▶ Process-Related Durative Phrases as Numeral-Classifier Phrases in Chinese

漢語的名前時量詞應分析為量詞

PROCESS-RELATED DURATIVE PHRASES AS NUMERAL-CLASSIFIER PHRASES IN CHINESE[*]

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Academia Sinica

ABSTRACT

This paper argues that pre-nominal durative phrases should be analyzed as numeral-classifiers in Chinese. New evidence is provided from Taiwanese tone sandhi rules and the *de*-insertion rule in Mandarin. It is shown that the numeral-classifier analysis of the pre-nominal durative phrase is able to solve the tension among previous analyses, and may provide a unified account for the syntax-semantic mismatch of the durative phrase.

Keywords: Chinese syntax, durative phrases, syntax-semantic mismatch, Taiwanese tone sandhi

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1. INTRODUCTION

Durative phrases in (Mandarin) Chinese are known to display rather eccentric behavior in terms of their syntactic distributions. For example, whereas in English, durative phrases occur in VP-peripheral positions, as in (1), durative phrases in Chinese may occur between verbs and their objects, as in (2). Henceforth, this type of durative phrase is referred to as the "pre-nominal" durative phrase in Chinese:

(1) a. John [$_{VP}$ attended high school [for five years]].
     b. John [$_{VP}$ sold fish [for one year]] in the market.

(2) a. Lisi nian-le   [wu   nian]   gaozhong.
         Lisi study-Asp   five   year   high.school
         'Lisi attended high school for five years.'
     b. Lisi zai   shichang mai-le   [yi   nian]   yu.
         Lisi in   market   sell-Asp one   year   fish
         'Lisi sold fish for one year in the market.'

Two major distinctions between (1) and (2) can be noticed. First, durative phrases in Chinese can occur in bare forms, in the sense that they do not need to be introduced/licensed by overt prepositions, unlike durative phrases in English (which require prepositions like *for* and *in*). Second, unlike other prepositional phrases in Chinese (such as *zai shi-chang* 'in the market'), which typically occur in preverbal positions, durative phrases occur between verbs and objects.[1] The pre-nominal durative phrase is also referred to as the process-related (P-related) durative phrase in Chinese (Liao 2004, Lin 2008), due to the fact that the

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[1] The analysis proposed here may also apply to frequentative phrases, such as *liang-ci* 'twice' in the following example:
(i) Wo gen Lisi jian-guo [liang   ci   mian].
     I   and Lisi meet-Asp two   time   face
     'Lisi and I met twice.'
I thank Miao-ling Hsieh for pointing this out to me.

pre-nominal durative phrase always measures the "process" of event, instead of the result state (Lin 2008, Piñón 1999). That is, the durative phrases in (2a) and (2b) measure the durations of school attendance and of fish-selling, respectively.

The atypical distributions of pre-nominal (or P-related) durative phrases in Chinese give rise to many interesting theoretical issues. One of the long pertaining problems, for example, is the syntax-semantic mismatch in such sentences, as first noted in Huang (1997). In (2b), for example, although the durative phrase is a semantic modifier of VP, it occurs in the nominal domain, and forms a constituent with NP in its syntax. The syntactic constituency can be evidenced by the dislocation and the coordination tests, as in (3a) and (3b). The problem, then, is why an NP modifier is able to take scope over the VP domain at LF:

(3)　a.　Lian　yi　nian　yu,　Lisi　dou　mei　mai-guo.
　　　　　Even　one　year　fish　Lisi　all　not　sell-Asp
　　　　　'Lisi did not sell fish even for a year.'
　　　b.　Lisi　mai-guo　yi　nian　(de)　yu,　liang　nian
　　　　　Lisi　sell-Asp　one　year　DE　fish　two　year
　　　　　(de)　cai.
　　　　　DE　vegetable
　　　　　'Lisi sold fish for one year, and vegetables for two years.'

This paper argues that the pre-nominal durative phrases should be treated as numeral-classifiers in Chinese. Such a conclusion is supported by various tests in syntax and the syntax-phonology interface, especially from the tone sandhi rules in the Taiwanese variety of the Southern Min languages (a family of the Chinese languages) and the *de*-insertion rule in Mandarin Chinese (Y. Li 2013). The paper is organized as follows. Section 2 gives an overview of previous analyses of durative phrases. Especially, I shall focus on the two competing analyses in Huang, Li & Li (2009) (HLL). Section 3 gives evidence for the main proposal that pre-nominal durative phrases should be treated on a par with numeral classifier phrases, and it is demonstrated that such an analysis has an advantage of providing a unified account for the two competing analyses found in HLL (2009). Section 4 concludes the paper.

2. PREVIOUS ANALYSES

Two major approaches can be found with respect to the syntactic status of prenominal durative phrases. Li (1987) proposes that two types of durative phrases can be distinguished with respect to their structural positions, and she argues that the P-related durative phrase should be analyzed as a complement of verb, while the other type of durative phrase (i.e., the result state-related) functions as the main predicate that takes its preceding sentence as a sentential subject. The two types of durative phrases can be illustrated as follows:

(4) a. [Complement Construction]
    Lisi mai-le [san   nian   yu].
    Lisi sell-Asp three year   fish
    'Lisi sold fish for three years.'
  b. [Sentential-Subject Construction]
    [Lisi mai yu] (yijing)   san   nian le.
    Lisi sell fish already   three year SFP
    'Lisi has been selling fish for three years.'

Li (1987) uses several tests to support the ambiguity analysis. One test involves the negation scope. Within the complement construction analysis, it is predicted that negation is able to negate the durative phrase under c-command, and within the sentential-subject analysis, the negation should not be able to take scope over the durative phrase.[2] The prediction is borne out, as shown by the contrast in (5):

(5) a. Lisi mei-you zuo san   tian gongzuo.
    Lisi not   do   three day job

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[2] Skeptical readers might worry that durative phrases can be viewed as a type of QP that undergoes QR, and that the covert operations might repair the c-command relation observed in the surface structure. Such a concern, however, can be resolved since the surface c-command relations (at S-Structure or Spell-out) directly reflect the LF c-command relations in Chinese, i.e., the isomorphism principle in Huang (1982).

(zenme keyi ling   san   tian qian?)
how   can receive three day money
'Lisi did not work for three days; (how can he get paid for three days?)'

b. Lisi   mei-you mai   yu   (yijing)   san   nian le.
Lisi   not   sell fish already   three year SFP
'It has been three years since Lisi ceased selling fish.'

In (5a), the complement durative phrase falls under the scope of negation, and therefore, a reading is obtained that the duration of the event is negated (not > three days). In (5b), on the other hand, the negation cannot negate the durative phrase, indicating that the durative phrase indeed occupies a structurally higher position than that of the negation (three years > not). The structural ambiguity is shown as follows:

(6) a. Complement Construction
    [IP …NEG [VP V Durative Phrase NP]]   (NEG > DurP)
    b. Sentential Subject Construction
    [IP [IP …NEG VP] … Durative Phrase]   (DurP > NEG)

A similar test involves the numeral quantifier *ban*, which is ambiguous between a polarity reading 'any' and a non-polarity reading 'half.' Given that the polarity reading must be licensed in the negative scope, it is predicted that the polarity reading is allowed in the complement construction, but not in the sentential subject construction. The contrasts are illustrated in (7), and the prediction is borne out in (8):

(7) a. Complement Construction
    [IP …NEG [VP V *ban*-Durative Phrase NP]] (ambiguous)
    b. Sentential Subject Construction
    [IP [IP …NEG VP] *ban*-Durative Phrase]   (non-polarity)

(8) a. (corresponding to (7a))
    Lisi   mei-you zuo(-guo) **ban   nian** gongzuo.
    Lisi   not   do(-Asp)   half   year   work
    (i) 'Lisi did not do a half-year work.'

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   (ii) 'Lisi did not work for even a year.'
   b. (corresponding to (7b))
      Lisi mei-you mai yu   yijing   **ban nian** le.
      Lisi not   sell fish already   half year SFP
      'It has been a half year since Lisi ceased selling fish.'

Another piece of evidence provided by Li (1987) is that only P-related
durative phrases may enter verb-copying transformation, as in (9),
suggesting that the P-related durative phrase is a complement of the verb,
given the phrase structure condition (PSC) in Huang (1982):

(9) a. Lisi zuo   gongzuo zuo-le   [san   tian].
       Lisi do   work   do-Asp   three   day
       'Lisi did his work for three days.'
   b. *Lisi   zuo   gongzuo zuo-le   zuo-tian[3]
      *Lisi   do   work   do-Asp   yesterday
       'Lisi did his work yesterday.'

The point here is that durative phrases behave entirely differently from
other temporal adverbs, and should be treated as complements, rather
than as adjuncts. At the same time, although the sentential-subject
durative phrases appear to be able to undergo verb-copying constructions,
as in (10), there are reasons to believe that this is not a true verb-copying
construction, and the second verb inserted in front of the durative phrase
simply happens to be the same:

(10) Lisi **mai** yu   yijing   **mai** san   nian   le.
     Lisi sell   fish   already   sell   three year   SFP
     'Lisi has been selling fish for three years.'

One major distinction between the two types of verb-copying patterns is
that the copied verb can be replaced by other predicates like *you* 'have'

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[3] In contrast, the *de*-complement phrase is much better in verb-copying constructions:
(i) Lisi zuo   gongzuo zuo-de   hen   lei.
     Lisi do   work   do-DE   very tired
     'Lisi did work and got tired.'

or *jingguo* 'pass' in fake verb-copying patterns, as in (11), but this is not possible in true verb-copying constructions, as in (12). Observe the following contrast:[4,5]

(11) [[Lisi zuo gongzuo] yijing **you/jingguo** san nian le].
    [[Lisi do work already have/pass three year SFP
    'It has been three years since Lisi started doing his work.'

(12) *Lisi zuo gongzuo **you/jingguo**-le san nian
    *Lisi do work have/pass-Asp three year
    'Lisi did his work for three years.'

In the next section, I will offer two other pieces of evidence, from the tone sandhi rules in Taiwanese and the *de*-insertion rule in Mandarin, which may lend further support to the complement analysis.

Despite the fact that the complement analysis is able to account for several syntactic properties of the pre-nominal durative phrase, Li (1987) offers few explanations for the syntax-semantic mismatch. However, one of the analyses offered in HLL (2009) may provide an account for the syntax-semantic mismatch between the pre-nominal durative phrase and its ability to obtain a verbal scope at LF.[6] HLL (2009) treat the object NP as an "eventive" argument that bears a special theta role, such as "Incremental Theme" (Dowty 1991), rather than as a typical argument, such as "Theme" or "Patient." In this sense, the durative phrase has the semantic function of defining the object NP as an eventive argument that

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[4] We may therefore revise the sentential subject analysis so that there is a covert predicate (PRED) connecting the sentential subject and the durative phrase:

(i)   Sentential Subject Analysis

        [IP [IP sentential subject] **PRED** Durative Phrase *le*]

[5] One anonymous reviewer asks how the sentential subject is licensed as an external argument. It should be clarified that in the given analysis, the sentential subject is not an external argument, but an internal argument of the nominal predicate (or the durative phrase), which is predicative of the sentential subject through a dummy relator, in the sense of den Dikken (2006), which can be realized by the fake copied verb, aux-insertion with *you*, or an unaccusative verb like *jingguo* 'pass,' or simply be left empty.

[6] HLL (2009) offer two competing accounts for the syntax-semantic mismatch, both of which are reviewed in this section.

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is measured by the durative phrase. Such a theory, however, requires additional stipulations on the theta theory and semantics of durative phrases in order to account for the syntax-semantic mismatch.

Alternatively, the adjunction analysis that provides a more transparent theory of syntax-semantic mapping is proposed, and it maintains that the pre-nominal durative phrase is a stranded adverb from verb movement (Huang 1997, HLL 2009, Liao 2004, Lin 2008, 2011, Tang 1994):

(13)   Adjunction Analysis
        $[_{YP} Y+V…[_{XP} …Durative Phrase…t_V \quad NP]]]$

There is little agreement regarding the original adjunction sites (i.e., the status of XP) and the final landing sites of the verb (i.e., the status of YP), but in general, the advocates of adjunction analysis propose that the durative phrase originates as a verbal modifier, and it is stranded in the pre-nominal position as a result of verb movement. Consider one of the analyses proposed in Huang (1997) and HLL (2009), which is illustrated below:

(14) a. Lisi   mai-le   yi-nian   (de)   yu.
          Lisi   sell-Asp   one-year   DE   fish
          'Lisi sold fish for a year.'
      b.

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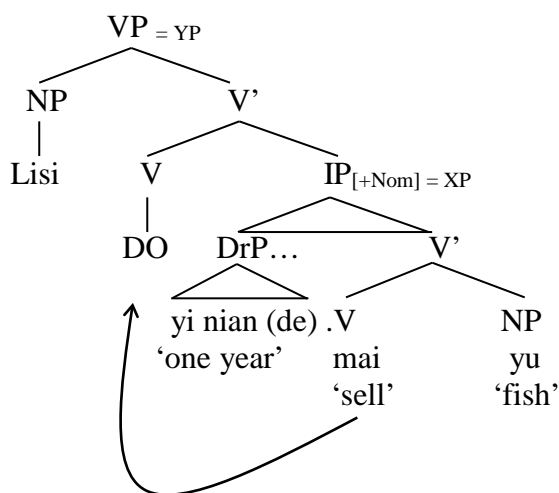
The durative phrase originates as an IP-adjunct. The verb subsequently moves out of the nominalized IP to a higher light verb position, leaving the durative adverb stranded in the nominalized IP. This type of analysis successfully analyzes away the surface syntax-semantics mismatch, and as a result, there is no mismatch in the underlying structure. However, in spite of its theoretical attractiveness, it cannot account for several syntactic properties of pre-nominal durative phrases. For example, it does not provide an account for why other adjuncts cannot enter verb-copying constructions:

(15) Agentive/Manner/Temporal Adverbs
    a. Lisi   guyi/manman/zuotian   chi-le   hambao
        Lisi   deliberately/slowly/yesterday   eat-Asp hamburger
        'Lisi ate the hamburger deliberately/slowly/yesterday.'
    b. *Lisi chi hanbao   chi-le   guyi/manman/zuotian
        *Lisi eat hamburger eat-Asp   deliberately/slowly/yesterday

Additionally, it is generally assumed that manner adverbs are VP-level or V-level adjuncts, and evidence from English shows that durative phrases are structurally higher than the manner adverbs in the canonical positions, as in (16):[7]

(16) a. John [[[ate hamburgers] slowly] for three hours].
    b. $^{??}$John [[[ate hamburgers] for three hours] slowly].

Assume durative phrases are IP (or VP) adjuncts stranded by verb movements, it is unclear why the lower VP-level manner adverbs are not stranded along with the durative phrase after verb raising:

(17) *Lisi **chi$_V$**-le [(san   xiaoshi)   [manman(-de)**t$_V$** [hanbao]]].
    *Lisi eat-Asp [three   hour   slowly-DE   hamburger
    '(intended) Lisi ate hamburgers (for three hours) slowly.'

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[7] (16b) is uttered without a prosodic pause before *slowly*; cf. Zubizarreta (1998).

We thus run into a dilemma. On the one hand, the complement analysis has the advantage of correctly describing the syntactic properties of pre-nominal durative phrases, yet it requires additional stipulations regarding the syntax-semantic mismatch; on the other hand, the adjunction analysis allows for a neat syntax-semantics mapping, but it fails to pass several syntactic tests. In the next section, I provide two more pieces of evidence for the complement analysis from the Taiwanese tone sandhi (TS) rules and the *de*-insertion in Mandarin. The TS rules in Taiwanese suggest not only that the pre-nominal durative phrase be treated as a complement of the verb, but also that the head of the durative phrase takes the following NP as a complement as well. This then paves the way for the numeral-classifier analysis of the pre-nominal durative phrase in Chinese.

3. DURATIVE PHRASES AS NUMERAL-CLASSIFIERS

In this section, it is proposed that pre-nominal durative phrases are in fact numeral-classifiers in disguise.[8] Especially, they should be treated as a type of temporal/eventive classifier. Such a treatment may provide a unified account for the two competing analyses reviewed in the previous section.

3.1 Evidence from Taiwanese Tone Sandhi Rules and *De*-Insertion

With respect to the adjunct/complement distinction, the tone sandhi (TS) rules in the Taiwanese variety of the Southern Min languages are able to act as very precise diagnostics. Specifically, the TS boundaries are sensitive to the syntactic complement-adjunct distinction (Chen 1987, 2000, Y. Li 2013, Lin 1994, Soh 2001). In Taiwanese, TS rules robustly apply to every word (except some functional elements) that does not occur at the right edge of a phonological domain (XP), and the phonological domain can be extended by syntactic complementation. That is to say, TS rules apply across-the-board to head-complement

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[8] The idea is not new. Chao (1968) also treats the durative phrases as a type of classifier, but in a more descriptive fashion.

structures (except for the rightmost edge of the largest XP), but not to the right edges of every adjunct/specifier of XP. The contrasts can be clearly illustrated in (18) (# stands for a tone sandhi boundary, = stands for a tone sandhi application, CT for citation tone, and ST for surface tone) (see Chen 1987, 2000 for the use of numbers 1-5 as tonal values, 5 = highest and 1=lowest):

(18) a. [[Ong--e] # [$_{VP}$ u= [$_{CLP}$ nng= ki = [$_{NP}$ bak-kiann]]]].

[[Ong--e	have	two	CL	glasses	
..24	22	22	44	4-21	[CT]
..24	21	21	22	21-**21**	[ST]

    'Ong--e has two pairs of glasses.'

   b. [[Ong--e]#[[$_{NP}$ bak-kiann]$_i$ # [$_{VP}$u   = [nng= ki] e_i]]].

[[Ong--e	glasses	have	two	CL	
..24	4-21	22	22	44	[CT]
..24	21-**21**	21	21	**44**	[ST]

    'Ong-e has two pairs of glasses.'

(18a) and (18b) illustrate that head-complement structures must undergo TS in Taiwanese. For example, TS applies to the verb *u* 'have' which takes the object DP/CLP *nng ki bak-kiann* 'two pairs of glasses' as its complement, and TS also applies to the numeral-classifier, which takes its following NP as complement. On the other hand, if the complement NP is fronted (moving out of VP, and adjoining to Spec of some higher XP), as in (18b), TS cannot apply to the fronted NP, since after NP-fronting, the adjoined NP does not take the following VP/IP as complement, and the NP-fronting now creates a new phonological boundary for TS. Subjects, like fronted NPs, are also immune from TS because they are specifiers of other XPs.

    (19) and (20) further show that modifiers/adjuncts of XP's (like subjects and fronted NPs) are also contained in the phonological boundaries that separate them apart from their following elements:

(19) Ong--e   # [[$_{AdvP}$ tak-kang] # [$_{VP/IP}$khui   = tshia]].

     Ong--e   every-day   drive   car

     'Ong--e drives every day.'

(20) Ong--e # [be = [AdjPoo-sik] # [DP hit = ki =
bak-kiann]].
Ong--e buy black-color that CL glasses
'Ong--e bought that pair of black glasses.'

When we look at durative phrases, tone sandhi patterns suggest that durative phrases are complements of verbs, and their heads take the following NPs as complements, and therefore, they should not be treated as modifiers of the following VP or NP. The TS patterns of durative phrases are illustrated in (21) and (22) (only relevant parts are marked):

(21) kang_CL 'day': 44_Citation → 22_Sandhi
Thiann-kong Ong--e sia [sann= kang(22_Sandhi) = tua-li].
hear-say Ong-e write three day_CL calligraphy
tioh sian ah.
then tired SFP
'(I) heard that Ong--e got tired after practicing calligraphy for three days.'

(22) ni_CL 'year': 24_Citation → 22_Sandhi
Tan--e kong Ong--e thak [lak= ni(22_Sandhi) = tai-hak]
Tan--e say Ong--e study six year college
ah, a-be pit-giap.
SFP yet-not graduate
'Tan--e said that Ong--e had been attending college for six years, and had not graduated yet.'

Any theories that treat pre-nominal durative phrases as stranded adverbs (or adjectives of their following NPs) would wrongly predict that TS rules cannot apply between durative phrases and the following NPs. On the other hand, according to the Taiwanese TS rules, pre-nominal durative phrases are complements of verbs, and the heads of the durative phrases in turn take the following NPs as complements. This can happen only if they occur in the "spine structure" as extended projections of N

(Grimshaw 2000). Therefore, they should be treated on a par with numeral-classifier phrases.[9]

Another piece of evidence for the classifier status of the durative phrase, in light of a recent proposal by Y. Li (2013), is to examine the occurrence of *de*-marker after object-fronting. In general, *de* can be inserted between an NP and a measure classifier phrase, or between an NP and a modifier phrase. Therefore, the following sentence is ambiguous between a measure reading and a modifier reading:

(23) Lisi mai-le [**san   kuai   de   dangao**].
      Lisi buy-Asp three   piece$_{CL}$ DE   cake
      a. 'Lisi bought three pieces of cakes.'   (measure reading)
      b. 'Lisi bought a three-piece cake.'   (modifier reading)

In the former, *san kuai* 'three pieces' is a classifier measuring the complement NP (where *de* is generally optional), while in the latter, *san kuai* 'three pieces' is a modifier phrase modifying the NP (where *de* is often obligatory) (see discussions in Y. Li 2013, X. Li 2013, Zhang 2013):

(24) a. (measure reading)
         [$_{CLP}$ san   kuai (de) [$_{NP}$ dangao]]
             three piece DE   cake
         'three pieces of cakes'
      b. (modifier reading)
         [$_{NP}$ [$_{ModP}$san   kuai $^{??}$(de)][$_{NP}$ dangao]]
                 three piece   ?(DE   cake
         'a three-piece cake'

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[9] In view of the verb-raising analysis in Huang (1997) and HLL (2009), one might argue that TS may take place after verb-raising, and the stranded durative phrase and NP then undergo restructuring as a single unit. While it remains to be seen if verb-raising and restructuring indeed take place, the analysis can be maintained that the durative phrase should be treated as the extended projection of NP after restructuring. I thank Miao-ling Hsieh for this point.

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Y. Li (2013) observes that the contrast is magnified when the object is fronted. Specifically, in the former, the *de* marker cannot appear when the object is fronted, while in the latter, the *de* marker is obligatory when the object is fronted:[10]

(25) a. Dangao$_i$, Lisi mai-le   san   kuai   (*de) e$_i$
        cake   Lisi buy-Asp   three   piece$_{CL}$ (*DE
        'As for cake, Lisi bought three pieces.'
     b. Dangao$_i$, Lisi   mai-le   san   kuai   *(de) e$_i$
        cake   Lisi   buy-Asp   three   piece$_{CL}$ *(DE
        'As for cake, Lisi bought a three-piece one.'

Pre-nominal durative phrases display the same ambiguity. With a *de* marker, the durative phrase in (26) is ambiguous between the measure reading and the modifier reading:[11]

(26) Lisi   du-le   san   nian   de   gaozhong
      Lisi   study-Asp   three   year   DE   high-school
      a. 'Lisi attended high school for three years.'
      (measure reading)
      b. 'Lisi attended a high school with a three-year curriculum.'
      (modifier reading)

Similarly, with object-fronting, *de* becomes impossible in the former, but obligatory in the latter, as shown in (27) and (28):

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[10] In her paper, Y. Li (2013) argues that the two types of *de*'s have distinct structures: [ModP-*de$_1$*][*de$_2$* NP]. *De$_2$* in the measure (classifier) construction is inserted in the prosodic component of grammar (Zubizarreta 1998), and *de$_1$* is a modifier marker that is attached to the preceding modifier phrase.

[11] It is possible to have the two readings co-occur in one nominal expression, such as in (i), where the measure durative phrase (as a numeral-classifier phrase) precedes the NP-modifier phrase:

(i) Ta   kan-le   [yi   zheng   tian   [liang   xiaoshi   de]   [$_{NP}$ dianying]].
    he   watch-Asp   one   whole   day   two   hour   DE   movie
    'He watched (several) two-hour films for a whole day.'

(27)   Gaozhong$_i$,   Lisi   du-le   [san nian] (*de) e$_i$.
        high-school   Lisi   study-Asp   three year   (*DE
        'As for high school, Lisi attended it for three years.'
        (measure reading)

(28)   Gaozhong$_i$, Lisi   du-le   [san   nian *(de)] e$_i$.
        high-school Lisi   study-Asp three   year *(DE
        'As for high school, Lisi attended the one with a three-year
        curriculum.'
        (modifier reading)

Again, we see that pre-nominal p-related durative phrases (the ones with measure readings) behave on a par with numeral-classifiers, but not with modifier phrases. We therefore conclude that pre-nominal p-related durative phrases are indeed numeral-classifier phrases.

3.2 Resolving the Syntax-Semantics Mismatch

Treating pre-nominal p-related durative phrases as numeral-classifier phrases also allows us to develop a unified account for the previous analyses proposed in HLL (2009). Recall that HLL offer two competing analyses. One analysis allows durative phrases to receive an eventive theta role (e.g., Incremental Theme), while the other analysis maintains that durative phrases are verbal adverbs in the underlying structure, and surface as nominal elements after IP-nominalization.

To find a solution to the dilemma, it is useful to look at the semantic function of numeral classifiers. Extending Chierchia (1998), Liao & Wang (2011) argue that NPs in Chinese have rather flexible denotations, in the sense that they may freely denote any information closely related to the concepts of NPs, and classifiers are able to define the "roles" and "levels" of counting out of the flexible NP denotations. That is to say, individual classifiers provide a criterion for counting individual/atomic objects, and kind classifiers define the counting level as "natural kinds" of "artificial types" of NPs. Their idea can be illustrated in (29), with an example in (30) (from Liao & Wang 2011):

(29) $[[NP]] \in_{D\langle e,t \rangle} =$
   a. $\{a_{in}, b_{in}, c_{in}, ...\}$ OR   *[a set of atomic individuals]*
   b. $\{a_{k1}, b_{k1}, c_{k1}...\}$ OR   *[a set of kind terms 1]*
   c. $\{a_{k2}, b_{k2}, c_{k2}...\}$ OR   *[a set of kind terms 2]*
   d. ...

(30) $[[DOG]] =$
   a. {Amigo, Bimbo, Candy, Doodle...}   *[individual dogs]*
   b. {Beagle, Chihuahua, Dachshund...}   ***[kind 1]***
   c. {long-haired, short-haired, smooth-haired...} ***[kind 2]***
   d. ...

Upon merging the classifier, the ambiguous NP denotations are disambiguated. A classifier defines the level of counting (e.g., a kind-classifier picks the level 1 kind terms), and constructs an enumerable set in the form of a semi-lattice, as in (31):

(31)
$$
\left[\!\!\left[\begin{array}{c} \text{CL'} \\ \diagup\diagdown \\ \text{KCL} \quad\quad \text{NP} \end{array} \right]\!\!\right] = \left(\begin{array}{c} \{a_{k1}, b_{k1}, c_{k1}\} \\ \{a_{k1},b_{k1}\}\{b_{k1},c_{k1}\}\{a_{k1},c_{k1}\} \\ \{a_{k1}\} \quad \{b_{k1}\} \quad \{c_{k1}\} \end{array} \right)_{\in D<e,t>}
$$

It is thus a natural extension that durative phrases, as "eventive" classifiers, are also able to define the counting roles as "time/event." Therefore, the complement NP simply represents an "event participant" at that time/event. That is, a set of event-objects are selected by the event classifiers. In a conceptually similar way, one might also think that the classifier offers a partition (or a set of counting units) of the concept provided by the N root, in the sense of Borer (2005b), and therefore, the durative classifier partitions the N by mapping it into a set of temporal units:[12]

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[12] Notice that through event-role or event partition, the complement NP does not change its syntactic status. The mechanisms simply give rise to a different LF interpretation of

(32)   Counting 'work' by the event classifier *xiaoshi* 'hour'
         [work]$_N$

| hour | hour | hour | … | … |
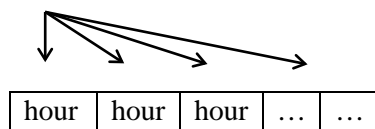
This then accounts for the proposal of 'eventive' theta-roles in HLL (2009). The numeral-classifier analysis may also capture the intuition behind the nominalization analysis. Given that phrase structures are parallel in the nominal and verbal domain (Abney 1987, Borer 2005a, b, Carlson 2003, Grimshaw 2000, Hsieh 2005, Stowell 1981, Svenonius 2004), it is natural to think that the elements in the nominalized verbal domain will turn into the corresponding functional categories in the nominal domain. Along this line, elements in a nominalized AspP should behave like the elements in the CLP, given that durative phrases are modifiers of AspP, as proposed in Demirdache and Uribe-Etxebarria (2004) for English and Liao (2004) for Chinese:

(33) F3   CP   QP
                | |
      F2   IP   DP
                | |
      F1   **AspP**   **CLP**
                | |
      F0   VP   NP

Finally, let us consider a puzzling behavior of pre-nominal durative phrases. It is often observed that pre-nominal durative phrases cannot appear before an indefinite classifier phrase, but the sentence is

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improved for some native speakers when the durative phrase occurs before a definite DP, as shown by the contrast in (34):[13]

(34) a. *Lisi nian-le   [san   nian] [yi jian daxue].
          Lisi study-Asp three year   one CL   college
       '(intended) Lisi went to some college for three years.'
     b. %?Lisi nian-le   [san   nian] [na   jian daxue].
          Lisi read-Asp   three year   that   CL   college
       'Lisi went to the college for three years.'

When we treat durative phrases as numeral classifiers in Chinese, the contrast between (34a) and (34b) finds its natural explanation. Liao & Wang (2011) observe that Chinese allows multiple-classifier constructions, in which two classifiers are stacked in one argument position. In such constructions, the lower DP must be definite/specific. They argue that the definiteness/specificity requirement is due to the universal partitive constraint (Fodor & Sag 1982, Jackendoff 1972, Ladusaw 1982), and they propose that multiple-classifier constructions in Chinese contain a covert partitive head, which provides a function to break the lower DP entity into a set (a function from e to $\langle e,t \rangle$) (Schwarzschild 2006, Zamparelli 1998, among others). In this sense, (34a) is ruled out by the partitive constraint, and (34b) can be considered as a multiple-classifier construction. The lower DP *na jian daxue* 'that college' is partitioned into a set of events, along the lines in (31) and (32).

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[13] Some speakers might dislike both sentences in (34), given that these sentences are often expressed through verb-copying or object-shifting constructions. However, at least to me, (34b) is much more favored than (34a).

4. CONCLUSION

It is proposed that pre-nominal durative phrases should be analyzed as numeral classifier phrases in Chinese. New pieces of evidence from Taiwanese tone sandhi rules and the *de*-insertion rule in Mandarin further support the proposed analysis. Such an analysis also has the advantage of unifying the two competing analyses proposed in HLL (2009), and it also provides an account for some unusual behaviors of the pre-nominal durative phrase that are difficult to explain under other alternative analyses.

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漢語的名前時量詞應分析為量詞

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本文討論出現在名前的時量詞的句法地位，主張其應當分析為量詞組。本文從兩方面提出新的證據，即閩南語裡的連讀變調規則以及漢語裡「的」字出現/省略的規則。這個新的量詞分析不但可以整合早前不同分析的矛盾之處，也可以對名前時量詞組帶來的句法–語意衝突難題提出統一的解釋。

關鍵字：漢語句法、時量詞組、句法–語意衝突、連讀變調