Verbal reduplication in Mandarin Chinese: An HPSG account

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In Mandarin Chinese, verbs (*kan* 'look') can be reduplicated (*kan kan* 'look look') to express a delimitative aspectual meaning (e.g. Chao 1968; Li & Thompson 1981; Xiao & McEnery 2004), namely that the event denoted by the verb happens in a short duration and/or a low frequency (Xiao & McEnery 2004: 155) (*kan kan* 'look a little bit'). The current study tries to determine a suitable formal and unified analysis for the structure of verbal reduplication in Mandarin Chinese. Specifically, previous studies disagree on the following questions:

(1) a. Which one of the two elements is the head and which one is the reduplicant?
    b. Is the verbal reduplication in Mandarin Chinese a morphological or a syntactic phenomenon?
    c. If it is a morphological phenomenon, what is the morphological structure/lexical rule, and if it is a syntactic phenomenon, what is the syntactic structure?

The present study tries to contribute more empirical evidence and to offer novel perspectives to resolve the questions above. It provides the first HPSG analysis to this phenomenon and avoids the problems of previous approaches.

1 The phenomenon

Verbal reduplication in Mandarin Chinese takes the following forms:

(2) a. for monosyllabic verbs: *shuo* 'say'
    (i) AA: shuo shuo
          say   say
    (ii) A-*yi*-A: shuo yi   shuo
             say   one say
    (iii) A-*le*-A: shuo le   shuo
             say   PFV say
    (iv) A-*le-yi*-A: shuo le   yi   shuo
               say   PFV one say
    (v) AA-*kan*: shuo shuo kan
           say   say   look
    (vi) A-*kan-kan*[1]: shuo kan   kan
             say   look look
  b. for disyllabic verbs: *lai-wang*
          come-go
    'come and go/communicate'

(i) ABAB: lai-wang lai-wang
      come-go come-go
(ii) AB-*le*-AB: lai-wang le   lai-wang
        come-go PFV come-go
(iii) AABB: lai   lai   wang wang
      come come go   go
c. for V-O compounds: *chang-ge* 'sing'
      sing-song
(i) AAB: chang chang ge
      sing   sing   song
(ii) A-*yi*-AB: chang yi   chang ge
      sing   one sing   song
(iii) A-*le*-AB: chang le   chang ge
      sing   PFV sing   song

Arcodia, Basciano & Melloni (2014), Fan (1964), Melloni & Basciano (2018) 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. This seems to suggest that there is a fundmental difference between these two groups. The current study will only focus on the AA, A-*yi*-A, A-*le*-A, A-*le-yi*-A and ABAB forms of verbal reduplication in Mandarin Chinese.[2]

The reduplication has a similar syntactic distribution as a simple verb. However, the reduplication cannot be aspect marked, expect with the perfective aspect marker *le*. And the reduplication is incompatible with an expression that quantifies the duration or the extent of the event. This is probably because the reduplication already contains a quantity meaning (Li 1998).

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[1] This form is more common in Taiwan than in Mainland China.

[2] For sake of simplicity, the term "reduplication" will be used in the following text to refer specifically to the AA, A-*yi*-A, A-*le*-A, A-*le-yi*-A and ABAB forms of verbal reduplication in Mandarin Chinese, if not specified otherwise.

Based on the fact that the perfective aspect marker *le* appears in between the reduplication, while the usual location of *le* is directly after the verb, we argue that the first element in the reduplication is the actual verb, which can take *le*, while the second element is the copy, which cannot take *le*.

As for whether the reduplication is a morphological or a syntactic process, Xie (2020) compared the AA and ABAB forms with the AABB form and claimed that AA and ABAB are syntactic processes while AABB is morphological. She pointed out that AA and ABAB are productive, while AABB is not. AA and ABAB allow *le*-insertion but AABB does not. 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. AA and ABAB do not change the valency of the input verb, but AABB makes a transitive verb intransitive. And they have different input and output constraints. However, a morphological process can be productive, and it does not necessarily change the category or valency of the input. And if we consider *le* to be a morphological element (Huang, Li & Li 2009; Müller & Lipenkova 2013), the insertion of *le* does not have to be considered a syntactic process either. It seems that Xie (2020) only showed that AA and ABAB are different processes than AABB, but not necessarily that the former is syntactic while the latter morphological. We therefore applied the following tests proposed by Duanmu (1998) and Schäfer (2009) to distinguish words from phrases in Mandarin Chinese: semantic compositionality, phrasal extension, phrasal substitution and conjunction reduction. The reduplication failed all of these tests, which is more similar to the behaviour of a parallel verb compound (*gou-mai* 'purchase-buy') than that of a serial verb construction ("a complex predicate structure formed by two or more verbal phrases which select for the same subject" (Müller & Lipenkova 2009: 235). We therefore assume reduplication to be a morphological process rather than a syntactic one.

2 Previous analyses

Previous analyses of the reduplication in Mandarin Chinese and in other languages can be classified into three groups: the reduplicant as a verbal classifier, the reduplicant as an aspect marker, and the postulation of a special reduplication construction.
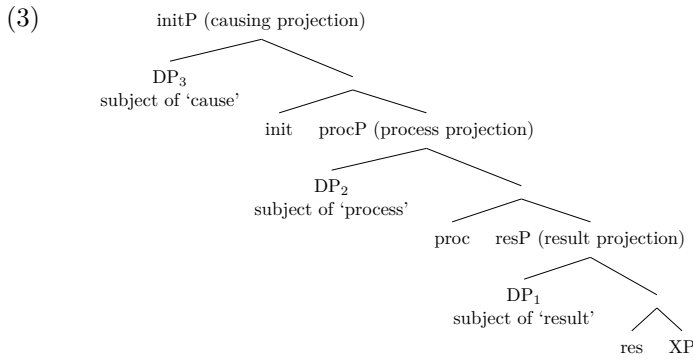
Chao (1968), Fan (1964) and Xiong (2016) analyzed the reduplicant in Mandarin Chinese as a verbal classifier. A verbal classifier is "a measure for verbs of action expresses the number of times an action takes place" (Chao 1968: 615). In this analysis, the first element in the reduplication is the head and an actual verb, the second element is the copy and 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. Although the reduplication and the verbal classifier both serve to quantify the extent of an event and can often be used interchangeably, they behave differently in the following three aspects. First, the verb and the verbal classifier can be separated, while reduplication cannot. Second, unlike the numerals in verbal classifier phrases, the *yi* 'one' in A-*yi*-A cannot be replaced by other numerals. Third, idioms lose their idiomatic meaning when used with verbal classifiers, but maintain their idiomatic meaning with reduplications. Therefore, it seems inappropriate to view the reduplicant as a kind of verbal classifier.

As it is widely accepted that the reduplication expresses a delimitative aspectual meaning (e.g. Chao 1968; Li & Thompson 1981; Xiao & McEnery 2004), a number of studies consider the reduplicant to be a delimitative aspect marker (Arcodia, Basciano & Melloni 2014; Basciano & Melloni 2017; Yang & Wei 2017). Debate arrises on the location where this aspect marker resides.

Arcodia, Basciano & Melloni (2014) and Basciano & Melloni (2017) analyzed the reduplication within the framework of First Phase Syntax developed by Ramchand (2008), as shown in (3). They assumed the first element in the reduplication to be the actual verb and the head, which resides under *init* and *proc*, and the second element the aspect marker and the copy, which resides in the complement position of *proc*, as it delimits the process of the event. Since the reduplicant has the same syntactic position as resP, it should have complementary distribution with resP. This analysis correctly predicted that the reduplication of achievement and stative verbs (marked by the [res] feature) is not as easily acceptable as that of action verbs (marked by the [init, proc] feature). However, the reduplication of achievement and stative verbs are acceptable in certain contexts, as shown in (4).[3] This shows that the incompatibility of the reduplication of achievement and stative verbs is semantic rather than structural. Their combination is possible in specific contexts and should not be ruled out syntactically.

Travis (1999; 2000) and Tsai (2008) assume two positions for AspP, one above vP (AspP1) and another between vP and VP (AspP2). Travis (1999; 2000) assumes AspP1 to incorporate inchoactive aspects and AspP2 perfective. For Mandarin Chinese, this approach would predict that *zai* 'DUR' and *zhe* 'PROG' should appear in AspP1, while *guo* 'EXP' and *le* 'PFV' in AspP2. Tsai (2008) assumed *zai* 'DUR' and *guo* 'EXP' to be in AspP1, which can move to TP to anchor tense, and *zhe* 'PROG' and *le* 'PFV' to be in AspP2, which cannot move to TP. Both analyses have syntax-semantics mismatch problems. In a sentence, *zai* appears to the left of

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[3]Reduplication boldfaced.

(3)

```
                    initP (causing projection)
                   /        \
              DP₃
         subject of 'cause'
                      \
                   init    procP (process projection)
                          /        \
                     DP₂
                subject of 'process'
                             \
                          proc    resP (result projection)
                                  /        \
                             DP₁
                        subject of 'result'
                                    \
                                   res    XP
```

(4) a. deng ren-men   ba zhe jian shi
         wait people-PL BA this CLF incident
         wang wang zai   shuo ba.[4]
         forget forget again talk
         'Let's wait until people forget this incident
         a little bit and then talk about it.'

     b. **lian lian ai** shi keyi de, ban xi-shi
         like like love COP ok   DE host wedding
         ding-hao chi yi-dian.[5]
         best   late a.bit
         'It's ok to be in love for a while, but it's
         better to get married a bit later.'

the verb while *le*, *zhe* and *guo* to the right. This linear order does not match either of the predictions above. To solve this problem, additional assumptions have to be made, which is less desirable.

Huang, Li & Li (2009) assume only one AspP position above vP and it can be used iteratively so that multiple aspect markers can appear simultaneously. In order to account for the fact that aspect markers such as *le*, *zhe* and *guo* occur to the right of the verb, they proposed that the "verb-*le*/*-zhe*/*-guo*" combination is base-generated as a verb form together under V, and these aspect markers only move to Asp covertly in LF. This implies that they assumed, at least for *le*, *zhe* and *guo*, that they are suffixes and are combined with the verb morphologically. This proposal can analyze A-*le*-A straightforwardly as two affixation processes [[A] -*le*] -A]. This would mean that the first element in the reduplication should be the head and the second the copy. Disadvantages of this analysis include: first, one has to assume covert movement in LF whose existence is hard to prove. Second, the analysis of A-*yi*-A and A-*le-yi*-A does not follow straightforwardly from this. One has to assume either the ungrammatical construction A-*yi* in [[[A] -*yi*] -A], A-*le-yi* in [[[[A] -*le*] -*yi*] -A] or *yi*-A in [[A] [[-*yi*] -A]] and [[[A] -*le*] [[-*yi*] -A]].

Travis (2001; 2003) proposed the structure in (5) for constructions like (6) in English, which she termed "syntactic reduplication". The result of the reduplication is assumed to be a QP, because she believed that the reduplication always expresses some kind of quantity meaning. An XP was assumed to create a reduplicant, which then appears in the Spec-QP position and checks whatever feature there is. This analysis has a problem by itself, namely that it cannot account for the non-compositional semantics of this structure. No matter how many times *student* is repeated, the whole structure simply means 'many students' and not a certain exact number of students. Applying it to the reduplication in Mandarin Chinese, it is impossible to copy the whole VP, as shown in (7). Also, a normal QP in Mandarin Chinese such as *liang jian* 'two pieces' cannot function as a predicate alone, unlike the reduplication. Since *chang le chang* in (7-a) is treated as a QP, one would expect that it has a similar distribution as other QPs, which is not the case. This analysis, therefore, does not seem to be appropriate for the reduplication in Mandarin Chinese.

(5)

```
                    QP
                  /    \
              Spec      Q'
          reduplicant  /  \
                      Q    XP
                          /  \
                         X    YP
```

(6) **Student after student** visited the professor
     on Monday.

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

     b. *ta **chang tang** le   **chang tang**.
         he taste   soup PFV taste   soup

Ghomeshi et al. (2004) provided the analysis in (9)[6] of the contrastive reduplication (CR) in English as in (8) with the Parallel Architecture (Jackendoff 1997; 2002). CR delimits the denotation of its base, restricting it to the most prototypical, most extreme, or most contextually salient case or range of cases (Ghomeshi et al.
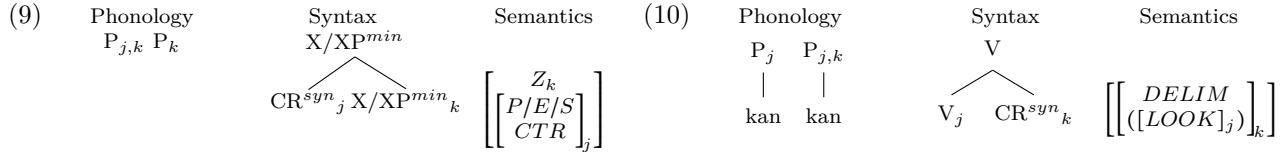
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[4]Liu, Zhen (1963). *Chang chang de liushui [Long long water]*. Beijing: The Writers Publishing House.

[5]Zhou, Libo (1958). *Shang xiang ju bian [Big changes of mountains and villages]*. Beijing: The Writers Publishing House.

[6]P = phonological unit, P/E/S CTR= prototypical/extreme/salient contrast, XP^{min} = XP without its specifier

2004: 343). Applying this to the reduplication in Mandarin Chinese, the structure should be something like (10). This analysis not only deals with A-*le*-A well, but can also account for A-*yi*-A. A-*le*-A can be analyzed as two compositional processes [[[A] -*le*] -A], and the *yi* in A-*yi*-A can simply be viewed as a dangling phonological unit.

(8)   l make the tuna salad, and you make the **SALAD-salad**.

(9)

Phonology	Syntax	Semantics
$P_{j,k}$ P_k	X/XP^{min}	

$$CR^{syn}_j \; X/XP^{min}_k \qquad \begin{bmatrix} Z_k \\ \begin{bmatrix} P/E/S \\ CTR \end{bmatrix}_j \end{bmatrix}$$

(10)

Phonology	Syntax	Semantics
P_j $P_{j,k}$	V	
| |		
kan kan		

$$V_j \quad CR^{syn}_k \qquad \begin{bmatrix} \begin{bmatrix} DELIM \\ ([LOOK]_j) \end{bmatrix}_k \end{bmatrix}$$

From the discussion above, two possible ways of analyzing the reduplication in Mandarin Chinese seem to stand out: an analysis of the reduplication as an affixation process (following the Mandarin Chinese aspectual system proposed by Huang, Li & Li (2009)), or an analysis with the stipulation of a special reduplication phrase (such as the one proposed by Ghomeshi et al. (2004)). Comparing these two analyses, the former is clearly morphological while the latter could either be morphological or syntactic, at least for Mandarin Chinese. The constructional approach can account for both A-*le*-A and A-*yi*-A, while the generative approach has problems with A-*yi*-A. The constructional analysis formalized the phonological formation of reduplication, while the affixation analysis did not. And the construction-based approach does not assume covert movement in LF. In sum, a constructional analysis seems to be more appropriate. On the other hand, by assuming a construction specially for the reduplication, Ghomeshi et al. (2004)'s approach lost the connection between the reduplication and other aspect markers in Mandarin Chinese, unlike the affixation analysis. This leads us to propose an HPSG analysis that both resolves the problem of *yi* and preserves the generalization on aspect markers.

3 An HPSG analysis

We propose the lexical rule (LR) in Figure 1 for the verbal reduplication in Mandarin Chinese. The LR takes a verb as a lexical daughter and adds a delimitative meaning to its semantics. The phonological variations can be accounted for by proposing the type hierarchy for the verbal reduplication LR and the perfective LR that is shown in Figure 2. The general verbal reduplication LR in Figure 1 and at the top of hierarchy in Figure 2 copies the phonology of the verb (☐) and states that it is possible to have some other phonological material (indicated by ☐, which is underspecified and could be the empty list or a list containing elements) in between the two copies (☐ ⊕ ☐ ⊕ ☐). The AA and A-*yi*-A LRs inherit from this general type. The AA LR determines that there is no extra phonological material between the reduplication of the phonology of the verb, whereas the A-*yi*-A LR specifies this possible phonological material as ⟨*yi*⟩. A general perfective LR merely states that there should be the phonological element ⟨*le*⟩ in a perfective verb form and it is possible to have other phonological material before and/or after. The V-*le* LR inherits from this general LR and specifies that ⟨*le*⟩ comes after the phonology of the verb (☐). This accounts for the usual form of perfective marking with *le*. The type *perfective-reduplication-lr* inherits both from the verbal reduplication and the perfective LRs, and states that there is ⟨*le*⟩ between the reduplicated phonology of the verb (☐) and potentially also some other material (☐) (it inherits both the delimitative and the perfective semantics, as well).[7] The A-*le*-*yi*-A and the A-*le*-A LRs then inherit from this type. The former specifies the middle phonological material with ⟨ *le, yi* ⟩ while the later only with ⟨*le*⟩. In this way, all the phonological variations of the reduplication can be accounted for while maintaining their structural and semantic uniformity. The connection between the reduplication and other aspect markers in Mandarin Chinese is also reflected in this type hierarchy.

4 Summary

We have shown how the reduplication analysis can be modeled as a lexical rule and how the interaction between reduplication and aspect marking can be handled as well. Both lexical rules have been recast in an inheritance hierarchy using underspecified phonology lists. We provided an extensive discussion of previous approaches and presented a new analysis that has none of their shortcomings.

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[7]A similar encoding has to be assumed for the semantics. The encoding of semantics has to make sure that the meaning of the aspect marking scopes over the delimitative semantics. Due to space reasons we cannot discuss this here, but we will present the solution in the talk. The ☐ in the RELS list in Figure 1 is a place holder for further relations (*A-le-yi-A-lr*, *A-le-A-lr*) or can be instantiated as the empty list (*AA-lr*, *A-yi-A-lr*).
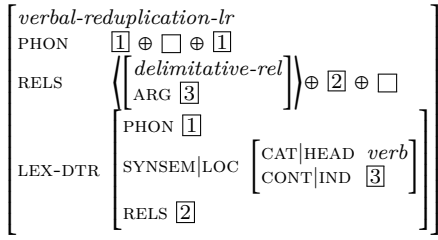
Figure 1 (attribute-value matrix):

$$
\begin{bmatrix}
\textit{verbal-reduplication-lr} \\
\text{PHON} \quad \boxed{1} \oplus \square \oplus \boxed{1} \\
\text{RELS} \quad \left\langle \begin{bmatrix} \textit{delimitative-rel} \\ \text{ARG} \ \boxed{3} \end{bmatrix} \right\rangle \oplus \boxed{2} \oplus \square \\
\text{LEX-DTR} \begin{bmatrix} \text{PHON} \ \boxed{1} \\ \text{SYNSEM} | \text{LOC} \begin{bmatrix} \text{CAT} | \text{HEAD} \ \textit{verb} \\ \text{CONT} | \text{IND} \ \boxed{3} \end{bmatrix} \\ \text{RELS} \ \boxed{2} \end{bmatrix}
\end{bmatrix}
$$

Figure 1: Verbal reduplication lexical rule

Figure 2 (type hierarchy):

$$
\begin{bmatrix} \textit{verbal-reduplication-lr} \\ \text{PHON} \ \boxed{1} \oplus \square \oplus \boxed{1} \end{bmatrix} \qquad \begin{bmatrix} \textit{perfective-lr} \\ \text{PHON} \ \square \oplus \langle le \rangle \oplus \square \end{bmatrix}
$$

$$
\begin{bmatrix} \textit{perfective-reduplication-lr} \\ \text{PHON} \ \boxed{1} \oplus \langle le \rangle \oplus \square \oplus \boxed{1} \end{bmatrix} \qquad \begin{bmatrix} \textit{V-le-lr} \\ \text{PHON} \ \square \oplus \langle le \rangle \end{bmatrix}
$$

$$
\begin{bmatrix} \textit{AA-lr} \\ \text{PHON} \ \boxed{1} \oplus \boxed{1} \end{bmatrix} \quad \begin{bmatrix} \textit{A-yi-A-lr} \\ \text{PHON} \ \boxed{1} \oplus \langle yi \rangle \oplus \boxed{1} \end{bmatrix} \quad \begin{bmatrix} \textit{A-le-yi-A-lr} \\ \text{PHON} \ \boxed{1} \oplus \langle le, \ yi \rangle \oplus \boxed{1} \end{bmatrix} \quad \begin{bmatrix} \textit{A-le-A-lr} \\ \text{PHON} \ \boxed{1} \oplus \langle le \rangle \oplus \boxed{1} \end{bmatrix}
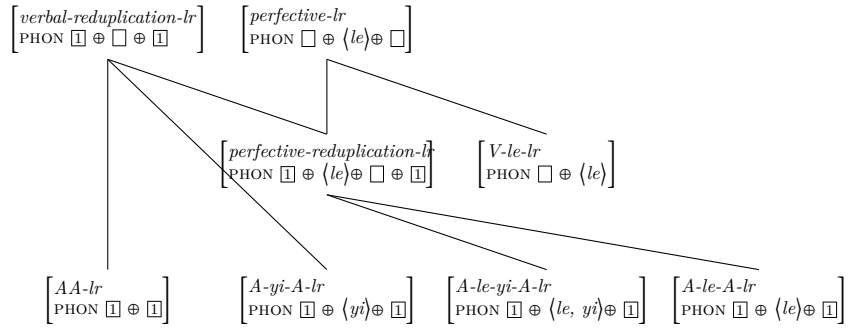$$

Figure 2: Type hierarchy for verbal reduplication and *le*

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