/quán} {dōu/yě }méi dǎ-guò   Yùrú.
         Dalin one/three   CL/CL^{fist} all/also not   beat-EXP Yuru
         'Dalin did not beat Yuru even once.'

This paper also excludes discussion about the *you* 'have' construction, such as (4). In this construction, the verb, such as *dǎ* 'beat' in (4), may not have any aspect marker, and thus seems to be nominalized. It is possible that *you* takes the nominalized event-denoting

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[2] Beyond Chinese, see Fassi Fehri & Vinet (2008) on CLvs in Arabic, and Gerner (2009) on CLvs in Kam (Dong). Instrument CLvs are also found in other languages (e.g., Gerner 2009). See Bisang (2011) for a general survey of studies on CLvs.

expression as its subject (cf. Ernst 1996: 177 fn. 4), and thus the syntax of the construction is different from that of the examples in (2).

(4) Dàlín dǎ   Yùrú yǐjīng   yǒu sān   cì le.
     Dalin beat Yuru already have three CL PRT
     'There are three times of Dalin's beating of Yuru.'

This paper discusses CLvs in frequentatives, such as *san ci* 'three times' in (5), not addressing duratives, such as *shi fenzhong* 'ten minutes' in this example, although in many papers of Chinese linguistics, the two kinds of expressions are analyzed together.

(5) Dàlín sān   cì tóu-téng-le   shí fēnzhōng.
     Dalin three CL head-ache-PRF ten minute
     'Dalin felt headache for ten minutes three times.'

One major contrast between frequentatives and duratives is that the unit words of the former may show s-selection on the associate verbal phrase in the language (to be elaborated in 3.1.2), whereas the time unit words in the latter, such as *fēnzhōng* 'minute', never have a parallel selection relation, cross-linguistically. Also, there is no parallel contrast between event-external and event-internal use of the time unit words (see Section 2). Cross-linguistically, frequentatives and duratives are syntactically, as well as semantically, different (see Cinque 1999).

In order to focus on the basic structure of CLv constructions, this paper does not discuss complex predicate constructions (see Zhang 2014b for an analysis of such constructions).

The paper is organized as follows. In Section 2, I make a distinction between event-external and event-internal CLvs. In Section 3, I report and explain a number of generalizations of the syntax of CLv constructions in the language. I then analyze the position contrast between the two types of CLvs in Section 4. Further arguments and elaboration of my proposal are presented in Section 5. I make some critical comments on alternative analyses of CLv constructions in Section 6. Finally, I conclude the paper in Section 7.

2. Event-external and event-internal CLvs
2.1 Two uses of frequentatives

Frequentatives encode the frequency of actions and states. There is a distinction between event (e)-internal and event (e)-external frequentatives. If a frequentative expresses the action frequency in a single occasion, it is e-internal; but if it expresses the action or state frequency on different occasions, it is e-external. Cusic (1981: 61) uses (6) to show that if the intended reading is (6a), the adverb *twice* is e-external; but if the intended reading is (6b), the word is e-internal. In the former reading, the two times of doorbell-ringing may be discontinuous, but in the latter reading, the two times must be connected. The contrast is captured by "the disconnectedness parameter" (see Cabredo Hofherr 2010: 19).

(6) The salesman rang the doorbell twice.
     a. On two separate occasions he rang the bell once.
     b. On one occasion he rang the bell two times.

The semantic contrast between e-external and e-internal frequentatives has been discussed in Cusic (1981), Andrew (1983), Lasersohn (1995), Xrakovskij (1997), Cabredo Hofherr (2010), among others. Syntactically, e-external frequentatives have a higher position than e-internal ones (Cinque 1999: 27, 92). Cinque (1999: 27) states that in (7), the preverbal

twice unambiguously quantifies over the event, as an e-external frequentative, whereas the post-verbal one quantifies over the act, as an e-internal frequentative.

(7)   John twice knocked on the door twice.

2.2 CLvs in event-external and event-internal counting

Numeral CLs are used as unit words for counting. In Chinese, some CLvs are used in counting events, and thus e-external, whereas some other CLvs are used in counting actions internal to a certain event and thus e-internal. Jeong (2002: 5) correctly states that CLvs like *cì* "are used to count an event denoted by VP as a whole"; whereas instrument CLvs "are used to count 'sub-event' or a 'slice' of an event". The external CLv *cì* is seen in (2a) and the first sentence of (8a), while the internal CLv$^{\text{fist}}$ *quán* is seen in (2b) and the second sentence of (8a). The two CLvs in (8a) are not exchangeable, as seen in (8b)

(8)   a.   Dàlín dǎ-le   Yùrú sān cì. Měi cì   dōu dǎ-le   sān quán.
           Dalin beat-PRF Yuru three CL each time all   beat-PRF three CL$^{\text{fist}}$
           'Dalin beat Daxiong three times. Each time he punched him three times.'
      b.   #Dàlín dǎ-le   Yùrú sān quán. Měi quán dōu dǎ-le   sān cì.
            Dalin beat-PRF Yuru three CL$^{\text{fist}}$ each CL$^{\text{fist}}$ all beat-PRF three CL

The disconnectedness parameter mentioned above can be seen in (9) and (10). In (9a), the CLv *cì* is e-external. The sentence can be followed by the sentence in the brackets, which elaborates the disconnected relation of the two events. However, in (9b), the CLv *quán* is e-internal, and thus the sentence may not be followed by the sentence in the brackets. The connectedness of the two actions is ensured by the internal CLv, in the absence of any adverb such as *liánxù* 'continuously'. The contrast shows that the internal CLv correlates with a connectedness effect. Similarly, the internal CLv *xià* in (10) rejects reading A. If the internal CLv were changed into the external CLv *cì*, this reading would be possible.

(9)   a.   Tā dǎ-le   wǒ liǎng cì. (Zuótiān dǎ-le   yí cì, jīntiān dǎ-le   yí cì.)
           3SG beat-PRF 1SG two CL   yesterday beat-PRF one CL today beat-PRF one CL
           'He beat me two times. (He beat me once yesterday and once today.)'
      b.   Tā dǎ-le   wǒ liǎng quán. (#Zuótiān dǎ-le   yí quán, jīntiān dǎ-le   yí quán.)
           3SG beat-PRF 1SG two CL$^{\text{fist}}$ yesterday beat-PRF one CL$^{\text{fist}}$ today beat-PRF one CL$^{\text{fist}}$
           'He punched me two times. (#He punched me yesterday and today.')
(10) Dàlín tiào-le   liǎng xià.
     Dalin jump-PRF two   CL
     A: Unavailable reading: 'On two separate occasions he jumped once.'
     B: Available reading: 'On one occasion he jumped two times.'

The semantic contrast between the two types of CLv is also seen in their compatibility with different situation types. External CLvs may occur with any situation types, but the internal ones typically occur with semifactives, rejecting some other situation types (see Zwarts 2005: 772, and the references therein, for a discussion of the distinctive semantics of semifactives). From the comparison between (11) and (12), one can see that the same situation may occur with the e-external CLv *cì*, but not an e-internal CLv. The achievement that occurs with the external CLv *ci* in (11a) is not compatible with the internal CLv *jiǎo* or *xià* in (12a); the accomplishment that occurs with *cì* in (11b) is not compatible with the internal CLv *yǎn* or *xià* in (12b); and the state that occurs with *cì* in (11c) is not compatible with the internal CLv *xià* in (12c) (also see Huang 1997: 60 fn. 4 for more examples where *ci*

occurs with various situation types).

(11) a. Lìli qù-le Bālí sān cì.
     Lili go-PRF Paris three CL
     'Lili went to Paris three times.'
   b. Lìli dú-le nà běn shū sān cì.
     Lili read-PRF that CL book three CL
     'Lili read that book three times.'
   c. Lìli tóu-tòng-le sān cì.
     Lili head-pain-PRF three CL
     'Lili had headache three times.'
(12) a. *Lìli qù-le Bālí sān {jiǎo/xià}.
     Lili go-PRF Paris three CL^{foot}/CL
   b. *Lìli dú-le nà běn shū sān {yǎn/xià}.
     Lili read-PRF that CL book three CL^{eye}/CL
   c. *Lìli tóu-tòng-le sān xià.
     Lili head-pain-PRF three CL

The restriction on internal CLvs is semantic: subject to pragmatic plausibility, any situation type may occur multiple times, but not all situation types are repeatable continuously.

2.3 Forms and lexical semantics of the two types of CLvs

Typical e-external CLvs include *cì, huí*, *biàn*, *tàng,* and *dùn*. Such CLvs do not specify any instrument information of the eventuality. They are thus highly grammaticalized, like functional elements. For this reason, they form a closed class (Jeong 2002).

Typical internal CLvs have three subtypes. The first subtype is *xià*, which also does not specify the instrument information of the eventuality, as seen in (13) (also (10)).

(13) Dàlín dǎ-le Yùrú sān xià.
    Dalin hit-PRF Yuru three CL
    'Dalin hit Yuru three times.'

The second subtype is instrument CLvs, which share their forms with an instrument word, such as the CLv^{gun} *qiāng* in (14a), with a human body-part instrument word, such as the CLv^{foot} *jiǎo* in (14b), and some other instrument word, such as the CLv^{voice} *shēng* in (14c).

(14) a. Dàlín duìzhe xiǎo niǎo dǎ-le sì qiāng.
     Dalin to small bird beat-PRF four CL^{gun}
     'Dalin shot the small bird four times.'
   b. Dàlín tī-le Yùrú liǎng jiǎo.
     Dalin kick-PRF Yuru two CL^{foot}
     'Dalin kicked Yuru two times.'
   c. Dàlín jiào-le Yùrú liǎng shēng.
     Dalin shout-PRF Yuru two CL^{voice}
     'Dalin called Yuru two times.'

The third subtype is goal CLvs, which share their forms with the goal of the action expressed by the verb, if the goal is a human-body part, such as the CLv^{mouth} *zuǐba* in (15a) (Zhang 2002: 4). As shown by (15b), if a word shares its form with the goal of an action but

the goal is not a human body part, it may not function as a CLv.

(15) a. Dàlín dǎ-le   Yùrú liǎng zuǐba.
        Dalin beat-PRF Yuru two   CL^mouth
        'Dalin slapped Yuru at his mouth twice.'
     b. *Dàlín dǎ-le   nà zuò fángzi liǎng mén
         Dalin beat-PRF that CL house two   door
         Intended: 'Dali hit the door of the house twice.'

Like many CLns (e.g., *gēn* 'CL^root' for needles and *wěi* 'CL^tail' for fish), the latter two subtypes of internal CLvs share their forms with other substantial words, especially instrument words. There seem to be unlimited number of instrument words and many of them can be used as internal CLvs. This type of CLvs have thus been claimed to be an open class (Jeong 2002).

Note that the fact that the physical presence of an instrument is required for the use of an instrument CLv construction is compatible with the counting unit function of the CLv (*pace* Tsai 2014: Section 5.3). This is similar to the situation that when *wei* 'CL^tail' is used as a counting unit for counting fish, we do not deny that a fish has a tail physically.

If an instrument adverbial occurs, an instrument internal CLv must be semantically compatible with the adverbial. For instance, in (16a), the CLv *dao* 'CL^knife' is compatible with the instrument adverbial *yong caidao* 'with a knife', but not *yong gunzi* 'with a stick'. Similarly, a goal internal CLv must be semantically compatible with the real goal expression in the clause. For instance, in (16b), the CLv *zuiba* 'CL^mouth' is compatible with the goal expression *cháo Yùrú de zuǐ* 'toward Yuru's mouth', but not *cháo Yùrú de jiānbǎng* 'toward Yuru's shoulder'.

(16) a. Dàlín yòng {*gùnzi/càidāo} kǎn-le   nà gè nánguā   liǎng dāo.
        Dalin with   stick/knife   cut-PRF that CL pumpkin two   CL^knife
        'Dalin cut that pumpkin with a {knife/*stick} two times.'
     b. Dàlín cháo   Yùrú de {*jiānbǎng/zuǐ} dǎ-le   tā liǎng zuǐba.
        Dalin toward Yuru DE   shoulder/mouth beat-PRF 3SG two CL^mouth
        'Dalin beat Yuru on his mouth two times.'

We thus see that a certain part of the semantics of a clause is visible in the CLv. Similarly, a certain part of the semantics of a nominal can also be visible in a CLn. The CLn *jià* in (17a) and the CLn *zuò* in (17b), for instance, both characterize the referent of the noun *qiao* 'bridge' ((17) is from Ōta 1958 [2003: 151]).

(17) a. sān   jià qiáo   b. sān   zuò qiáo
        three CL bridge   three CL   bridge
        'three frame-like bridges'   'three hill-like stone bridges'

The lexical meanings of CLs indicate that they do not behave like typical functional elements. All CLs are semi-functional elements (see Zhang 2013: 208-212 for the semi-functional properties of CLns).

2.4 A comparison to the traditional classification of CLvs
The external-internal classification of CLvs proposed in this paper is different from Ōta (1958 [2003: 153]) and Zhu's (1982: 50-51) classification. In their classification, instrument CLv belong to one group exclusively, in contrast to the rest, including the CLv *xià*. The former

group is called derived or borrowed CLvs, whereas the latter group is called pure or non-derived ones. Their classification is lexical semantic (i.e., whether a CLv denotes an instrument) and diachronic. No structural contrast between the two types is shown in their work (see the rest of this paper for such contrasts between external and internal CLvs). Examples like (9) and (10) show that *xià* patterns with instrument CLvs in its function, even though it does not denote an instrument. *Xià* and instrument CLs are e-internal, in contrast to the e-external ones.

3. Accounting for some shared properties of CLvs
3.1 Four generalizations of CLvs in Mandarin Chinese
3.1.1 A: The numeral-CL sequential generalization

When a CLv occurs with a numeral, like a CLn, it follows the latter in the language. In (18), the CLn *tóu* must follow the numeral *sān* 'three'; similarly, in (19), the CLe *chang* must follow the numeral in the nominal. In (20), the CLv *bāzhǎng* also must follow the numeral.

(18) a.   sān tóu zhū   b. *tóu sān   zhū
        three CL pig   CL three pig
        'three pigs'
(19) a.   na sān chang bisai   b. *na chang san   bisai
        that three CL   competition   that CL   three competition
        'those three competitions'
(20) a.   dǎ-le   sān bāzhǎng   b. *dǎ-le   bāzhǎng sān
        beat-PRF three CL$^{\text{palm}}$ beat-PRF CL$^{\text{palm}}$ three
        'slapped three times'

3.1.2 B: The s-selection generalization

It is well-known that CLns may have s-selection on the associate NPs. The CLn *tóu* is used for animals such as pigs, but not for horses; however, the use of the CLn *pī* is just the opposite, as shown in (21).

(21) a.   dǎ-le   sān {tóu /*pī} zhū   b. dǎ-le   sān {*tóu/pī} mǎ
        beat-PRF three CL/CL pig   beat-PRF three   CL/CL horse
        'beat three pigs'   'beat three horses'

A CLe may also have s-selection relation with an event-denoting expression. E-external CLes can be either general (*cì, huì*) or action-semantic-specific. For instance, *tàng* is for trips (Chao 1968: 616), but not for reading a book; in contrast, *biàn* is for reading a book, checking a road, etc., but not for trips. In the nominal domain, the CLe *dùn* can be used for meals, but not for cultural entertainment shows; in contrast, the CLe *chǎng* can be used for shows, but not for meals, as shown in (22).

(22) a.   nà sān {dùn/*chang} jiǎozi   b. nà sān {*dùn/chǎng} biǎoyǎn
        that three CL/CL   dumpling.meal   that three   CL/CL   show
        'those three dumpling meals'   'those three shows'

The same is true in the verbal domain. The CLv *dùn* can be used for meals, as in (23a), but neither for an eating event that does not count as meals (I thank a reviewer for reminding me of the different uses between *dùn* and *cì* for an eating event), nor for a cultural entertainment event, as shown in (23c).

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(23) a.　Dàlín chī-guò sān　{dun/*chang} jiǎozi.
　　　　Dalin eat-EXP three CL/CL　dumpling
　　　　'Dalin ate dumpling meals three times.'
　　b.　Dàlín chī-guò sān　{*dùn/ci} bingqilin.
　　　　Dalin eat-EXP three　CL/CL　ice-cream
　　　　'Dalin ate ice-cream three times.'
　　c.　Dàlín kàn-guò　sān　{*dun/chang}　Tiān'é-hú.
　　　　Dalin watch-EXP three　CL/CL　　　　Swan-Lake
　　　　'Dalin watched Swan-Lake three times.'

Like external CLvs, internal CLvs can also be either general (*xià*) or action-semantic-specific. The latter situation is typically seen in (compatible) instrument CLvs. However, the selection restriction can also be arbitrary. For instance, the internal CL$^{\text{fist}}$ *quán* is for beating, as in (2b), not knocking at a door, as shown in (24), although one's fist may also be used in knocking at a door.

(24)　Dàlín zài mén-shàng qiāo-le　sān　{xià /*quán}.
　　　Dalin at door-on　knock-PRF　three　CL/CL$^{\text{fist}}$
　　　'Dalin knocked at the door three times.'

Like CLns, the s-selection differences of various CLvs justify the availability of multiple forms of CLvs. The English CLv *time* has no s-selection, and thus it is the unique form of CLv in the language. In this sense, the CLv in English is similar to the CLn *e* in Niuean, which occurs with a numeral and is the unique CLn in the language (Massam 2009).

3.1.3 C: The non-adjunct status of the combination of a numeral and a CL

The combination of a numeral and an e-external CLv is not an adverbial. For instance, the frequentative adverbial *jīngcháng* 'often' never surfaces between a transitive verb and its object, as seen in (25a), but the string *sān cì* 'three CLv' in (25b) occurs between the verb *kān-guò* 'see-EXP' and its object *nà bù diànyǐng* 'that movie'.

(25) a.　Dàlín (jīngcháng) kàn (*jīngcháng) diànyǐng.
　　　　Dalin often　　　see often　　　movie
　　　　'Dalin often sees movies.'
　　b.　Dàlín　kàn-guò s̲a̲n̲　c̲ì̲ nà　bù　diànyǐng.
　　　　Dalin　see-EXP three　CL that CL　movie
　　　　'Dali saw that movie three times before.'

Moreover, a CLv behaves like a head element, rather than an adverbial, since it licenses VP ellipsis, as seen in (26a). In contrast, an adverb, such as the frequentative adverb *ǒu'ěr* 'occasionally', does not license VP ellipsis, as seen in (26b).

(26) a.　Dàlín céngjīng sān　cì chí-dào,　Yùrú liǎng cì　c̶h̶í̶-̶d̶à̶o̶.
　　　　Dalin before　three CL arrive-late Yuru two　CL arrive-late
　　　　'Dalin was late two three times, and Yuru was later two times.'
　　b.　*Dàlín jīngcháng chí-dào,　Yùrú ǒu'ěr　　　c̶h̶í̶-̶d̶à̶o̶.
　　　　Dalin often　　arrive-late Yuru occasionally arrive-late

The combination of a numeral and an e-internal is not an adverbial, either. For instance, an instrument CLv cannot be an instrument adverbial, since it may occur with another

instrument adverbial, such as *yòng shǒu* 'with hand' in (27).

(27)　　Dàlì <u>yòng　　shǒu</u>　dǎ-le　　nà　gè　nánguā　liǎng　quán.
　　　　Dali with　　hand　　beat-PRF　that CL　pumpkin　two　　CL^{fist}
　　　　'Dali punched that pumpkin with his hand two times.'

Before stating my argument, I clarify that first, the word *yòng* 'with, use' in (27) is not a verb. This can be seen in a fact about the so-called A-not-A questions. In Chinese, A-not-A questions are yes-no questions. They are formed by the reduplication of the initial syllable of a verb (or of a larger prosodic unit of the predicate phrase), and an appropriate negation word (*bù* 'not' or *méi* 'not') between the reduplicant and the base. All verbs may undergo A-not-A question formation (Huang 1982). However, *yòng* fails to undergo the A-not-A question formation in the context.

(28)　*Dàlì　<u>yòng-mei-yong　　shǒu</u>　dǎ-le　　nà　gè　pumpkin　liǎng　　quán?
　　　　Dali　with-not-with　　　hand　　beat-PRF　that CL　pumpkin　two　　CL^{fist}
　　　　Intended: 'Did Dali punch that pumpkin with his hand two times?'

Second, in (27), *yòng* and *shǒu* 'hand' form a constituent (Sybesma 1999: 169; see Tsai 2014: Section 3 for a different analysis of instrument constructions). The noun *shǒu* can be replaced with a full-fledged definite nominal, as in (29a), and the combination *yòng* and the nominal can be fronted to a topic position, as seen in (29b).

(29) a.　Dàlì <u>yòng　　nà　zhi　shǒu</u>　dǎ-le　　nà　gè　nánguā　liǎng　quán.
　　　　　Dali with　　that CL　hand　beat-PRF　that CL　pumpkin　two　　CL^{fist}
　　　　　'Dali punched that pumpkin with that hand of his two times.'
　　　b.　<u>Yòng　(nà zhi) shǒu</u>,　Dàli dǎ-le　　nà　gè　nánguā　liǎng　quán.
　　　　　with　　that CL　hand　　Dali beat-PRF　that CL　pumpkin　two　　CL^{fist}
　　　　　'With {that hand of his/his hand}, Dali punched that pumpkin two times.'

No predicate allows two instrument adverbials (*I fixed the roof with a harmer with nails. See Svenonius 2014: 7 for the theory of "uniqueness of roles" to rule out such an example). Since *yòng shǒu* in (27) is already an instrument adverbial, the string *liǎng quán* cannot be another instrument adverbial.

Note that unlike the combination of a numeral and a CLv, a frequentative adverbial may not occur sentence-finally in the language:

(30)　　Dàlín (fǎnfù)　kàn nà bù diànyǐng (*fǎnfù).
　　　　Dalin repeatedly see that CL movie　　repeatedly
　　　　'Dalin saw that movie repeatedly.'

3.1.4 D: The non-imperfective generalization
Like a frequentative adverb such as *jīngcháng* 'often', a CLv never occurs with a verb that has the aspect marker *-zhe, zài, -qǐlái,* and *-xiàqu*, and the sentence-final aspect particle *ne*, regardless of whether the CLv is e-external, as in (31a), or e-internal, as in (31b). All of these markers denote an imperfective aspect, which presents only part of a situation, not including its endpoint (Comrie 1976: 4). Thus, no CLv is compatible with an imperfective aspect.

(31) a.　*Dàlín dǎ-zhe　Yùrú sān　cì.　　　　b.　*Dàlín dǎ-zhe　Yùrú sān　quán.
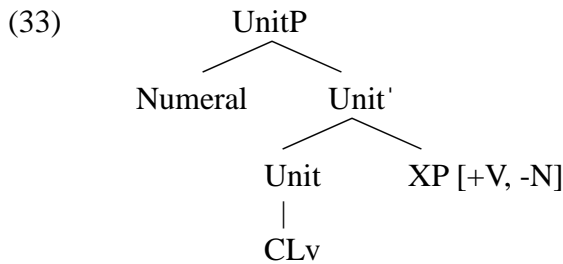　　　　　Dalin beat-DUR Yuru three CL　　　　　　Dalin beat-DUR Yuru three CL^{fist}

The four generalizations reported in this section are summarized as follows:

(32)   A: The numeral-CL sequential generalization
         B: The s-selection generalization
         C: The non-adjunct generalization
         D: The non-imperfective generalization

3.2 My analysis of the generalizations
3.2.1 The complementation structure of a numeral expression

I claim that a CLv heads a functional projection UnitP, taking the numeral as its Spec and the verbal phrase as its complement, as the tree in (33) shows.

(33)   UnitP
              /   \
        Numeral   Unit'
                   /   \
               Unit   XP [+V, -N]
                |
               CLv

The head status of CLvs is supported by their ability to license VP ellipsis, seen in (26a) above.

This Spec-Head-Complement structure for a numeral, a CL, and the associated XP is the same structure for a numeral construction in the nominal domain (Cheng & Sybesma 1998: 406; Watanabe 2006; 2010; Zhang 2013). If the Unit is realized by a CLn, its complement is a nominal XP. The complementation structure thus unifies the syntax of CLns and that of CLvs.

In this structure, the local Spec-head relation between a numeral and a CLv captures Generalization A, i.e., the sequential relation between a numeral and a CL; and the local head-complement relation between a CLv and its associate verbal phrase captures Generalization B, i.e., the selection relation between the two elements. Moreover, a Spec-head relation of a numeral and a CLv also captures Generalization C, i.e., the combination of the two elements is not an adjunct. I discuss the last generalization in the next subsection.

3.2.2 The general low position of a CLv with respect to viewpointAspP

According to Travis (2010), a viewpoint aspect (e.g., perfective, progressive) is licensed by a functional projection that is projected higher than vP. Let us call this projection viewpointAspP. This projection is located between the surface and base-positions of a subject (see Bošković 2014: 30). Generalization D shows that a CLv never occurs with an imperfective aspect. This generalization tells us that both types of CLvs are in the scope of the viewpointAsp that has the feature [-imperfective]. I thus claim that a UnitP headed by a CLv is lower than viewpointAspP, regardless of whether the CLv is internal or external, as illustrated in (34).

(34)   [$_{viewpointAspP}$ ...   [$_{UnitP}$ CLv …]]
         [-imperfective]

In this section, I have explained the four generalizations of CLv constructions. The numeral-CL sequential generalization (A) is observed because a numeral and a CL have a

Spec-head relation, regardless of whether the CL is a CLn or CLv. The s-selection generalization (B) indicates that a CL takes its associate phrase, regardless of whether it is nominal or verbal, as its complement. The non-adjunct generalization (C) is also predicted by this Spec-head relation between a numeral and a CL. Finally, the non-imperfective generalization (D) is seen because the projection headed by a CLv is always lower than viewpointAspP.

4. Accounting for the position contrasts of the two types of CLvs
4.1 The position contrasts of the two types of CLvs
An external CLv may generally occur to the right (R), or the left (L) of a predicate, or between a verb and its complement (Middle: M).

(35) a.　Dàlín céngjīng kān-guò nà bù diànyǐng sān c̄ì.　　　external CLv　R
　　　　 Dalin before　see-PRF that CL movie　three CL
　　 b.　Dàlín céngjīng sān c̄ì kān-guò nà bù diànyǐng.　　　　　　　L
　　 c.　Dàlín céngjīng kān-guò sān c̄ì nà bù diànyǐng.　　　　　　　M
　　　　 All: 'Dalin saw that movie three times before.'

　　For each of the three positions, there are specific constraints (e.g., Chao 1968: 616; Fang 1993; Zhang 2010, among others). For instance, (36) is not acceptable:

(36) * Dàlín sān dùn chīguò　jiǎozi.
　　　 Dalin three CL eat-EXP dumpling

Nevertheless, the availability of the three positions, including the L one, is documented in the Academia Sinica corpus and attested by psycholinguistic experiments (Lo 2013) (also see Ernst 1996: 183; 2002: 383; see 5.2 for a further discussion of the issue).
　　However, only the R position is possible for an internal CLv (Jeong 2002: 7) (see Zhang 2014b for a discussion of complex predicate constructions).

(37) a.　Dàlín céngjīng dǎ-guò Yùrú sān quán.　　　　　internal CLv　R
　　　　 Dalin before　beat-EXP Yuru three CL^{fist}
　　　　 'Dalin punched Yuru three times before.'
　　 b.　*Dàlín céngjīng sān quán dǎ-guo Yùrú.　　　　　　　　　　L
　　 c.　*Dàlín céngjīng dǎ-guo sān quán Yùrú.　　　　　　　　　　M

　　In order to explain the position contrasts, I first discuss the syntactic positions of UnitPs that host the two types of CLvs.

4.2 The high UnitP and the low UnitP
UnitP headed by a CLv is a variant of Cinque's AspP$_{frequentative}$ (see Cinque 1999: 205, fn. 39). In order to avoid confusion with other kinds of AspP, I re-label his AspP$_{frequentative}$ as FreqP. FreqP$_{(H)}$ (= his AspP$_{frequentative\ (I)}$), which is e-external and in a high position, correlates with a high UnitP, for external CLvs; and FreqP$_{(L)}$ (= his AspP$_{frequentative\ (II)}$), which is e-internal and in a low position, correlates with a low UnitP, for internal CLvs.

(38)　　　… [$_{FreqP(H)/UnitP}$^{external} … [$_{FreqP(L)/UnitP}$^{internal} …]]
　　　　　　 (e-external)　　　　　(e-internal)

　　Importantly, Cinque (1999: 27, 92, 130) claims that the e-external one is projected

higher than Voice, whereas the lower one is projected lower than Voice. To simplify the basic hierarchy, I claim that the higher one is higher than vP, and the lower one is lower than vP. Thus, we have the contrast between (39a) and (39b):[3]

(39)   a. $[_{\text{viewpointAspP}} \ldots [_{\text{UnitP}}^{\text{external}} \ldots \quad [_{\text{vP}} \ldots \quad _{\ldots} \quad [_{\text{vP}} \ldots]]]]$
        b. $[_{\text{viewpointAspP}} \ldots \qquad\qquad [_{\text{vP}} \ldots [_{\text{UnitP}}^{\text{internal}} \ldots \quad [_{\text{vP}} \ldots]]]]$
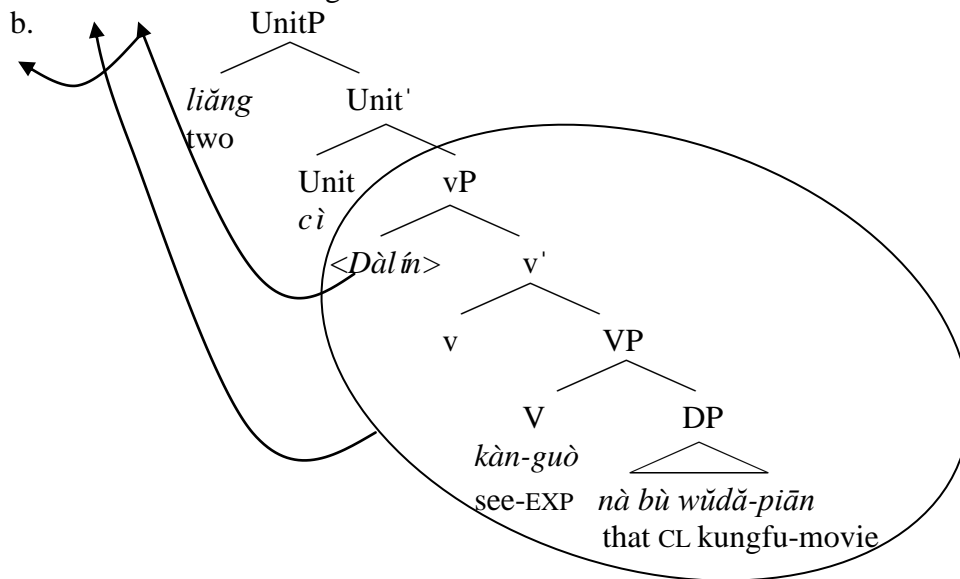
4.3 Deriving the three orders
4.3.1 Deriving the R-position of a CLv

I have argued that (33) represents the base-order of the elements of a numeral expression. The R-position of a CLv can be derived by the movement of the complement of the CLv, as shown in (40):

(40) $[_{\ldots} \text{XP}_i \ldots [_{\text{UnitP}} \text{numeral CLv } t_i]]]$

The R-position of the external CLv *cì* in (41a) is derived by the structure in (41b) (since the syntax of the adverb *céngjīng* 'before' does not affect my argumentation, I ignore it in the structure).

(41) a.   Dàlín céngjīng kàn-guò nà bù wǔdǎ-piān   liǎng cì.   (= (35a))
          Dalin before   see-PRF that CL kungfu-movie two   CL
          'Dalin saw that kungfu-movie two times before.'
     b.   UnitP
              /   \
          liǎng   Unit'
          two   /   \
                  Unit   vP
                  cì   /   \
                    <Dàlín>   v'
                            /   \
                           v   VP
                                    /   \
                                   V   DP
                                kàn-guò   /‾‾\
                                see-EXP *nà bù wǔdǎ-piān*
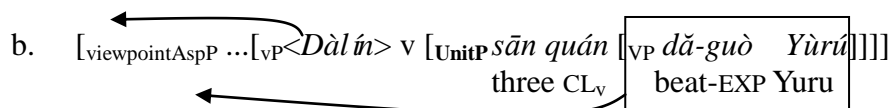   that CL kungfu-movie

In this structure, the subject moves out of vP to a higher position (Huang 1993), and the remnant vP moves to a position to the left of UnitP (In the language, as argued in Huang 1993, such vP-fronting is available independently). Then the subject moves further to the left of the raised vP, by, e.g., topicalization.

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[3] In Travis (2010), InnerAspP licenses a situation-type aspect (e.g., state, accomplishment), and is projected lower than vP. Compatible with her theory, in my analysis, the high UnitP is above InnerAspP, outside the scope of the latter. This explains the free situation types occurring with external CLvs, seen in (11). The structural position of this UnitP is captured by (39a), even though InnerAspP is not marked there. The low UnitP, however, is below the InnerAspP and thus is in the scope of the situation type specified by the features of InnerAsp. We have seen in (12) that situation types for internal CLvs are restricted. The structural position of this UnitP is captured by (39b), assuming InnerAspP is between vP and UnitP$^{\text{internal}}$.

As for the R-position of an internal CLv, I claim that the VP, which is the complement of the internal CLv, moves to left of vP. For instance, the structure of (42a) is (42b).

(42) a.   Dàlín céngjīng dǎ-guò Yùrú   sān quán.   (= (37a))
       Dalin before   beat-EXP Yuru three CL$^{\text{fist}}$
       'Dalin punched Yuru three times before.'

b.   [$_{\text{viewpointAspP}}$ ...[$_{vP}$<*Dàlín*> v [$_{\textbf{UnitP}}$ *sān quán* [$_{VP}$ *dǎ-guò   Yùrú*]]]]
                                    three CL$_v$ beat-EXP Yuru

In this structure, the subject moves out of the vP, as usual, and it surfaces to the left of the raised VP. See 5.3 for more about this VP-fronting.

The movement of the complement of a CLv captures the availability of the R position for both types of CLvs (35a and 37a).

4.3.2 Deriving the L-position of a CLv

The L-position of an external CLv is derived without vP movement. (43a) is derived in the structure in (43b). Again, as usual, the subject moves out of vP to a higher position.

(43) a.   Dàlín céngjīng liǎng cì kàn-guò nà   bù wǔdǎ-piān.   (= (35b))
       Dalin before   two   CL see-EXP that CL kungfu-movie
       'Dalin saw that kungfu-movie two times before.'

b.   [$_{\text{viewpointAspP}}$ [$_{\text{UnitP}}$ *liǎng cì* [$_{vP}$ <*Dàlín*> v [$_{VP}$ *kàn-guò nà bù wǔdǎ-piān*   ]]]]]
                  two   CL   Dalin   see-EXP that CL kungfu-movie

Now we examine why an internal CLv may not occur in the L-position, as seen in (37b), repeated here as (44a). The unacceptable (44a) is supposed to have the structure in (44b). We can see that in the same vP phase, between the two verbal heads, v and V, the CLv *quán*, which is a nominal head (see 5.3), occurs. This phase is labelled as an improper phase.

(44) a.   *Dàlín céngjīng sān   quán dǎ-guò   Yùrú.   (= (37b))
        Dalin before   three CL$^{\text{fist}}$ beat-EXP Yuru

b.   *[$_{\text{viewpointAspP}}$... [$_{vP}$<*Dàlín*> v   [$_{\text{UnitP}}$ *sān*   *quán* [$_{VP}$ *dǎ-guò Yùrú*]]]]]
                         | three   CL$^{\text{fist}}$ beat-EXP
   improper phase: [+V,-N]   [-V,+N] [+V,-N]

I claim that the complement of an internal CLv, i.e., VP, must move. If the VP does not move, the vP phase, as an extended projection of VP, is intervened by UnitP, which is a nominal projection. The intervention is syntactically problematic (See 5.3 for a further discussion). This explains why an internal CLv may not occur in the L-position.

4.3.3 Deriving the M-position of a CLv

The M-position of an external CLv, as in (35c), is derived by the raising of the object to the Spec of XP (=Topic/FocusP) that is between the high UnitP and vP (see below), followed by the vP-fronting. Other details, e.g., the raising of the subject, are the same as those in (41b). For instance, the example in (45a) has the structure in (45b).

(45) a. Dàlín céngjīng kàn-guò liǎng cì nà bù wǔdǎ-piān.　　　(= (35c))
　　　Dalin before　see-PRF　two CL that CL kungfu-movie
　　　'Dalin saw that kungfu-movie two times before.'
　　b.
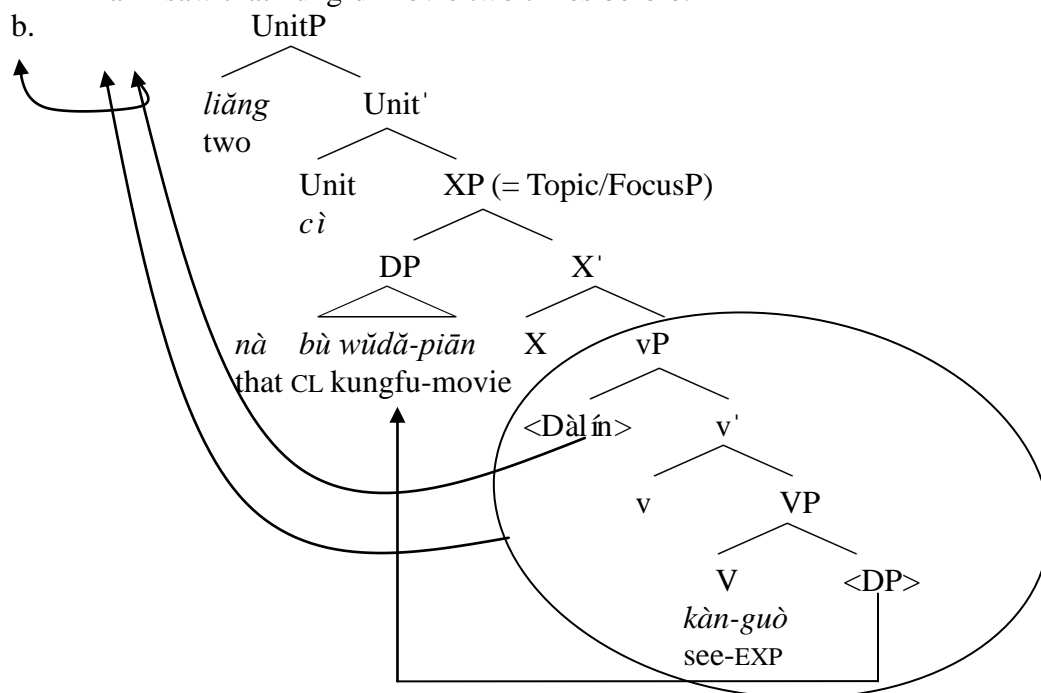
　　Compared with (41b), (45b) has one more operation: the A-bar movement of the object. This movement is independently available in the language (e.g., Ernst & Wang 1995; Zhang 2000). The XP that hosts the fronted object is provided for a certain information-structure consideration (focus or topic, see Chao 1868: 616; Fang 1993). It is out of the θ-domain. One shared constraint on an object-fronting construction and the construction in which a CLv occurs in the M-position is that the object may not be a pronoun. In (46a), the preposed object is *nà běn shū* 'that CL book', which may not be replaced by *tā* 'it'. Similarly, in (46b), where the CLv occurs in the M-position, the object may not be a pronoun. The fact that an M-position CLv rejects a pronoun object has been noted in Chao (1968: 616). This fact supports our object-fronting analysis of the construction in which a CLv occurs in the M-position.

(46) a. Dàlín {nà běn shū/*tā} kàn-guò-le.
　　　Dalin that CL book/3SG read-EXP-PRF
　　　'Dalin has read that book.'
　　b. Dàlín céngjīng kàn-guò liǎng cì {nà bù wǔdǎ-piān/*tā}.
　　　Dalin before　see-PRF　two CL that CL kungfu-movie/it
　　　'Dalin saw that kungfu-movie two times before.'

　　Another shared constraint on an object-fronting construction and the construction in which a CLv occurs in the M-position is that the object may not start with a numeral. In (47a), the preposed object is *nà běn shū* 'that CL book', which may not be replaced by *san ben shu* 'three books' (see Ernst & Wang 1995: 240 for more discussion). Similarly, in (47b), where the CLv occurs in the M-position, the object may not be *san ben shu*. The fact that an M-position CLv rejects a numeral-initial object has been discussed in Fang (1993: 55). This fact also supports our object-fronting analysis of the construction in which a CLv occurs in the M-position (I thank a reviewer for pushing me to highlight this constraint on the M

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position of external CLvs).

(47) a. Dàlín {nà běn shū/*sān běn shū } kàn-guò-le.
      Dalin that CL book/three CL book read-EXP-PRF
      'Dalin has read that book.'
   b. Dàlín céngjīng kàn-guò liǎng cì {nà bù wǔdǎ-piān/*sān bù wǔdǎ-piān}.
      Dalin before   see-PRF   two CL that CL kungfu-movie/three CL kungfu-movie
      'Dalin saw that kungfu-movie two times before.'

In (37b), we have seen that the internal CLv may not occur in the M-position. Let us see why internal CLvs are constrained in this way. If the same syntactic operations that are used to derive (45a) are applied, the unacceptable form in (48a) should have the structure in (48b).

(48) a. *Dàlín céngjīng dǎ-guò   sān quán Yùrú.   (= (37c))
      Dalin before   beat-EXP three CL^{fist} Yuru

   b. [$_{viewpointAspP}$ ...[$_{vP}$<Dàlín>v [$_{UnitP}$ sān quán [*$_{XP}$ [$_{VP}$ dǎ-guò   Yùrú]]]]]
                              three CL$_v$ beat-EXP Yuru

We can see that in order to derive the M-order, the object is supposed to move to a position lower than the internal CLv, which is below vP; however, since such an XP (FocP or TopicP) may not be projected in the θ-domain, the object has no place to move to. Thus the M-position is impossible for an internal CLv.

4.4 Summary of the proposed analysis

Compatible with the structural height difference between external and internal frequentative adverbs, the projection headed by an external CLv is higher than vP, and the projection headed by an internal CLv is lower than vP. As a consequence, an external CLv and an internal CLv take vP and VP as their complement, respectively. This categorial-level difference of the complements of the two types of CLvs explains their position contrasts. I have argued that for an external CLv, the movement of its complement, i.e., vP, is optional. If the movement occurs, the R-order is derived; if it does not occur, the L-order is derived. Moreover, the M-order is derived by both the object raising and then the remnant vP-fronting. For an internal CLv, however, the complement of the CLv is VP, and the movement of the VP is obligatory. If the VP remains in situ, the UnitP, which is nominal, will intervene between vP and VP in the same phase. Also, there is no landing site below the low UnitP for an A-bar movement of the object, making the M-order impossible for internal CLvs. Therefore, only the R-order is possible.

5. Further justification of the analysis
5.1 A-bar movement of a verbal phrase in a post-verbal CLv construction

In order to explain the availability of the three possible positions of a CLv, I have proposed that the movement of a verbal phrase is responsible for the two post-verbal positions, i.e., the R and M positions, and the absence of the movement is responsible for the L position.

In a CLv construction, the CLv takes a verbal phrase as its complement and s-selects the latter. If the surface order does not match the structural relation of the selection, it must be different from the base-generated order. This is seen in the constructions where the CLv occurs in either the M or R position. I have claimed that a movement operation has been applied to the complement of the CLv in the constructions.

One piece of evidence for the movement of a verbal phrase in a post-verbal CLv

construction is an A-not-A fact. Recall that an A-not-A questions are yes-no question that is formed by the reduplication of the initial syllable of a verb (or of a larger prosodic unit of the predicate phrase), and an appropriate negation word (*bù* 'not' or *méi* 'not') between the reduplicant and the base (see the text above (28)). In the declarative (49a) below, for instance, the verb *qù* 'go' occurs at the left-edge of the predicate. In the yes-no question in (49b), the A-not-A form *qù-méi-qù-guò* occurs. (49b) alternates with (49c), in which it is the auxiliary *shì* 'be', rather than the verb, that is in the A-not-A form.

(49) a. Dàlín qù-guò Bālí.　　　　　　　　b. Dàlín qù-méi-qù-guò Bālí?
　　　　Dalin go-EXP Paris　　　　　　　　　　Dalin go-not-go-EXP Paris
　　　　'Dalin has been to Paris.'　　　　　　　'Has Dalin been to Paris?'
　　c. Dàlín shì-bù-shì qù-guò Bālí?
　　　　Dalin be-not-be go-EXP Paris
　　　　'Has Dalin been to Paris?'

An A-not-A form is licensed by a question feature in Infl/C (Huang 1982; Soh 2005). The licensing is syntactic, and thus not all verbs that surface at the left-edge of a predicate may have an A-not-A form. It may if the hosting verbal phrase is base-generated there as a matrix predicate. In (50a), the left-edge verb *zuò* 'sit' is in a manner adverbial, rather a matrix predicate, and thus it may not have an A-not-A form. Comparing (51a), and (51b), one can see that in the latter, the verbal phrase *zébĕi háizi* 'blame kid' is fronted. (51c) shows that the verb *zébĕi* 'blame' in the fronted verbal phrase may not have an A-not-A form. Moreover, both (50b) and (51d) show that if an A-not-A verb is not allowed, the A-not-A form of the auxiliary *shì* 'be' may occur, instead.

(50) a. *Dàlín zuò-méi-zuò-zhe shuìjiào?　　b. Dàlín shì-bù-shì zuò-zhe shuìjiào?
　　　　 Dalin sit-not-sit-PRG　　sleep　　　　　 Dalin be-not-be sit-PRG sleep
　　　　　　　　　　　　　　　　　　　　　　　　'Did Dalin sleep while sitting?'

(51) a. Dàlín bù yuànyì zébĕi háizi.
　　　　Dalin not want blame kid
　　　　'Dalin does not want to blame the kid.'
　　b. Dàlín zébĕi háizi bù yuànyì.
　　　　Dalin blame kid not want
　　　　'Blame the kid, Dalin does not want to.'
　　c. *Dàlín zé-bù-zébĕi 　　　 háizi bù yuànyì?
　　　　 Dalin blame-not-blame kid　　not want
　　d. Dàlín shì-bù-shì zébĕi háizi bù yuànyì?
　　　　Dalin be-not-be blame kid　　not want
　　　　'Is it true that Dalin does not want to blame the kid?'

Now turn to CLv constructions. The CLv in (52a) is in the R-position and the one in (52b) is in the M-position. Compare these two unacceptable forms with the acceptable one in (49b). The difference is that the former has a numeral and a CLv, whereas the latter does not. We thus see that in the presence of a CLv, a verb may not have an A-not-A form, although it surfaces at the left edge of a predicate. The verb in these two bad forms is not in any adverbial. The ungrammaticality may indicate that the hosting verbal phrase is not in its base-position. The ungrammaticality of (52a) and (52b) is parallel to that of (51c). Our verbal phrase movement explains this A-not-A restriction. The examples in (53) show that *shì-bù-shì* may always occur, indicating that the constraint seen in (52) is not a semantic constraint.

(52) a. *Dàlín qù-méi-qù-guò Bālí sān cì? b. *Dàlín qù-méi-qù-guò sān cì Bālí?
Dalin go-not-go-EXP Paris three CL   Dalin go-not-go-EXP three CL Paris
(53) a. Dàlín shì-bù-shì qù-guò Bālí sān cì? b. Dàlín shì-bù-shì qù-guò sān cì Bālí?
Dalin be-not-be go-EXP Paris three CL   Dalin be-not-be go-EXP three CL Paris
'Has Dalin been to Paris three times?'   'Has Dalin been to Paris three times?'

In (52a) and (53a), if the verb *qu* 'go' is replaced by *da* 'beat' and the external CLv *ci* is replaced by the internal CLv[fist] *quan*, the grammaticality patterns remain the same. Thus the verbal phrase movement is also supported for the R-position of internal CLvs.

To make our description complete, we add the following two examples in which the CLv occurs at the L-position, to show that (54a) is not acceptable simply because the verb is not at the left-edge position of the predicate; and that (54b) is fine, because it is the auxiliary *shì* that is in the A-not-A form. The unacceptability of (54a) is independently explained, and thus it does not affect our claim that there is no verbal phrase movement in the construction.

(54) a. *Dàlín céngjīng sān cì qù-méi-qù-guò Bālí?
Dalin before   three CL go-not-go-EXP Paris
    b. Dàlín shì-bù-shì céngjīng sān cì qù-guò Bālí?
Dalin be-not-be before   three CL go-EXP Paris
'Has Dalin been to Paris three times?'

5.2 Explaining the markedness of the different positions of a CLv
The R-position is available for any CLv. It is preferred, if other positions are also possible. Why is there such a contrast? It is well-known that the right-edge of a sentence is a position for focus (e.g., Cinque 1993). In a numeral construction, the numeral is always the focus. Since a numeral has to be followed by a CL in Chinese, the right-edge position of the numeral-CLv string is thus preferred. This preference does not mean that the word order of the construction is base-generated. A parallel situation is seen in the Heavy NP Shift construction in English. Compared with (55a), (55b) is preferred, but this preference does not mean that the order of (55b) is base-generated.

(55) a. They sent [that book that only got good reviews in the New York Times] to Mary.
    b. They sent to Mary [that book that only got good reviews in the New York Times].

Various factors may affect the choice among the three possible positions for an external CLv. In addition to the information structure consideration, the definiteness or specificity of the object (e.g., Ernst 1996: 179 and the references therein), whether the object is a proper name, a pronoun, or a complex nominal with a relative clause, whether there is a WH form or negation word, etc., all have an impact on the word order choice. This paper only discusses how a possible order is derived, not addressing how to choose among possible orders. For the latter issue, see Fang (1993) and Zhang (2010), among others.

5.3 The categorial feature of CLvs and improper phases
In order to explain why an internal CLv never occurs in the L-position, which is preverbal, I have claimed that if the VP does not move, the nominal projection UnitP intervenes between vP and VP, within the vP phase. My claim can be further elaborated as follows.

First, like other functional and lexical elements, CLvs have categorial features, and they are nominals. Instrument CLvs are exclusively internal CLs (2.3). Syntagmatically, like CLns, instrument CLvs can be modified by dimensional adjectives such as *dà* 'big', as seen in (56).

(56) Dàlín dǎ-le   Yùrú sān   dà quán.
      Dalin beat-PRF Yuru three big CL$^{\text{fist}}$
      'Dalin punched Yuru three times violently.'

The adjective modification is subject to the same constraint seen in CLns: like a pre-CLn adjective, a pre-CLv adjective may not be a phrase and thus it may not be followed by the functional element *de* and may not be preceded by *hen* 'very' (see Zhang 2013: 227-232). In both cases, as head elements, CLs can be decomposed morphologically.[4]

Morphologically, internal CLvs still keep the derivational nominal suffixes such as *–tou*, as seen in the CLv$^{\text{finger}}$ *zhǐ-tóu* in (57a), and *–zi*, as seen in the CLv$^{\text{stick}}$ *gùn-zi* in (57b), and *–r*, as seen in the CLv *xià-r* in (57c).

(57) a. Dàlín chuō-le Yùrú liǎng zhǐ-tóu.   b. Dàlín zòu-le   Yùrú liǎng gùn-zi.
         Dalin poke-PRF Yuru two CL$^{\text{finger}}$ Dalin beat-PRF Yuru two   CL$^{\text{stick}}$
         'Dalin poked Yuru twice with his finger.'   'Dalin beat Yuru twice with a stick.'
     c. Dàlín pāi-le   Yùrú liǎng xià-r.
         Dalin pat-PRF Yuru two   CL
         'Dalin patted Yuru twice.'

Note that the English CLv *time* (as in *Bill jumped three times*), like a noun, has the plural form *times*, different from the adverb *twice* (See Kayne's 2014 discussion of *once* and *twice*). The CLv *marrat* in Arabic has a case marker, like nominals (Fassi-Fehri & Vinet 2008: 63):

(58) a. raqasa   marrat-ayni   b. 'ahabba   marrat-ayni
         danced   time-DUAL.ACC   loved   time-DUAL.ACC
         'He danced two times.'   'He loved two times.'

Moreover, as we introduced at the beginning of the paper, when a CLe is used with an event-denoting nominal, it is a CLn, but when it is used with a verbal phrase, it is called a CLv. In (59a), the word *lǚxíng* 'trip' is a noun, and so is the word *shèjí* 'shooting' in (59b). In both examples, a demonstrative precedes the numeral, and the whole expression follows the causer marker *bǎ*, a position for nominals exclusively.

(59) a. Dàlín bǎ nà   liǎng cì lǚxíng dōu wàng-le.
         Dalin BA that two   CL trip   all forget-PRF
         'Dalin forgot both trips.'
     b. Dàlín bǎ nà   liǎng qiāng shèjí   láoláo jì   zài xīnlǐ.
         Dalin BA that two   CL$^{\text{gun}}$ shooting firmly memerize at heart
         'Dalin firmly keeps in his mind the two times of shooting.'

The above facts show that CLvs are nominal, rather than verbal, and thus their categorial features are [-V, +N]. The term CLv comes from the category of the substantial phrase that a CL is associated with, rather than from the properties of the CL itself.[5]

CLvs and CLns also share some other properties. For instance, in the absence of a

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[4] Not all CLs may be modified by an adjective: the individual CLn *wèi*, the kind CLn *zhǒng* 'kind', the external CLe *cì*, and the internal CLe *xià* may not. But *xià* may have the nominal suffix *–zi* or *–r*, as in (57c).

[5] Greenberg (1975: 30) claims that "It is generally the case that numeral classifier languages apparently lack a classifier in nouns indicating periods of time, units of distance and the word 'time' in such phrases as 'five times'." Since no example is given in his work to show how the counterpart of *five times* is impossible in a numeral CL language, it is not clear whether the occurrence of the CLs *cì* and *qiāng* in (59) challenges his claim.

numeral, they denote unit-singularity, as shown by the CLn *tiáo* in (60a) and the CLv *tàng* in (60b).

(60) a.　Dàlín mǎi-le　tiáo máojīn.　　　b.　Dàlín qù-le　tàng Xīzàng.
　　　　Dalin buy-PRF CL　towel　　　　　　Dalin go-PRF CL　Tibet
　　　　'Dalin bought a towel.'　　　　　　　'Dalin has been to Tibet once.'

Also, reduplicate CLs denote unit-(abundant)plurality, as shown by the CLn *tiáo-tiáo* in (61a) and the CLv *tang-tàng* in (61b). See Zhang (2014a) for an extensive discussion of the issue with respect to CLns.

(61) a.　Nàlǐ guà-zhe　yī tiáo-tiáo máojīn.　b.　Tāmen qù-le　yī tàng-tàng Xīzàng.
　　　　there hang-DUR one CL-RED towel　　　they　go-PRF one CL-RED　Tibet
　　　　'There are many towels hung there.'　　'They have been to Tibet many times.'

Second, no phase may be intervened by a projection with categorial features contrastive to those of the phase. In a representational perspective, it is well-recognized that an improper movement is an A-movement operation that is preceded by an A-bar movement operation of the same element. It is also well-recognized that no movement sequence may contain both a step of a maximal projection and a step of a head movement of the same element. In both cases, some kind of consistency constraint is seen. The constraint is effective, even though from a derivational perspective, each movement operation might be locally motivated. Parallel to the improper movement, an improper phase can be defined as follows:

(62) A phase is composed of a sequence of head elements in a complementation structure;
　　　if the sequence is intervened by a head element that has the categorial features
　　　contrastive to those of the phase, the phase is an improper one.

For instance, in a D-domain phase, all extended projections of NP are [-V, +N]. Thus, it is impossible to have an unnominalized verbal element (e.g., a modal) to be c-commanded by D and c-command N. On the other hand, in a C-domain phase, all extended projections of TP are [+V, -N]. Thus, it is impossible to have a nominal one to intervene them. No improper phase should occur in a syntactic presentation, even though for semantic reasons, UnitP headed by an internal CLv is base-generated between vP and VP. The movement of the complement of the CLv rescues the syntactic representation, avoiding an improper phase.

　　Note that if a projection with contrastive categorial features to a phase is not sandwiched in the phase, it does not intervene the phase. Thus, if D takes VP as its complement, as in a nominalization construction (Fu 1994; Fu et al. 2001), the phase is not an improper one, even though they have contrastive categorial features. Also, if V takes DP as its complement, the latter starts a new phase, and thus there is no improper phase.

　　Thus, in an internal CLv construction, if the VP remains in situ, the nominal UnitP intervenes between v and V, and thus the categorial sequence of the vP phase is syntactically illegal. This explains why an internal CLv never occurs in the L-position. To avoid the problem, VP-movement is obligatory. This justifies the VP moment in deriving the R position of an internal CLv. Theoretically, adopting Moro (2000), Chomsky (2013: 43) elaborates how problematic merger of two elements, with respect to categorial features, can be rescued by movement of one of the elements. The raising of VP in the internal CLv construction discussed here is compatible to the general idea of this rescue-by-movement theory.

5.4 A comparison to frequentative adverbs
In Mandarin Chinese, frequentative adverbs must precede verbs, i.e., occur at the L-position. Neither the R nor the M position is possible for the e-external *jīngcháng* 'often', as seen in (63b) and (63c). The e-internal frequentative adverb *fǎnfù* 'repeatedly' is subject to the same constraint, as seen in (64). In (65), in addition to the e-external *jīngcháng*, the e-internal *fǎnfù* occurs. As claimed by Cinque (1999), an e-external frequentative must be structurally higher than an e-internal one, and therefore, the order of the two may not be exchanged, as seen in the acceptability contrast between (65a) and (65b).

(63) a. Lùlu <u>jīngcháng</u> fān nà běn rìjì.　　b. *Lùlu fān nà běn rìjì　<u>jīngcháng</u>.
　　　 Lulu often　　flip that CL diary　　　　 Lulu flip that CL diary often
　　　 'Lulu often flips through that diary.'
　　 c. *Lùlu fān　<u>jīngcháng</u> nà běn rìjì.
　　　　 Lulu often flip　　that CL diary
(64) a. Lùlu <u>fǎnfù</u> fān nà běn rìjì.　　b. *Lùlu fān nà běn rìjì　<u>fǎnfù</u>.
　　　 Lulu repeatedly　flip that CL diary　　 Lulu flip that CL diary repeatedly
　　　 'Lulu fliped through that diary repeatedly.'
　　 c. *Lùlu fān　<u>fǎnfù</u>　　nà běn rìjì.
　　　　 Lulu flip　repeatedly that CL diary
(65) a. Lùlu <u>jīngcháng</u> <u>fǎnfù</u>　fān　nà běn rìjì.
　　　 Lulu often　　repeatedly flip that CL diary
　　　 'Lulu often flips through that diary repeatedly.'
　　 b. *Lùlu <u>fǎnfù</u>　　<u>jīngcháng</u> fān　nà běn rìjì.
　　　　 Lulu repeatedly often　　flip that CL diary

The positions of CLs and frequentative adverbs in the language are summarized in (66).

(66) The positions of CLvs and frequentative adverbs in Mandarin Chinese

		L	M	R
CLv	e-external	✓	✓	✓
	e-internal	*	*	✓
frequentative	e-external	✓	*	*
adverb	e-internal	✓	*	*

　　The table shows that in the L position, only e-internal CLvs are banned; in the M position, only e-external CLvs are allowed; and in the R position, both types of CLvs are allowed, but both types of frequentative adverbs are banned.

　　If the UnitP headed by a CLv and FreqP that hosts a frequentative adverb are just variants of the same functional projection (see 4.2), we can explain the position pattern in (66). First, the L-position for CLvs is simply the parallel preverbal position for frequentative adverbs, although CLs are head elements, while adverbs are not.

　　Second, the fact that CLvs may occur post-verbally, whereas frequentative adverbs may not, can also be explained. CLvs are head elements, taking a verbal phase as their complement (3.2.1). In contrast, adverbs are not head elements; and they can be base-generated as Spec of FreqP (Cinque 1999). In Section 4, I have argued that the post-verbal positions (the M and R positions) of CLvs are the result of the movement of the verbal phrases, which are the complement of CLvs. The consistent preverbal position of frequentative adverbs means that there is no verbal phrase movement. This is expected, considering that adverbs are not head elements, and thus they do not license the movement of a verbal phrase (they do not license ellipsis, either; see (26b)).

Third, the fact that e-internal CLvs may not occur preverbally, as seen in (37b), but e-internal frequentative adverbs may, as seen in (65a), can also be explained. The L position of a CLv means that the verbal phrase remains in situ. I have claimed that if the VP in an internal CLv construction does not move, an improper phase will emerge. However, an e-internal frequentative adverb never causes an improper phase, since it is not a head element, and thus it does not intervene the [+V,-N] sequence of the head elements of the vP phase. This is also compatible with the verbal status of Cinque's FreqP (= his AspP$_{frequentative}$), which hosts a frequentative adverb.

6. Comparing with alternative analyses
In my proposed analysis of CLv constructions, a numeral and its following CLv do not form a constituent. This is different from all other analyses of the constructions in the literature. In this section, I point out major inadequacies of four alternative analyses.

6.1 The complement analysis of a post-nominal numeral-CLv string
For the constructions in which a CLv occcurs in the R-position, which is a post-nomnal position, Chao (1968), Zhu (1982: 116), Liu et al. (1983), Sybesma (1999), and Paris (2013: 270, fn. 14) all claim that the sequence of a numeral and a CLv is a constituent, and it is a complement of the verb, in addition to the direct object to the left. More specifically, Sybesma (1999: 127) calls the sequence "indirect object", and Chao (1968: 312-313, 615-616) calls it cognate object. This complement analysis is illustrated in (67).

(67) Dàlín [$_{VP}$ céngjīng kàn-guò [nà bù wǔdǎ-piān   ][$_{COMPLEMENT}$ wǔ cì]]
      Dalin   before see-PRF that CL kungfu-movie   five CL
      'Dalin saw that kungfu-movie five times before.'

There are at least two major inadequacies in this complement analysis of a post-nominal numeral-CLv string. The analysis is not able to explain the fact that a CLv may s-select the associate verbal phrase (Generalization B), missing the general parallelism between CLvs and CLns in the numeral CL language. Moreover, it does not address how the R position of a CLv is related to its possible L and M positions.

The two inadequacies are also seen in the analyses in which the sequence of a numeral and a CLv is treated as a bearer of a Case assigned by the verb (Li 1990; Ernst 1996).

It needs to be clarified that a CLv is different from a cognate object in many aspects. First, cognate objects do not require the occurrence of a numeral, however, when a CLv occurs in the R-position, as in (67), it must follow a numeral, functioning as a counting unit.

Second, the modifier of a cognate object is phrasal (Mittwoch 1998: 316), but that of a CLv may not be phrasal (5.3). Some of the examples in (68) are cited from Massam (1990: 167, 169).

(68) a. She smiled a very big smile.
     b. She sneezed her early morning sneeze.
     c. She smiled that silly smile that I was telling you about.

Third, a cognate object is event-denoting and its modifier typically denotes a manner (e.g., *heroic* in *fight a heroic fight*) (Mittwoch 1998: 316), but a CLv itself is not event-denoting and its modifier may not be a manner expression. Instead, it has to be a dimensional adjective such as *da* 'big', patterning with that of a CLn (5.3).

Fourth, different languages have different constraints on the types of verbs that may take a cognate object (Mittwoch 1998), however in no language are the constraints parallel to the

ones on CLvs. In 2.2, we have shown that external CLvs are compatible with predicates of any situation types, and internal CLvs are typically seen with semifactives. No language has the restriction that a cognate object is typically seen with semifactives. Thus the syntax and semantics of CLv constructions are very different from cognate object constructions.

6.2 The attributive analysis of a pre-nominal numeral-CLv string

Zhu (1982: 51, 117, 120), Matthews & Yip (1999) (see Matthews & Leung 2001: 448), and Liu (2008) all claim that when a CLv occurs in the M position, which is a pre-nominal position, the sequence of the numeral and the CL is an attributive, modifying the NP to the right. Their claim is illustrated in (69).

(69)   Dàlín céngjīng kàn-guò [NP [wǔ cì] [NP nà bù wǔdǎ-piān   ]]
        Dalin before   see-PRF   five CL   that CL kungfu-movie
        'Dalin saw that kungfu-movie five times before.'

Paris (1981, 2013: 262) falsifies this analysis. One of her arguments is that a numeral nominal can stand as an answer to a *duoshao* 'how many' question, as seen in (70); likewise, if a numeral-CLv sequence and its following NP formed a nominal constituent, the constituent should be able to function as an answer to a *duoshao* question; however, (71) shows that this is impossible. She concludes that a numeral-CLv sequence and its following NP do not form constituent.[6]

(70) Q.: Tā   kàn-le   duōshǎo?   Ans.:   Tā kàn-le wǔ běn.
         3SG read-PRF how.many   3SG read-PRD five CL
         'How many (books) did he read?'   'He read five (books).'
(71) Q.: Tā   kàn-le   duōshǎo?   Ans.   #Tā   kàn-le   wǔ cì.
         3SG read-PRF how.many   3SG read-PRF five CLv
         'How many (books) did he read?'   'He read five times.'

In addition, we find that the attributive analysis has other problems. First, there is a semantic problem in the merger of an attributive with a demonstrative-initial nominal, as in (69). As pointed out by Lin (2008: 857) and Bošković (2014: 78), once a demonstrative has mapped a nominal element to an individual, further modification by an attributive is impossible. Second, the analysis does not address how the M position is related to the possible L and R positions of CLvs. In the language, the modifier of an NP never occurs in a preverbal and sentence-final position. Third, like the analysis reviewed in 6.1, this analysis is not able to explain the s-selection property (Generalization B). Fourth, this analysis, as well as the analysis reviewed in 6.1, does not address the contrasts between the two types of CLvs. For instance, it does not address the impossibility of the M-position for an internal CLv.

6.3 The unified adverbial or specifier analyses

Unlike the above two analyses, and like the analysis proposed here, some scholars claim that the sequence of a numeral and a CLv is base-generated to the left of a verbal projection. However, unlike the analysis proposed here, they assume that the sequence is a constituent (e.g., Tang 1990: 154-160 and her later works). Huang (1997) assumes that the sequence is Spec of a verbal projection, and Soh (1998; adopted in Zhang 2010) assumes that it is a VP

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[6] Paris's (2013: 261) own analysis of the M position of a CLv is that the string numeral-CLv is a constituent, which interrupts the verb-object adjacency. But she does not elaborate how this interruption is syntactically achieved. Moreover, in her example (11), *yi* 'one' may not be replaced by another numeral and thus is not a real numeral (see Section 1), and therefore the CLv *xià* is not a counting unit in the example.

adjunct (also see Huang To appear: Sec. 4). Their general claim is illustrated in (72):

(72)   Dàlín céngjīng [VP [liǎng cì] [VP/V· kàn-guò nà bù wǔdǎ-piān   ]]
        Dalin before   two CL   see-PRF that CL kungfu-movie
        'Dalin saw that kungfu-movie two times before.'

The VP adverbial analysis shares some major problems with the analyses reviewed above. First, it is unable to explain the selection property between a CLv and the verbal phrase (Generalization B). Second, it is challenged by the non-adjunct property of the numeral-CLv string (Generalization C; also see 5.4). Third, it does not address the position contrasts between the different types of CLvs.

6.4 The null light verb analysis of the internal CLvs

The only analysis that addresses the syntactic contrasts between the two types of CLvs, as far as I know, is Jeong (2002). She notices that instrument CLvs must be e-internal, and they occur in the R-position only. However, her analysis is not desirable. Similar to the analyses in 6.1, in her analysis, the string of a numeral and a CLv is assumed to be the complement of the verb. She also claims that there is a verb head movement to a higher position, and that the internal CLv starts from an N position. Her analysis of the internal CLv construction in (73a) is (73b) (to be consistent with other parts of my paper, I replace Jeong's label VCl with CLv, for a verbal CL).

(73) a.   tī-le   Zhāngsān yī   jiǎo   b.   VP3   (Jeong 2002: 8)
           kick-PRF Zhangsan one CL^foot
           'kicked Zhangsan one time'

In this analysis, the CLv is too low to capture its selection on the verbal phrase (Generalization B). Also, she assumes that the head of VP1 USE is a light verb. However, a light verb s-selects an event (e.g., Odijk 1997: 369), but the nominal *jiao* 'foot' does not encode an event. Furthermore, the analysis discusses the instrument CLvs only, not covering the general internal CLv *xià*. Is *xià* also the object of the null light verb USE? If *xià* is base-generated at the head of CLvP, the syntax and semantics of its complement is not clear.

7. Conclusions

A CLe can appear in either a nominal domain, where a numeral occurs with an

event-denoting nominal, or a verbal domain, where a numeral occurs with a verbal phrase. The CLe in the latter use has been called a CLv. I have shown that CLvs are nominal, and the term CLv comes from the category of the substantial phrase that a CL is associated with, rather than from the properties of the CL itself. I have also distinguished internal and external CLvs, and explained four generalizations of CLvs. The numeral-CL sequential generalization (A) comes from the general Spec-head relation between a numeral and a CL. The general s-selection generalization (B) is the result of the head-complement relation between a CL and its associate phrase, regardless of whether the latter is nominal or verbal. The non-adjunct property of the combination of a numeral and a CLv (C) is predicted by their Spec-head relation. Finally, the non-imperfective generalization (D) is seen because the projection headed by a CLv is lower than viewpointAspP.

I have argued that for an external CLv, the movement of its complement, i.e., vP, is optional. If vP moves, the R-order is derived; if vP does not move, the L-order is derived. Moreover, the M-order is derived by both the object raising and then the remnant vP movement. For an internal CLv, however, the movement of its complement, VP, is obligatory. If the VP remains in situ, the UnitP, which is nominal, will intervene between vP and VP in the same phase. Since the VP movement always occurs, the internal CLv is always stranded, surfacing at the right end of the predicate. The M-position is impossible for internal CLvs because there is no place below the UnitP to be the landing site of the A-bar movement of the object.

Empirically, this research has proposed one possible analysis of the syntactic properties of the two types of CLvs, especially their possible and impossible positions in Mandarin Chinese. Theoretically, on the one hand, this research has unified the syntax of CLns and CLvs; but on the other hand, this research has distinguished the syntax of internal CLvs and external CLvs. As we mentioned in Section 2, the semantic contrast between event-internal and event-external frequentatives has been seen in the literature; however, this paper has made an effort to explore the syntactic impact of the contrast. Unlike frequentative adverbs, CLs are head elements, and thus they interact with other head projections in the same phase. Also, unlike an adverb, particle, and adposition, the category features of a CLv are contrastive to those of a verb. I have also claimed that movement may also be driven by avoiding an intervention of a contrastive category in the same phase.

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