Chapter 14

Reduplication across boundaries: The case of Mandarin

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In this chapter, we shed new light on the reduplicative processes of Mandarin Chinese and assess the structural and interpretive properties of the input/base and output of these word formation phenomena. In particular, we focus on the categorial status of the base and address the issue of whether reduplication applies to category-free roots or full-fledged lexemes. Empirically, the privileged domain of research is *increasing* reduplication of disyllabic bases, or, as we dub it in the chapter, the AABB pattern, which is compared with *diminishing* reduplication, expressed by the template ABAB. The comparison between the two phenomena allows us to show that increasing and diminishing reduplication differ in the nature of the input units involved. On the grounds of a wide-ranging class of data, we argue that Mandarin reduplication takes base units of different 'size': word/lexeme-like units provided with category, namely verbs in the case of diminishing reduplication, and categoryless roots in the case of increasing reduplication. Throughout the chapter, we explore some category neutral properties of increasing reduplication and propose a unitary semantic operation capable to derive the various interpretive nuances of this phenomenon across lexical categories.

1 Introduction

1.1 Lexemes vs. words and reduplication phenomena

Lexemes are usually understood as sound/meaning pairs, i.e. linguistic signs provided with lexical category specification yet lacking inherent inflectional specification. Lexemes and words are thus considered as distinct entities in lexicalist approaches to word formation. As a matter of fact, while a word proper is a fully inflected entity functioning as a syntactic atom, a lexeme is the abstract version of the word-form lacking inflectional marking (Fradin & Kerleroux 2003). As put forward by Fradin & Kerleroux (2003), the

form of the lexeme can either be segmentally simple (*viz.* a root) or complex (*viz.* a stem), with affixal derivation, compounding and reduplication as phenomena possibly involved in lexeme formation.

Reduplication phenomena, however, are particularly challenging under this approach, since cross-linguistically the functions of reduplication are very varied and difficult to place categorically within the *derivational* domain of lexemes. In fact, whereas derivation typically forms new lexemes and can be category changing, reduplication often conveys values typically found in the *inflectional* domain. Although reduplication is attested with a variety of meanings (and forms) across languages, this phenomenon is consistently associated with its prototypical (iconic) function of intensification. In its increasing value, reduplication in the nominal domain gives as a result plural nouns, and in the domain of verbs it usually conveys aspectual meanings, i.e. pluractionality, iterative or progressive aspect, which are features prototypically expressed by inflection markings in most Indo-European languages. With adjectives, the prototypical value is intensification of the property/quality expressed by the base adjective. Nevertheless, independently of its semantic values, reduplication manifests several properties of word/lexeme formation and, formally, approaches derivational phenomena. First of all, (full) reduplication consists in the iteration of simple or complex roots (*viz.* stems), since it may also involve complex objects, such as compounds. Crucially, however, it typically applies to uninflected bases, with inflectional marking, if any, applying outside of/after reduplication. Moreover, reduplication shows many properties of compounding, since it often induces a reanalysis of the stress or tonal pattern of its base, or the insertion of epenthetic material between the two iterating units and/or some other phonological readjustment. Further, semantic drift and idiosyncrasy can characterize the outputs of reduplicative processes, while inflection phenomena are very transparent at the interpretive level (see Forza 2011, for an enlightening typological perspective) .

Therefore, under the lexeme/word distinction approach, we could argue that reduplication applies to roots or stems (traditionally understood as the phonological form of lexemes) and its domain of application is below the level of the word, or below X° in the standard X-bar approach.

1.2 Words, lexemes, and roots/stems in Mandarin Chinese

If the concept of lexeme appears empirically motivated in fusional or agglutinating languages whereby inflection markers modify the word form conveying relevant features in the syntactic contexts, its motivation is less grounded in isolating languages, where (concrete) words occur with none or a very low number of inflection markers, typically show invariable form and are virtually indistinguishable from the corresponding (abstract) lexemes. Mandarin Chinese is one of those languages where words have little or no inflection and where lexemes, expressing the abstract representation of a word, cannot be distinguished from word forms on a formal basis.

In Mandarin, the crucial distinction at the morphological level lies in the bound or free status of the root (a lexical morpheme), i.e. whether the root can 'stand alone' and occupy

a syntactic slot (1), equating thus free standing words in fusional languages, or whether it must be formally conjoined with another bound or free root, or with a derivational affix, to form an autonomous lexeme/word (2).

(1) free roots: 貓 *māo* 'cat', 走 *zǒu* 'walk, run away'

(2) bound roots: 衣 *yī* 'clothing, clothes' , 毆 *ōu* 'beat'

While the roots in (1) can be used by themselves in a sentence, those in (2) cannot stand alone but occur in complex words like e.g. 大衣 *dà-yī* 'big-clothes, overcoat, topcoat', 雨衣 *yǔ-yī* 'rain-clothes, raincoat', 衣櫃 *yī-guì* 'clothes-cupboard, wardrobe', 衣鉤 *yī-gōu* 'clothes-hook, clothes hook' (Arcodia & Basciano 2017: 105-106). Due to a strong tendency towards disyllabification attested in the evolution of the Chinese language over the centuries (see Shi 2002: 70-72), most roots are nowadays bound in Standard Mandarin (about 70% according to Packard 2000). Therefore, the majority of words or lexemes are compounds or other types of morphologically complex forms, typically ranging over all major lexical categories.

Another crucial aspect of Chinese morphology lies in the absence of strictly morphological criteria for the identification of the lexical category of roots (or stems, if morphologically complex), with some exceptions.[1] As a matter of fact, no category-specific morphology (such as declension/conjugation class markers in fusional languages) can be deployed to partition roots into lexical classes, with a verb like 走 *zǒu* 'walk, run away' being virtually indistinguishable at the morphological level from a noun like 書 *shū* 'book' (see Basciano 2017). Since there are no reliable morphological criteria to identify *lexeme*s as roots (or stems) endowed with lexical category features, the only reliable criterion is the distributional one. For instance, syntactic distribution only can discriminate among the adjectival, verbal or nominal use of a stem (namely, a combination of two roots) like 麻煩 *máfan* 'annoying, bother, trouble' (examples below from Basciano 2017: 561–562):

(3) a. 這件事很麻煩。
　　　 zhè jiàn shì hěn máfan
　　　 this CLF fact very troublesome

　　　 'This fact is troublesome.'

　　 b. 他不願麻煩別人。
　　　 tā   bù-yuàn   máfan biérén
　　　 3SG.M not-willing trouble others

　　　 'He is unwilling to trouble other people.'

　　 c. 你們在路上會遇到一些麻煩。
　　　 nǐ-men zài lù-shang huì   yùdào yīxiē máfan
　　　 2SG-PL in street-on may/will meet   some trouble

　　　 'You may/will run into some troubles on the road.'

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[1]Examples are words containing suffixes such as 子 *-zi*, e.g. 刷子 *shuāzi* 'brush' (cf. 刷 *shuā* 'to brush'), and 頭 *-tou*, e.g. 想頭 *xiǎngtou* 'idea' (cf. 想 *xiǎng* 'to think'), which are always nouns (see Basciano 2017).

Thus, under the standard approach to lexemes proposed in 1.1, a relevant issue concerns the very existence of these units in the Chinese language where, at the lexical level, the very flexible distribution of lexical items seems to point in the direction of a lexicon whose base units (roots/stems) lack inherent category features. Moreover, the examples in (3) shed light on the need for a very loose semantics of roots/stems, arguably incompatible with the specific semantic meaning of lexemes, as proposed in Fradin & Kerleroux (2003). Under the hypothesis that roots bear no category specification, their meaning should be 'vague' enough to make it compatible with the adjectival, verbal or nominal meanings that might be instantiated in the syntax.[2] We may remark, however, that the great flexibility observed in previous stages of the language has been largely reduced over the centuries, first with a functional specialization of lexemes during the Han period (206 BCE-220 CE), and then with the proliferation of compound words, whose functional preference has been always much more rigid and stable (see Zádrapa 2017). Even though cases of 'regular ambiguity' like the one in (3) are found, in Modern Chinese lexemes tend to be more fixed as far as lexical category and distribution are concerned; many roots have a 'prototypical' distribution and cannot be easily coerced into other lexical categories. However, even very stable words may be occasionally placed in syntactic slots usually occupied by other word classes, creating "innovative ambiguities" (Kwong & Tsou 2003: 116; see also Basciano 2017) . As observed by Zádrapa (2017), although it is not possible to distinguish on a formal basis the prototypical from the non-prototypical use, it is still possible to perceive a functional "strain" (or "pragmatic markedness" in Bisang's 2008 terms), which always results in a semantic shift of varying dimension (see Croft 2001: 73).

1.3 Reduplication phenomena in Mandarin Chinese

Among word formation phenomena in Mandarin, reduplication is one of the most productive and, as we will see throughout this chapter, it is found across all major lexical categories with both increasing (iconic) and diminishing (countericonic) values. Whereas there is no perfect correspondence between lexical categories and reduplication functions (verbs, for instance, can be reduplicated along one or the other function), we will see there is instead a tight correspondence between the structural pattern of reduplication and its diminishing or increasing value, so that the two patterns are rigidly differentiated at the segmental and suprasegmental level.

In recent years there has been a growing attention to reduplication in Sinitic. In this chapter, we will try to shed new light on the reduplicative processes of Mandarin, and try to assess the structural and interpretive properties of the input (the bases of reduplication) and the output of reduplicative processes. In particular, we will focus on the question of the categorial status of the base of the reduplicative processes in Mandarin, i.e. what the base units are and, specifically, whether reduplication applies to category-less

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[2]In syntactic approaches to word formation such as Distributed Morphology, the meaning of a word emerges constructionally once the root has been categorized by a selecting head (*n, v* or *a*) in the course of syntactic derivation, and cannot be determined lexically.

roots or to full-fledged lexemes/words. Empirically, the privileged domain of research will be the increasing reduplication of disyllabic bases, or, as we dub it here, the AABB pattern, which will be compared with the diminishing pattern, characterized by the disyllabic template ABAB.

The comparison between the two patterns will allow us to show that they differ in the type of units that constitute the basis of the reduplicative process. Mandarin reduplication, indeed, involves base units of different 'size', ranging from word/lexeme-like units provided with category and, namely, involving the verbal domain in the case of diminishing reduplication, to category-less roots in the case of increasing reduplication. Throughout the chapter, we will provide evidence for the latter claim, i.e. that reduplication phenomena involve roots, and we will explore some category neutral properties of increasing reduplication. We will conclude with some remarks on the semantic effects of this phenomenon, which we interpret as an *increased measure* function modifying the sortal type conveyed by the (combination of) roots.

1.4 Outline of the chapter

The chapter is organized as follows. Section 2 is dedicated to the presentation of the main patterns of full reduplication in Mandarin Chinese. Section 3 explores the characterizing features of increasing reduplication (AABB pattern) in some detail and discusses its formal and interpretive properties across lexical categories. Section 4 contains the structural analysis and some hypotheses about the semantics of AABB increasing reduplication, and section 5 draws the conclusions.

2 Data description

2.1 Reduplication in Mandarin: An overview

Reduplication in Mandarin Chinese is a widespread and productive phenomenon, virtually affecting all major lexical categories (V, Adj, N) and showing a tight relation between structural patterns (form) and semantic meanings (function). Semantically, Mandarin reduplications have augmentative/increasing and diminishing functions that are rigidly associated with different structural and/or suprasegmental patterns.

The diminishing function is only found in the verbal domain. Reduplicated verbs typically convey 'delimitative' or 'tentative' aspect (Chao 1968, Li & Thompson 1981, Tsao 2001), meaning to do something "a little bit/for a while" (Li & Thompson 1981: 29) or, by extension, to do something quickly, lightly, casually or just for a try.[3] Both monosyllabic (A → AA) and disyllabic (AB → ABAB) bases can reduplicate, but only in the case of monosyllabic reduplication the morpheme 一 *yi* (< *yī*) 'one' can occur between the base and the reduplicant:

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[3]Further, it has the pragmatic function of marking a relaxed tone, casualness (Ding 2010), and thus reduplicated verbs are also used as mild imperatives (see Xiao & McEnery 2004).

(4) a. 教 (A)   →   教（一）教 (AA)
         jiāo   *jiāo   (yi) jiao*
         teach   teach one teach
         'teach'   'teach a little'
     b. 休息 (AB)   →   休息休息 (ABAB)
         xiūxi   *xiūxi xiūxi*
         rest   rest   rest
         'rest'   'rest a little/for a while'

It has been argued that this reduplicative process is a syntactic phenomenon involving units in the *v*P domain (see Arcodia et al. 2014, Basciano & Melloni 2017). First of all, the reduplicated complex is not a syntactic atom, since it is possible to have intervening morphemes between the base and the reduplicant: beyond the numeral 一 *yi* (<*yī*) 'one' mentioned above, the perfective aspect marker 了 *le*[4] can intervene between the base and the reduplicant, as in (5):

(5) a. 走了走
         zǒu-le   zou
         walk-PFV walk
         'walked a bit'
     b. 走了一走
         zǒu-le   yi   zǒu
         walk-PFV one walk
         'had a walk'

Moreover, diminishing reduplication is subject to event structure constraints (see Fradin & Kerleroux 2003, for similar constraints in French word formation): the base verb must be a process verb, typically controlled by an agent and crucially lacking a result, which captures the fact that achievements, accomplishments and resultative compounds are systematically excluded from reduplication. Aspectually, the reduplicated verb is incompatible with the progressive and durative aspectual markers while, as we have seen, it is perfectly compatible with the perfective aspect marker. Therefore, reduplication seems to modify the event structure of the base verb, providing a temporal boundary to the unbounded process expressed by the base (see Xiao & McEnery 2004). Other constraints, e.g. purely morphological constraints, are not observed.

In view of these facts and under the assumption that aspectual properties are *syntactically* encoded (see e.g. Travis 2000, 2010, Borer 1994, 2005, McClure 1995, Ramchand 2008), Arcodia et al. (2014) propose that diminishing reduplication is a syntactic phenomenon affecting the *v*P domain, and develop a syntactic analysis to account for it; the reader is referred to Arcodia et al. (2014) and Basciano & Melloni (2017) for further details of the analysis.

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[4]Note that the perfective marker 了 *le* is generally placed after the second verb in resultatives and other kinds of compound verbs: 喝醉了 *hē-zuì-le* 'drink-drunk-PFV' *vs.* * 喝了醉 *hē-le zuì* 'drink-PFV drunk'.

Increasing reduplication exhibits several properties that make it a very different phenomenon from diminishing reduplication. First, increasing reduplication is found mainly among adjectives, but it can be found with verbs and nouns/classifiers too. Consider the following examples of adjectival reduplication:[5]

(6) a. 小 (A)   →   小小 (AA)
          xiǎo   *xiǎo~xiāo*
          small   small~small
          'small'   'very/really small'

      b. 高興 (AB)   →   高高興興 (AABB)
          gāoxìng   *gāo~gāo-xìng~xìng*
          'happy'   'very happy'

In the adjectival domain, the increasing function expressed by this kind of reduplication is not necessarily 'very Adj', but it rather makes the adjectives more descriptive, indicating a higher degree of liveliness and vividness.[6] As we will see in the next section, differently from diminishing reduplication, increasing reduplication requires that its base adjectives and verbs have specific structural properties.

Increasing reduplication applies to verbs too, but only if the base is bimorphemic and its constituents are in a relation of coordination.[7] In (7), for instance, the reduplicated verb portrays two interrelated actions which are performed alternately, repeatedly, or an action performed by a great number of people.

(7) 來往   →   來來往往
     lái-wǎng   *lái~lái-wǎng~wǎng*
     come-go   come~come-go~go
     'come and go'   'come and go repeatedly, come and
                                  go in great numbers'

AABB verbs, beside expressing pluractionality or action in progress (see Hu 2006, Ding 2010), can also express vividness (8), or acquire an extended meaning, losing their verbal meaning and becoming more similar to adjectives in meaning and distribution

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[5]According to Li & Thompson (1981: 33), in AABB reduplication of adjectives the second syllable is unstressed, and thus has a neutral tone. However, there is no clear consensus on tonal patterns in this kind of reduplication. For example, according to Tang (1988: 282), the second syllable is in the neutral tone, while the third and fourth syllables, or just the fourth syllable, are in the first tone. Further, Tang observes that in Taiwan most people use the original tones, i.e. there is no tonal modification in this reduplication pattern (see also the examples in Paul 2010).

[6]Xu (2012a: 6) states that, when adjectives are reduplicated, the degree of the adjective's quality is generally intensified. However, this does not seem to be always the case in the modern language: for example, she observes that colour perception can be subjective and variable, and thus adjectives indicating colours are prone to subjective interpretation.

[7]Reduplication of monosyllabic verbs (AA) in Modern Chinese does exist but has a diminishing meaning (see ex. (4a)). However, in previous stages of the language, before the appearance of the VV pattern with diminishing meaning, reduplication of monosyllabic verbs had an increasing function (repetition or action in progress); see e.g. Xu (2012a: 7).

(9),[8] depending on the linguistic context (on the meaning of AABB verbal reduplication, see Hu 2006).

(8) 跑跳   →   跑跑跳跳
    pǎo-tiào   *pǎo~pǎo-tiào~tiào*
    run-jump   run~run-jump~jump
    'run and jump'   'skip, run about, run and jump in a
                             vivacious way'

(9) 偷摸   →   偷偷摸摸
    tōu-mō   *tōu~tōu-mō~mō*
    steal-touch   steal~steal-touch~touch
    'pilfer'   'furtive, surreptitious, sneaky'

Finally, nouns can reduplicate too, conveying an overall increasing function, though AA reduplication no longer seems to be productive:

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[8]See the following examples, where 偷偷摸摸 *tōu~tōu-mō~mō* is used as a nominal modifier (i) and as an adverbial, both with (ii.a) and without (ii.b) the adverbial marker 地 *-de* (examples from the Academia Sinica Balanced Corpus of Modern Chinese: http://lingcorpus.iis.sinica.edu.tw/cgi-bin/kiwi/mkiwi/kiwi.sh?ukey=-78102521&qtype=1&ssl=7 [2017-08-25]).

(i)   [...] 最機警與最偷偷摸摸的一種動物
     zuì jījǐng yǔ zuì tōu~tōu-mō~mō de yī zhǒng   dòngwù
     most astute and most furtive   DET one CLF (type) animal

     '[...] the most astute and furtive animal.'

(ii) a. 不要偷偷摸摸寫
       bù yào tōu~tōu-mō~mō xiě
       not have furtive   write

       'You must not write furtively'

     b. 也儘量不要躲在角落裡偷偷摸摸地拍攝
       yě jǐnliàng   bù yào duǒ-zài jiǎoluò lǐ tōu~tōu-mō~mō-de pāishè
       also as.mush.as.possible not have hide-at corner in furtive-ADV   take.picture

       'Also, as much as possible, you must not hide in a corner taking pictures furtively'

Generally speaking, adjectives may function as adverbs, modifying verbs. Adverbs are generally formed from adjectives (though sometimes they can be formed from abstract nouns) but not from verbs. Basically, an adjective may modify both a noun/NP or a verb/VP, while a verb may only modify a noun/NP (see Arcodia 2014).

It must be noted, though, that basically all reduplicated AABB verbs can have an adverbial use, and thus they all share an important property of adjectives:

(iii) 妻子和女兒説説笑笑地準備著晩飯。
     qīzi hé nǚ'ér   shuō~shuō-xiào~xiào-de   zhǔnbèi-zhe wǎnfàn
     wife and daughter talk~talk-laugh~laugh-ADV prepare-DUR dinner

     'His wife and daughter were preparing dinner talking and laughing.'

    (Center for Chinese Linguistics PKU corpus of Modern Chinese: http://ccl.pku.edu.cn:8080/ccl_corpus/index.jsp?dir=xiandai [2017-07-24])

(10) a. 天 (A)   →   天天 (AA)
          tiān   *tiān~tiān*
          day   day~day
          'day'   'every day'

      b. 花草 (AB)   →   花花草草 (AABB)
          huā-cǎo   *huā~huā-cǎo~cǎo*
          flower-plant/grass   flower~flower-plant~plant
          'flowers and plants'   '(many) flowers and plants'

Reduplicated monosyllabic nouns are said to have a distributive (see e.g. Li & Thompson 1981, Hu 1994, Li 2009, Xu 2012b) or plural-collective (Paris 2007) meaning. Given the specific meaning of monosyllabic reduplications, their lack of productivity and the fact that many of the nouns that can reduplicate display classifier-like properties, it is disputable whether AA reduplication applies to actual nouns or nominal classifiers (functional elements in the *extended* NP domain); we will go back to this in section 3.3. As for disyllabic reduplicated nouns, the disyllabicity of the base (classifiers never are disyllabic) point to uncontroversially nominal bases. Semantically, Zhang (2015) argues that AABB reduplication is a plural marker, expressing 'greater plurality' (see Corbett 2000), but according to Xu (2012b) it indicates distributivity, as we will see in section 3.3.

2.2 Diminishing vs. increasing reduplication

From the brief overview provided above, a first interesting generalization arises. There is a correspondence between reduplicative pattern (with consistent structure and meaning) and lexical category, but limited to diminishing reduplication: AA or ABAB diminishing reduplication applies only to verbs, as input and output categories. Increasing reduplication is very different in this respect because it cross-cuts lexical categories rather than being firmly associated with a word class (although AA/monosyllabic reduplication is unproductive nowadays with nouns and classifiers).

Let us now focus on other differences between the two types of reduplication: it appears that the two functions of reduplication are associated with a set of different formal and selectional properties. A striking fact, especially in consideration of the great deal of unstable meaning-structure correspondences in reduplication cross-linguistically, is the tight correspondence between form and function observed in the reduplication of disyllabic bases.[9] While for monosyllabic bases the difference between increasing and diminishing reduplication is visible only at the suprasegmental level,[10] for disyllabic bases (AB), the difference arises at the segmental level.

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[9]Many (if not most) languages do not exhibit such a clear correspondence between patterns and functions in reduplication (Mattes 2014).

[10]According to some, diminishing reduplicated verbs are toneless, whereas the reduplicated adjective always bears the first tone (Tang 1988: 282, Paul 2010: 120). However, according to Li & Thompson (1981: 33), the second syllable of reduplicated adjectives too is unstressed. As for the few monosyllabic nouns that reduplicate in Modern Chinese, it seems that the reduplicant keeps the same tone as the base noun.

In the diminishing function, the base is reduplicated as a whole (ABAB), as in the ex. (4b), while in the increasing function, each morpheme is reduplicated by itself (AABB), as seen in the examples (6b), (7)-(9) and (10b). Thus, it appears that there is a strong correlation between the function and the form of reduplication: as hinted at in section 2.1, the ABAB pattern always conveys diminishing meaning, whereas the AABB pattern is associated with increasing semantics, regardless of the word class of the input. Interestingly enough, the AABB pattern seems to be associated with increasing semantics also in other Sinitic languages (see Arcodia et al. 2015).

It is worth noting that some disyllabic words predominantly showing an adjectival distribution can not only occur in the (standard) increasing template AABB, but they may also appear in the diminishing ABAB template, so that the same base eventually enters two reduplication templates formally and functionally distinct:

(11)   a.   高興   →   高高興興 (AABB) (cf. 6b)
            gāoxìng   *gāo~gāo-xìng~xìng*
            'happy'   'very happy'

       b.   高興   →   高興高興 (ABAB)
            gāoxìng   *gāoxìng gāoxìng*
            'happy'   'have some fun'

Crucially, these minimal pairs are restricted to disyllabic bases amenable to a verbal/dynamic beyond an adjectival/stative interpretation, as we can see in the ABAB pattern in (11b). Therefore (11b) is not a counterexample to the generalization that only verbs can be reduplicated along the ABAB pattern.

Moreover, the difference between diminishing and increasing reduplication is not only semantic, but also concerns the restrictions on the input and on the output. As for diminishing reduplication, the selection restrictions, as we have seen, seem to be aspectual and allegedly dependent on event structure constraints, while for increasing reduplication these restrictions are (mostly) morphological, as we will see in the next section.

3 Increasing reduplication: input and output

Different from diminishing reduplication, increasing reduplication requires that its bases have specific morphotactic and semantic properties. In what follows we focus on the category-specific and category-neutral restrictions of increasing reduplication and describe the properties of the outputs of these reduplications across the major lexical categories.

3.1 Adjectives

In the adjectival domain increasing reduplication applies indifferently to monosyllabic and to disyllabic bases. In both cases, the base adjective must be gradable, thus absolute adjectives cannot reduplicate: e.g. 方 *fāng* 'square' cannot give rise to *方方 *fāng~fāng*

(see Paris 1979, cit. in Paul 2010: 139, fn. 18). [11] Therefore, adjectival reduplication only applies to bases that encode a degree/scalar value (see also Zhu 2003). At the morphotactic level, we find restrictions as far as disyllabic bases are concerned: as a matter of fact, the AABB pattern requires a disyllabic *and* bimorphemic base, whereas disyllabic monomorphemic words cannot be reduplicated (Paul 2010: 137):[12]

(12) 窈窕   →   *窈窈窕窕
      yǎotiǎo   **yǎo~yǎo-tiǎo~tiǎo*
      'graceful, gentle'

Also, the two morphemes must be lexical. For instance, adjectives formed with a prefix-like element cannot reduplicate (see Zhu 2003):

(13) 不安   →   *不不安安
      bù-ān   **bù~bù-ān~ān*
      not-peaceful
      'troubled/restless'

It thus appears that units are here handled strictly on a morphemic basis, rather than on a prosodic basis. Moreover, the possible bases for AABB reduplication are either lexicalized, non-transparent bases (14a), or adjectives formed by two morphemes with a similar meaning (14b) or in a logical coordination (14c):

(14) a. 馬虎   →   馬馬虎虎
          mǎ-hu   *mǎ~ma-hū~hū*
          horse-tiger   horse~horse-tiger~tiger
          'careless, casual'   'careless, casual (stronger)'

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[11]However, Tang (1988: 279-283) lists 方方 *fāng~fāng* 'square~square' among possible reduplicated adjectives. This could be possibly the result of a coerced interpretation (see e.g. English *very square face*). Indeed, Tang highlights that adjectives that express distinctive properties (e.g. appearance, size and colour) generally can reduplicate even when, as in the case of 方 *fāng* 'square', they are not used predicatively and cannot be modified by degree adverbs (examples from Tang 1988: 283):

  (i)   [??] 他的臉很方
        tā   de   liǎn hěn fāng
        3SG.M DET face very square
        'His face is very square.'

  (ii) [??] (很) 方的臉
        (hěn) fāng   de   liǎn
        (very) square DET face
        'A (very) square face'

  (iii) 方方的臉
        fāng~fāng   de   liǎn
        square~square DET face
        'A (very/really) square face'

[12]窈窕 *yǎotiǎo* is an example of partial reduplication in Old Chinese, involving rhymes only, traditionally called 叠韵 *diéyùn* 'reduplicated rhymes': 窈窕 *ˀ ʔiwʔ-liwʔ > ewX-dewX > yǎotiǎo* (Sagart 1999: 137).

b. 快樂 → 快快樂樂
kuài-lè *kuài~kuài-lè~lè*
pleased-happy pleased~pleased-happy~happy
'happy' 'very/really happy'

c. 高大 → 高高大大
gāo-dà *gāo~gāo-dà~dà*
tall-big tall~tall-big~big
'tall and big' 'very/really tall and big'

These data show that the disyllabic AABB template applies to complex bases that are structurally and semantically symmetrical, i.e. exocentric or coordinative structures lacking a clearly identifiable head. Adjectival reduplication, thus, seems to be conditioned by morphosyntactic (word-internal) factors.

As for the output, the reduplicated adjective loses its gradability: while the base must be gradable, the reduplicated adjective is no longer gradable. As a matter of fact, whereas the (scalar) base adjective is compatible with degree modifiers such as 'very' and 'fairly', which indicate a high level on the scale of the (gradable) property expressed by the adjective they modify, the reduplicated adjective is not:

(15) a. 長 → 非常長
cháng *fēicháng cháng*
'long' 'very long'

b. 長長 → * 非常長長
cháng~cháng *fēicháng cháng~cháng*
'long~long' *'very long~long'

Moreover, whereas the base adjective can appear in the comparative construction, the reduplicated adjective cannot:

(16) a. 我的頭髮比他的長。
wǒ de tóufa bǐ tā de cháng
1SG DET hair COMP 3SG.M DET long

'My hair is longer than his.'

b. * 我的頭髮比他的長長。
wǒ de tóufa bǐ tā de cháng~cháng
1SG DET hair COMP 3SG.M DET long~long

However, there is a group of adjectives for which reduplication works differently. These are adjectives that typically involve a modifier-head structure, such as 雪白 *xuě-bái* 'snow-white', which reduplicates as ABAB (雪白雪白 *xuě-bái~xuě-bái*). The function is reportedly increasing, as in the case of AABB reduplicated adjectives. This might appear as an exception to the form-function identity between ABAB reduplication and diminish-

ing meaning in Mandarin.[13] It must be noted, though, that modifier-head adjectives like 雪白 *xuě-bái* 'snow-white' are not gradable and, indeed, they are not compatible with degree adverbs and cannot be used in the comparative construction. Therefore, reduplication does not result in a change in gradability of the base adjective, as it is the case with AA and AABB adjectival reduplication. Adjectival ABAB reduplication, thus, seems to be a phenomenon distinct from the other patterns of reduplications described in this section. We will go back to this issue in section 3.5., when discussing the word/lexeme status of the bases of increasing reduplication.

3.2 Verbs

As for verbs, increasing reduplication poses no aspectual requirements on the base unit since all kinds of verbs, including inherently telic verbs like 來 *lái* 'come', 進 *jìn* 'enter' or 出 *chū* 'exit', are allowed (see ex. (7), repeated here as (17c)). Nonetheless, increasing reduplication requires base units that possess specific structural properties. As a matter of fact, AABB increasing reduplication is generally possible only for coordinated complex verbs, the constituents of which may be either in a relation of logical coordination (17a), synonymy (17b) or antonymy (17c):

(17) a. 説笑 → 説説笑笑
          shuō-xiào   *shuō~shuō-xiào~xiào*
          talk-laugh   talk~talk-laugh~laugh
          'talk and laugh'   'talk and laugh continuously'

      b. 叫嚷 → 叫叫嚷嚷
          jiào-rǎng   *jiào~jiào-rǎng~rǎng*
          call-shout   call~call-shout~shout
          'shout, howl'   'shout repeatedly'

      c. 來往 → 來來往往
          lái-wǎng   *lái~lái-wǎng~wǎng*
          come-go   come~come-go~go
          'come and go'   'come and go repeatedly, come and
                               go in great numbers'

Note that in (17) the bases of reduplication are existing verbs, but this is not necessarily always the case, as e.g. 走走停停 *zǒu~zǒu-tíng~tíng* 'walk and stop' (there is no corresponding base verb 走停 *zǒu-tíng*).[14]

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[13] According to Paul (2010: 137, fn. 15), "[the] reduplication pattern for 'modifier-adjectival head' compounds deriving an adjective of the form [$_{A°}$ ABAB] is not to be confounded with the repetition of a disyllabic verb as a whole in syntax: [$_{V°}$ AB] [$_{V°}$ AB]".

[14] An alternative analysis might pose that verbal AABB reduplication is the result of the coordination of two reduplicated verbs, [A~A] [B~B]. However, note that since the reduplication of monosyllabic verbs expresses a delimitative meaning, the coordination of two monosyllabic reduplicated verbs should result in a delimitative semantics. Further, this analysis is not tenable because telic verbs like 來 *lái* 'come', as said above, cannot reduplicate by themselves, * 來來 *lái~lái.*

Also, it is worth remarking that the verbal reduplication pattern AABB may also be found with disyllabic monomorphemic verbs, such as (18a) or other kind of compound verbs (18b and 18c):

(18)   a.   哆嗦
           duōsuo
           'tremble'

       b.   飄悠
           piāo-you
           'float-long/leisurely, wobble, stagger'

       c.   鬧騰
           nào-teng
           'noisy-jump, disturb/create confusion'

As for the prosodic properties of the pattern, the second morpheme/syllable of non-coordinate compound verbs that can undergo AABB reduplication generally has the neutral tone, suggesting that these are lexicalized forms.[15] Thus, similarly to adjectives, the AABB template in the verbal domain basically applies to structurally and semantically symmetrical bases, but it can also apply to unanalyzable morphemes or to lexicalized forms.[16] For some of these lexicalized forms, it is possible that they originate from co-ordinating structures whose relationship became opaque with time, but an in depth diachronic analysis is needed to substantiate this hypothesis.

As for the output, AABB reduplication of verbs seems to operate at the aspectual level, expressing repetition or action in progress. However, as we have seen, it can also express vividness (8), or other kinds of more abstract meanings (9), closely approaching *adjectival* reduplicative processes.

3.3 Nouns

As we have seen, reduplicated monosyllabic nouns are said to have a 'distributive' or 'plural collective' meaning:

(19)   人人都喜歡受人稱贊。
       rén~rén   dōu xǐhuan shòu   rén   chēngzàn
       person~person all   like   receive person praise
       'Everybody likes to be praised by people.'

---

[15]Toneless items in Chinese are typically grammatical morphemes, such as e.g. aspectual markers, (some) no longer productive derivational suffixes, and the second syllables of some reduplicated or compound words, as e.g. 爸爸 *bàba* 'father', 學生 *xuésheng* 'student'. Thus, lack of tone is a clue of either grammaticalization or lexicalization.

[16]The only constraint which does not seem to be morphological but rather aspectual concerns coordination of telic verbs: as we have seen, telic verbs may appear in the AABB pattern of reduplication, but if they do they must be antonyms (as in ex. 7/17c), i.e. reduplication of synonymic telic verbs does not seem to be possible (see Zhang 2016). This might be due to the fact that the coordination of two antonymic telic verbs (like *enter-exit*) results in the annulment of the *télos*, which seems to suggest that, actually, the bases of this kind of reduplication too must express an overall *atelic* event. This issue deserves further research.

Several authors (e.g. Hu 1994, Cai 2007, Li 2009) stress the fact that reduplication of monosyllabic nouns may be assimilated to classifier reduplication and that many of the nouns that can reduplicate show classifier-like properties. For example, Hu (1994: 103) observes that at least part of these (alleged) nominal bases can directly follow a numeral without an intervening classifier, as e.g. 一年 *yī nián* 'one year', 三戶 *sān hù* 'three households', and they can themselves work as classifiers, as e.g. 三戶人家 *sān hù rénjiā* 'three household (CLF) family, three families', thus exhibiting properties of (nominal) classifiers.

Reduplication of classifiers – how it is generally reported in reference grammars – seems to convey a distributive meaning:

(20) 看書的時候，書上的字不可能個個都認識。
    kàn shū de shíhou, shū shàng de zì   *bù kěnéng gè~gè*   *dōu rènshi*
    read book DET time   book on   DET character not can   CLF~CLF all   know
    'You cannot know all the characters/each character of the books you read.'

According to Paris (2007: 68), however, reduplicated classifiers get a (plural) distributive meaning when they appear in pre-verbal position (21a), while they get a plural collective interpretation when they occupy the post-verbal position (21b):[17]

(21)   a. 他個個學生都認得。
         tā   *gè~gè*   *xuésheng dōu rènde*
         3SG.M CLF~CLF student   all   be.acquainted.with
         'He knows all the students (individually).'

   b. 在分析上遇見種種困難
         zài fēnxī   *shàng yùjiàn zhǒng~zhǒng kùnnan*
         at   analysis on   meet   CLF~CLF   difficulty
         'Come across all kinds of difficulties during the analysis.'

According to Zhang (2014), reduplication of classifiers in Mandarin is a type of plural marking; it denotes plurality of *units* (groups/collectives) rather than of individuals. Units and individuals can overlap, like in (22a), but it is not always the case, like in (22b), where 'lotus' is the individual, while 'lotus pile' is the unit that reduplicates (examples from Zhang 2014: 6):

(22)   a. 河裏漂著（一）多多蓮花。
         hé   *lǐ piāo-zhe (yī) duō~duō liánhuā*
         river in float-DUR (one) CLF~CLF lotus

         'There are many lotuses floating on the river.'

---

[17]Paris notes that it is not possible to have the noun preceded by the reduplicated classifier in post-verbal position with the same meaning as (21a), so that the following sentence is ungrammatical:

   (i)   * 他認得個個學生。
        tā   *rènde*   *gè~gè*   *xuésheng*
        3SG.M be.acquainted.with CLF~CLF student

b. 地上有一堆堆蓮花。

dì   shàng yǒu yī   duī~duī   liánhuā

earth on   have one CLF(pile)~CLF lotus

'There are piles of lotuses on the ground.'

Zhang (2014: 12) argues that the distributive meaning emerges when reduplicated classifiers occur with the adverb 都 *dōu* 'all' (even when it is allowed but does not show up; see e.g. Guo 1999) or other kinds of adverbials:

(23)   個個學生都有自己的網頁。

gè~gè   xuésheng dōu yǒu zìjǐ de   wǎngyè

CLF~CLF student   all have own DET webpage

'All of the students have their own webpage.'

In contrast, according to Zhang, in (24), where no 都 *dōu* 'all' is allowed, the distributive meaning is not possible (example from Zhang 2014: 12):

(24)   雙雙情人步入會場。

shuāng~shuāng qíngrén bù-rù   huì-chǎng

CLF (pair)~CLF lover   step-enter meet-place

'Many pairs of lovers stepped into the meeting place.'

According to Zhang (2014: 12), the fact that reduplicated classifiers do not have an intrinsic distributive reading is proven by the compatibility with collective verbs.

Going back to reduplication of monosyllabic nouns proper, Paris (2007) argues that it expresses a 'plural collective' meaning, more specifically it denotes a collectivity of elements sharing the same properties, which can function either as an argument or as an adverbial. According to Paris (2007: 69-70), reduplication of monosyllabic units does not have a distributive meaning, as shown by the contrast between (25a) and (25b), where the first one contains a reduplicated noun (天天 *tiān~tiān* 'day~day, every day'), while the second contains the quantifier 每 *měi* 'each'. In (25b) the object is necessarily distributed, i.e. it must be a different poem every day, while this is not necessarily the case in (25a).[18]

(25)   a. 他天天都讀一首詩。

tā   tiān~tiān dōu dú   yī   shǒu shī

3SG.M day~day all read one CLF   poem

'He reads a poem every day.'

b. 他每一天都讀一首詩。

tā   měi yī   tiān dōu dú   yī   shǒu shī

3SG.M each one day all read one CLF   poem

'Every day he reads a (different) poem.'

---

[18]Note that in (25a) 都 *dōu* 'all' is used but, according to Paris, we do not get the distributive reading. This contrasts with what Zhang argues about classifiers, where the presence of this adverb would lead to a distributive reading (see above).

Providing a detailed picture of the kind of plural readings expressed by reduplicated classifiers is beyond the scope of this chapter; however, what we want to stress here is that it is not easy to trace a clear boundary between different kinds of plural readings and that arguably different readings can be related to distributional/syntactic rather than solely lexical factors.

As for reduplication of disyllabic nouns, a first element is the undisputable categorial nature of the input, since classifiers are all monosyllabic. Structurally, nominal bases seem to be subject to the same morphological constraints observed for AABB adjectives and verbs. The AB base nouns usually entail a relation of coordination between their constituents: either logical coordination (see 26a), or synonyms or antonyms (26b) (see Tang 1979: 114; Zhang 2015):[19]

(26) a. 家戶 → 家家戶戶
jiā-hù *jiā~jiā-hù~hù*
family-household family~family-household~household
'household/family' 'every family/each house-hold/many families'

b. 老少 → 老老少少
lǎo-shào *lǎo~lǎo-shào~shào*
old-young old~old-young~young
'the old and
the young' 'old people and young people'

As we have seen with adjectives (14), we can also find more lexicalized forms like:

(27) a. 風雨 → 風風雨雨
fēng-yǔ *fēng~fēng-yǔ~yǔ*
wind-rain wind~wind-rain~rain
'wind and rain/
trials and
hardships' 'trials and hardships/storms'

b. 點滴 → 點點滴滴
diǎn-dī *diǎn~diǎn-dī~dī*
dot-drip/drop dot~dot-drop~drop
'droplet' 'dribs and drabs/bit by bit'

The nominal AABB pattern of reduplication seems to be well-established in the Chinese lexicon (see e.g. Hu 1994, Wu & Shao 2001), and can be extended to disyllabic nouns that usually do not reduplicate (28a, Hu 1994: 106). Also, two monosyllabic nouns A and B

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[19]Note that some AABB lexicalized nouns do not have a AB compound counterpart (see Wu & Shao 2001: 12): e.g. 生生世世 *shēng~shēng-shì~shì* 'life~life-generation~generation, generation after generation'(*生世 *shēng-shì*). Generally speaking, it is possible to form AABB nouns from the coordination of two items that do not form an AB compound (see (28b) and the related discussion).

that do not form a AB compound word, but satisfy the coordination requirements seen above, can reduplicate along the AABB pattern forming novel combinations (28b, see Wu & Shao 2001: 12):

(28) a. 情景   →   情情景景
          qíng-jǐng   *qíng~qíng-jǐng~jǐng*
          feeling-scene   feeling~feeling-scene~scene

          'scene, sight,   'every scene, all scenes'
           circumstances'

      b. 盆罐   →   盆盆罐罐
          pén   guàn   *pén~pén-guàn~guàn*
          'basin/pot' 'jar'   'pots and jars'

According to Zhang (2015: 7), though, the AABB nominal pattern is not productive, since many acceptable compound nouns formed by parallel constituents do not reduplicate (she argues the same for verbs too). This is however questionable since e.g. one of the example she mentions, i.e. 桌椅 *zhuō-yī* 'table-chair, tables and chairs' → 桌桌椅椅 *zhuō~zhuō-yī~yī* 'table~table-chair~chair', is listed as an example of reduplicated AABB noun by Wu & Shao (2001: 12-13), who put it among AABB 'temporary' combinations with low frequency. Even though it is not easy to establish the productivity of a pattern, we believe that 'occasional' usages and the possibility to coin new AABB nouns are hints of its productivity.

As for its function, as we have mentioned, Zhang (2015) argues that AABB expresses 'greater plurality' (see also Wu & Shao 2001), though it sometimes seems to have a distributive meaning, like in the case of reduplicated monosyllabic nouns; and, indeed, as we have seen, according to Xu (2012a), reduplicated AABB nouns indicate distributivity. See the examples below:[20]

(29) a. 家家戶戶的門前都掛著青天白日滿地紅的國旗 [...]
          jiā~jiā-hù~hù   *de mén-qián dōu guà-zhe*
          family~family-household~household DET door-front all   hang-DUR
          qíng-tiān-bái-rì   mǎn-dì   hóng de guó-qí
          blue-sky-white-sun full-ground red   DET country-flag

          'In front of the door of each household hung the red national flag with the white sun in the blue sky [...]'

      b. 海水浴場裡，男男女女、老老少少，都穿著各種不同款式的泳裝 [...]
          hǎi-shuǐ   yù-chǎng lǐ, nán~nán-nǔ~nǔ,   lǎo~lǎo-shào~shào,   dōu
          sea-water bath-site in man~man-woman~woman old~old-young~young all
          chuān-zhe gè   zhǒng   bùtóng kuǎnshì de yǒng-zhuāng
          wear-DUR   each CLF(kind) different style   DET swim-suit

          'Every man, woman, old and young bathing in the sea was wearing all different styles of swimming suits'

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[20]Examples from Academia Sinica Balanced Corpus of Modern Chinese: http://app.sinica.edu.tw/cgi-bin/kiwi/mkiwi/kiwi.sh [2016-11-24].

In any case, it is possible to argue that this reduplication pattern expresses a kind of plural and, indeed, Xu (2012a) argues that reduplication, like plural marking, is one of the major devices for indicating plurality in human languages.[21] This plural displays interesting properties: it is compatible with 'numeral+classifier' constructions (30a) and, most importantly, it seems to be compatible with the plural marker 們 -*men*[22] (30b):

(30)   a. 200 多個子子孫孫前來祝壽
           èrbǎi duō   ge   zǐ~zǐ-sūn~sūn   qiánlái zhù-shòu
           200   more CLF son~son-grandson~grandson come   congratulate-longevity

           'More than 200 children and grandchildren came to congratulate [the old woman] on her birthday.'[23]
       b. [...] 讓我們的子子孫孫們還能依靠這個地球生活。
           ràng wǒ-men de   zǐ~zǐ-sūn~sūn-men   hái néng yīkào zhè ge
           let   1SG-PL DET son~son-grandson~grandson-PL still can   rely   this CLF
           dìqiú shēnghuó
           earth live

           '[...] to let the future generations still be able to rely on this earth to live.' [24]

From a typological perspective, it is interesting to observe that in languages where reduplication and classifiers are found extensively, plural marking is not well developed and is sensitive to the semantic feature [+human] (Xu 2012a: 12), just like in Mandarin (see Corbett 2000 for a more comprehensive overview of number marking across languages). Xu (2012a) further remarks that the more plural marking is developed, the less this semantic feature ([+human]) is required; also, the more a language possesses developed plural markers, the less it needs reduplication and classifiers.

At the distributional level, the possible co-occurrence of AABB reduplication and of the plural marker 們 –*men* suggests that these two forms of pluralization cannot be equated, and, in a syntactically oriented approach to word formation and inflection, it indicates that these two plurals occupy different syntactic positions in the (extended) nominal projection. In particular, following Wiltschko's (2008) analysis of plural markers in Halkomelem Salish, we will argue that the reduplicative process is a derivational process that operates at the root level, even before root categorization is determined. This analysis allows us to explain the otherwise unexpected occurrence of 們 –*men* plu-

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[21]Xu (2012b: 48) highlights some general tendencies in the languages of the world: 1) languages with obligatory plural marking tend not to have classifiers (see Greenberg 1972, Sanches & Slobin 1973; but see e.g. Bisang 2012); 2) languages without obligatory plural marking tend to use reduplication to express plurality. In general, languages which do not have plural marking seem to appeal to both reduplication and classifiers.

[22]The plural marker 們 -*men* can be added only to human nouns; it is entirely optional and is generally used "only when there is some reason to emphasize the plurality of the noun" (Li & Thompson 1981: 40). It is obligatorily used only with personal pronouns. Moreover, if the noun is preceded by a 'numeral+CLF', the marker 們 –*men* cannot be used: * 三個老師們 *sān ge lǎoshī-men* 'three CLF teacher-PL, three teachers' (cf. 30a). This can be taken as an indication of the fact that 們 –*men* is a marker of pluralization connected to the determiner/classifier domain, rather than being involved at the NP level.

[23]http://news.xinhuanet.com/society/2007-10/06/content_6833517.htm [2016-11-24].

[24]http://www.china-coop.org/index.php?ac=article&at=read&did=854 [2016-11-24].

ral marking on AABB (animate) nouns, which could be analysed as a modifier in the DP domain. We will go back to this issue in section 4.

3.4 Further remarks on the AABB pattern

To sum up, the data above show that increasing AABB reduplication is sensitive to the morphological makeup of its input, and insensitive to the categorial feature of the base (Adj, V, N) or, semantically, to its ontological/sortal type (whether the base denotes a quality, an event, or an entity/individual). As for the morphological restrictions on the base units, it is worthwhile noting that the requirement of a compound base of a specific type is also category-neutral, since it is found with AABB adjectives, verbs and nouns. In particular, the kind of root combinations we find seem to have much in common with 'co-compounds', in particular, with the following categories singled out by Wälchli (2005: 138): 'additive co-compounds', as e.g. Georgian *xel-p'exi* 'hand-foot'; 'generalizing co-compounds', as e.g. Mordvin *t'ese-toso* 'here-there, everywhere'; collective co-compounds, as e.g. Chuvash *sĕt-śu* 'milk-butter, dairy products'; synonymic co-compounds, as e.g. Uzbek *qadr-qimmat* 'value-dignity, dignity'.

According to Wälchli, additive co-compounds denote pairs consisting of the parts A and B; in a broader sense, they denote sets exhaustively listed by A and B. Generalizing co-compounds denote general notions (as e.g. 'all', 'always'); their parts express the extreme opposite poles of which the whole consists. As for collective co-compounds, they are not always easy to define since they obey to different criteria, which do not always agree: the parts do not exhaustively list the whole; the whole comprises all meanings having the properties shared by A and B; collective co-compounds are co-compounds which denote collectives.[25] Finally, in synonymic co-compounds, the constituents (A and B) and the whole compound have (almost) the same meaning. Wälchli observes that synonymic co-compounds "express homogeneous collection complexes in which (ideally) every element contained in them can be referred to by both parts of the co-compound" (p. 140). This, according to Wälchli, explains the affinity between synonymic co-compounds and plurality, though there is no language in which synonymic compounds work as fully grammaticalized plurals. Synonymic co-compounds may have affinities either to collective, to additive or to generalizing co-compounds. In any case, each type of co-compound described above may be considered as complexes where the referents are joint together to indicate a 'set'.

Interestingly enough, the AABB pattern can apply to AB bases that are not attested as coordinated bases (see sections 3.2, 3.3), and crucially it can be 'category-changing' (see Paul 2010: 145-146; cf. also ex. (9)):

(31) 婆婆媽媽   →   [AABB] = Adj
pó~po-mā~mā
old.lady~old.lady-mother~mother
'kindhearted/sentimental/effeminate'

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[25]The example from Chuvash reported above meets all the three criteria, but it is not always the case. It is difficult to distinguish between additive and collective co-compounds if the first two criteria do not apply at the same time.

In (31), the AB base is not an existing word, but AABB reduplication applies to two free/non-conjoined lexical roots. Reduplication of two elements independently compatible with a nominal meaning[26] results in an *adjectival* AABB lexeme.

Furthermore, the AABB pattern extends to others categories too, like numerals, place words, coordinated classifiers, onomatopoeias, etc. (see Hu 1994):

(32)   a. 千千萬萬
          qiān~qiān-wàn~wàn
          thousand~thousand-ten.thousand~ten.thousand

          'thousands and thousands'

       b. 前前後後
          qián~qián-hòu~hòu
          front~front-back~back

          'whole story/ins and outs'

       c. 嘻嘻哈哈
          xī~xī-hā~hā
          giggling.onomatopoeia~giggling.onomatopoeia-
          laughter.onomatopoeia~laughter.onomatopeia

          'laughing and joking'

All these facts seem to support the hypothesis that the AABB reduplication pattern applies even before the conjoined bases get their categories (and indeed the constituents can be bound roots too).[27] This is consistent with an analysis according to which word formation can apply to roots, or in this specific case, to combination/coordination of category-less roots, which would explain why, different from ABAB diminishing reduplication, it is a phenomenon found across almost all word classes.[28] We will go back to this in section 4, where we will put forth an analysis for this reduplication pattern.

3.5 On the base units of AABB reduplications

As we have seen in 2.2, diminishing reduplication does not form syntactic atoms and can be analyzed as a syntactic operation whose application is conditioned by structural re-

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[26]It is worth noticing that when the base is formed by a bound root constituent, like 婆 *pó* 'old.lady' in (31), we cannot determine its lexical category since bound roots do not occupy syntactic slots (see section 1.2); rather, it can be said that these roots are 'noun-like' *semantically*, i.e. they denote entities/individuals (see section 3.5).

[27]A reviewer observed that it is difficult to make such a claim if the cases mentioned in this section are well-established lexicalized formations. Actually, these cases seem to be quite marginal, and for category changing items it is quite expected, since intuitively we expect that reduplication of two roots compatible with the nominal meaning leads to a nominal output. However, these examples further highlight the cross-categoriality of the pattern and further support the hypothesis of the acategoriality of the base roots. In any case, it is undoubtable that bound roots can enter this pattern of reduplication (see e.g. the reduplicated word in the examples (30) above, where both roots are bound), which as mentioned above (footnote 26; see also section 3.5) do not have a lexical category, and this points toward the acategorical nature of the conjoined roots.

[28]Reduplication of non-existent AB bases is not possible with diminishing verbal reduplication; in ABAB verbal reduplication, the AB base must be an existing disyllabic verb.

strictions in the *v*P domain (see Arcodia et al. 2014, Basciano & Melloni 2017). In contrast, we have shown that increasing reduplication is subject to 'morphological' restrictions. Keeping in line with previous research on reduplication and plural marking, we argue that AABB increasing reduplication is the result of the modification of roots (see section 4), understood here, as in most exoskeletal approaches (see Borer 2003), like elements crucially lacking category features. Moreover, as we will show in details in the next section, AABB reduplications are syntactic atoms which cannot allow for the insertion of other material between the iterated units (see e.g. Lapointe 1980).

Different pieces of evidence speak in favour of the hypothesis that AABB reduplication applies to elements smaller than a word, i.e. a root/stem, and possibly lack *per se* a definite category specification. In what follows, we will concentrate on the differences between AABB/increasing reduplication and other reduplicative processes to illustrate our point.

First of all, let us consider the verbal domain, where we find both diminishing reduplication and increasing reduplication. A first crucial difference between the two patterns, namely ABAB and AABB verbs, concerns the distribution of aspectual markers. With AABB reduplicated verbs, if an aspectual marker is present, it follows the whole reduplicated verb (33a), as in the case of resultatives and other kinds of compound verbs (cf. fn. 4). In diminishing reduplication, as we have seen, the aspectual marker 了 *le* is unexpectedly placed between the base and the reduplicant (33b):

(33)   a. 連老郭都進進出出了好幾次。
       lián lǎo-Guō dōu jìn~jìn-chū~chū-le   hǎojǐ cì
       even old-Guo all   enter~enter-exit~exit-PFV many time

       'Even old Guo entered and exited from there many times.'[29]

       b. 她試了試那件衣服。
       tā   shì-le   shì nà jiàn yīfu
       3SG.F try-PFV try that CLF dress

       'She tried on that dress.'

A second piece of evidence comes from 'rhotacization' or *erhua* (兒化 *érhuà*), a morpho-phonological phenomenon that is very common in the speech varieties of Northern China, consisting in the addition of a retroflex approximant (兒 *-r*) at the end of a word. More precisely, phonologically, this suffix incorporates into the final syllable of a host stem replacing an existing coda, as e.g. 公園 *gōngyuán* → 公園兒 *gōngyuár* 'park', 鳥 *niǎo* → 鳥兒 *niǎor* 'bird'. The suffix 兒 *-r* can appear in reduplicated adjectives, and in the AABB pattern it occurs after the whole reduplicated adjective:

(34)   高高興興兒
       gāo~gāo-xìng~xìng-r
       'really happy'

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[29]http://www.cctv.com/program/zoujinkexue/topic/science/C15580/20060413/100489.shtml [2016-11-24].

Lee-Kim (2016) observes that, even if to a lesser extent, this suffix can be also found in the reduplication of modifier-head adjectives (see 3.1). However, in this case the suffix attaches after each AB, i.e. AB-*r* AB-*r*:

(35) 雪白兒雪白兒
      xuě-bái-r~xuě-bái-r
      '(very) snow-white'

According to Lee-Kim (2016), this difference between the AABB pattern and the ABAB pattern, as far as the suffix 兒 –*r* is concerned, suggests that these two types of reduplication have a distinct internal structure. Assuming that 兒 –*r* adjoins to a phrasal node that introduces categorial information (*n, v, a* in DM), since it consistently occurs at the end of a full-fledged category, Lee-Kim argues that the contrast between (34) and (35) indicates that each AB forms an adjective phrase in the adjectival ABAB pattern of reduplication, while AABB as a whole forms a single adjectival phrase. She further argues that modifier-head compounds would undergo *erhua* before reduplication ([AB-*r*]-RED), while coordinate compounds reduplicate before 兒 –*r* adjoins ([AB-RED]-*r*). Since in the ABAB pattern 兒 –*r* adjoins *before* reduplication, the double occurrence of this suffix (AB-*r* AB-*r*) elegantly follows: reduplication applies to the whole suffixed compound AB-*r*, copying it as a whole. According to Lee-Kim, this also suggests that reduplication of modifier-head compounds is phrasal, while reduplication of coordinate compounds targets units smaller than a phrase. A corollary of this analysis might be that reduplication applies both to units below and above X°, but under this view it would be difficult to explain that there are no constraints on the gradability of the base, in the case of ABAB adjectival reduplication.

An alternative and more feasible hypothesis is that the ABAB pattern instantiates another kind of phenomenon, which is well attested across languages (even those ones that lack productive reduplication), *viz. contrastive focus* reduplication/repetition. Different from 'morphological' reduplication, contrastive repetition phenomena involve the copying of full fledge words and sometimes phrases, as in the following examples from Ghomeshi et al. (2004: 308), and typically have no phonological/tone reanalysis or other types of morpho-phonological readjustment phenomena that characterize reduplication in a cross-linguistic perspective:

(36) a. I'll make the tuna salad, and you make the SALAD–salad.
      b. My car isn't MINE–mine; it's my parents'.
      c. Oh, we're not LIVING-TOGETHER–living-together.

The semantic effect of this construction is, according to Ghomeshi et al., "to focus the denotation of the reduplicated element on a more sharply delimited, more specialized, range" (p. 308). For example, in (36a) *SALAD-salad* denotes green salads as opposed to salads in general.

Although the interpretive difference between increasing reduplication and contrastive repetition is difficult to get from our Mandarin-speaking informants, we suggest that

reduplicated adjectives such as 雪白雪白 *xuě-bái~xuě-bái* 'snow-white~snow-white' might have a similar semantic effect, which is to express a prototypical, standard property denotation in the adjectival domain. As such, ABAB would be a different phenomenon applying at the phrasal level and crucially lacking the morphological constraints found with increasing reduplication. In contrast, the AABB pattern operates below the X° level and affects the gradable property of the base, i.e. it turns a gradable base into a no longer gradable one (see section 3.1).

A further element which seems to support the status of the AABB reduplicated forms as syntactically atomic units[30] is that they are often formed by at least one bound root (either A or B, or both of them) which cannot stand as a syntactic word by itself (see section 3.4, ex. (31) and fn. 26 and 27). For instance, in the example (37) the AB base is formed by two bound roots (cf. the free forms 兒子 *érzi* 'son' and 孫子 *sūnzi* 'grandson'):

(37)   子孫   →   子子孫孫
       zǐ-sūn   *zǐ~zǐ-sūn~sūn*
       son-grandson   son~son-grandson~grandson
       'children and   'heirs'/'generation after generation
        grandchildren'/   of descendants'
       'descendants'

This further corroborates the hypothesis that this process applies to roots, thus to acategorial elements; bound roots, indeed, have 'nouny', 'verby', 'adjective-like', etc. features, but, since they are not able to occupy a syntactic slot by themselves, they do not have a syntactic category proper.

4 Analysis

Given the properties illustrated thus far, in this section we will propose that AABB reduplication is a phenomenon applying at the root level, as we briefly mentioned in section 3.5. In particular, in the previous sections we have shown that the AABB pattern applies across categories and even to non-attested AB units, can be 'category changing' (e.g. a coordination of two noun-like roots may result in an adjective), can be formed by bound roots, and displays syntactic atomicity/lexical integrity.

We thus propose, along the line of Wiltschko (2008) and Zhang (2015), that AABB reduplication constitutes a modification/adjunction process which targets category-less roots.

4.1 Reduplication of (compound) roots

Over the last two decades, frameworks of word formation, especially Distributed Morphology or Borer's exoskeletal framework (2003), have taken very seriously the hypoth-

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[30]Whether they are category-less roots/stems or standard lexemes endowed with category features will be discussed throughout section 4.
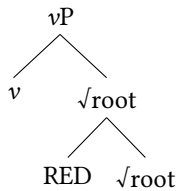
esis that roots, as the invariant core of full-fledged words (stripped away of all morphological formatives) are category-less elements, and that they must be combined in the syntax with category assigning heads (see among others Marantz 2001, Embick & Noyer 2007, Embick & Marantz 2008). Under this view, lexemes/words never are atomic entities, but are the spell-out forms of roots selected by a functional head, i.e. *a, n, v,* determining the corresponding phrasal domain, so that: N = [*n* + √], V = [*v* + √], A = [*a* + √].

Adopting this approach to word formation and its compositional analysis of lexemes, a possibility allowed by the system is that morphological phenomena traditionally described as 'derivational' do not actually target lexemes proper but category-less items, i.e. category-less roots. Increasing reduplication in Mandarin would then fall within the realm of those phenomena that apply at a very 'low' level in the morphosyntactic derivation, namely before categorization takes place. Leaving aside for the moment the complicating factor that the base of increasing reduplication is not a single root but a compound form made up of two roots (see section 4.4 for further discussion on this), under this analysis, it naturally follows that the whole reduplicated AABB form can be assigned to different lexical categories, in accordance with the ontological (/sortal) specification of the root, i.e. whether it denotes objects, events, or (gradable) qualities/attributes.

(38) a.

```
        nP
       /  \
      n   √root
          /  \
       RED   √root
```

b.

```
        vP
       /  \
      v   √root
          /  \
       RED   √root
```

c.

```
        aP
       /  \
      a   √root
          /  \
       RED   √root
```
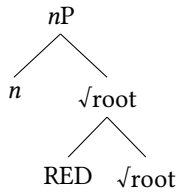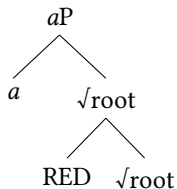
In (38) we limited our representation to nouns, verbs and adjectives, but the analysis can be in principle extended to other categories too, like adverbs. The assumption that roots are atomic, non-decomposable elements virtually independent of the traditional lexical categories (i.e. roots are not associated with categorial information, as e.g.

nouns, verbs, adjectives; see Marantz 1997) allows for a unified analysis of AABB reduplication across categories. Under this approach, reduplication involves acategorial items, and categorization is determined afterwards, in accordance with the type of category-determining heads, i.e. *n*, *v*, *a*, and under the assumption that "whatever category can select for roots can also select for pluralized roots, because pluralized roots are still roots" (see Wiltschko 2008: 60).

While we argue, along the line of Wiltschko (2008) and Zhang (2015), that a single structural analysis is capable to explain for all the category patterns of increasing reduplication, the interpretive outcomes of reduplication are still in need of a satisfactory analysis in the literature.

As can be observed in other languages too, reduplication of nouns and verbs results is a (lexical) means of pluralization. The existence of lexical plurals, in particular, in the nominal domain is well attested across languages, with Italian, for instance, having a class of (feminine) nouns that are lexically specified as being plural (e.g. *braccia* 'arms', see Acquaviva 2008). As for the Chinese cases under consideration, according to Zhang (2015), AABB reduplication expresses overall a 'greater plural' meaning, which can apply both to individual-denoting and to action-denoting elements. In particular, this plural marker, according to Zhang, is integrated in the word-formation domain, where instead of categorial features, semantic features (see Cinque 1990, Lieber 2004, Lieber 2006) and probably phonological features, take part in the selection.

Zhang's analysis relies much on Wiltschko's (2008) analysis of pluralization in Halkomelem Salish. Wiltschko proposes, based on different distributional properties, that in a language like English, with obligatory plural marking, and in a language like Halkomelem, with optional plural marking, plural markers differ in their 'way' and place of merging. While in English, as it is generally assumed, the plural marker spells out the plural value of a functional head selective for a phrasal node such as little *n*, in Halkomelem plural marking functions as a modifier of the category-less root:

(39) a. English

```
              D
            /   \
          D      #:PL
                /    \
            #:PL      n
                     / \
                    n   √root
```

b.   Halkomelem

```
              D
            ╱   ╲
          D       n
                ╱   ╲
              n      √root
                   ╱     ╲
          PLURALIZER    √root
```
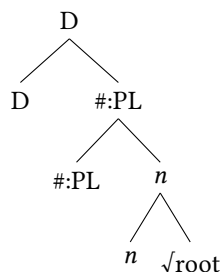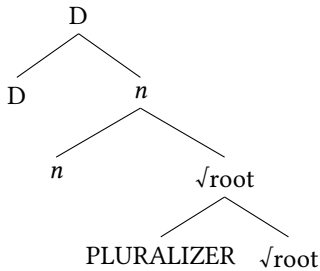
According to Wiltschko (2008: 688), modifying plural markers (39b) have the syntax of adjuncts, rather than of selecting heads, because of a set of properties setting them aside from functional plurals: they are not obligatory; they do not trigger agreement; their absence is not associated with a specific meaning, but instead is truly unmarked; they cannot be selected for; they do not allow for form-meaning mismatches.

We argue that the root-adjoined analysis in (39b) can be the correct analysis for the Mandarin AABB reduplication under examination, where the 'pluralizer' is expressed by means of the reduplicative pattern itself, i.e. by means of independent phonological copying of both base units.[31] This explains for several peculiar features of AABB reduplication, such as its non-obligatoriness and cross-categoriality, as well as its compatibility with the plural marker 們 –*men*, possibly used to emphasize plurality (see fn. 22), and with nominal classifiers. In particular, as we have noticed in section 3.3 (30b), reduplication and pluralization are not incompatible:

(40)   子子孫孫們 (extracted from ex. (30b))
       zǐ~zǐ-sūn~sūn-men
       son~son-grandson~grandson-PL
       'heirs/generation after generation of descendants'

Furthermore, the plural meaning of increasing reduplication is not merely 'plural': since it applies to a coordination of entities/individuals which are *per se* inherently plural (AB means the sum of the entities/individuals denoted by A and those denoted by B, see section 3.4), its meaning is that of 'excessive/greater plural'.

Another striking feature shared by Halkomelem Salish and Mandarin lies in the fact that their 'lexical' plural marking is not restricted to nouns, different from inflectional plural marking which is typically bound to nominal lexemes (not counting agreement plural marking, which can occur wherever it is required). This leads us to discuss the other lexical categories of the outputs of these reduplicative processes.

As for the verbal domain, pluractional meaning of reduplicated verbs is certainly not exceptional in a cross-linguistic perspective. A great deal of reduplicative processes

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[31]The intriguing issue of the peculiar phonological exponence of disyllabic increasing reduplication is left for future investigation, but we refer to Feng (2003) for an interesting analysis within Optimality Theory framework. See section 4.4. for further remarks on this.

across languages show a pattern close to Mandarin, where (increasing) reduplication in the verbal domain implies repetition/iteration of the event expressed by the base, hence operating over the verb aspectual structure. This means that increasing reduplication has an inherent quantificational meaning, resulting in a plurality of individuals or in a pluractionality of events, in compliance with the (vague) root meaning, ultimately determined by the type of selecting head, *n* vs. *v*, taking the reduplication as its complement (see (38)). Another property in common with nouns and, to the best of our knowledge, specific of Mandarin Chinese, is the need for a base composed of coordinated roots (especially in the case of verbs), standing in a symmetrical relation. We will come back to this intriguing issue in section 4.3.

4.2 Zooming in on adjectives

Whereas the plural analysis seems to nicely fit the nominal and verbal domains of AABB reduplication, it remains to be understood what the interpretive analysis of adjective reduplication is. Interestingly, Wiltschko (2008) observes that in Halkomelem Salish the pluralizer (be it an affix, ablaut or a reduplicated form) occurs productively not only with nouns (41a, 41b), but with verbs (41c) and adjectives (41d) too (Wiltschko 2008: 641, 679-680), conveying a meaning close to the one we find in Mandarin AABB reduplication:[32]

(41) a. *méle*   *mámele*
         child   child.PL
         'child'   'children'

      b. *q'ámi*   *q'álemi*
         girl   girl.PL
         'girl'   'girls'

      c. *qw'óqw-et*   *qw'óleqw-et*
         whip-TRANS   whip.PL-TRANS
         'whip something/someone' 'whip something/someone several times'

      d. *kw'ós*   *kw'ó-kw'es*
         hot   hot.PL
         'hot'   'real hot/very hot'

Wiltschko (2008) argues that, no matter whether it occurs in the context of nouns, verbs or adjectives, the plural marker is exactly the same. She further observes that, if the plural marker is exactly the same, we expect it having exactly the same meaning in each of these contexts. However, to determine what a root pluralizer denotes, we need to know what a root denotes, i.e. what its sortal type is. Wiltschko thus speculates that roots do not have a specific denotation (vs. nouns, which denote individualities, verbs, which denote eventualities, or adjectives, which denote attributes/qualities); they are able to

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[32]The reader should note that the unmarked form, here glossed as a singular form, is in fact compatible with both singular and plural interpretation; as we have mentioned, the plural marker is not obligatory in Halkomelem.

name "Events, Things, States and Qualities (see Harley 2005), and the pluralizer appears to simply assert that there are a lot of Events, Things, States, Qualities, depending on the nature of the √root" (p. 686).

While this intuitive explanation in principle could work for nouns and verbs, it is nonetheless far less accurate for depicting the increased semantics of reduplicated adjectives. Looking at the semantic effects that reduplication has on Mandarin adjectives, it does not seem the case that it denotes 'lots of Qualities'. Rather, it seems that AABB adjectives express 'increased intensity', thus affecting the gradable property of the base, and this seems to be true also for many other languages that exhibit reduplication with increasing semantics (with Halkomelem *pluralized* adjectives not counting as an exception in this domain, see (41d)).[33] Since reduplication affects gradability, providing a greater/increased degree value expressed by the base root, we might ask what the interpretive relation is between increasing reduplication in the adjectival domain, on the one hand, and increasing reduplication in the verbal and nominal domain on the other, where reduplication is a means of quantification over entities/individuals and events.

4.3 Wellwood's (2014, 2015) analysis of measurement functions across categories

The analysis of adjectives, especially the fact that only gradable adjectives can be reduplicated, sheds light on the core issue of gradability/scalarity in increasing reduplication. However, as we mentioned in the previous section, the relation between increasing reduplication in the adjectival domain and increasing reduplication in the verbal and nominal domain still remains to be explained. In this section, based on the existing literature, we show that concepts of gradability and measurement, rather than being limited to the adjectival domain, may be applied uniformly across categories. This will help to support our hypothesis on the function of Mandarin increasing reduplication, namely that it expresses a unique function, i.e. 'increased measure', as will be discussed in the next section.

While according to some authors gradability is a distinctive property of adjectives (see e.g. Jackendoff 1977), a great deal of research over the last decades found evidence of gradable properties across lexical categories (see e.g. Bolinger 1972, Bresnan 1973, Doetjes 1997, Neeleman et al. 2004, Caudal & Nicolas 2005, Bochnak 2010). As observed by Nicolas (2010), gradable expressions are found among: plural count nouns (*more dogs*), but not singular count nouns (**more dog,* *less cup); mass nouns, concrete (*more water, less wine*) or abstract (*more sadness, less playfulness*); adjectives (*smaller, less sad*); verbs (*to work more/less*).

Wellwood (2015) puts forward a unified account of comparison across categories, challenging those theories that consider gradable adjectives as elements specifying measure functions (see above) vs. nouns and verbs, which allegedly do not express such measure functions. According to this scholar, "which dimensions are possible across domains is a

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[33]According to Xu (2012a), reduplication is iconically motivated, and 'positive degree' constitutes its core meaning.

consequence of what is measured, rather than which expressions measure" (p. 69). Wellwood (2015: 69) also observes that a noun like *coffee* introduces individuals that can be measured, while a verb like *run* introduces events and an adjective like *tall* introduces states; in any case, they all can be measured along certain types of dimensions, specifically those which respect 'part-whole' relation (e.g. volume and weight for *soup*, but not temperature; time and distance for *run*, but not speed[34]). She posits a variable in nominal and verbal domains "that ranges over measure functions, restricted to just those that are homomorphic to the measured domain" (p. 68). Wellwood (2014, 2015) argues that comparative sentences in the adjectival, nominal and verbal domain all contain instances of a single (phonologically overt or covert) morpheme that compositionally introduces degrees; "this morpheme, sometimes pronounced *much*, contributes a structure-preserving map from entities, events, or states, to their measures along some dimension." (Wellwood 2015: 67).

This approach characterizes the notion of "measurement" uniformly in terms of structure-preservation across comparative constructions and unifies the contrasts existing (within each category) between gradable and non-gradable adjectives, between mass and count nouns, and between atelic and telic verb phrases.[35] Wellwood observes that mass nouns tend to show cumulative reference: "if *coffee* applies to two portions of matter, then it also applies to the mereological sum of those portions" (p. 71). In contrast, count nouns, when interpreted singularly, tend to show non-cumulative reference: "if a *cup* applies to a given object, it fails to apply to any of its (relevant) proper parts" (p. 71). Therefore, the semantics of mass nouns is modelled in terms of a domain structured by the part-of relation, while that of a noun like *cup* lacks such structure. Similarly, atelic predicates (like mass nouns) tend to show cumulative reference, while telic predicates tend to show quantized, non-cumulative reference. If *run in the park* applies to two stretches of activity, it also applies to their sum; thus atelic events have domains structured by the part-of relation on events. In contrast, if *run to the park* applies to an event, it fails to apply to any of its relevant subparts; thus telic events lack the part-of relation (Wellwood 2015: 73).

As for adjectives, Wellwood proposes that non-gradable adjectives, which express quantities that either exist or not (a table is either square or not, it cannot be more or less square) are formally parallel to (singular) count nouns and telic predicates, while gradable adjectives, which express quantities that there may be more or less of (a thing can be more or less hot), are parallel to mass nouns and atelic predicates. They both express predicates of states, the difference being that gradable adjectives, unlike non-gradable ones, predicate of ordered states: they associate directly with sets of ordered degrees, or scales. Besides, Wellwood assumes that the measure functions introduced with gradable adjectives are not only homomorphic to the ordering relations on the measured domain, but to non-trivial part-whole relations.

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[34]For example, she observes that larger portions of soup have greater measures by volume or weight than smaller portions, but generally this is not the case with measures by temperature.

[35]Gradability presupposes the existence of a scale, and can be seen as related to ±boundedness (see Paradis 2001, Alexiadou 2010).

Therefore, instead of adopting a notion of 'measurement' based on a variety of measure functions acting on the same objects in unpredictable ways, Wellwood proposes that language encodes measurement of different sorts of things in limited ways. Accordingly, she elaborates a uniform account of measurement as a monotonic mapping from ordered sets of entities, events, or states to degrees.

4.4 Reduplication as increased measure

Let us now try to combine the structural analysis of increasing reduplication proposed in section 4.2 with the cross-categorial (strictly compositional) analysis of measurement functions proposed by Wellwood (2014, 2015). Keeping with Wellwood's proposal that there are no differences in the type of measurement functions among the lexical categories at a higher level of syntactic/semantic composition, we speculate that reduplication conveys a similarly stable/unique function but it targets elements lacking any specification in terms of formal features.[36] In particular, we wish to argue that reduplication expresses a unique function, i.e. 'increased measure', that constantly applies to roots, only differing in their ontological denotation. Therefore, increasing reduplication is a very low-level ('morphological') adjunction operation which conveys the function 'increased measure' to the roots it applies to: the semantic effects obtained (pluralization, pluractionality, intensification of the base gradable property) ultimately depend on the different sort of things reduplication modifies, and arguably emerge constructionally, that is, after root categorization applies. It should be noticed that, semantically, similar results might be obtained at higher level of syntactic composition via different means, depending on the categorial domain of application, i.e. through fully-fledged degree phrases in the adjectival domain (see En. 'very Adj', e.g. *very good*; Ch. '很 *hěn* Adj', e.g. 很高興 *hěn gāoxìng* 'very happy'), and through the use of plural affixes and aspectual markers in the nominal and verbal domain respectively.

This analysis, however, does not account for some relevant asymmetries across lexical categories previously noted in the literature (see Zhang 2015). As it has been argued in section 3, the main difference at the structural level between adjectives, on the one hand, and nouns and verbs, on the other, concerns the obligatoriness of disyllabic bases for the latter. That is, whereas increasing reduplication applies to quality-denoting roots that may be either mono- or disyllabic, resulting in AA and AABB patterns interpretively equivalent, with entity and event denoting roots it targets disyllabic units, resulting exclusively in the AABB pattern.[37]

As we have seen in 3.3, the AABB reduplication pattern requires a coordinate base, i.e. two elements related in a symmetrical fashion, either in a logical coordination, or synonyms or antonyms; thus, instead of having a single root we have a combination

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[36]It is worth reminding that roots have a strongly underspecified semantics which allows them to be compatible with the semantics of adjectives (as properties of attributes), verbs (as properties of events), nouns (as properties of individuals).

[37]The generalization holds under the assumption that AA monosyllabic reduplication in the nominal domain should be rather understood as reduplication of classifiers (see section 3.3). We do not have an analysis of this type of reduplication yet, and we leave the issue for future research.

of roots. These roots are joined together to form a set, whereby the two constituents equally contribute to the semantics of the whole complex stem, i.e. they are in a symmetrical relation. Structurally, it is worth emphasizing that these operations all apply at the root level, resulting in a recursive application of 'morphological' phenomena, with (symmetrical) compounding and reduplication rigidly ordered in the derivation, yet both applying before categorization (see Zhang 2015):

(42)
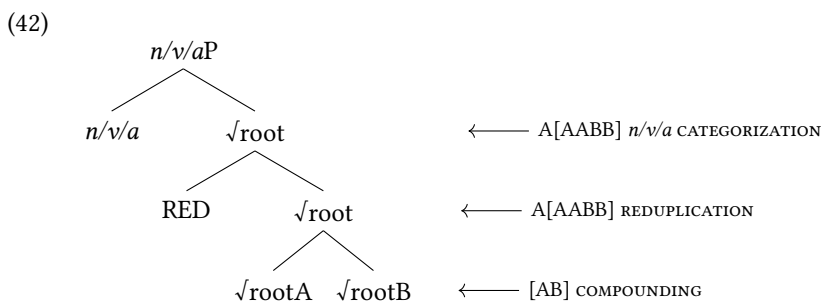
This analysis seems to produce the surface pattern ABAB, since reduplication applies to a compound base AB. However, prosodic patterns within AABB structures actually seem to support the structural analysis in (42). In particular, Feng (2003) examines tone *sandhi* rules within disyllabic reduplication and, for AABB, he argues that these rules apply first between the second A and first B and then between the first B and second B. On this basis, Feng argues that AB is the actual morphological unit, whereas AA and BB are not, resulting in the structural analysis [A[AB]B] (Feng 2003: 7-8). The issue deserves further investigation especially aimed at explaining the reason for the mismatch between underlying structure, supra-segmental patterns and surface order of morphemes, for which at the moment we cannot offer an explanation. Suffice it to say that the prosodic pattern of AABB provides evidence in favour of the analysis in (42).

At the interpretive level, we put forward that the combination of two roots which act as the base for the AABB reduplication process forms itself a sort of 'plural/collective' expression and reduplication provides an *increased measure* for this kind of expressions. It has been noted that AABB nouns express greater plural (possibly differing in the semantics from AA reduplication of nouns/classifiers, most typically expressing a distributive meaning), and a similar effect is obtained with AABB verbs (ex. in (43a) and (43b) are adapted from examples (22, 24) in Zhang 2015):

(43)   a.   枝枝葉葉
           zhī~zhī-yè~yè
           twig~twig-leaf~leaf
           'twigs and leaves'

       b.   縫縫補補
           féng~féng-bǔ~bǔ
           sew~sew-repair~repair
           'sew and repair repeatedly'

A possible explanation for this structural requirement might lie in the different onto-logical type of roots: in particular, individual and event denoting roots, different from quality denoting roots, seem to require an inherently plural interpretation in order to be measured. As a matter of fact, typically comparative expressions with *more* in English require either mass nouns or plural nouns, but exclude singular nouns (*more dogs* vs. *more dog). Similar effects obtain in the domain of verbs with the contrasts between telic and atelic verbs discussed by Wellwood (2015).

Although at this point the present analysis becomes very speculative, we put forward here that a principled reason for the necessary disyllabicity of nominal and verbal bases might have the same source of the asymmetry observed in the domain of comparative expressions. Specifically, if the semantics of roots is very vague and compatible with any interpretation which eventually emerges at higher levels of syntactic composition, a way to introduce gradability at the level of roots is to merge them directly, so to create a col-lection of individuals, like e.g. 男女 *nán-nǚ* 'man and woman' (which is reduplicated as 男男女女 *nán~nán-nǚ~nǚ* 'men and women'), or of events, e.g. 起伏 *qǐ-fú* 'rise and fall' (which is reduplicated as 起起伏伏 *qǐ~qǐ-fú~fú* 'rise and fall repeatedly'). In this view, the first merger provides reduplication with the 'gradable base' over which it can apply its increased measure function. On the contrary, roots that are selected by an adjectival head (i.e. *a*) would inherently express a gradable property and, accordingly, reduplica-tion would not pose specific disyllabic requirements on these base units. Furthermore, if this is the case, we expect no difference in meaning between the reduplication of AA and AABB adjectival forms, as confirmed by the data (see examples (6a) and (6b) in section 2.1, repeated below for the reader's convenience):

(44) a. 小 (A)   →   小小 (AA)
          xiǎo   *xiǎo~xiāo*
          small   small~small
          'small'   'very/really small'

      b. 高興 (AB)   →   高高興興 (AABB)
          gāoxìng   *gāo~gāo-xìng~xìng*
          'happy'   'very/really happy'

5 Conclusion

Reduplication is a challenging phenomenon in many respects: it is hardly amenable to a uniform characterization in a cross-linguistic perspective, given the extreme variety of forms and functions it is associated with; further, it can surface with different forms and meanings within a single language too, as we have shown with the reduplicative processes of Mandarin under consideration; it can manifest semantic functions closely related to the inflectional/functional domain, but it approaches more closely the domain of derivation/word formation; finally, it can take as its base units elements of different size, ranging from lexeme/word-like units in one domain (diminishing reduplication,

which implies *verbal* reduplication in Mandarin) to category-less units in the other (increasing reduplication).

The case of diminishing reduplication seems to involve units as 'big' as lexemes, i.e. stems endowed with category features and with specific (aspectual) semantics, as we have shown in section 2.1. The case of increasing reduplication, however, points to the existence of word formation phenomena that applies below the lexeme level. In particular, increasing reduplication seems to suggest that it is a phenomenon that can apply at a very 'low level', namely, that it can merge with roots/stems lacking category specification. Further, it is *per se* unable to express a definite category, given its presence across all major lexical categories at both input and output levels. Therefore, the present case study sheds some light on the existence of word formation that does not take lexemic inputs and does not give lexemic outputs either.

On the one hand, this study brings further evidence in favor of a neo-constructionist/ DM-like view of the lexemes or word units as syntactically complex elements, and ultimately for the very existence of category-less roots. On the other hand, the curious asymmetries observed in the domain of increasing AA and AABB reduplication, whereby adjectives seem to part company from verbs and nouns, call into question the semantic (ontological?) character of roots and their alleged requirements for insertion in the syntactic structure responsible for category assignment and, overall, for their morphosyntactic properties and distribution. This is a very complex issue on which we hope to have contributed some further empirical and theoretical basis but that, it goes without saying, needs further research and ampler empirical coverage to be satisfactorily addressed.

To conclude, our research has explored the structural and interpretive effects of reduplication, so productive in Mandarin (see Basciano & Melloni 2017) and broadly attested across Sinitic (see Arcodia et al. 2015) yet still lacking a satisfying analysis, despite of a growing interest in the last years. So doing, we hope to have paved the way for a better understanding of Mandarin reduplication specifically, and more in general for an approach to word formation which seeks to reinterpret morphology-specific properties and restrictions within a more integrated model of grammar, where syntax is also responsible for word formation.

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takes responsibility for Sections 1, 3, 3.1, 3.2, 3.5, 4.3, 4.4, 5, and Bianca Basciano takes responsibility for Sections 2, 3.3, 3.4, 4, 4.1, 4.2.

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