Deliminative verbal reduplication in Mandarin Chinese

The current study presents an HPSG analysis for deliminative verbal reduplication in Mandarin Chinese. We provide a detailed description of the phenomenon. After discussing reduplication's interaction with *Aktionsarten* and aspect markers, we argue that it is better analyzed as a morphological rather than a syntactic process. We put forward a lexical rule for verbal reduplication in Mandarin Chinese, and the different forms of reduplication are captured in an inheritance hierarchy. The interaction between verbal reduplication and aspect marking is handled by multiple inheritance. This analysis covers all forms of deliminative verbal reduplication in Mandarin Chinese and has none of the shortcomings of previous analyses.

Keywords: verbal reduplication, Mandarin Chinese, HPSG, Minimal Recursion Semantics

1. INTRODUCTION

In Mandarin Chinese, verbs can be reduplicated to express a delimitative aspectual meaning (e.g. Chao 1968: 204–205; Li & Thompson 1981: 232; Li 1996: 14; Dai 1997: 70; Zhu 1998: 382–383; F. Xing 2000: 420–421; Q. Chen 2001: 48; Tsao 2001: 288; Yang 2003: 11–12; Xiao & McEnery 2004: Sec. 4.3). This means that the event or state denoted by the verb happens in a short duration and/or a low frequency (Xiao & McEnery 2004: 155), such as illustrated in (1).[1] Thus, verbal reduplication in Mandarin Chinese is often translated as doing something "a little bit/for a little while".

(1) (a) qǐng   nǐ   cháng zhè dào cài.
        please you taste this CLF dish
        'Please taste this dish.'

    (b) qǐng   nǐ   *cháng*-chang zhè dào cài.
        please you taste-taste   this CLF dish
        'Please taste this dish a little bit.'

The current study tries to determine a suitable formal and unified analysis for the structure of verbal reduplication in Mandarin Chinese. It contributes more empirical evidence and offers a novel analysis in the theoretical framework of Head-driven Phrase Structure Grammar (HPSG; Pollard & Sag 1994, Sag 1997, Müller et al. 2021) to this phenomenon using Minimal Recursion Semantics (MRS; Copestake et al. 2005) as the

---

[1] Reduplications in the example sentences will be set in italics.

semantic representation formalism. This new account avoids the problems of previous approaches and explains more forms of deliminative verbal reduplication in Mandarin Chinese.

This paper is organized as follows: after this introduction, we will present in Section 2 the forms and syntactic distribution as well as the semantics of verbal reduplication in Mandarin Chinese. Importantly, we restrict the object of this study to the AA, A-*yi*-A, A-*le*-A, A-*le-yi*-A, ABAB and AB-*le*-AB forms of verbal reduplication in Mandarin Chinese. We will also discuss in this section, with the help of corpus data, the question of whether the reduplication is better analyzed as a morphological or a syntactic process. In Section 3, we will discuss the advantages and drawbacks of previous approaches. Section 4 will present a new HPSG account for verbal reduplication in Mandarin Chinese. Finally, Section 5 will conclude the paper.

The data in this paper was drawn from several sources. In addition to introspection, the Modern Chinese subcorpus of the corpus of the *Center for Chinese Linguistics of Peking University* (CCL) (Zhan et al. 2003, 2019) and the BCC corpus (Xun et al. 2016) was also consulted. Further, examples from novels and plays written by native speakers were considered. Corpus data provides natural and contextualized examples, and contains a variation of linguistic properties (Meurers & Müller 2009: 921). This can help us discover relevant constraints that can otherwise go unnoticed through introspection.

2. The phenomenon

This section introduces the fundamental grammatical behaviors of verbal reduplication in Mandarin Chinese. After illustrating its forms, syntactic distribution and semantics, we discuss the questions of whether it is better analyzed as a morphological or a syntactic phenomenon.

2.1. Forms

There is no general agreement on the forms of verbal reduplication in Mandarin Chinese. We adopt a broad definition in terms of the forms of verbal reduplication in Mandarin Chinese and list in (2)–(4) all the forms commonly discussed in the literature.

(2) for monosyllabic verbs: *shuō* 'say'

    (a) shuō-shuo   AA
          say-say

    (b) shuō-yi-shuō   A-*yi*-A
          say-one-say

    (c) shuō-le-shuō   A-*le*-A
          say-PFV-say

    (d) shuō-le-yi-shuō   A-*le-yi*-A
         say-PFV-one-say

    (e) shuō-shuō-kàn   AA-*kàn*
         say-say-look

    (f) shuō-kàn-kàn   A-*kàn-kàn*[2]
         say-look-look

(3)   for disyllabic verbs: *lái-wǎng* come-go 'come and go/communicate'

    (a) lái-wǎng-lái-wǎng   ABAB
         come-go-come-go

    (b) lái-wǎng-le-lái-wǎng   AB-*le*-AB
         come-go-PFV-come-go

    (c) lái-lái-wǎng-wǎng   AABB
         come-come-go-go

(4)   for V-O compounds: *shuō-huǎng* tell-lie 'lie'

    (a) shuō-shuō-huǎng   AAB
         tell-tell-lie

    (b) shuō-yi-shuō-huǎng   A-*yi*-AB
         tell-one-tell-lie

---

[2] One reviewer points out that this form is not acceptable for him/her. The acceptability of the A-*kàn-kàn* form seems to vary among Mandarin Chinese speakers. Cheng (2012: 73) suggests that unlike AA-*kàn*, A-*kàn-kàn* is an emerging construction that is still undergoing grammaticalization. He found in the Academia Sinica Balanced Corpus of Modern Chinese (Sinica Corpus; Huang & Chen 1998) 23 tokens of A-*kàn-kàn* but 141 tokens of AA-*kàn* (p. 64). This shows that the former is less common than the latter. (2a) is an example of A-*kàn-kàn* from the Sinica Corpus.

(a) jiù   shùn-zhe   běi-fēng-de   chuī-shì,   *shì-kàn-kàn*   néng fǒu jiāng
    just follow-PROG north-wind-DE blow-direction try-look-look can   not make
    hǎi-shā lán-xiàlái   ba!   (Sinica Corpus)
    sea-sand block-down PTC
'Let's just follow the north wind, try and see if we can block the sand!'

    Cheng's (2012) study is based on the Mandarin spoken in Taiwan. We might assume that A-*kàn-kàn* is more widely used in Taiwan than in Mainland China. But we also found the following examples of A-*kàn-kàn* in the BCC corpus, which includes mostly data from Mainland China. This suggests that A-*kàn-kàn* is acceptable for and used by at least some Mainland Chinese Mandarin speakers as well.

(a) nàme, nǐ   dào *shuō-kàn-kàn*, nǐ   huì yǒu shénmeyàngde gǎibiàn…   (BCC)
    then   you just say-look-look you will have what.kind.of   change
'Then you just try and say what kind of changes you will have.'

(b) wǒ děi   *tīng-kàn-kàn*   nǐde tiáojiàn zài shuō…   (BCC)
    I   have.to listen-look-look your condition then say
'I'll have to listen to your conditions first before talking about it/ deciding.'

    A statistical comparison of the acceptability and the productivity of A-*kàn-kàn* among speakers of different varieties of Mandarin Chinese has to be left for future studies.

(c)　shuō-le-shuō-huǎng　　　　　　　　　　　A-*le*-AB
　　　tell-PFV-tell-lie

Fan (1964), Arcodia et al. (2014) and Xie (2020) compared the AA, ABAB and AABB forms of reduplication and found a number of differences between the AA, ABAB forms compared to the AABB form in terms of their semantics, productivity, syntactic distribution and origin. Specifically, Arcodia et al. (2014: 17–18), Melloni & Basciano (2018: 144) and Xie (2020: 90) identified that AA and ABAB have a diminishing meaning, namely that the event happens for a short duration or to a small extent. By contrast, AABB expresses an increasing meaning, which indicates a repetition or an action in progress. Xie (2020: Sec. 3.1) also found that AA and ABAB have relatively high productivity, whereas the productivity of AABB is low. She further showed that AABB is generally correlated with the lack of a postverbal object, but the direct object remains present when a transitive verb undergoes AA or ABAB patterns of reduplication. Fan (1964: 277) proposed that AA, ABAB originated from the verb-measure word combination from Middle Chinese, while AABB developed from the reiterative rhetoric from Old Chinese. These differences seem to suggest that there is a fundmental difference between these two groups of verbal reduplication. The current study will only focus on the AA, A-*yi*-A, A-*le*-A, A-*le-yi*-A, ABAB and AB-*le*-AB forms of verbal reduplication in Mandarin Chinese. AA-*kan*, A-*kan-kan*, AAB, A-*yi*-AB, A-*le*-AB will also be mentioned occasionally to provide further arguments. In what follows, the term *reduplication* will be used to refer specifically to the AA, A-*yi*-A, A-*le*-A, A-*le-yi*-A, ABAB and AB-*le*-AB forms, if not specified otherwise.

2.2. *Syntactic distribution*

The reduplication has a similar syntactic distribution as an unreduplicated verb (5)–(10). This suggests that a reduplicated verb can be treated as its unreduplicated counterpart in syntax (see Section 2.4). The reduplication cannot be aspect marked, though, except with the perfective aspect marker *le* (see Section 2.3.3).The reduplication also cannot co-occur with an expression that quantifies the duration or the extent of the event described by the sentence due to its semantic properties (see Section 2.3.4).

(5)　Intransitive verb:

　　(a)　tā　xiào-le.
　　　　 he　laugh-PFV
　　　　 'He laughed.'

　　(b)　tā　*xiào-le-xiào.*
　　　　 he　laugh-PFV-laugh
　　　　 'He laughed a little bit.'

(6) Transitive verb:

  (a) nǐ   wèn tā.
       you ask him
       'Ask him.'

  (b) nǐ   *wèn-(yi)-wèn* tā.
       you ask-(one)-ask he
       'Try to ask him.'

(7) Under negation:

  (a) wèishénme wǒ bù kàn tā qítā fāngmiàn de jìnbù   ...
       why   I   not look he other aspect   DE progress
       'Why don't I look at his progress in other aspects?'

  (b) wèishénme wǒ bù *kàn-kan* tā qítā fāngmiàn de jìnbù...
       why   I   not look-look he other aspect   DE progress
                                                               (CCL)

       'Why don't I look a little bit at his progress in other aspects?'

(8) In a *ba*-construction:

  (a) gòu-mǎi   zhīqián zhēn   gāi   bǎ qíngkuàng
       purchase-buy before   really should BA situation
       mō-qīngchǔ.
       touch-clearly
       '(I) should really check the situation clearly before I make the
       purchase.'

  (b) gòu-mǎi   zhīqián zhēn   gāi   bǎ qíngkuàng
       purchase-buy before   really should BA situation
       mō-mō-qingchǔ.[3]   (CCL)
       touch-touch-clearly
       '(I) should really quickly check the situation clearly before I
       make the purchase.'

(9) With modal verb:

  (a) yǒu   liǎng běn shū   nǐ-men kěyǐ kàn ...
       there.be two   CLF book you-PL can read
       'There are two books that you can read ...'

  (b) yǒu   liǎng běn shū   nǐ-men kěyǐ *kàn-kan* ... (CCL)
       there.be two   CLF book you-PL can read-read
       'There are two books that you can read a little bit ...'

---

[3] As a reviewer comments, this example also involves the reduplication of V1 of
a resultative compound. This runs counter to exiting literature on this subject
which consistently maintains that resultative compounds are not amenable to
reduplication.

(10)   In a Serial Verb Construction (SVC):

    (a)   tā   …   qǐng shīfu   bāngmáng kàn   nǎlǐ   chū-le
          she   ask   master help   look where come.out-PFV
          wèntī.
          problem
          'She … asked the master to help have a look at where went wrong.'

    (b)   tā   …   qǐng   shīfu   bāngmáng *kàn-kan*   nǎlǐ
          she   ask   master   help   look-look   where
          chū-le   wèntī.   (CCL)
          come.out-PFV problem
          'She … asked the master to help have a quick look at where went wrong.'

2.3.   Semantics

As shown in Section 1, the reduplication seems to be connected to certain aspectual properties. The current study adopts the two-component aspect model proposed by Xiao & McEnery (2004) based on Smith (1991). The general term "aspect" is considered to encompass the following two components: situation aspect, i.e. "aspectual information conveyed by the inherent semantic representation of a verb or an idealized situation" (Xiao & McEnery 2004: 21); and viewpoint aspect, i.e. "the aspectual information reflected by the temporal perspective the speaker takes in presenting a situation" (Xiao & McEnery 2004: 21). Situation aspect can be further modeled as verb classes at the lexical level and situation types (the interaction of verb classes and other constituents, such as adjuncts) at the sentential level (Xiao & McEnery 2004: 33). The verb classes are determined with verbs in a neutral context (preferably in a perfective viewpoint aspect, with a simple object only when it is obligatory), where everything that might change the aspectual value of a verb is excluded and only the inherent features of the verb itself are considered (see Xiao & McEnery 2004: 52 for more details). This does not rule out the fact that the same verb may express different aspectual properties in other contexts, but its verb class remains the same, as the aspectual change can be attributable to other components at the sentential level.

In this section, we will first discuss the core meaning of the reduplication as well as the meaning of its different forms (Section 2.3.1). We will then investigate the interaction of the reduplication with verb classes (Section 2.3.2), aspect markers (Section 2.3.3) and other sentential components (Section 2.3.4) .

2.3.1. Core meaning

The reduplication has a *delimitativeness* meaning (e.g. Chao 1968: 204–205; Li & Thompson 1981: 232; Li 1996: 14; Dai 1997: 70; Zhu 1998: 382–383; F. Xing 2000: 420–421; Q. Chen 2001: 48; Tsao 2001: 288; Yang 2003: 11–12; Xiao & McEnery 2004: Sec. 4.3). To be specific, the reduplication of [+durative] verbs reduces the duration of the events, and the reduplication of [−durative] verbs reduces the iteration frequency of the events (Li 1996: 14; Xiao & McEnery 2004: 149–150). Besides delimitativeness, Chao (1968: 204), Fan (1964: 276), Smith (1991: 356; 1994: 199–120), Li (1996: 14) and Tsao (2001: 290–291) suggest that the reduplication signifies *tentativeness*, which can be used "to refer modestly to one's own activities, or for mild imperatives" (Smith 1991: 356), or "trying to" do something (Li & Thompson 1981: 234). *Frequentativeness* or *habitualness*, that the event denoted by the verb happens frequently or habitually, is mentioned by Fan (1964: 276), Li (1996: 15) and Qian (2000: 1) as the meaning of reduplication as well. Fan (1964: 276) further proposes a meaning of *slightness* or *casualness* for reduplication, which implies that the event is unimportant or conveys a casual attitude of the speaker. Zhu (1998: Sec. 3.1.3) suggests that the main function of reduplication is to *increase the agency* of the action or the change denoted by the verb.

In general, all of the above cited research agree that the reduplication expresses a short duration and/or a low frequency, which fits the definition of delimitativeness. Xiao & McEnery (2004: 152–154) and Yang (2003) argue that the core meaning of reduplication is delimitativeness, while all other meanings are merely pragmatic extensions in specific contexts. Xiao & McEnery (2004: 152–154) points out that tentativeness and casualness are constrained by a number of contextual elements such as the reduplicated verb must be volitional and the subject of the sentence must be animate. But these constraints are only necessary but not sufficient conditions for a tentative or casual meaning of reduplication. Among all instances of verbal reduplication they found in a corpus, all of them have a delimitative reading, while only some of them convey tentativeness or casualness. Yang (2003) compares the sentence pairs with reduplicated verbs and their unreduplicated counterparts, and shows that the reduplication itself does not add a tentative, frequentative, casualness or increased agency meaning to the sentence. Rather, these additional meanings arise from the sentences or the contexts as a whole. She concludes that these additional meanings are results of meaning extensions of delimitativeness in specific contexts. We follow Xiao & McEnery (2004) and Yang (2003) and treat delimitativeness as the central meaning of reduplication, and the other meanings as pragmatic extensions.

The semantics of the reduplication has the properties of transitoriness, holisticity and dynamicity (Dai 1997: 70–79; Xiao & McEnery 2004: 155–159). It presents the situation as a transitory and non-decomposable whole.

A situation expressed by a sentence with the reduplication involves changes not only in the initiation and termination of an event, but also in the transitory process itself. Compared to (11a), which could mean that the protagonist kept staring at the the footprint, (11b) indicates that the protagonist took a brief look or several brief looks at the footprint and looked away in the end, which is a process full of changes.

(11) (a) Wú Xùmáng kàn-le   zuò-àn   shí   liúxià de
          Wu Xumang   look-PFV   commit-crime   when   leave   DE
          jiǎoyīn   …   (Xiao & McEnery 2004: 158)
          footprint
          'Wu Xumang looked at the footprint left when the crime was committed.'

      (b) Wú Xùmáng kàn-le-kàn   zuò-àn   shí   liúxià de
          Wu Xumang   look-PFV-look commit-crime when   leave   DE
          jiǎoyīn   …   (Xiao & McEnery 2004: 158)
          footprint
          'Wu Xumang looked a little bit at the footprint left when the crime was committed.'

The semantics of A-*le*-A can be deduced compositionally from its structure. It is a hierarchical combination of the perfective aspect and delimitativeness, "conveying a transitory event which has been actualized" (Xiao & McEnery 2004: 151).

As for A-*yi*-A, Fan (1964: 273) compares examples found in novels and plays and concludes that A-*yi*-A has exactly the same meaning as its AA counterpart. She thus assumed that AA is merely a form of A-*yi*-A, where the *yi* is omitted phonologically. F. Xing (2000: Sec. 5) considers that the major difference in meaning between AA and A-*yi*-A lies in the speaker's attitude. The former conveys a casual attitude whereas the latter sounds more serious.However, he stressed that there is no difference in the delimitative semantics of both forms, and that the variance in meaning is a pragmatic one. The difference is also not absolute and often only shows a tendency. Xu (2002) finds out that compared to A-*yi*-A, one tends to use AA in contexts with strong emotional attitudes, urgent, casual, timid or uncertain contexts. But he also states that these differences are pragmatic rather than semantic, as he argues that AA and A-*yi*-A can be used interchangeably in most cases, and the specific differences in meaning only arise from specific contexts as a whole. Yang (2003: 15) suggests that AA and A-*yi*-A have the same core meaning, while A-*yi*-A implies a slightly more serious attitude than AA due to its length. We assume A-*yi*-A to be a form of reduplication and that it has the same core semantics as AA.

AA-*kàn* and A-*kàn-kàn* are described to express a "try … and find out" meaning (Cheng 2012: 63). Tsao (2001: 290) also observes that

the tentative meaning is particularly prominent when the reduplication is followed by *kàn* 'look'. We still consider the tentativeness implied by these two forms to be a pragmatic extension of delimitativeness. The tentative meaning is made prominent by the verb *kàn* 'look', and the whole structure can be understood as "do A a little bit and see".

2.3.2. Interaction with verb classes

Previous research often claims that the reduplication can only be used for certain verb classes, while it is infelicitous for other ones. Li & Thompson (1981: 234–235) and Hong (1999: 277–278) suggest that reduplication is only possible for volitional activity verbs. Dai (1997: 70–71) and Tsao (2001: 290) both consider that reduplication can only be used in dynamic situations. The former further claims that achievement verbs cannot be reduplicated. Xiao & McEnery (2004: 155), Arcodia et al. (2014: 20) and Basciano & Melloni (2017: 145) propose that only [+dynamic] and [−result] verbs can be reduplicated. This means that the reduplication can only interact with dynamic situations which encode no results and is consequently only compatible with activities and semelfactives, but not with states and achievements.

Q. Chen (2001: 53) and Yang (2003: 10–11) acknowledge that the reduplication of non-volitional verbs is more restricted than that of volitional ones. But Zhu (1998: 381–382) lists a number of non-volitional predicates that can be reduplicated. We found the examples shown in (12) in CCL where non-volitional verbs *wěiqū* 'feel wronged', *rèn-xìng* 'be willful' and *diào* 'drop' are reduplicated.

(12) (a) kěshì   xiànmùjīn,   dàjiā   yě   zhǐhǎo
         but   now   everybody   also   can.only
         wěiqū-wěiqū   le.   (CCL)
         feel.wronged-feel.wronged PTC
         'But now, everybody can only feel wronged a little bit.'

    (b) tā-men   néng   zuò   de   búguò   shì
         she-PL   can   do   DE   just   be
         rèn-rèn-xìng,   shuǎ diǎn'er xiǎo píqì,
         be.willful-be.willful-temperament play a.little small temper
         diào-diao yǎnlèi shénmede.   (CCL)
         drop-drop tear   what
         'What they can do is just to be a little bit willful, to lose their temper a little bit and to drop a little bit of tears or something.'

It is true that the reduplication of stative and achievement verbs is not as easily acceptable as that of activities and semelfactives. (Xiao & McEnery 2004: 155) classify *bìng* 'be sick' as a stative verb. Indeed, compared to the questionable reduplication of *bìng* 'be sick' in (13a), the reduplication

of the activity verb *kan* 'watch' in (13b) and that of the semelfactive verb *kesou* 'cough' in (13c) are readily acceptable.

(13) (a) ? tā *bìng-bing*   jiù   hǎo le.
           he be.sick-be.sick then well PTC

                                 (Xiao & McEnery 2004: 155)

           Intended: 'He was sick for a little while and then got well.'

    (b) tā *kàn-le-kàn*   nà   chǎng bǐsài.
         he watch-PFV-watch that CLF   competition
         'He watched that competition for a little while.'

    (c) tā *késòu-késòu* jiù   hǎo le.
         he cough-cough then well PTC
         'He coughed a little bit and then got well.'

However, examples such as (14) can be found where *bìng* 'be sick' is reduplicated.

(14) wǒ zhēn xiǎng *bìng-yi-bìng*,   xiē tā ge   shí tiān bàn
      I   really want be.sick-one-be.sick rest it CLF ten day half
      yuè.   (Q. Chen 2001: 54)
      month
      'I really want to be sick for a little while and rest for ten days or half a month.'

As a reviewer points out, Tham (2013: Sec. 3.3) considers *bìng* 'be sick' to be a basic change of state (COS) verb, i.e. 'become sick'. In contrast, she uses *xǐhuān* 'like' and *xiāngxìn* 'believe' as examples of stative verbs. Peck et al. (2013: 680) also list *xǐhuān* 'like' and *xiāngxìn* 'believe' as stative verbs. For these two verbs, examples such as (15) and (16) can be found.

(15) zhè chē hǎo xíng a! zěnme le, wǒ jiù   *xǐhuān-xǐhuàn* bùxíng
      this car so cool PTC what PTC I   just like-like   cannot
      me?   (BCC)
      PTC
      'This car is so cool! What? I can't just like it for a little bit?'

(16) shéi ràng wǒ lái   *xiāngxìn-xiāngxìn*   (CCL)
      who let   I   come believe-believe
      'Who lets me believe him/her?'

On the other hand, as the reviewer and indeed Tham (2013: 669–670) herself noted, verbs expressing psychological states such as these can have a COS interpretation (but not necessarily), let us look at other examples of stative verbs listed by Peck et al. (2013: 680) which do not express psychological states, and examples in Xiao & McEnery (2004: Sec. 3.3.3) of individual-level states (ILSs) which only have stative

interpretation, as opposed to stage-level states (SLSs) which can have both stative and dynamic interpretations.[4] The following examples contain the reduplication of *xiàng* 'look like' and *zài-chǎng* 'be present on the scene'.

(17) Context: Wáng Shèngdí is the actor of the character Gù Miǎo in a TV series. Wáng Ānyǔ is another actor in the series.

   Wáng Shèngdí … tài xiàng   Gù Miǎo le. Wáng Ānyǔ
   Wang Shengdi   very look.like Gu Miao PTC Wang Anyu
   nǐ kuàidian yě *xiàng-yi-xiàng*   ba!⁵
   you fast   also look.like-one-look.like PTC
   'Wang Shengdi … really looks like Gu Miao. Wang Anyu, you too should just look like (your character) already!'

(18) tā … hèn xūyào mǔqīn *zài-yi-zài-chǎng* …
   she very need mother be.present-one-be.present-scene
                           (CCL)
   'She … really needs her mother to be present on scene for a little while …'

One might argue that even in the examples above, dynamic rather than stative meaning is conveyed. We argue that the dynamic interpretation does not come from the verb but from reduplication. The use of reduplication affects the situation aspect at the sentential level. And as we describe in Section 2.3.1, the semantics of reduplication has the property dynamicity. Verbs such as *xiàng* 'look like' and *zài-chǎng* 'be present on the scene' are stative in a neutral context and thus, we consider the intrinsic feature of these verbs to be stative and they should be classified as stative verbs. The dynamic interpretation only arises when they are used in specific contexts, in this case, when they are reduplicated.

Similar to stative verbs, the reduplication of achievement verbs is also not readily acceptable, as shown in (19) with reduplication of *yíng* 'win'.

(19) ? tā *yíng-le-yíng* ná chǎng bǐsài.
   he win-PFV-win that CLF competition
                           (Xiao & McEnery 2004: 155)
   Intended: 'He won that competition a little bit.'

However, examples such as those in (20a–c) can be found. Here, achievement verbs like *wang* 'forget' and *sheng* 'give birth to' are reduplicated.

---

[4] Note that most examples of ILSs in Xiao & McEnery (2004: Sec. 3.3.3) are adjectives. Since in Mandarin Chinese, adjectives have a different reduplication pattern (see e.g. Tsao 2001: Sec. 2.2, Fan et al. 2015: Sec. 4.1, Sui 2018: Sec. 3), and further, COS verbs can be systematically derived from adjectives (Tham 2013: Sec. 3), these predicates are not included in our examples.

[5] https://www.163.com/dy/article/FS1FKUC30534DZO1.html (Accessed 26th March 2024).

(20)   (a)   děng rén-men   ba zhè jiàn shì   *wàng-wang* zài shuō
           wait people-PL BA this CLF incident forget-forget then talk
           ba.[6]
           PTC
           'Let's wait until people forget this incident a little bit and then talk about it.'

      (b)   wómen   nǔrén   …   zhǐ   néng   *shēng-shēng*
           we   women   only   can   give.birth.to-give.birth.to
           háizi…   (BCC)
           child
           'We women can only give birth to children …'

      (c)   jiào tā *shēng-shēng*   xiǎohái, jiù   zhīdào zuò
           let she give.birth.to-give.birth.to child   then know   COP
           mǔqīn de gān-kǔ   le.   (L. Chen 2005: 112)
           mother DE sweet-bitter PTC
           'Let her try to give birth to a child and then she will know the bittersweetness of being a mother.'

The reduplication does not seem to cancel the *telos* of achievements. Applying the classic "for/in X-time" test, reduplication is compatible with "in X-time" (21b) but not with "for X-time" (21c).

(21)   (a)   yíkuài   …   dào   fùjìn   shìchǎng *mǎi-mǎi* dōngxi…
           together   arrive nearby market   buy-buy thing
                                                  (CCL)
           '(We) together … went to the market nearby to buy some things.'

      (b)   liǎng tiān hòu dào   fùjìn   shìchǎng *mǎi-mǎi* dōngxi.
           two   day   later arrive nearby market   buy-buy thing
           'Two days later, (we) went to the market nearby to buy some things.

      (c)   *dào   fùjìn   shìchǎng *mǎi-mǎi* dōngxi liǎng tiān.
           arrive nearby market   buy-buy thing   two   day
           Intended: '(We) went to the market nearby to buy some things for two days.'

The following continuation that cancels the *telo* is also infelicitous (22).

(22)   dào   fùjìn   shìchǎng *mǎi-mǎi* dōngxi, # dàn shénme yě
      arrive nearby market   buy-buy thing   but anything also

---

[6] Liu, Zhen. 1963. *Chang chang de liushui [Long long water]*, 72. Beijing: The Writers Publishing House.

méi măi-dào.
not buy-arrive
Intended: '(We) went to the market nearby to buy some things, but
we didn't buy anything.'

These tests suggest that the reduplicated verbs are indeed achievements,
rather than being used as activities.

The examples presented in this section show that although the redu-
plication does have a tendency to interact with volitional verbs and with
activities and semelfactives due to its dynamic meaning, this is by no means
a rigid constraint, and non-volitional verbs, states and achievements can be
reduplicated in appropriate contexts as well, contrary to common beliefs
in the literature. Thus, a theoretical account of reduplication should not
restrict its use to only certain verb classes.

2.3.3. Interaction with aspect markers

As mentioned in Section 2.1, the reduplication can only be marked by the
perfective aspect marker *le* but not other aspect markers.[7] We believe this
incompatibility to be for semantic reasons.

Xiao & McEnery (2004: Ch. 4) consider *le, guò* and reduplication to
indicate perfective aspects, as they all view the situation as an inseparable
whole. The perfective aspect marker *le* is compatible with reduplication
while the experiential aspect marker *guò* is not. Xiao & McEnery (2004:
128–131) stated that *le* has the semantic feature of dynamicity, since it
"can focus on both heterogeneous internal structures and changing points"
(Xiao & McEnery 2004: 129). It can be combined with a situation with a
dynamic internal structure, such as crying in (23a). It can also co-occur
with a situation with a change at a certain time point, such as getting to
know in (23b).

(23) (a) wèicǐ, Dèng Lìjūn shāngxīn de kū-le sān tiān.
for.this Deng Lijun sadly DE cry-PFV three day
(Xiao & McEnery 2004: 129)
'For this reason, Deng Lijun cried sadly for three days.'

(b) tā zhīdào-le zhè shì de nèi-qíng.
he know-PFV this matter DE inside-information
(Xiao & McEnery 2004: 130)
'He got to know the inside information on this matter.'

Le is compatible with the reduplication, because its dynamicity can relate
to not only the termination or instantiation of an event (a point of change),

---

[7] There is no consensus on which elements exactly are considered aspect markers in
Mandarin Chinese. We only discuss the most commonly recognized ones here.

but also the process of the situation, just like that of the reduplication (see Section 2.3.1).

In comparison, the experiential aspect marker *guò* cannot co-occur with a reduplicated verb, because its dynamicity attributes to an "experiential change" (Xiao & McEnery 2004: 148), namely that a situation has been experienced historically and that "the final state of the situation no longer obtains" at the reference time (Xiao & McEnery 2004: 144). Compare (24a) and (24b), *guò* in (24a) suggests a change out of the state of being a soldier, whereas *le* in (24b) conveys a change into the state of being a soldier (Xiao & McEnery 2004: 149).

(24) (a) tā dāng-guò   bīng.   (Xiao & McEnery 2004: 149)
          he serve.as-EXP soldier
          'He once served as a soldier.'

      (b) tā dāng-le   bīng.   (Xiao & McEnery 2004: 149)
          he serve.as-PFV soldier
          'He became a soldier.'

It is clear that *guò* only indicates a change at the termination of a situation and cannot express the dynamicity within a situation. Hence, it is incompatible with the semantics of the reduplication.

Due to the holistic semantics of the reduplication, it is incompatible with imperfective aspect markers: the durative aspect marker *zhe* and the progressive aspect marker *zài*, as both only focus on a part of the situation and do not view the situation as a whole (Xiao & McEnery 2004: Ch. 5).

From the illustration above, it seems that due to its semantics, reduplication can only be marked by *le* but not the other aspect markers.

2.3.4. Interaction with other sentential components

The reduplication is incompatible with an expression that quantifies the duration or the extent of the event expressed in the sentence (25) (Li 1998: 83–84; L. Chen 2005: 114–115). This is because the reduplication already contains a quantity meaning (Li 1998: 84; L. Chen 2005: 114–115), namely a short duration or a small extent, which cannot be measured on a concrete scale (Xiao & McEnery 2004: 155; Sui & Hu 2016: 333). This results from the properties of reduplication rather than the verb itself, as the verb itself can be combined with such an expression (25a).

(25) (a)   tā yì tiān pǎo shí lǐ.   (Li 1998: 83)
              he one day run ten mile
              'He runs ten miles a day.'

      (b) * tā yì tiān *pǎo-pǎo* shí lǐ.
              he one day run-run ten mile

A reviewer also notes that the reduplication appears frequently in imperative (example 20a) and conditional sentences (26) as well as

causative sentences with *ràng/jiào/shǐ* 'let/let/make' (examples 16, 17, 20c).

(26) nǐ   yàoshì gěi   wǒ *zhǐ-zhi*   Lǐ-jiā   de mén, wǒ
     you   if   give I point-point   Li-family DE door I
     yuàn   gěi nǐ guìxià   (Xiao & McEnery 2004: 157)
     be.willing.to give you kneel.down
     'If you point at the door of Li's for me, I am willing to kneel down
     for you.'

This can be attributed to the holistic semantics of reduplication (see Section 2.3.1). As illustrated in Section 2.3.3, *le* expresses a situation being realized, while *guò* conveys a situation already experienced, and thus, both rarely occur in future situations. The use of reduplication does not have these constraints. This makes the reduplication the only perfective viewpoint aspect that can freely occur in future situations (Xiao & McEnery 2004: 156–157). This explains the general tendency for the reduplication to appear in conditional clauses and imperative or causative contexts, which are frequently used to describe future situations.

2.4. Word vs. phrase

The literature on reduplication makes different assumptions on whether it is a morphological or syntactic phenomenon. Chao (1968: Ch. 4), Li & Thompson (1981: Ch. 3), Dai (1992: Sec. 4.1) and Liao (2014: 4–5) list reduplication under morphological processes. By contrast, Arcodia et al. (2014: 23), Xiong (2016), Basciano & Melloni (2017: 146), Yang & Wei (2017: 229–231), Melloni & Basciano (2018: 330) and Xie (2020) claim it to be syntactic. This section reviews the arguments in Xie (2020), and applies tests from Dai (1992: Sec. 7, 1998: Sec. 2.3–2.4) to distinguish words from phrases in Mandarin Chinese. The results argue for a morphological analysis of reduplication.

Xie (2020) compares the AA and the ABAB forms of reduplication with the AABB form and claims that AA and ABAB are syntactic processes while AABB is morphological. She points out that AA and ABAB behave differently from AABB in their productivity, possibility of *le* insertion, categorial stability, transitivity, and input/output constraints. While AA and ABAB are highly productive, AABB shows low productivity. *Le* can be inserted freely into AA (27) and ABAB (28) but not into AABB (29).

(27) (a) Yáo Míng *kàn-kàn* tā de fānyì   Kē Lín …
          Yao Ming look-look he DE translator Ke Lin
          'Yao Ming looked at his translator Ke Lin a little bit …'

     (b) Yáo Míng *kàn-le-kàn* tā de fānyì   Kē Lín … (CCL)
          Yao Ming look-PFV-look he DE translator Ke Lin
          'Yao Ming looked at his translator Ke Lin a little bit …'

(28) (a) tā *héji-héji*,   duì Jiāng Qīng shuō …
      he consider-consider to Jiang Qing say
      'He considered a little bit, and told Jiang Qing …'

(b) tā *héji-le-héji*,   duì Jiāng Qīng shuō … (CCL)
      he consider-PFV-consider to Jiang Qing say
      'He considered a little bit, and told Jiang Qing …'

(29) (a) *yáo-yáo-huàng-huàng* jiù bá chūlái le.
      shake-shake-sway-sway then pull out PTC

(Xie 2020: 85)

      'Shake it a little bit and then it will be pulled out.'

(b) * *yáo-yáo-le-huàng-huàng* jiù bá chūlái le.
      shake-shake-PFV-sway-sway then pull out PTC

(Xie 2020: 85)

The output of AA and ABAB does not change the grammatical category of the input (verb), but the output of AABB could have other categories such as adverb (30) or adjective (31).

(30) (a) * diàn-chē *yáo-huàng-yáo-huàng* kāi zǒu …
      electric-car shake-sway-shake-sway drive away

(Xie 2020: 86)

(b) diàn-chē *yáo-yáo-huàng-huàng* kāi zǒu …
      electric-car shake-shake-sway-sway drive away

(Xie 2020: 86)

      'The tram drove away jiggly …'

(31) (a) * … zuò zài *yáo-huàng-yáo-huàng* de chē shàng
      sit on shake-sway-shake-sway DE car on

(Xie 2020: 86)

(b) … zuò zài *yáo-yáo-huàng-huang* de chē shàng
      sit on shake-shake-sway-sway DE car on

(Xie 2020: 86)

      '… sit on the jiggling car'

AA and ABAB do not change the valency of the input verb, but AABB makes a transitive verb intransitive (32).

(32) (a) qiāo-dǎ gān-jīng shì huǎnjiě gān-qì de hǎo
      knock-beat liver-channel COP relieve liver-*qi* DE good
      bànfǎ. (Xie 2020: 88)
      method
      'Beating the liver channel is a good method to relieve the stagnation of liver *qi*.'

(b) *qiāo-dǎ-qiāo-dǎ*   gān-jīng   shì   huǎnjiě gān-qì
knock-beat-knock-beat liver-channel COP relieve liver-*qi*
de hǎo   bànfǎ.   (Xie 2020: 88)
DE good method
'Beating the liver channel a little bit is a good method to relieve the stagnation of liver *qi*.'

(c) * *qiāo-qiāo-dǎ-dá*   gān-jīng   shì   huǎnjiě gān-qì
knock-knock-beat-beat liver-channel COP relieve liver-*qi*
de hǎo   bànfǎ   (Xie 2020: 88)
DE good method

(d) *qiāo-qiāo-dǎ-dǎ*   shì   huǎnjiě gān-qì   de   hǎo
knock-knock-beat-beat COP relieve liver-*qi* DE good
bànfǎ
method
'Knocking around is a good method to relieve the stagnation of liver *qi*.'

The two groups also have different input and output constraints. Xie (2020) claims that only dynamic and volitional verbs can undergo AA or ABAB reduplication (but see Section 2.3.2). In comparison, AABB requires its input to be a complex verb whose constituents are either synonymous, antonymous or logically coordinated (33). Moreover, as can be seen in the translation in (33), the output of AABB has an increasing meaning, i.e. an event happens repeatedly or continuously, as opposed to the delimitative meaning of AA and ABAB.

(33) (a) duǒ-shǎn   → *duǒ-duǒ-shǎn-shán*   (Xie 2020: 88)
hide-dodge   hide-hide-dodge-dodge
'hide and dodge' 'hide and dodge repeatedly'

(b) jìn-chū   → *jìn-jìn-chū-1*chu   (Xie 2020: 88)
enter-exit   enter-enter-exit-exit
'enter and exit' 'enter and exit repeatedly'

(c) shuō-xiào   → *shuō-shuō-xiào-xiào*   (Xie 2020: 88)
talk-laugh   talk-talk-laugh-laugh
'talk and laugh' 'talk and laugh continuously'

However, a morphological process can be productive, and it does not necessarily change the category or valency of the input. For instance, the *-able* derivation in English is a productive morphological process. Tense inflections in English such as *-ed* change neither the category nor the valency of the input verb. Further, if *le* is considered to be a morphological element (e.g. Huang et al. 2009: 101–102; Müller & Lipenkova 2013: 246), the insertion of *le* does not have to be viewed as a syntactic process either. It seems that Xie (2020) only shows that AA and ABAB are different

processes than AABB, but not necessarily that the former is syntactic while the latter morphological.

A reviewer claims that *le* insertion can be seen as a violation of lexical integrity, because it is never found in between the two constituents of a compound word, but must be placed after the whole unit. For instance, Her (2006: 1282) claims that the V-*gěi* sequence cannot be separated and uses this as evidence for analyzing it as a single lexical item (*jì-gěi-le tā* 'send-give-PFV he, sent him' vs. ? *jì-le-gěi tā* 'send-PFV-give he'). In non-separable VO compounds, *le* insertion also does not seem to be possible (*guān-xīn-le* 'close-heart-PFV, cared for' vs. ? *guān-le-xīn* 'close-PFV-heart'). AABB

In respond to this, we found counter-examples that show *le* insertion in-between V-*gěi* (34) as well as *guān-xīn* 'close-heart, care for' (35) is possible.

(34) … xǔduō nǚzǐ, jiāng zìjǐde xiàngpiān … jì-le-gěi   tā.
      many women take own   photo   send-PFV-give he
                                                         (CCL)

'Many women … sent him photos of themselves.'

(35) xǔduō tóngzhì … zìdòngde   duì bìngyuán guān-lē-xin.
      many comrade   voluntarily to patient close-PFV-heart
                                                         (CCL)

'Many comrades … voluntarily cared for the patients.'

In any case, since reduplication is not compounding (Sui 2018: 149–150; Gao et al. 2021 provides empirical evidence.), and the patterns discussed here constitute a different process than the AABB pattern (see the discussions above, also Deng 2013: Sec. 4.3, Sui & Hu 2016: Sec. 2, Sui 2018 and Wang 2023), it is not surprising that *le* occurs at a different position.

It is, therefore, necessary to resort to other tests that are intended to distinguish words from phrases. Dai (1992: 32–33, 1998: 117–120) proposes the modification and the expansion tests to distinguish words from phrases in Mandarin Chinese.

First, the modification test suggests that subparts of a word cannot be modified at a phrasal level. This is possible for a VP (36), as the NP inside of the VP can be modified by e.g. an AP.

(36) kāi   hóngsède mén
      open red   door
      'open the red door'

In contrast, the individual verbs in reduplication cannot be modified by an e.g. AdvP. (37) is ungrammatical whether the AdvP is interpreted to modify the first or the second verb.

(37)   * kàn   tōutōude   kàn
        look   secretly   look

Second, the expansion test suggests that a phrasal dependent (either a modifier or an argument) cannot be inserted into a word. This is possible for a verbal classifier phrase (38), as the object can occur after or in-between.

(38)   (a)   kāi   mén   sān   cì
             open door three time
             'open the door three times'

       (b)   kāi   sān   cì   mén
             open three time door
             'open the door three times'

For reduplication, this is also not possible (39), as the object cannot be inserted between the two verbs.

(39)   (a)   *kāi-(le)-kāi*   mén
             open-PFV-open door
             'open the door for a little while'

       (b)   * *kāi-(le)-mén-kāi*
             open-PFV-door-open

Cross-linguistically, verbal reduplication in Mandarin Chinese patterns more with morphological reduplication (below as *reduplication*) in other languages than syntactic reduplication (below as *repetition* Gil 2005: 31, Forza 2016: 1–2). Gil (2005: 35–36) considers non-iconicity and having only two (but not more) copies as sufficient but not necessary conditions for reduplication. He further proposes building one intonational group as sufficient and necessary condition for reduplication (p. 36). All three conditions are true for verbal reduplication in Mandarin Chinese (see Sui 2018: 154 on intonation of verbal reduplication in Mandarin Chinese). Forza (2016: 9) argues that the substantial difference between reduplication and repetition lies in the fact that only the former affects grammatical features such as aspect. This is also the case for verbal reduplication in Mandarin Chinese.

In sum, we maintain that verbal reduplication in Mandarin Chinese is better off analyzed as a morphological phenomenon.

3. Previous analyses

Previous analyses on the reduplication in Mandarin Chinese and in other languages can be classified into three groups: the reduplication as a verbal classifier phrase (Section 3.1), as an aspect marker (Section 3.2), and as a

special reduplication construction (Section 3.3).[8] This section will review these analyses and will discuss their advantages and shortcomings.

3.1. *The reduplication as a verbal classifier phrase*

Fan (1964), Chao (1968: 205) and Xiong (2016) analyzed the reduplication in Mandarin Chinese as a verbal classifier phrase[9]. A verbal classifier is "a measure for verbs of action expresses the number of times an action takes place" (Chao 1968: 615), such as the *ci* in (40).

(40) mei che guo yi   ci   huang   (Chao 1968: 616)
      not tell EXP one CLF lie
      'haven't told lie once'

In this analysis, the first element in the reduplication is the actual verb, the second element is a verbal classifier borrowed from a verb, and *yi* 'one' is an optional pseudo-numeral that only has an abstract 'a little bit' meaning. The analysis is syntactic.

The parallel between the reduplication and a verbal classifier phrase is obvious. Both the reduplication and the verbal classifier phrase serve to quantify the duration or the extent of a situation. A reduplication structure can often be paraphrased into a verbal classifier phrase such as *yi xia* 'once, a while', *yi hui* 'a while', as illustrated in (41).

(41) (a) *deng-deng* wo.
           wait-wait   I
           'Wait for me a little bit.'

      (b) deng wo yi   xia.
           wait I   one CLF
           'Wait for me a little while.'

However, there are several arguments suggesting that the reduplication cannot be analyzed the same way as a verbal classifier phrase. First, the verb and the verbal classifier can be separated (42), while the reduplication cannot (43) (Paris 2013: 269).

(42) (a) ni   deng yi   xia Zhangsan!
           you wait one CLF Zhangsan
           'Wait for Zhangsan for a while!'

---

[8] The term *construction* is used here in its general sense, not in the sense of Construction Grammar.

[9] Alternative terms for *verbal classifier*: *measure for verbs of action* in Chao (1968: 615) or *cognate object* in Chao (1968: 312) and Hong (1999: 263). The *verbal classifier phrase* is also termed *quantity adverbial* in Li & Thompson (1981: 352–353) or *frequency phrase* in Huang et al. (2009: 91).

(b) ni   deng Zhangsan yi   xia!
     you wait Zhangsan one CLF
     'Wait for Zhangsan for a while!'

(43) (a) ni   *deng-yi-deng* Zhangsan!
           you wait-one-wait Zhangsan
           'Wait for Zhangsan a little bit!'

      (b) *ni   *deng* Zhangsan *yi   deng*!
           you wait Zhangsan one wait

Second, unlike verbal classifiers (44), the *yi* 'one' in A-*yi*-A cannot be replaced by other numerals (45) (Yang & Wei 2017: 299–230).

(44) (a) ta pai-le   wo yi xia.
           he pat-PFV I   one CLF
           'He patted me once.'

      (b) ta pai-le   wo liang xia.
           he pat-PFV I   two   CLF
           'He patted me twice.'

(45) (a) ta *pai-le-yi-pai*   wo.
           he pat-PFV-one-pat I
           'He patted me a little bit.'

      (b) *ta *pai-le-liang-pai*   wo.
           he pat-PFV-two-pat I

Third, idioms (46a) lose their idiomatic meaning when used with verbal classifiers (46b), but maintain their idiomatic meaning with reduplications (46c) (Yang & Wei 2017: 230–231).

(46) (a) bao   fo-jiao
           clasp Buddha-foot
           Literal: 'clasp the Buddha's foot'
           Idiomatic: 'make a last-minute effort'

      (b) ta kaoshi qian   bao-le   san xia fo-jiao.
           he exam   before clasp-PFV three CLF Buddha-foot
           'He clasped the Buddha's foot three times before the exam.'
           (idiomatic reading unavailable)

      (c) ta kaoshi qian   *bao-le-bao*   fo-jiao.
           he exam   before clasp-PFV-clasp Buddha-foot
           Literal: 'He clasped the Buddha's foot a little bit before the exam.'
           Idiomatic: 'He made a bit of a last-minute effort before the exam.'

Based on these observations, it seems inappropriate to view the reduplication as a kind of verbal classifier phrase.
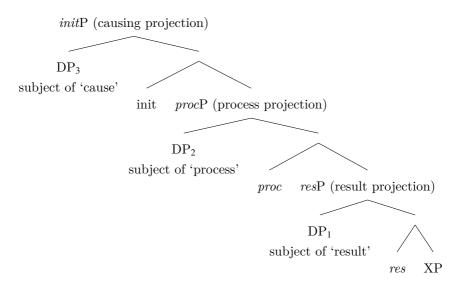
Figure 1: Event structure according to Ramchand (2008: 193)

3.2. The reduplicant as an aspect marker

A number of studies consider the reduplication to be a delimitative aspect marker (Arcodia et al. 2014, Basciano & Melloni 2017, Yang & Wei 2017) due to its delimitative aspectual meaning. Travis (1999, 2000) also analyzed the reduplication in Tagalog as an imperfective aspect marker.

Arcodia et al. (2014) and Basciano & Melloni (2017) analyzed the reduplication within the framework of First Phase Syntax (Ramchand 2008). Ramchand (2008) proposed that an event is comprised of the following phrases: the causative subevent (*init*P), the process subevent (*proc*P) and the result subevent (*res*P), which are ordered hierarchically, as illustrated in Figure 1.[10] Dynamic and volitional verbs have the features [init proc] and are therefore located under *init* and *proc* (Arcodia et al. 2014: 24; Basciano & Melloni 2017: 147). Achievement verbs possess the feature [res] and reside under *res* (Arcodia et al. 2014: 24; Basciano & Melloni 2017: 147). Stative verbs do not contain a *proc*P (Basciano & Melloni 2017: 152).

Arcodia et al. (2014) and Basciano & Melloni (2017) assumed that the first element in the reduplication is the actual verb, which resides under *init* and *proc*, and that the second element is an aspect marker, which resides in the complement position of *proc*, as it delimits the process of

---

[10] The present study does not argue for a NP or a DP analysis and simply takes over the illustration provided in the cited papers.

the event. Since the second element occupies the same syntactic position as *res*P, it should have complementary distribution with *res*P and should thus be incompatible with achievement verbs because of their [res] feature. Furthermore, if *proc*P does not exist in the event, as in the case of states, there should be no place for the reduplication either.

This analysis correctly predicts that the reduplication of achievement verbs and stative verbs is not as easily acceptable as that of dynamic and volitional verbs (marked by [init, proc] features).

However, as shown in Section 2.3.2, the reduplication of states and achievements is unusual but not impossible. This suggests that the reduced acceptability of reduplicated achievement and stative verbs is semantic rather than structural. Their use is possible in specific contexts and should not be ruled out syntactically. Consequently, this proposal does not seem to offer an appropriate account for reduplication.

Yang & Wei (2017: 229) endorsed the analysis of reduplication as an aspect marker following the structure of Mandarin Chinese aspects proposed by Tsai (2008). Tsai (2008) provided the syntactic analysis for aspect markers in Mandarin Chinese as shown in Figure 2.[11] He observed that *zhe* 'PROG', *le* 'PFV' and *wan* 'COMPL' necessarily occur with additional information about the event denoted by the sentence (47), while *zai* 'DUR' and *guo* 'EXP' can occur without further information (48).

(47) Xiaoli chi-zhe/le/wan   fan   *(le).
      Xiaoli eat-PROG/PFV/COMPL meal PTC
      'Xiaoli is eating/ate/finished eating the meal.'

(48) Xiaoli (gangcai) zai   ku/ku-guo.
      Xiaoli just.now   DUR cry/cry-EXP
      'Xiaoli was crying/cried just now.'

He thus proposed three aspect positions under TP. *zai* and *guo* reside under Asp$_1$, while *zhe* and *le* under Asp$_2$, as illustrated in Figure 2.[12]

Turning to reduplication, it cannot occur without additional information as well (49). Based on this, the reduplicant should reside under Asp$_2$, as illustrated in Figure 3.

(49) (a)   * ta *xiao-xiao*
              he laugh-laugh

      (b)   ta *xiao-le-xiao*
              he laugh-PFV-laugh
              'He laughed a little.'

---

[11] Asp = Aspect
[12] Tsai (2008) differentiated the middle and the inner aspect based on the fact that *wan* can only occur with certain types of predicate. This differentiation does not play a role for our purpose and will not be further discussed here.

```
                          TP
                         /  \
                        T    ...
                             |
                    AspP₁ (outer aspect)
                      /        \
                   Asp₁         vP
                   zai/guo     /  \
                              v    AspP₂ (middle aspect)
                                    /         \
                                 Asp₂          VP
                                 zhe/le         |
                                        V-Asp₃ (inner aspect)
                                              wan
```

Figure 2: Structure of the aspectual system in Mandarin Chinese according to Tsai (2008: 683)

> (c) ta *xiao-xiao*,   bu shuohua
>   he laugh-laugh   not speak
>   'He laughed a little, and didn't speak.'

This analysis would result in a mismatch between syntax and semantics. Even though *le*, *guo* and reduplication all mark perfective aspects (Section 2.3.3, Dai 1997, Xiao & McEnery 2004), *guo* is situated under Asp₁ while *le* and the reduplication are under Asp₂, as can be seen from Figure 3.

In sum, both analyses of the reduplicant as an aspect marker do not seem to be convincing.

3.3. Reduplication construction

The following section discusses previous literature which proposed a special construction for the reduplication.

Fan et al. (2015) provided a unified HPSG analysis for the reduplication of both verbs and adjectives in Mandarin Chinese. They considered reduplication to be a morphological process and modeled it via lexical rules. They provided the lexical rule (50) for reduplication in general, and further proposed *redup-a-lr* and *redup-v-lr* as subtypes of *redup-type*, as illustrated

TP
├── T
└── ...
        │
    AspP$_1$ (outer aspect)
    ├── Asp$_1$
    │   zai/guo
    └── vP
        ├── v
        └── AspP$_2$ (middle aspect)
            ├── Asp$_2$
            │   zhe/le/reduplication
            └── VP
                │
                V-Asp$_3$ (inner aspect)
                wan

Figure 3: Position of reduplication according to the aspectual system in Tsai (2008)

in (51) and (52) respectively.[13] For them, the reduplication functions as an intensifier predicate, as represented in the PREDICATE (PRED) in the CONSTRUCTIONAL-CONTENT (C-CONT). The *intensifier_x_rel* has two subtypes: *redup_up_x_rel* for the amplifiying meaning of adjectival reduplication and *redup_down_x_rel* for the delimitative meaning of verbal reduplication. The orthography is handled separately. The AABB form for adjectives and the ABAB form for verbs, as well as the AAB form for V-O compounds, are handled as irregular derivation forms.

---

[13] Note that the format in which the lexical rule is given is not the input–output format usually used for lexical rules in HPSG. Instead it is depicted as a unary branching phrase structure rule: the input is the daughter on the right-hand side of the rule. The output is the mother on the left-hand side. The view of lexical rules as unary branching rules is adopted in most current work on lexical rules (Briscoe & Copestake 1999, Meurers 2001) despite the notation that is commonly assumed.

(50)
$$
\begin{bmatrix}
\textit{redup-type} \\
\text{CAT}|\text{HEAD} \quad \boxed{1} \\
\text{VAL} \qquad \boxed{2} \\
\text{CONT} \qquad \boxed{3} \begin{bmatrix} \text{HOOK} \begin{bmatrix} \text{LTOP} \quad \boxed{4} \\ \text{IND} \quad \boxed{5} \end{bmatrix} \end{bmatrix} \\
\text{C-CONT} \qquad \left\langle \begin{bmatrix} \textit{event-rel} \\ \text{PRED } \textit{intensifier\_x\_rel} \\ \text{LBL} \quad \boxed{4} \\ \text{ARG1} \ \boxed{5} \end{bmatrix} \right\rangle
\end{bmatrix}
\rightarrow
\begin{bmatrix}
\text{CAT}|\text{HEAD} \quad \boxed{1} \\
\text{VAL} \qquad \boxed{2} \\
\text{CONT} \qquad \boxed{3}
\end{bmatrix}
$$

(51)
$$
\begin{bmatrix}
\textit{redup-a-lr} \subset \textit{redup-type} \\
\text{CAT}|\text{HEAD } \textit{adjective} \\
\text{VAL} \qquad \begin{bmatrix} \text{SPR } \langle\rangle \end{bmatrix} \\
\text{C-CONT} \qquad \left\langle \begin{bmatrix} \text{PRED } \textit{redup\_up\_x\_rel} \end{bmatrix} \right\rangle
\end{bmatrix}
$$
ORTHOGRAPHY: A → AA; (irregular AB → AABB)

(52)
$$
\begin{bmatrix}
\textit{redup-v-lr} \subset \textit{redup-type} \\
\text{CAT}|\text{HEAD} \qquad \textit{verb} \\
\text{CONT}|\text{HOOK} \begin{bmatrix} \text{ASPECT } \textit{non-aspect} \end{bmatrix} \\
\text{C-CONT} \qquad \left\langle \begin{bmatrix} \text{PRED } \textit{redup\_down\_x\_rel} \end{bmatrix} \right\rangle
\end{bmatrix}
$$
ORTHOGRAPHY: A → AA; A → A-*yi*-A; (irregular AB → ABAB)

This approach provided a unified account for adjectival and verbal reduplication. Their commonalities are captured by inheritance hierarchies of the intensifier predicates and the lexical rules. In the case of verbal reduplication, A-*yi*-A is analyzed as an alternative orthographical form of AA. This correctly captured the intuition that AA and A-*yi*-A express the same meaning and only differ from each other phonologically/orthographically (see Section 2.3.1).

Nevertheless, this analysis has some shortcomings. To begin with, since the combination with aspect markers is completely forbidden, it is impossible for this approach to account for A-*le*-A. Moreover, as verbal reduplication is considered to express a delimitative aspectual meaning, it seems unconvincing to assume that there is no aspect information in its semantics. We consider a semantic explanation as described in Section 2.3.3 to be more reasonable for ruling out aspect markers other than *le*. Furthermore, this account can only deal with monosyllabic reduplication and handles ABAB and AAB as irregular forms, for the reason that ABAB and AAB reduplication of AB verbs "are not very productive in Chinese" (Fan et al. 2015: 102). This is not true. H. Xing (2000: 33), Basciano

& Melloni (2017: 161), Melloni & Basciano (2018: 329) and Xie (2020: Sec. 3.1) all considered both AA and ABAB to be productive, and H. Xing (2000: 36) concluded that AAB is productive as well. Thus, these forms should not be handled as irregular forms, but should be derivable by lexical rules.

The shortcomings of previous analyses lead us to propose a new analysis on verbal reduplication with HPSG, that formalizes the phonology of the reduplication, resolves the problem of *yi* and preserves the generalization on aspect marking, as we will elaborate in Section 4.

4. A NEW HPSG ANALYSIS

In this section, we suggest a new lexical-rule-based analysis of aspect marking and reduplication using Minimal Recursion Semantics (MRS; Copestake et al. 2005). MRS uses lists of elementary predications that are connected via pointers. Scope constraints are represented by statements of domination. This allows for elegant ways to underspecify scope. The details cannot be discussed here. The interested reader is referred to Copestake et al. (2005). In what follows, we will present the elementary predications with the features assumed in MRS, but leave out handle constraints to keep things simple.

Like Fan et al. (2015), we assume lexical rules for reduplication. Our lexical rules are organized in an inheritance network. *verbal-reduplication-lr* is the most general type for reduplication lexical rules in this network and the implicational constraint in (53) shows the constraints on all structures of type *verbal-reduplication-lr*. Such structures take a verb as LEXICAL-DAUGHTER (LEX-DTR). The output reduplicates the PHONOLOGY (PHON) of the input verb with the possibility to have further phonological material in between. □ indicates an underspecified list which could be empty or not. A delimitative relation is appended to the RELATIONS (RELS) value of the input verb, and it takes the event index of the input verb as argument. The label of the output (②) is identified with the label of the input and with the label of the delimitative relation, hence *delimitative-rel* is treated as a modifier. Further relations can be added at the beginning of the RELS list to allow for the additional perfective meaning in A-*le*-A and A-*le-yi*-A. The combination with the perfective will be elaborated on in the following paragraphs.
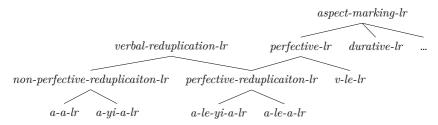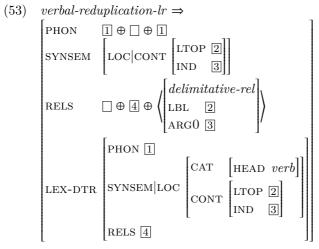
Figure 4: Type hierarchy for lexical rules of verbal reduplication and *le*

(53) *verbal-reduplication-lr* ⇒

$$
\begin{bmatrix}
\text{PHON} & \boxed{1} \oplus \square \oplus \boxed{1} \\[4pt]
\text{SYNSEM} & \left[\text{LOC|CONT} \begin{bmatrix} \text{LTOP} & \boxed{2} \\ \text{IND} & \boxed{3} \end{bmatrix}\right] \\[10pt]
\text{RELS} & \square \oplus \boxed{4} \oplus \left\langle \begin{bmatrix} delimitative\text{-}rel \\ \text{LBL} & \boxed{2} \\ \text{ARG0} & \boxed{3} \end{bmatrix} \right\rangle \\[18pt]
\text{LEX-DTR} & \begin{bmatrix} \text{PHON} & \boxed{1} \\[4pt] \text{SYNSEM|LOC} & \begin{bmatrix} \text{CAT} & \left[\text{HEAD } verb\right] \\[4pt] \text{CONT} & \begin{bmatrix} \text{LTOP} & \boxed{2} \\ \text{IND} & \boxed{3} \end{bmatrix} \end{bmatrix} \\[14pt] \text{RELS} & \boxed{4} \end{bmatrix}
\end{bmatrix}
$$

To account for the variations in the phonology of the reduplication as well as the combination with the phonology and semantics of the perfective aspect marker *le*, the type hierarchy of lexical rules in Figure 4 is put forward. Apart from the type *perfective-reduplication-lr*, which adds the inherited perfective relation, there is a subtype *non-perfective-reduplication-lr*, which does not add further relations. Hence, what is □ in the RELS list in (53) is the empty list in (54):

(54) *non-perfective-verbal-reduplication-lr* ⇒

$$
\begin{bmatrix}
\text{RELS} & \boxed{1} \oplus \left\langle [\,] \right\rangle \\[6pt]
\text{LEX-DTR} & \left[\text{RELS } \boxed{1}\right]
\end{bmatrix}
$$

The RELS list of the output of the lexical rule is the RELS list of the daughter (□) plus a list with one element. Since this element is specified in the supertype, it is not specified in (54) again.

non-perfective-verbal-reduplication-lr has *aa-lr* and *a-yi-a-lr* as direct subtypes. (56) and (57) show *aa-lr* and *a-yi-a-lr*, respectively. As subtypes of *verbal-reduplication-lr* illustrated in (53), both inherit the constraints on

the LEX-DTR and on the semantics of the output, and because of (54), no extra material is appended to the RELS value of the input verb and the list containing the *delimitative-rel*. In addition to the inherited constraints, *aa-lr* and *a-yi-a-lr* specify the phonology of the output differently. *aa-lr* determines that the □ between the two phonological copies in (53) is the empty list, whereas *a-yi-a-lr* specifies this list of phonological material as ⟨ *yi* ⟩:

(55)   Constraints on lexical rules of type *aa-lr* and *a-yi-a-lr*:

    (a)   *aa-lr* ⟹
$$\begin{bmatrix} \text{PHON} & \boxed{1} \oplus \boxed{1} \\ \text{LEX-DTR} & \begin{bmatrix} \text{PHON} & \boxed{1} \end{bmatrix} \end{bmatrix}$$

    (b)   *a-yi-a-lr* ⟹
$$\begin{bmatrix} \text{PHON} & \boxed{1} \oplus \langle\, yi\, \rangle \oplus \boxed{1} \\ \text{LEX-DTR} & \begin{bmatrix} \text{PHON} & \boxed{1} \end{bmatrix} \end{bmatrix}$$

The lexical rules with all inherited constraints are given in (56) and (57):

(56)   The AA lexical rule with all constraints inherited from the supertypes:

$$\begin{bmatrix} aa\text{-}lr \\ \text{PHON} \quad \boxed{1} \oplus \boxed{1} \\ \text{SYNSEM} \quad \begin{bmatrix} \text{LOC}|\text{CONT} & \begin{bmatrix} \text{LTOP} & \boxed{2} \\ \text{IND} & \boxed{3} \end{bmatrix} \end{bmatrix} \\ \text{RELS} \quad \boxed{4} \oplus \left\langle \begin{bmatrix} delimitative\text{-}rel \\ \text{LBL} & \boxed{2} \\ \text{ARG0} & \boxed{3} \end{bmatrix} \right\rangle \\ \text{LEX-DTR} \quad \begin{bmatrix} \text{PHON} \quad \boxed{1} \\ \text{SYNSEM}|\text{LOC} \begin{bmatrix} \text{CAT} & \begin{bmatrix} \text{HEAD} & verb \end{bmatrix} \\ \text{CONT} & \begin{bmatrix} \text{LTOP} & \boxed{2} \\ \text{IND} & \boxed{3} \end{bmatrix} \end{bmatrix} \\ \text{RELS} \quad \boxed{4} \end{bmatrix} \end{bmatrix}$$

(57)   The A-*yi*-A lexical rule with all constraints inherited from the supertypes:

$$
\begin{bmatrix}
\textit{a-yi-a-lr} \\
\text{PHON} \quad \boxed{1} \oplus \langle\ yi\ \rangle \oplus \boxed{1} \\
\text{SYNSEM} \quad \begin{bmatrix} \text{LOC}|\text{CONT} \begin{bmatrix} \text{LTOP} & \boxed{2} \\ \text{IND} & \boxed{3} \end{bmatrix} \end{bmatrix} \\
\text{RELS} \quad \boxed{4} \oplus \left\langle \begin{bmatrix} \textit{delimitative-rel} \\ \text{LBL} & \boxed{2} \\ \text{ARG0} & \boxed{3} \end{bmatrix} \right\rangle \\
\text{LEX-DTR} \quad \begin{bmatrix} \text{PHON} \ \boxed{1} \\ \text{SYNSEM}|\text{LOC} \begin{bmatrix} \text{CAT} & \begin{bmatrix} \text{HEAD} & \textit{verb} \end{bmatrix} \\ \text{CONT} & \begin{bmatrix} \text{LTOP} & \boxed{2} \\ \text{IND} & \boxed{3} \end{bmatrix} \end{bmatrix} \\ \text{RELS} \ \ \boxed{4} \end{bmatrix}
\end{bmatrix}
$$

v-le-lr is a direct subtype of the *perfective-lr*. *perfective-reduplication-lr* inherits from both *verbal-reduplication-lr* and *perfective-lr* and has two subtypes, *a-le-yi-a-lr* and *a-le-a-lr* itself. *verbal-reduplication-lr* is already presented in (53). We now turn to the constraints on *perfective-lr* and its subtypes.

Müller & Lipenkova (2013: 246) proposed the perfective lexical rule given in (58), adapted to the formalization adopted in the current paper. It takes a verb as LEX-DTR and appends ⟨ *le* ⟩ to its phonology. Further, it accounts for the change in semantics by appending the RELS value of the input verb to a *perfective-rel*.

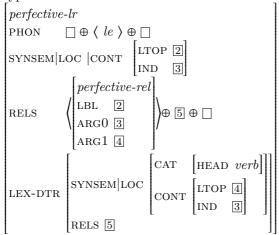(58) Perfective lexical rule adapted from Müller & Lipenkova (2013: 246):

$$
\begin{bmatrix}
\textit{perfective-lr} \\
\text{PHON} \quad \boxed{1} \oplus \langle\ le\ \rangle \\
\text{SYNSEM}|\text{LOC}|\text{CONT} \quad \begin{bmatrix} \text{LTOP} & \boxed{2} \\ \text{IND} & \boxed{3} \end{bmatrix} \\
\text{RELS} \quad \left\langle \begin{bmatrix} \textit{perfective-rel} \\ \text{LBL} & \boxed{2} \\ \text{ARG0} & \boxed{3} \\ \text{ARG1} & \boxed{4} \end{bmatrix} \right\rangle \oplus \boxed{5} \\
\text{LEX-DTR} \quad \begin{bmatrix} \text{PHON} \ \boxed{1} \\ \text{SYNSEM}|\text{LOC} \begin{bmatrix} \text{CAT} & \begin{bmatrix} \text{HEAD} & \textit{verb} \end{bmatrix} \\ \text{CONT} & \begin{bmatrix} \text{LTOP} & \boxed{4} \\ \text{IND} & \boxed{3} \end{bmatrix} \end{bmatrix} \\ \text{RELS} \ \ \boxed{5} \end{bmatrix}
\end{bmatrix}
$$

The event variables ($\boxed{3}$) of the input and the output verb are shared. The LTOP of the output of the lexical rule ($\boxed{2}$) is the label of the perfective relation, and this relation scopes over the embedded verb. The handle of the embedded verb ($\boxed{4}$) is the argument of the *perfective-rel*.
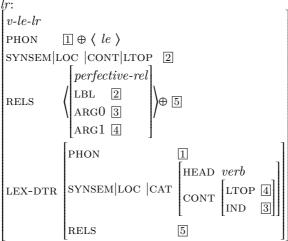
The lexical rule suggested in (58) only explains simple perfective aspect marking with *le*, where *le* immediately follows the verb. But it cannot account for the perfective aspect marking of a reduplicated verb, as *le* does not occur after the reduplication, nor can *le* be reduplicated together with the verb. It can only appear between the verb and the reduplicant. In order to accommodate *le* marking for both simple and reduplicated verbs, a general perfective lexical rule as in (59) and a subtype *v-le-lr* as in (60) are posited here. Besides adding a *perfective-rel* in the RELS list of the output as in (58), the *perfective-lr* in (59) allows an underspecified list to be appended at the end of the RELS list. The PHON value of the output makes it possible for further phonological material to occur both before and after ⟨ *le* ⟩.

(59) Type constraints on the type *perfective-lr* from which other subtypes inherit:

$$
\begin{bmatrix}
\textit{perfective-lr} \\
\text{PHON} \quad \boxed{\;} \oplus \langle\ \textit{le}\ \rangle \oplus \boxed{\;} \\
\text{SYNSEM}|\text{LOC}\,|\text{CONT} \begin{bmatrix} \text{LTOP} & \boxed{2} \\ \text{IND} & \boxed{3} \end{bmatrix} \\
\text{RELS} \quad \left\langle \begin{bmatrix} \textit{perfective-rel} \\ \text{LBL} & \boxed{2} \\ \text{ARG0} & \boxed{3} \\ \text{ARG1} & \boxed{4} \end{bmatrix} \right\rangle \oplus \boxed{5} \oplus \boxed{\;} \\
\text{LEX-DTR} \begin{bmatrix} \text{SYNSEM}|\text{LOC} \begin{bmatrix} \text{CAT} & \begin{bmatrix} \text{HEAD} & \textit{verb} \end{bmatrix} \\ \text{CONT} & \begin{bmatrix} \text{LTOP} & \boxed{4} \\ \text{IND} & \boxed{3} \end{bmatrix} \end{bmatrix} \\ \text{RELS} \quad \boxed{5} \end{bmatrix}
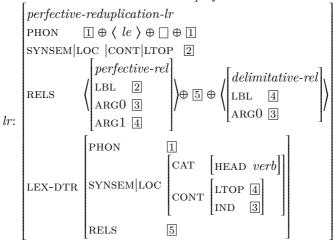\end{bmatrix}
$$

v-le-lr with all inherited constraints as given in (60) inherits from *perfective-lr* and specifies that the first element in the output PHON list is identified with the PHON value of the input verb and that nothing else comes after ⟨ *le* ⟩. Furthermore, no other list can be appended at the end of the RELS list of the output anymore. This corresponds to the proposal of Müller & Lipenkova (2013: 246) shown in (58), which accounts for the simple perfective marking of verbs.

(60) Structure of type *v-le-lr* with constraints inherited from *perfective-lr*:

$$
\begin{bmatrix}
\textit{v-le-lr} \\
\text{PHON} \quad \boxed{1} \oplus \langle\ \textit{le}\ \rangle \\
\text{SYNSEM|LOC |CONT|LTOP} \quad \boxed{2} \\[2pt]
\text{RELS} \quad \left\langle \begin{bmatrix} \textit{perfective-rel} \\ \text{LBL} \quad \boxed{2} \\ \text{ARG0} \ \boxed{3} \\ \text{ARG1} \ \boxed{4} \end{bmatrix} \right\rangle \oplus \boxed{5} \\[4pt]
\text{LEX-DTR} \begin{bmatrix} \text{PHON} \qquad\qquad \boxed{1} \\ \text{SYNSEM|LOC |CAT} \begin{bmatrix} \text{HEAD} \ \textit{verb} \\ \text{CONT} \begin{bmatrix} \text{LTOP} \ \boxed{4} \\ \text{IND} \quad \boxed{3} \end{bmatrix} \end{bmatrix} \\ \text{RELS} \qquad\qquad \boxed{5} \end{bmatrix}
\end{bmatrix}
$$

perfective-reduplication-lr inherits from both *verbal-reduplication-lr* and *perfective-lr*. The PHON value of the output reduplicates the phonology of the input verb and states that there is ⟨ *le* ⟩ in between, as well as potentially further phonological material. The RELS list of the output appends the *delimitative-rel* to the *perfective-rel* and the RELS value of the input verb. The arguments of both *perfective-rel* and *delimitative-rel* share the event index of the input verb (⊡) to ensure that they apply to the same event denoted by the input verb. The label of the *delimitative-rel* and the input verb are identified (*delimitative-rel* is a modifier) and this shared label is embedded under the *perfective-rel*.

(61) Perfective and reduplication combined: type *perfective-reduplication-lr* with constraints inherited from *perfective-lr* and *verbal-reduplication-lr*:

$$
\begin{bmatrix}
\textit{perfective-reduplication-lr} \\
\text{PHON} \quad \boxed{1} \oplus \langle\ \textit{le}\ \rangle \oplus \square \oplus \boxed{1} \\
\text{SYNSEM|LOC |CONT|LTOP} \quad \boxed{2} \\[2pt]
\text{RELS} \quad \left\langle \begin{bmatrix} \textit{perfective-rel} \\ \text{LBL} \quad \boxed{2} \\ \text{ARG0} \ \boxed{3} \\ \text{ARG1} \ \boxed{4} \end{bmatrix} \right\rangle \oplus \boxed{5} \oplus \left\langle \begin{bmatrix} \textit{delimitative-rel} \\ \text{LBL} \quad \boxed{4} \\ \text{ARG0} \ \boxed{3} \end{bmatrix} \right\rangle \\[4pt]
\text{LEX-DTR} \begin{bmatrix} \text{PHON} \qquad\qquad \boxed{1} \\ \text{SYNSEM|LOC} \begin{bmatrix} \text{CAT} \quad \begin{bmatrix} \text{HEAD} \ \textit{verb} \end{bmatrix} \\ \text{CONT} \begin{bmatrix} \text{LTOP} \ \boxed{4} \\ \text{IND} \quad \boxed{3} \end{bmatrix} \end{bmatrix} \\ \text{RELS} \qquad\qquad \boxed{5} \end{bmatrix}
\end{bmatrix}
$$

For example (**??**), repeated here as (62), we get the MRS representation in (63), where h1 and h2 correspond to the handles ② and ④ and e1 to the event variable ③:

(62) ta *chang-le-chang* tang.
he taste-PFV-taste soup
'He tasted the soup a little bit.'

(63) h1 ⟨ h1:perfective(e1,h2), h2:taste(e1,he,soup), h2:delimitative(e1) ⟩

So the delimitative relation is treated as an adjunct to the main relation of the verb, and the perfective relation scopes over both the main relation and the delimitative relation.

Two subtypes of *perfective-reduplication-lr* are posited: *a-le-yi-a-lr* and *a-le-a-lr*, as shown in (64). They take over the semantic change to the input from *perfective-reduplication-lr*, but specify the PHON value differently. Specifically, *a-le-yi-a-lr* specifies the middle phonological material as ⟨ *le, yi* ⟩, while *a-le-a* specifies it as ⟨ *le* ⟩ only.

(64) (a) *a-le-yi-a-lr* ⇒
$$\begin{bmatrix} \text{PHON} & ① \oplus ⟨ \ le, \ yi \ ⟩ \oplus ① \\ \text{LEX-DTR} & \begin{bmatrix} \text{PHON} & ① \end{bmatrix} \end{bmatrix}$$

(b) *a-le-a-lr* ⇒
$$\begin{bmatrix} \text{PHON} & ① \oplus ⟨ \ le \ ⟩ \oplus ① \\ \text{LEX-DTR} & \begin{bmatrix} \text{PHON} & ① \end{bmatrix} \end{bmatrix}$$

Since the above-described lexical rules do not constrain the number of syllables of the input verb, but simply reduplicate its phonology as a whole, they can also account for the ABAB and the AB-*le*-AB forms of reduplication, as long as the input verb is disyllabic. Notice that the lexical rules above also produce AB-*yi*-AB and AB-*le*-*yi*-AB for disyllabic input verbs. Although these forms are generally considered unacceptable (Li & Thompson 1981: 30; Hong 1999: 275–276; Basciano & Melloni 2017: 160; Yang & Wei 2017: 239), Fan (1964: 269) and Sui (2018: 143) considered AB-*yi*-AB and AB-*le*-*yi*-AB to be possible, even though they both recognized that these two forms are rare. Indeed, a few examples of AB-*yi*-AB and AB-*le*-*yi*-AB in Early Mandarin (65a–b) and Modern

Mandarin (65c–f) were found.

(65) (a) ni   yu wo *zhengli-yi-zhengli.*[14]
          you let me arrange-one-arrange
          'Let me arrange it a little bit!'

      (b) ni   *dating-yi-dating.*[15]
          you inquire-one-inquire
          'Inquire about it a little bit!'

      (c) ge   ge   dian-tou *weixiao-yi-weixiao.*[16]
          CLF CLF nod-head smile-one-smile
          'Each one nodded his head and smiled a little bit.'

      (d) ta *weixiao-le-yi-weixiao*, you *mingxiang-le-yi-mingxiang.*[17]
          he smile-PFV-one-smile   and meditate-PFV-one-meditate
          'He smiled a little bit and meditated a little bit.'

      (e) feichang   yansu   de   ba   jinshi   yanjing
          very   seriously DE   BA   nearsighted   glasses
          duanzheng-le-yi-duanzheng.[18]
          straighten-PFV-one-straighten
          '[He] very seriously straightened the nearsighted glasses
          quickly.'

      (f) jiduo sanluan-zhe   de   chuan li de   dengguang, ye
          many   scattered-DUR   DE   boat   in DE   light   also
          huyinhumie de *bianhuan-le-yi-bianhuan* weizhi.   (CCL)
          flicker   DE change-PFV-one-chang   position
          'Many scattered lights in the boats also changed their positions
          a little bit, flickering.'

This suggests that even though AB-*yi*-AB and AB-*le-yi*-AB might be degraded, they are not ungrammatical *per se*. The reason for this degradedness is probably phonological, since AB-*yi*-AB and AB-*le-yi*-AB contain too many syllables (Fan 1964: 274; Zhang 2000: 15; Yang & Wei 2017: 239; Sui 2018: 143), but we argue that it is not an issue of grammaticality. Thus, they can still be produced via the lexical rules posited above, but are ruled out or degraded due to a general phonological constraint.

---

[18] *Yuanqu xuan: Luzhailang [Selected Yuanqu: Luzhailang]*, as cited in Zhang (2000: 15)

[19] *Yuan Ming juan: Piaotongshi [Yuan and Ming volume: Piaotongshi]*, 308, as cited in Zhang (2000: 15)

[20] Rou, Shi. 1975. *Roushi xiaoshuo xuanji [Selected novels of Roushi]*, 31. Beijing: People's Literature Publishing House.

[21] Rou, Shi. 1975. *Roushi xiaoshuo xuanji [Selected novels of Roushi]*, 31. Beijing: People's Literature Publishing House.

[22] Li, Jieren. 1962. *Da bo [Great wave]*, 3rd band, 171. Beijing: The Writers Publishing House.

AAB, A-*yi*-AB, A-*le*-AB, AA-*kan* and A-*kan-kan* can also be accounted for by the lexical rules proposed in this section. They can be analyzed as compounds consisting of a reduplicated monosyllabic verb and another element. Specifically, AAB, A-*yi*-AB and A-*le*-AB can be considered as the compound of a reduplicated monosyllabic verb (A) and a noun (B).[19] AA-*kan* can be regarded as the compound of a reduplicated monosyllabic verb (A) and the verb *kan* 'look', whereas A-*kan-kan* is the compound of a monosyllabic verb (A) and the reduplication of *kan* 'look'. A-*yi*-A-*kan* is also possible, though rare, presumably also due to its length. An inquiry in CCL found 55 hits of A-*yi*-A-*kan*. A sample is listed in (66).

(66) (a) teyi gongneng de yanjiuzhe-men bufang ruci
 special power DE researcher-PL may.as.well such
 shi-yi-shi-kan … (CCL)
 try-one-try-look
 'Researchers of special power may as well have a try as such as see …'

 (b) danshi dui fa mei fa-guo hege-zheng,
 but about issue not issue-EXP conformity-certificate
 yijing shuo bu qing le, xuyao *cha-yi-cha-kan.*
 already say not clealy PTC need check-one-chek-look
 (CCL)
 'But one already cannot say it clearly anymore, whether a certificate of conformity is issued or not. One needs to have a check and see.'

 (c) rang wo lai *cai-yi-cai-kan.* (CCL)
 let I come guess-one-guess-look
 'Let me have a guess.'

 (d) da-laoban-men yao *deng-yi-deng-kan* (CCL)
 big-boss-PL need wait-one-wait-look
 'Big bosses need to wait a little bit and see.'

 (e) furen ni dao *shu-yi-shu-kan,* zhe zhu hua de
 madam you just count-one-count-look this CLF flower DE
 huaduo gong you ji zhong yanse. (CCL)
 blossom in.total have how.many CLF color
 'Madam, just try to count and see how many colors the blossom of this flower has in total.'

---

[19] Huang (1984: 64–65) and Her (1996: Sec. 2; 2010: Sec. 3.1) argued that some of these V-O combinations are compounds, some are phrases, and some have dual status (both compounds and phrases). Following this approach, AAB, A-*yi*-AB and A-*le*-AB can (also) be considered as the phrasal combination of a reduplicated verb and its object.

Due to the prominent tentative, trying meaning of AA-*kan* and A-*kan-kan*, they are not compatible with the perfective aspect marker *le* semantically, as one usually cannot try something that is already realized. Thus, structures such as A-*le*-A-*kan* and A-*kan-le-kan* are considered pragmatically infelicitous.

The current analysis provides a unified account for all forms of delimitative verbal reduplication in Mandarin Chinese. Like in Fan et al. (2015), *yi* is handled as a phonological element which does not make any contribution to the semantics, and an inheritance hierarchy is used to capture the commonalities among different forms of reduplication. But the present proposal also reflects the connection between the reduplication and aspect marking via multiple inheritance. This account makes use of a semantic mechanism, which correctly rules out aspect marking with forms other than *le*. By providing a semantic explanation, this mechanism seems less *ad hoc* than the one used in Fan et al. (2015), which simply assumed that the reduplication cannot combine with aspect information. The present approach also has a broader coverage of the forms of verbal reduplication than the one in Fan et al. (2015). Furthermore, all the forms are derivable from the lexical rules proposed here, so that there is no need to resort to irregular lexicon entries, and the productivity of these forms is correctly captured. In sum, the analysis proposed in this paper possesses greater explanatory power and resolves the problems of previous studies.

5. Conclusions

The current study provides a new HPSG account for verbal reduplication in Mandarin Chinese. We present empirical evidence that reduplication is possible with all *Aktionsarten*. We give a semantic explanation for the incompatibility of reduplication with aspect markers other than *le*. We argue that reduplication is a morphological rather than a syntactic process. We model reduplication as a lexical rule, and the different forms of reduplication are captured in an inheritance hierarchy using underspecified lists. The interaction between verbal reduplication and aspect marking is handled by multiple inheritance. This analysis is compatible with both mono- and disyllabic verbs, so that all productive forms of reduplication are derivable by lexical rules. The analysis is implemented as part of a computer-processable grammar of Mandarin Chinese.

References

Arcodia, Giorgio Francesco, Bianca Basciano & Chiara Melloni. 2014. Verbal reduplication in Sinitic. In Sandra Augendre, Graziella Couasnon-Torlois, Déborah Lebon, Michard Clément, Gilles Boyé & Fabio Montermini (eds.), *Proceedings of the Décembrettes 8th International Conference on Morphology*, 15–45. Bordeaux: CLLE-ERSS. https://iris.unive.it/retrieve/handle/10278/39972/85072/carnGram22.23-53.pdf.

Basciano, Bianca & Chiara Melloni. 2017. Event delimitation in Mandarin: The case of diminishing reduplication. *Italian Journal of Linguistics* 29(1). 143–166. doi:10.26346/1120-2726-106.

Briscoe, Ted J. & Ann Copestake. 1999. Lexical rules in constraint-based grammar. *Computational Linguistics* 25(4). 487–526. http://www.aclweb.org/anthology/J99-4002.

Chao, Yuen Ren. 1968. *A grammar of spoken Chinese.* Berkeley, CA: University of California Press.

Cheng, Yi-Yang. 2012. Verbal reduplication and grammaticalization: A study of Mandarin VV-kan and V-kankan constructions. *Annual Meeting of the Berkeley Linguistics Society* 38. 63–77. doi:10.3765/bls.v38i0.3321.

Chen, Limin. 2005. Lun dongci chongdie de yufa yiyi [On the grammatical meaning of verbal reduplication]. *Zhongguo Yuwen [Studies of the Chinese Language]* 305(2). 110–191.

Chen, Qianrui. 2001. Dongci chongdie de qingzhuang tezheng ji qi ti de diwei [The situational features of Chinese verbal reduplication and its aspectual status]. *Yuyan Jiaoxue yu Yanjiu [Language Teaching and Linguistic Studies]* (4). 48–56.

Copestake, Ann, Dan Flickinger, Carl Pollard & Ivan A. Sag. 2005. Minimal Recursion Semantics: An introduction. *Research on Language and Computation* 3(2–3). 281–332. doi:10.1007/s11168-006-6327-9.

Dai, John Xiang-Ling. 1992. *Chinese morphology and its interface with the syntax*: Ohio State University dissertation. https://etd.ohiolink.edu/apexprod/rws_etd/send_file/send?accession=osu1487777901660569&disposition=inline.

Dai, John Xiang-Ling. 1998. Syntactic, phonological, and morphological words in Chinese. In Jerome L. Packard (ed.), *New approaches to Chinese word formation: Morphology, phonology and the lexicon in Modern and Ancient Chinese* (Trends in Linguistics: Studies and Monographs [TiLSM] 105), 103–134. Berlin and New York: De Gruyter Mouton. doi:10.1515/9783110809084.103.

Dai, Yaojing. 1997. *Xiandai hanyu shiti xitong yanjiu [Studies on the tense and aspect system of Modern Chinese].* Hangzhou: Zhejiang Education Publishing Group.

Deng, Dun. 2013. *The syntax and semantics of event quantifiers in Mandarin Chinese.* Madison, WI: University of Wisconsin-Madison PhD thesis. https://asset.library.wisc.edu/1711.dl/LNJN2QOOHNOSC87/R/file-7db2d.pdf.

Fan, Fanglian. 1964. Shi lun suowei "dongci chongdie" [A tentative analysis of the so-called "verbal reduplication"]. *Zhongguo Yuwen [Studies of the Chinese Language]* 4. 264–278.

Fan, Zhenzhen, Sanghoun Song & Francis Bond. 2015. Building Zhong, a Chinese HPSG Shared-Grammar. In Stefan Müller (ed.), *Proceedings of the 22nd International Conference on Head-Driven Phrase Structure Grammar, Nanyang Technological University (NTU), Singapore*, 96–109. Stanford, CA: CSLI Publications. http://cslipublications.stanford.edu/HPSG/2015/fsb.pdf.

Forza, Francesca. 2016. Doubling as a sign of morphology. *Toronto Working Papers in Linguistics* 35. 1–21. https://twpl.library.utoronto.ca/index.php/twpl/article/view/15308.

Gao, Feier, Siqi Lyu & Chien-Jer Charles Lin. 2021. Processing Mandarin tone 3 sandhi at the morphosyntactic interface: Reduplication and lexical compounds. *Frontiers in Psychology* 12. doi:10.3389/fpsyg.2021.713665.

Ghomeshi, Jila, Ray Jackendoff, Nicole Rosen & Kevin Russell. 2004. Contrastive focus reduplication in English (the salad-salad paper). *Natural Language & Linguistic Theory* 22(2). 307–357. doi:10.1023/B:NALA.0000015789.98638.f9.

Gil, David. 2005. From repetition to reduplication in Riau Indonesian. In Bernhard Hurch (ed.), *Studies on reduplication* (Empirical Approaches to Language Typology [EALT] 28), 31–64. Berlin and New York: De Gruyter Mouton. doi:10.1515/9783110911466.31.

Her, One-Soon. 1996. Variation of the VO construction in Chinese: A synchronic account. *Linguistics* 34(4). 733–751. doi:10.1515/ling.1996.34.4.733.

Her, One-Soon. 2006. Justifying part-of-speech assignments for Mandarin *gei*. *Lingua* 116(8). 1274–1302. doi:10.1016/j.lingua.2005.06.003.

Her, One-Soon. 2010. *Interaction and variation in the Chinese VO construction*. Taipei: Crane Publishing revised edn. edn. http://www3.nccu.edu.tw/~osh/publication/D07-Interaction-REV.pdf.

Hong, Zhou. 1999. Cognate objects in Chinese. *Toronto Working Papers in Linguistics* 17. 263–284. https://twpl.library.utoronto.ca/index.php/twpl/article/view/6265.

Huang, C.-T. James. 1984. Phrase structure, lexical integrity, and Chinese compounds. *Journal of Chinese Language Teachers Association* 12(2). 53–78. https://scholar.harvard.edu/files/ctjhuang/files/1984.lexical.integrity.pdf?m=1443058311.

Huang, C.-T. James, Y.-H. Audrey Li & Yafei Li. 2009. *The syntax of Chinese* Cambridge Syntax Guides. Cambridge: Cambridge University Press. doi:10.1017/CBO9781139166935.

Huang, Chu-Ren & Keh-Jiann Chen. 1998. Academia Sinica Balanced Corpus of Modern Chinese. https://asbc.iis.sinica.edu.tw/.

Jackendoff, Ray. 1997. *The architecture of the language faculty* (Linguistic Inquiry Monographs 28). Cambridge, MA: MIT Press.

Jackendoff, Ray. 2002. *Foundations of language: Brain, meaning, grammar, evolution*. Oxford: Oxford University Press. doi:10.1093/acprof:oso/9780198270126.001.0001.

Li, Charles N. & Sandra A. Thompson. 1981. *Mandarin Chinese: A functional reference grammar*. Berkeley, CA: University of California Press.

Li, Yuming. 1996. Lun ciyu chongdie de yiyi [On the meaning of reduplication]. *Shijie Hanyu Jiaoxue [Chinese Teaching in the World]* 35(1). 10–19.

Li, Yuming. 1998. Dongci chongdie de ruogan jufa wenti [Some syntactic issues on verbal reduplication]. *Zhongguo Yuwen [Studies of the Chinese Language]* 2. 83–92.

Liao, Wei-Wen Roger. 2014. Morphology. In Y.-H. Audrey Li, Andrew Simpson & C.-T. James Huang (eds.), *The handbook of Chinese linguistics*, 3–25. Hoboken, NJ: Wiley. doi:10.1002/9781118584552.ch1.

Lüdeling, Anke & Merja Kytö (eds.). 2009. *Corpus linguistics: An international handbook*, vol. 2 (Handbücher zur Sprach- und Kommunikationswissenschaft 29). Berlin: Mouton de Gruyter. doi:10.1515/9783110213881.2.

Melloni, Chiara & Bianca Basciano. 2018. Reduplication across boundaries: The case of Mandarin. In Olivier Bonami, Gilles Boyé, Georgette Dal, Hélène Giraudo & Fiammetta Namer (eds.), *The lexeme in descriptive and theoretical morphology*, 325–363. Berlin: Language Science Press. doi:10.5281/zenodo.1407013.

Meurers, W. Detmar. 2001. On expressing lexical generalizations in HPSG. *Nordic Journal of Linguistics* 24(2). 161–217. doi:10.1080/033258601753358605.

Meurers, W. Detmar & Stefan Müller. 2009. Corpora and syntax. In Lüdeling & Kytö (2009) 920–933. doi:10.1515/9783110213881.2.920.

Müller, Stefan & Janna Lipenkova. 2013. ChinGram: A TRALE implementation of an HPSG fragment of Mandarin Chinese. In Huei-ling Lai & Kawai Chui (eds.), *Proceedings of the 27th Pacific Asia Conference on Language, Information, and Computation (PACLIC 27)*, 240–249. Taipei: Department of English, National Chengchi University. https://www.aclweb.org/anthology/Y13-1023.pdf.

Müller, Stefan, Anne Abeillé, Robert D. Borsley & Jean-Pierre Koenig (eds.). 2021. *Head-Driven Phrase Structure Grammar: The handbook* (Empirically Oriented Theoretical Morphology and Syntax 9). Berlin: Language Science Press. doi:10.5281/zenodo.5543318.

Paris, Marie-Claude. 2013. Verbal reduplication and verbal classifiers in Chinese. In Guangshun Cao, Hilary Chappell, Redouane Djamouri & Thekla Wiebusch (eds.), *Breaking down the barriers: Interdisciplinary studies in Chinese linguistics and beyond*, vol. 1, 257–278. Taipei, Taiwan: Institute of Linguistics, Academia Sinica. http://www.ling.sinica.edu.tw/Files/LL/Docments/Monographs/Breaking%20Down%20the%20Barriers/Volume%201/12-Paris.pdf.

Peck, Jeeyoung, Jingxia Lin & Chaofen Sun. 2013. Aspectual classification of Mandarin Chinese verbs: A perspective of scale structure. *Language and Linguistics* 14(4). 663–700. https://hdl.handle.net/10356/79599.

Pollard, Carl & Ivan A. Sag. 1994. *Head-Driven Phrase Structure Grammar* (Studies in Contemporary Linguistics 4). Chicago, IL: University of Chicago Press.

Qian, Nairong. 2000. Xiandai hanyu de fanfuti [Frequentative aspect in Modern Chinese]. *Yuyan Jiaoxue yu Yanjiu [Language Teaching and Linguistic Studies]* (4). 1–9.

Ramchand, Gillian Catriona. 2008. *Verb meaning and the lexicon: A First Phase Syntax* (Cambridge Studies in Linguistics 116). Cambridge: Cambridge University Press. doi: 10.1017/CBO9780511486319.

Sag, Ivan A. 1997. English relative clause constructions. *Journal of Linguistics* 33(2). 431–483. doi:10.1017/S002222679700652X.

Smith, Carlota S. 1991. *The parameter of aspect* (Studies in Linguistics and Philosophy 43). Dordrecht: Kluwer Academic Publishers.

Smith, Carlota S. 1994. Aspectual viewpoint and situation type in Mandarian Chinese. *Journal of East Asian Linguistics* 3. 107–146.

Sui, Na & Jianhua Hu. 2016. Dongci chongdie de jufa [The syntax of verbal reduplication in Chinese]. *Contemporary Linguistics* 18(3). 317–338.

Sui, Yanyan. 2018. Affixation or compounding? Reduplication in Standard Chinese. In Rita Finkbeiner & Ulrike Freywald (eds.), *Exact repetition in grammar and discourse* (Trends in Linguistics, Studies and Monographs (TiLSM) 323), 127–157. De Gruyter Mouton. doi:10.1515/9783110592498-006.

Tham, Shiao Wei. 2013. Change of state verbs and result state adjectives in Mandarin Chinese. *Journal of Linguistics* 49(3). 647–701. doi:10.1017/S0022226713000261.

Travis, Lisa deMena. 1999. A syntactician's view of reduplication. In Carolyn Smallwood & Catherine Kitto (eds.), *Proceedings of the sixth meeting of the Austronesian Formal Linguistics Association (AFLA VI)*, 313–331. Toronto: Department of Linguistics, University of Toronto. https://twpl.library.utoronto.ca/index.php/twpl/article/view/6295.

Travis, Lisa deMena. 2000. Event structure in syntax. In Carol L. Tenny & James Pustejovsky (eds.), *Events as grammatical objects: The converging perspectives of lexical semantics and syntax* (CSLI Lecture Notes 100), 145–185. Stanford, CA: CSLI Publications.

Tsai, Wei-Tien Dylan. 2008. Tense anchoring in Chinese. *Lingua* 118(5). 675–686. doi: 10.1016/j.lingua.2007.09.002.

Tsao, Feng-fu. 2001. Semantics and syntax of verbal and adjectival reduplication in Mandarin and Taiwanese Southern Min. In Hilary Chappell (ed.), *Sinitic grammar: Synchronic and diachronic perspectives*, 285–308. Oxford: Oxford University Press.

Wang, Chen. 2023. A syntactic derivation of the reduplication patterns and their interpretation in Mandarin. *Natural Language & Linguistic Theory* 41(2). 847–877. doi:10.1007/s11049-022-09549-y.

Xiao, Richard & Tony McEnery. 2004. *Aspect in Mandarin Chinese: A corpus-based study* (Studies in Language Companion Series 73). Amsterdam: John Benjamins. doi:10.1075/slcs.73.

Xie, Zhu. 2020. Two types of verb reduplications in Mandarin Chinese. *Studies in Chinese Linguistics* 41(1). 73–108. doi:10.2478/scl-2020-0003.

Xing, Fuyi. 2000. Shuo "V yi V" [Note on "V yi V"]. *Zhongguo Yuwen [Studies of the Chinese Language]* 278(5). 420–432.

Xing, Hongbing. 2000. Hanyu ciyu chongdie jiegou tongji fenxi [Statistical analysis on reduplication Modern Chinese words]. *Yuyan Jiaoxue yu Yanjiu [Language Teaching and Linguistic Studies]* (1). 32–37.

Xiong, Zhongru. 2016. Dongci chongdie de jufa fenxi [A syntactic analysis of verbal reduplication]. *Shijie Hanyu Jiaoxue [Chinese Teaching in the World]* 30(2). 156–169. doi:10.13724/j.cnki.ctiw.2016.02.002.

Xu, Lianxiang. 2002. Dongci chongdieshi VV yu V-yi-V de yuyong chabie [Pragmatic differences between VV and V-yi-V verbal reduplication]. *Zhongguo Yuwen [Studies of the Chinese Language]* 287(2). 118–122.

Xun, Endong, Gaoqi Rao, Xiaoyue Xiao & Jiaojiao Zhang. 2016. Dashuju beijing xia BCC yuliaoku de yanzhi [The construction of the BCC Corpus in the age of Big Data]. *Yuliaoku Yuyanxue [Corpus Linguistics]* 3(1). 93–109. http://bcc.blcu.edu.cn/.

Yang, Ping. 2003. Dongci chongdie de jiben yiyi [The basic function of verb reduplication in Chinese Language]. *Yuyan Jiaoxue yu Yanjiu [Language Teaching and Linguistic Studies]* (5). 8–16.

Yang, Yifan & Wei Wei. 2017. Verbal reduplication in Mandarin Chinese: An analysis at the syntax-phonology interface. In Michael Yoshitaka Erlewine (ed.), *Proceedings of GLOW in Asia XI*, vol. 1, 227–242. Cambridge, MA: MIT Working Papers in

Linguistics. https://glowlinguistics.org/asia11/wp-content/uploads/sites/3/2017/11/v1-yang-wei.pdf.

Zhan, Weidong, Rui Guo, Baobao Chang, Yirong Chen & Chen Long. 2019. Beijing Daxue CCL yuliaoku de yanzhi [The building of the CCL corpus: Its design and implementation]. *Yuliaoku Yuyanxue [Corpus Linguistics]* 6(1). 71–86.

Zhan, Weidong, Rui Guo & Yirong Chen. 2003. Beijing Daxue Zhongguo Yuyanxue Yanjiu Zhongxin CCL yuliaoku (Guimo: 7 yi zi; shijian: gongyuanqian 11 shiji - dangdai)[The CCL corpus of Chinese texts: 700 million Chinese characters, the 11th Century B.C. – present]. http://ccl.pku.edu.cn:8080/ccl_corpus.

Zhang, Cheng. 2000. Xiandai hanyu "VyiV" shi he "VV" shi de laiyuan [The origin of the "V-yi-V" and "VV" forms in modern Chinese]. *Yuyan Jiaoxue yu Yanjiu [Language Teaching and Linguistic Studies]* 4. 10–17.

Zhu, Jingsong. 1998. Dongci chongdieshi de yufa yiyi [The semantics of verbal reduplication]. *Zhongguo Yuwen [Studies of the Chinese Language]* 266(5). 378–386.