

Two types of classifier reduplications in Mandarin*

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Zheng, Yanyang and Kyumin Kim. 2022. Two types of classifier reduplications in Mandarin. *Linguistic Research* 39(1): 185-211. Reduplication is a word formation process, which has been widely attested across languages. Mandarin is a language that shows extensive range of reduplication across different categories such as a classifier. However, despite its widespread use of classifier reduplication, the syntax of reduplicated classifiers has not been well understood in the current literature. This paper addresses the syntax of reduplicated classifiers by focusing on the two issues: (i) the category of a reduplicated classifier, and (ii) the syntactic derivation of classifier reduplication. As for issue (i), we propose that classifier reduplication creates two different syntactic categories, namely D(eterminer) and A(djective), building on novel empirical evidence not provided in the previous studies. Regarding issue (ii), building on head movement analysis of Travis (2003) on reduplication, we propose that a CL head undergoes head movement which results in the proposed categorial status of reduplication, i.e., D and A. This paper not only contributes to the understanding of syntax of classifier reduplication in Mandarin, but also provides support for the current view that reduplication can be motivated by syntax (Basciano and Melloni 2017; Kimper 2008; Travis 2003). (Nanyang Institute of Technology · Chungbuk National University)

Keywords classifier reduplication, classifier, head movement, plural, determiner, adjective

1. Introduction

Reduplication is well-observed cross-linguistically; for example, Hungarian (Brdar and Brdar-szabó 2014), Vata (Travis 2003), and Arabic (Maas 2005) among others. Mandarin is another example which shows extensive reduplication phenomenon across different word classes such as a noun, an adjective, or a verb including a classifier (Huang et al. 2009; Paul 2015; Zhu 1982). This paper examines the distribution of classifier

* We would like to thank the 6 native speakers of Mandarin for their help on the data, and we also thank two anonymous reviewers of *Linguistic Research* for their constructive feedback. All errors are of our own.

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reduplication in Mandarin with the goal of accounting for the syntax of classifier reduplication in the language, which is scarce in the current literature.

In Mandarin, a classifier is obligatory in counting the number of an entity represented by a noun, and it has to appear with a numeral which indicates a numerical value of the noun counted. This is exemplified in the example in (1). The classifier *ge* in (1) has to appear in order to count the number of the noun *haizi* ‘kid’. The position of a classifier is fixed; for instance, in (1), the classifier *ge* has to appear between the numeral *san* ‘three’ and the noun *haizi* ‘kid’.^{1,2}

- (1) *san ge haizi*
 three CL kid
 ‘three kids’

Although a classifier in Mandarin has a role of counting as illustrated in (1), a reduplicated classifier in the language shows different roles from that of a classifier. For example, consider the examples in (2). In (2a), the classifier *ge* is reduplicated as *ge-ge* which appears with the nominal *xuesheng* ‘student’. The reduplicated classifier is interpreted as plural ‘many’. In (2b), the reduplicated classifier *duo-duo* appears with the nominal *lianhua* ‘lotus’; it also indicates plural meaning ‘many’.³ As shown in these examples, a reduplicated classifier has a different meaning from a classifier, namely ‘plural’. As for (2a), unlike (2b), it has a definite meaning as the literal meaning indicates. This difference between (2a) and (2b) will be discussed in more detail in the following sections.

- (2) a. *ge-ge xuesheng*
 CL-CL student
 Literally: ‘the many students’

1 Mandarin data without citation is from consultation with 6 native speakers.

2 The following abbreviations are used in glosses: ASP = aspect; CL = classifier; D = determiner; DE = nominal modification marker *de* ‘的’; DOU = distributivity marker; DUR = durative aspect; MEN = plural suffix; Num = number; SFP = sentence final particle.

3 The type of reduplication shown in (2) is one of several types of classifier reduplication available in Mandarin. There are other forms of reduplicated classifiers identified in Mandarin literature: *yi*-CL-CL, *yi*-CL-*yi*-CL, and *yi*-CL-*you*-*yi*-CL. In this list, the literal meaning of *yi* is ‘one’ and the literal meaning of *you* is ‘again’. This paper discusses the reduplication type illustrated in (2) only.

- b. duo-duo lianhua
 CL-CL lotus
 ‘many lotuses’

Most of the previous studies on reduplicated classifiers in Mandarin literature have focused on the semantics of number that a reduplicated classifier indicates (Chao 2011; Cheng 2009; Guo J. 1999; Lam 2014; Lee 2020; Li 1998; Yang H. 2005; Zhang 2013).⁴ On the other hand, there are only a few studies on the syntax of reduplicated classifiers in the current literature (Sui and Hu 2017; Yang H. 2005; Zhang 2013). These studies mainly focused on identifying a categorial status of the reduplicated classifiers different from that of a classifier; for instance, a reduplicated classifier is proposed to be a D(eterminer) or Num(ber). Although these studies have initiated the investigation of the syntax of classifier reduplication, what they have not accounted for is how the reduplication of a classifier can be understood in syntax which results in the categorial change of a classifier after reduplication. This is an important issue that needs to be addressed under any syntactic approach to classifier reduplication, as reduplication is a process that often creates a new word of a different category from the category of the base word, e.g., CL. Furthermore, a newly formed category of a reduplicated classifier would interact with the syntactic structure that it appears. Thus, it is significant to establish the syntax of reduplicated classifiers.

This paper aims to address the syntax of reduplicated classifiers. In particular, this paper focuses on two issues. One is the categorial status of reduplicated classifiers, and we propose that classifier reduplication creates two different syntactic categories: a determiner (D) and an adjective (A). The other issue to be addressed is the syntactic derivation of reduplication of a classifier that can account for the proposed categorial status of reduplicated classifiers. We propose that both categories of reduplicated classifiers are the consequences of head movement building on the study on reduplication

4 There seems to be no study on the formal semantics on reduplicated classifiers in Mandarin, although there is one such study in Cantonese, namely Lee (2020). The distribution and properties of reduplicated classifiers in Mandarin and Cantonese are not the same, and thus it is not clear whether the formal semantic types proposed for Cantonese in Lee (2020) can apply to Mandarin without an issue. Under the current proposal in which reduplicated classifiers in Mandarin such as in (2) belong to the category of a determiner or a modifier such as an adjective, we speculate that they would have those of formal semantic types of a determiner or an adjective in the language. However, addressing this issue is well beyond the scope of this paper, and we do not further question it.

in Travis (2001, 2003).

This paper is organized as follows. Section 2 discusses two major previous studies on classifier reduplication in Mandarin literature. Section 3 demonstrates that classifier reduplication results in the two different syntactic categories, i.e., D and A, by providing novel pieces of evidence. Section 4, building on the consequences of section 3, provides an account for the manner that classifier reduplication takes place in the syntax by resulting in the proposed two different categories. Section 5 concludes the paper.

2. Previous approaches to classifier reduplication

Among a few syntactic approaches to classifier reduplication in the literature, this section briefly discusses two major views on the categorial status of reduplicated classifiers: a determiner (D) and a quantifier (Num(ber)).

2.1 Reduplicated classifier as D

It has been observed that a reduplicated classifier indicates definiteness and thus occupies the D position in the nominal structure on a par with the determiner *every* in English (An and Zhao 2017; Cheng 2009; Sui and Hu 2017; Yang H. 2005). For instance, as shown in (3), the classifier *ge* is reduplicated as *ge-ge* which precedes the noun *xuesheng* ‘student’. Together with the noun, in (3), the reduplicated classifier appears in the topic position.

- (3) Ge-ge xuesheng, wo dou piping le.
 CL-CL student I DOU criticize SFP
 ‘Every student, I have criticized (her/him).’

(Sui and Hu 2017: 35)

The data as in (3) has been taken to suggest that the reduplicated classifier is definite similar to English *every*, as an indefinite expression is prohibited occurring in the topic position in Mandarin (Huang et al. 2009; Li and Thompson 1981).⁵ Building on this type

⁵ In (3), *dou* ‘all’ is known as a distributivity marker (Feng 2014; Lee 1986; Lin 1998; Schwarzschild 1996; Tomioka and Tsai 2005) which we assume in this paper without further argument.

of data, the aforementioned studies suggested that a reduplicated classifier such as in (3) realizes the D head with a definite feature (An and Zhao 2017; Sui and Hu 2017; Yang H. 2005).

We agree that a reduplicated classifier such as *ge-ge* is interpreted as definite in line with those previous studies, but would like to stress that it also indicates a plural meaning, just like English *every* (Borer 2005).

2.2 Reduplicated classifier as a quantifier (Num)

Another view on reduplicated classifiers is that a reduplicated classifier is a quantifier (Hsieh 2008; Yang K. 2003; Yang X. 2002). As a quantifier, a reduplicated classifier can denote number - either singular or plural meaning - as shown in (4). The reduplicated classifier *ge-ge* in (4a) indicates a singular meaning ‘every’ and the reduplicated classifier *duo-duo* in (4b) means plural ‘many’ (emphasis is ours).^{6,7}

- (4) a. Ta-men jia you san ge xiaohai, ge-ge dou
 he-MEN family have three CL child CL-CL DOU
 hen jiechu.
 very outstanding
 ‘There are three children in the family; each of them is outstanding.
 (Hsieh 2008: 67)
- b. …yi kuai pinji ji faren hehu de yuandi, neng
 one CL barren and lack take care DE land can
 kai-chu duo-duo jiankang de huarui... (A. S. Corpus)
 grow-out CL-CL health DE flower bud
 ‘...barren and unattended patch of land is able to produce many healthy
 kinds of flowers.’
 (Hsieh 2008: 66)

Semantic property of number such as singular or plural is associated with Num head (Li 1999; Ritter 1991). Assuming this property of Num head, the data such as (4) is suggested to indicate that a reduplicated classifier belongs to the category of Num.

6 In (4a), *ge-ge* is interpreted as ‘each of~’ due to the presence of a distributivity marker *dou* (see footnote 5).

7 A. S. Corpus indicates Academia Sinica Balanced Corpus of Modern Chinese.

In sum, the previous literature proposed that a reduplicated classifier belongs to a category of either D or Num. In most of these studies, no detailed syntactic evidence for the proposed category has been provided. However, as will be shown in the next section, there is a range of novel empirical data of reduplicated classifiers that the previous literature has not taken into consideration (see section 3 for more detail). We proposed that empirical evidence to be discussed suggests that one sole view of either D or Num proposed by the previous studies cannot provide a full-fledged account for the data of reduplicated classifiers in Mandarin.

3. Categorical status of reduplicated classifiers: D and A

In this section, we propose that classifier reduplication creates two different syntactic categories of word: D and A. In particular, we provide novel evidence as summarized in Table 1 that supports for our proposal. It is shown that reduplicated classifiers show contrasting syntactic distributions that correspond to two different syntactic categories, namely D and A. Thus, unlike the previous literature, this paper proposes that the reduplicated classifiers cannot be viewed as belonging to a single category but two different categories.

Table 1. Differences between two different categories of reduplicated classifiers

| Category Syntactic properties | D (e.g., <i>ge-ge</i> , <i>zhi-zhi</i>) | A (e.g., <i>duo-duo</i> , <i>tiao-tiao</i>) |
|---|---|---|
| 1. Can be followed by <i>de</i> ? | × | √ |
| 2. Can co-occur with an adjective? | × | √ |
| 3. Can co-occur with a demonstrative? | × | √ |
| 4. Can appear in an existential clause? | × | √ |
| 5. Can be adverbial or predicate? | × | √ |

Before we start our discussion on the different distributions of reduplicated classifiers, we would like to sort out classifiers that can undergo reduplication which results in a category of D or A. Not all classifiers in Mandarin can undergo reduplication. The previous literature recognized that there are almost 300 monosyllabic classifiers that can be reduplicated in the language (Guo R. 2002; Guo Y. 2013; Zhang Q. Y. 2009). The data provided in this paper is building on the monosyllabic classifiers identified in those studies.⁸

Regarding these 300 monosyllabic classifiers, we found out that they can be further divided into two types, those that can be a category D or A after undergoing reduplication, as shown in (5a) and (5b) respectively.⁹

(5) a. Category D after reduplication

ge, gen ‘root’, *zhi, ben, liang, men* ‘door’, *ke, pian* ‘sheet’ etc.

b. Category A after reduplication

duo ‘bud’, *tiao* ‘strip’, *chuan* ‘bunch’, *bao* ‘bag’, *ping* ‘bottle’, *ceng* ‘layer’, *ci, jian* etc.

In what follows, we discuss each of the syntactic evidence in Table 1 for each type of reduplicated classifiers, i.e., D and A.

3.1 Modification marker *de*¹⁰

In Mandarin, *de* appears between an adjective and a head noun, and it indicates that

8 Guo Y. (2013) has conducted corpus study on 626 classifiers, and checked whether those classifiers can be found in the online corpus of Chinese language developed by Center for Chinese Linguistics PKU (Peking University), i.e., CCL corpus. She found out that among 626 classifiers 322 classifiers can be reduplicated and the reduplicated classifiers discussed in this paper are among those 322 classifiers identified by Guo Y. (2013).

9 In (5), some classifiers have meaning while other classifiers do not have a dedicated meaning. For instance, *zhi* in (5a) or *jian* in (5b) has no dedicated meaning but each counts a different type of an object. *Zhi* counts an animal such as sheep, duck or chicken, while *jian* counts an object such as clothes or luggage. Thus, the presence or the absence of meaning of a classifier does not affect the proposed different categories of reduplicated classifiers in (5).

10 The modification marker *de* can precede both nouns and verbs, but they are written in different characters in Mandarin: ‘的’ for nominal modification marker *de* and ‘地’ for preverbal adverbial modification *de* (see Li and Thompson 1981; Ross and Ma 2014). In this paper, we only discuss the nominal modification marker *de*.

the adjective modifies the head noun, as illustrated in (6) (Cheng and Sybesma 1999; Hsieh 2008; Li and Thompson 1981; Paul 2015; Sproat and Shih 1988; Zhang 2013 for the details on *de*). For instance, in (6), the modification marker *de* occurs between the adjective *keai* ‘lovely’ and the noun *yazi* ‘duck’, which shows that the adjective is the modifier and the noun is the modified element.

- (6) *keai de yazi*
 lovely DE duck
 ‘lovely duck’

Reduplicated classifiers show different behaviors with respect to the modification marker *de*. One set of reduplicated classifiers represented by *ge-ge* cannot be followed by *de*, but the other set of reduplicated classifiers represented by *duo-duo* can. The examples of each type of reduplications are illustrated in (7) and (8). In (7), the morpheme *de* cannot appear between the reduplicated classifier and the nouns. For instance, in (7a), the reduplicated classifier *ge-ge* cannot appear with *de* to modify the noun *xuesheng* ‘student’. In contrast, in (8), the morpheme *de* can appear between the reduplicated classifier and the noun to modify the noun; for instance, the reduplicated classifier such as *duo-duo* in (8a) followed by *de* modifies the noun *baiyun* ‘white-cloud’.

- | | |
|--|--|
| <p>(7) a. *<i>ge-ge de xuesheng</i> CL-CL DE student Intended: ‘the many students’</p> | <p>b. *<i>zhi-zhi de yazi</i> CL-CL DE duck Intended: ‘the many ducks’</p> |
| <p>(8) a. <i>duo-duo de baiyun</i> CL-CL DE white-cloud ‘many white-clouds’</p> | <p>b. <i>tiao-tiao de shangba</i> CL-CL DE scar ‘many scars’</p> |

The contrast shown by (7) and (8) suggests that the reduplicated classifiers cannot be grouped into the same syntactic category. Reduplicated classifiers that pattern with those in (7) cannot be an adjective but those that pattern with reduplicated classifiers in (8) must be an adjective. Thus, the data with respect to *de* modification supports the proposed account in this paper in which reduplicated classifiers can be of two different categories, namely D and A.

3.2 Co-occurrence with adjectives

In Mandarin, more than one modifier can appear to modify a head noun (Cheung 2012; Lu 1988; Zhu 1982, among many others). What has been suggested by the previous studies is that modifiers such as an adjective can co-occur, as illustrated in (9). In (9), the adjective *keai* ‘lovely’ can co-occur with the modifier *xianyan* ‘bright’.

- (9) *xianyan* *de* *keai* *de* *weijin*
 bright DE lovely DE scarf
 ‘bright lovely scarfs’

Under this assumption on modifiers, consider the reduplicated classifiers of the two types as illustrated in (10) and (11). In (10), the reduplicated classifiers, *ge-ge* in (10a) and *zhi-zhi* in (10b), cannot co-occur with other modifiers such as *jiankang* ‘healthy’ or *keai* ‘lovely’. This fact suggests that the reduplicated classifiers such as in (10) cannot be categorized as an adjective. In contrast, the reduplicated classifiers *duo-duo* in (11a) and *tiao-tiao* in (11b) are compatible with the same adjectives, which suggest that the reduplicated classifiers belong to the same type of a category, i.e., an adjective.

- (10) a. **ge-ge* *jiankang* *de* *xuesheng*
 CL-CL healthy DE student
 Intended: ‘the many healthy students’
 b. **zhi-zhi* *keai* *de* *yazi*
 CL-CL lovely DE duck
 Intended: ‘the many lovely ducks’
 (11) a. *duo-duo* *de* *jiankang* *de* *huarui*
 CL-CL DE healthy DE flower-bud
 ‘many healthy buds of flowers’
 b. *tiao-tiao* *de* *keai* *de* *weijin*
 CL-CL DE lovely DE scarf
 ‘many lovely scarfs’

The contrast between (10) and (11) indicates that the reduplicated classifiers cannot

belong to the same category but two different categories, as we have proposed in this paper. In particular, the contrast between (10) and (11) indicates that the reduplicated classifiers in (10) do not belong to a category of an A, but those in (11) do, being consistent with the consequence of the previous section on *de*-modification. The data in this section further support our proposal that reduplicated classifiers should be divided into two different categories.

3.3 Co-occurrence with demonstratives

Building on the previous studies on a demonstrative such as *zhe* ‘this’ or *na* ‘that’ in Mandarin (Li 1999; Wu and Bodomo 2009), we assume that a demonstrative belongs to a category of D.

Turning to the data of reduplicated classifiers with demonstratives, reduplicated classifiers show different behaviors, as shown in (12) and (13). In (12), the reduplicated classifier *ge-ge* appears with the demonstratives *zhe/na*. In (12a), *ge-ge* precedes the demonstrative *zhe* ‘this’ or *na* ‘that’, and in (12b) it follows the demonstrative. Both cases are ungrammatical, which suggests that reduplicated classifiers like *ge-ge* competes for the same position with the demonstratives. That is, the type of reduplicated classifiers like *ge-ge* belongs to the same category with a demonstrative, i.e., D. Recall the discussion in the previous two sections. It has been shown that reduplicated classifiers such as *ge-ge* do not pattern with a category of A. The data in (12) not only provides further support to this consequence, but also suggests that *ge-ge* type reduplicated classifiers must be a category D.

- (12) a. **zhe/na ge-ge xuesheng*
 this/that CL-CL student
 Intended: ‘these/those students’
 b. **ge-ge zhe/na xuesheng*
 CL-CL this/that student
 Intended: ‘these/those students’

In contrast, the reduplicated classifiers of *duo-duo* type can appear with the demonstrative *zhe/na* as shown in (13). This fact suggests that reduplicated classifiers

such as in (13) do not belong to D, but must be a different category from D. This conclusion is also in line with the data of reduplicated classifiers discussed in the previous sections. That is, reduplicated classifiers that pattern with *duo-duo* in (13) can be concluded as the category A. In fact, an adjective in the language such as *jiankang* ‘healthy’ or *keai* ‘lovely’ can appear with a demonstrative, as shown in (14), which provides further support to the proposed account.

- (13) a. zhe/na duo-duo de huaer
 this/that CL-CL DE flower
 ‘these/those flowers’
 b. zhe/na tiao-tiao de malu
 this/that CL-CL DE road
 ‘these/those roads’
- (14) a. zhe jiankang de xuesheng
 this healthy DE student
 ‘these healthy students’
 b. na keai de weijin
 that lovely DE scarf
 ‘those lovely scarfs’

3.4 Reduplicated classifiers and existential clauses

An existential construction is frequently used in Mandarin literature to test whether a nominal in question is definite or indefinite (Hsieh 2008; Huang et al. 2009; Yang H. 2005; Zhang 2013). A nominal is considered definite if it cannot occur in an existential construction while it is understood to be indefinite if it can occur in an existential construction. In Mandarin, the existential construction involves the verb *you* ‘exist’ as illustrated in (15). In (15a), the nominal phrase *na san ben shu* ‘those three books’ is viewed to be definite as the ungrammaticality of its presence in the existential clause, but in (15b) the nominal phrase *san ben shu* ‘three books’ is viewed to be indefinite in that it can occur in the existential construction.

- (15) a. *You na san ben shu zai zhuo-shang.

- have that three CL book at table-top
 Intended: 'There are those three books on the table.'
- b. You san ben shu zai zhuo-shang.
 have three CL book at table-top
 'There are three books on the table.'

Reduplicated classifiers show different behaviors with an existential clause, as shown in (16) and (18). The examples in (16) illustrate reduplicated classifiers that have been argued to belong to D thus far in this paper. Those reduplicated classifiers are ungrammatical in an existential clause, as shown in (16). The nominal phrase containing the reduplicated classifiers – *ge-ge xuesheng* 'many students' in (16a) or *zhi-zhi yazi* 'many ducks' in (16b) – cannot occur in the existential clause.

- (16) a. *You ge-ge xuesheng zai jiaoshi li.
 have CL-CL student be classroom in
 Intended: 'There are many students in the classroom.'
- b. *You zhi-zhi yazi zai he li.
 have CL-CL duck be river in
 Intended: 'There are many ducks on the river.'

By contrast, those reduplicated classifiers shown to belong to the category A in this paper are predicted to be grammatical with an existential clause, just like an A in the language shown in (17) with the adjective *keai* 'lovely'. This prediction with reduplicated classifiers is true, as shown in (18). In (18), the nominal phrase containing the A-type reduplicated classifiers, *duo-duo baiyun* 'many white-clouds' in (18a) and *tiao-tiao shangba* 'many scars' in (18b), are grammatical in the existential clauses.

- (17) Caochang shang you henduo keai de haizi.
 playground on have many lovely DE kid
 'There are many lovely kids on the playground.'
- (18) a. You duo-duo baiyun zai tiankong zhong piao-zhe.
 have CL-CL white-cloud at sky in float-DUR
 'There are many white clouds floating in the sky.'
- b. Bei-shang you tiao-tiao shangba.

back-on have CL-CL scar
 ‘There are many scars on the back.’

The data such as in (16) and (18) further support the proposal made in this paper that classifier reduplication should be viewed as creating two different categories, namely D and A.

3.5 Functioning as a predicate or an adverbial

Some adjectives in Mandarin can function as predicates (Cinque 2006; Lü and Rao 1981; Paul 2010; Sproat and Shih 1988, among others), as illustrated in (19). The adjective *congming* ‘clever’ in (19a) can appear as a predicate as shown in (19b).¹¹

- (19) a. *congming* (de) *haizi*
 clever DE kid
 ‘a clever kid’
 b. *Ta* *congming*.
 he clever
 ‘He is clever.’

It has also been noted that there are types of adjectives that can function as adverbials (Chao 2011; Guo R. 2002; Larson 2018; Li and Thompson 1981). This is illustrated with the adjective *bai* ‘white’ in (20a) and (20b).

- (20)a. *bai* *qiang*
 white wall
 ‘white wall’
 b. *bai* *pao* *yi-tang*
 in vain make a trip one-CL
 ‘make a trip in vain’

¹¹ In Mandarin, adjectives that appear as predicates can appear without a copula verb (Hsieh 2008; Huang et al. 2009; Paul 2014).

These data show that an adjective in Mandarin can appear as a predicate or an adverb. If so, a reduplicated classifier proposed to be a category of A may appear as a predicate or an adverb, unlike reduplicated classifier proposed to be a category of D. This prediction is borne out by the data in (21) and (22). In (21), both D and A types of reduplicated classifiers appear in the typical position of a predicate in Mandarin following the subject. The data in (21a) shows that the reduplicated classifier proposed to belong to D such as *ge-ge* cannot function as a predicate, but the data in (21b) shows that a reduplicated classifier such as *duo-duo* that belongs to A can appear as a predicate.

- (21) a. *Xuesheng ge-ge.
 student CL-CL
 Intended (literally): ‘The students are many.’
 b. Baiyun duo-duo.
 white-cloud CL-CL
 Literally: ‘White clouds are many.’

The same point is made with the data in (22). The reduplicated classifiers *ge-ge* in (22a) and *duo-duo* in (22b) are in the typical adverbial position that follows the subject and precedes the verb in the sentence. A *ge-ge* type reduplicated classifier that belongs to D cannot appear in this position which suggests that it cannot function as an adverbial as shown in (22a). By contrast, as shown in (22b), a *duo-duo* type reduplicated classifier that belongs to A can appear in the same position being able to function as an adverbial.

- (22) a. *Xuesheng ge-ge lai-le.
 student CL-CL come-ASP
 Intended: ‘The students came one by one.’
 b. Huaer duo-duo xiang taiyang.
 flower CL-CL face sun
 Literally: ‘Flowers are facing the sun in large quantities.’

This section demonstrates that reduplicated classifiers can be of two different syntactic categories, i.e., D and A.¹² In the following section, we provide an account for

¹² A reduplicated classifier like *duo-duo* that belongs to a category of A can also appear in the subject position in the presence of the distributivity marker *dou* (Sui and Hu 2017; Yip 2018; Zhang 2013), similar to a

how the proposed two different syntactic categories – D and A – can be derived structurally which has not been initiated in the previous literature.

4. Syntax of reduplicated classifiers

In this paper, we assume the nominal structure as illustrated in (23) for Mandarin as proposed in Li (1999). In (23), the D head under DP bears the feature [definite], and the head Num hosts the feature for number such as [plural].

$$(23) \begin{array}{ccccc} [\text{DP} & \text{D} & [\text{NumP} & \text{Num} & [\text{CLP} & \text{CL} & [\text{NP} & \text{N} &]]] \\ & [\text{definite}] & & [\text{plural}] & & & & & \end{array}$$

(Li 1999: 76)

We also assume the syntactic analysis of reduplication in terms of head movement proposed in Travis (2001, 2003), as discussed in the following section.

4.1 Assumption: reduplication by head movement

This paper assumes that reduplication of classifiers is the consequence of phonological copying that is analysed syntactically in Travis (2001, 2003), which has been supported by other studies such as Kimper (2008) and Lipták and Saab (2019). Phonological copying can target a different phonological unit such as a syllable or a foot.¹³ A case of reduplication of a syllable is illustrated in the data from Papago in (24). In this data, the noun *bana* in (24a) refers to a singular entity ‘coyote’. Reduplication

reduplicated classifier such as *ge-ge* that is a category of D. Interpretation of a *duo-duo* type reduplicated classifier in this position is also similar to that of *ge-ge* type reduplicated classifier being distributive, e.g., each of X where X is a noun (Hsieh 2008; Guo J. 1999; Yang K. 2003; Zhang 2013). However, this similarity in meaning does not indicate that *duo-duo* type reduplicated classifiers may belong to the same category as *ge-ge* type reduplicated classifiers. Evidence discussed in this section strongly suggests that a *duo-duo* type reduplicated classifier cannot be a category of D unlike a *ge-ge* type reduplicated classifier. As mentioned earlier (see footnote 5), distributive interpretation comes from the distributivity marker *dou* (Guo J. 1999; Li 1999; Lin 1998; Zhang 2013), which we do not further question in this paper.

13 There are other types of reduplication that target a syntactic constituent such as a phrasal unit: iterative reduplication and contrastive reduplication. Reviewing the details on these types of the reduplication are beyond the scope of this paper, and we refer readers to Travis (2001, 2003). Also, see Kimper (2008) for a syntactic analysis of reduplication that targets a syntactic constituent.

of this noun is shown in (24b): the copied part is the first syllable of the noun in (24a). Note that with this type of reduplication copying of the syllable only occurs once, not multiple times.¹⁴

(24) Papago

- a. *bana* ‘coyote’ b. *baabana* ‘coyotes’ (Moravcsik 1978)

A striking cross-linguistic fact is that the result of reduplication shows a similar meaning, i.e., plural or event iteration, well documented in various languages such as Samoan, Papago, Amharic for plural, and languages such as in Tzeltal, Thai, Twi, Sundanese and so on for event iteration (Moravcsik 1978). An instance of this fact is shown in the data in (24b) from Papago mentioned in Moravcsik (1978): the reduplicated word *baabana* indicates more than one entity, namely plural ‘coyote-s’. This semantic characteristic of reduplication is also the case for Mandarin, as shown in the previous sections, which we will detail in the next section.

Travis (2001, 2003) proposed that reduplication motivated by phonological copying such as in (24) can be syntactically analysed as an affixation in which the reduplicated syllable, e.g., *baa* in (24b), is treated as an affix. In particular, it is proposed that the reduplicated morpheme as an affix realizes a syntactic head that represents the semantic result of the reduplication, e.g., plural, as shown by the data in (24b). Under the view of reduplication as an affixation, the syntactic derivation takes place via head movement of the host to the affix (Halle and Marantz 1993; Harley 2013). For example, as illustrated in (25), the host head N realized by *bana* in (24a) head-moves to a Q head being adjoined to Q, which is triggered by feature checking (Travis 2003).

It is neither mentioned nor discussed in Travis (2001, 2003) what types of feature derives the proposed head movement for reduplication. With other scholars on head movement as affix such as Julien (2002), Matushansky (2006), Roberts (2010) among others, we assume that head movement is triggered by c(ategorial)-feature. A head can c-select the syntactic category of its complement, and the relevant c-feature of the selecting head is the uninterpretable counterpart to the c-feature of its complement; for example, as in the case of V to T head movement, [*u*V] for T that c-selects VP. We

¹⁴ There is a type of reduplication that allows the copy of the target syllable multiple times. Importantly, in Travis (2001, 2003), it is shown that such a type of reduplication is syntactically different from the reduplication that allows copying only once as in (24b).

propose that Q in (25) c-selects its complement, i.e., NP, and that Q bears [*u*N] which is checked off by [*i*N] on the head N of the complement NP. The relevant reduplication, namely copying the syllable of the head N (i.e., *baa-*) illustrated in (24b), occurs in the head Q, once the head N moves to the head Q. Reduplication via head movement thus creates a different category from the category of the host, e.g., Q is different from N in (25).

$$(25) \begin{array}{c} [_{QP} [_{Q'} Q [_{\pi N} N [_{iN}]] \quad [_{NP} \langle N \rangle \dots]] \\ \quad \quad \quad baa- \quad \quad bana \quad \quad \langle bana \rangle \\ \quad \quad \quad COPY \end{array}$$

(Adapted from Travis 2001: 2)

It should be mentioned that the reduplication that targets a phonological unit shows different properties from reduplication that targets a syntactic constituent such as a phrase (see footnote 13). Consequently, a different analysis for each type of reduplication has been proposed (Kimper 2008; Travis 2001, 2003). Although we cannot detail the different analyses, as this is beyond the scope of this paper, important to the current discussion is that head movement analysis such as in (25) is reserved for reduplication that targets a phonological unit, not for reduplication that targets a syntactic constituent.¹⁵ We assume this difference for our proposal for classifier reduplication in Mandarin discussed in the following sections.

4.2 Reduplicated classifiers in Mandarin by head movement

This section proposes that classifier reduplication in Mandarin can be analysed by the head movement in line with Travis (2001, 2003). There are several pieces of evidence that support the proposed head movement analysis for reduplicated classifiers. As shown earlier in this paper, classifier reduplication in Mandarin indicates a specific meaning, i.e., plural meaning, as shown in (2) earlier repeated as (26) below. Thus, Mandarin shares a similar meaning of reduplication with other languages that allow reduplication analysed as head movement.

¹⁵ For instance, in Kimper (2008), reduplication that targets a syntactic constituent is analysed by adopting the Copy Theory of Movement (Chomsky 1995). See Kimper (2008) for details.

- (26) a. Ge-ge xuesheng
 CL-CL student
 Literally: ‘the many students’
 b. duo-duo lianhua
 CL-CL lotus
 ‘many lotuses’

Another property of classifier reduplication that supports the proposal in this paper in which classifier reduplication can be accounted by the head movement analysis is that a classifier cannot be copied more than once similar to the reduplication discussed in Travis (2001, 2003) (cf. section 4.1). As shown in (27a), one copy of the CL *ge* is grammatical, while more than one copy of the CL *ge*, as in (27b), is ungrammatical.

- (27) a. ge-ge xuesheng
 CL-CL student
 Literally: ‘the many students’
 b. *ge-ge-ge xuesheng
 CL-CL-CL student
 Intended: ‘the many students’

Moreover, classifier reduplication targets a monosyllabic classifier only, and a disyllabic classifier cannot undergo reduplication (Chao 2011; Guo R. 2002; Jiang 2001; Shi 1996; Zhang Q. Y. 2009; Zhang 2013). An example of a disyllabic classifier is shown in (28a), and reduplication of the disyllabic classifier in (28a) results in ungrammaticality as illustrated in (28b).¹⁶

- (28) a. jialun ‘gallon’
 b. *jialun-jialun ‘many gallons’ (Chao 2011: 222-223)

16 The monosyllable restriction is observed with classifier reduplication only. In other types of reduplication such as verb reduplication in the language, a disyllabic verb can undergo reduplication (Chao 2011; Li and Thompson 1981; Paul 2015; Zhu 1982). Thus, it seems that a unit for reduplication is not the same across parts of speech even in the same language. This difference between classifier and verb reduplication is interesting, but we cannot further go into this issue as this is beyond the scope of this paper.

The type of data as in (28) further indicates that a classifier cannot be a unit for reduplication. Building on the fact that monosyllabic but not disyllabic classifier is a target for reduplication, we conclude that a unit of classifier reduplication in Mandarin is a syllable, which supports the proposed head movement analysis for classifier reduplication in this section. As discussed in the previous section, head movement analysis applies for the type of reduplication that targets a phonological unit such as a syllable but not for reduplication that targets a syntactic constituent (cf. footnote 13 and 14).

Last support for the proposed account in which classifier reduplication should be analysed as head movement is that the result of reduplication is a different category from a classifier. As demonstrated in section 3, a reduplicated classifier is not a CL, but belongs to a category of D or A.

In what follows, we provide a specific syntactic analysis of the identified two different categories of classifier reduplication, i.e., D and A, in terms of head movement.

4.3 D-classifier reduplication and head movement

Regarding classifier reduplication that creates a category of D, we propose that it is the result of a CL head moving to the Num head where the copying of the CL takes place, as illustrated in (29b) for the reduplicated classifier *ge-ge* in the example in (29a).¹⁷ Once reduplication takes place as in (29b), the Num head realized by the reduplicated classifier merges with an NP such as *xuesheng* ‘student’ as in (29c), and further undergoes head movement to the D.

- (29) a. ge-ge xuesheng
CL-CL student
Literally: ‘the many students’
b. [NumP Num [*π*CL]-CL [iCL]] [CLP <CL> [iCL]]
ge-ge <*ge*>
c. [DP D [definite][NumP Num [plural]] [NP N]]]
ge-ge <*ge-ge*> *xuesheng*

17 In Travis (2003), a Q head is proposed in order to account for a wide range of languages of reduplication. As for Mandarin, we propose Num head in line with the language specific nominal structure (see (23)).

Specifically, in (29b), the classifier *ge* merges in CL head, and it head-moves to the Num head being adjoined to Num. At this stage of the derivation in (29b), no noun appears. This is because reduplication of a classifier, a word formation process, has to precede before a reduplicated classifier merges with a noun which takes place in syntax. As discussed for the Papago instance in the previous section, head movement illustrated for reduplication in Mandarin (29b) is also triggered by feature checking via c-features: in (29b), Num c-selects CLP, [*i*CL] on the CL head of the complement CLP is attracted by [*u*CL] on the Num head, and the uninterpretable feature [*u*CL] is checked by the interpretable feature [*i*CL]. Upon this movement, copying the CL *ge* takes place in the NumP. The reduplicated classifier *ge-ge* as a category of Num is able to merge with an NP such as *xuesheng* ‘student’ as in (29c). As Num is specified with the feature [plural], the NP is interpreted as plural ‘students’. We further propose that the reduplicated classifier *ge-ge*, as a head Num, head-moves to the D head as in (29c), and thus the NP with the reduplicated classifier is interpreted as a definite plural entity, i.e., ‘the many students’.¹⁸ The proposed analysis captures both meanings of D-type reduplicated classifier, i.e., being plural and definite.

This analysis is supported by the properties of classifier reduplication demonstrated in section 3. Recall that we have discussed five properties of classifier reduplication that suggest that the reduplicated classifiers can be divided into two different categories, i.e., D and A. Putting aside classifier reduplication that creates a category of A for now (which will be discussed in the next section), the proposed account in this section captures those five properties of reduplicated classifiers that belong to the category of D. For example, the fact that this type of reduplicated classifiers cannot appear with a demonstrative such as *na/zhe* in the language can be accounted for. As the demonstrative also appears in the D position (Li 1999; Lyons 1999; Pereltsvaig 2007; Szabolcsi 1987; Wu and Bodomo 2009), it cannot be compatible with reduplicated classifiers of D-category. As realizing D with [definite] feature, reduplicated classifiers cannot appear in the existential clause (see (16) in section 3). As D-elements can never be predicates (Higginbotham 1987), a reduplicated classifier as a D cannot be a predicate as shown in (21a) in section 3. The other properties of classifier reduplication that creates a category D shown in section 3 – not being able to be followed by the modification marker *de* and not being able to co-occur with a modifying adjective (see the examples

18 We assume that the head movement from Num to D is not an affixal movement and thus it is driven by the feature [definite] rather than a c-feature.

(7) and (10) in section 3) – are also accounted for. A reduplicated classifier as a D head cannot function as a modifier such as an adjective; thus, the properties that belong to the properties of an adjective in the language (cf. section 3) are not compatible with a reduplicated classifier that is a category of D.

4.4 A-classifier reduplication and head movement

We propose that reduplicated classifiers that create a category of A can also be analysed as undergoing head movement via c-features similar to reduplicated classifiers that create a category of D proposed in the previous section. An instance of classifier reduplication that creates A is illustrated in (30a) with the classifier *duo*. As shown in (30b), the classifier *duo* first merges in the CL head, and moves to another head, namely A. The derivation of forming a reduplicated classifier illustrated in (30b) has to take place before the reduplicated classifier merges with a noun, as in the derivation of a D-type reduplicated classifier discussed in the previous section. The motivation of the proposed head movement in (30b) is a c-feature similar to the derivation of classifier reduplication of D category. We propose that the relevant features are [*i*CL] on CL and [*u*CL] on A: the uninterpretable feature on A is checked by the interpretable feature on CL as illustrated in (30b). Upon the head movement of CL to A, the copy of the classifier *duo* takes place resulting in the reduplication of the classifier *duo-duo*. A reduplicated classifier as a category A resulting from derivation such as in (30b) is able to merge with a noun just like a standard category of A, as shown in (30c). An A-type reduplicated classifier being specified with the feature [plural], the noun *baiyun* ‘white-cloud’ such as in (30c) is interpreted as being plural.¹⁹

- (30) a. duo-duo baiyun
 CL-CL white-cloud
 ‘many white-clouds’
 b. [_{AP} [_A A [*u*CL] – CL [*i*CL]] [_{CLP} <CL>]]
 duo duo <duo>
 c. [_{NP} [_{AP} A [plural]] N]

¹⁹ A feature such as [plural] is possible with a category of a modifier as shown in recent studies (Kim et al. 2017; Kim and Melchin 2018; Wiltschko 2008). As with these studies, we propose that Mandarin also allows the feature [plural] on a modifier such as an A created by a reduplicated classifier.

duo-duo baiyun

In the proposed structure as in (30b), AP is projected above CLP similar to the previous studies on reduplication (Kimper 2008). In Kimper (2008), it is shown that a reduplicative morpheme can be a category of A or Adv evidenced by cross-linguistic data in the world languages. In particular, it is proposed that a reduplicative morpheme in this case projects its own phrase rather than adjoining to the base form as a usual adjunct does. Reduplication including classifier reduplication is one of word formation processes, and it can create a different category from its base form. Thus, the projection of the reduplicative morpheme *duo* as an A as in (30b) naturally follows from the nature of reduplication as word formation process.

The proposed head movement analysis of classifier reduplication of a category A captures its properties which contrast with the properties of classifier reduplication that creates a category of D. As discussed in section 3 (see Table 1 for summary), classifier reduplication of A can be followed by *de* and co-occur with an adjective (see the examples (8) and (11) in section 3), which are the general properties of an adjective in the language (cf. section 3). As this type of reduplication creates a category of A as proposed in this section, it is predicted to be followed by *de* and co-occur with other adjectives. The other properties – being able to appear with a demonstrative, being allowed in an existential clause, and being an adverbial or predicate – are also accounted for, as these are also the properties of adjectives in the language, as shown earlier in section 3.

5. Conclusion

This paper examined classifier reduplication in Mandarin with the focus on its categorial status and its syntactic derivation, which have not been paid much attention in the previous studies. Unlike the previous studies on classifier reduplication, this paper newly proposed that the category of classifier reduplication can be of two types, namely D and A. This paper also proposed an analysis on syntactic derivation of classifier reduplication that can account for its categorial status that has not been provided in the previous studies.

Reduplication belongs to the domain of morphology, as a word formation. However,

a newly created word via reduplication enters into syntax in order to generate a meaningful clause or sentence. For example, as shown with classifier reduplication (see section 3), reduplicated classifiers interact with various syntactic clauses or elements and the different categories of reduplicated classifiers show different behaviors. Thus, it is necessary to establish the syntax of newly created words via reduplication. This paper has undertaken such a task, in particular making contribution to the understanding of classifier reduplication in syntax, and provides a new look at classifier reduplication as a syntactically motivated word formation process.

References

- An, Fengcun and Lei Zhao. 2017. A study on the reduplication of Chinese classifiers. In Rong Tong, Yue Zhang, Yanfeng Lu, and Minghui Dong (eds.), *Proceedings of the International Conference on Asian Language Processing (IALP)*, 150-154. Singapore: National University of Singapore.
- Basciano, Bianca and Chiara Melloni. 2017. Event delimitation in Mandarin: The case of diminishing reduplication. *Italian Journal of Linguistics/Rivista di Linguistica* 29(1): 147-170.
- Borer, Hagit. 2005. *Structuring sense, vol. 2: The normal course of events*. Oxford: Oxford University Press.
- Brdar, Mario and Rita Brdar-Szabó. 2014. Metonymies we (don't) translate by. *Argumentum* 10: 232-247.
- Chao, Yuen-Ren. 2011. *A grammar of spoken Chinese*. Beijing: The Commercial Press.
- Cheng, Lisa Lai-Shen. 2009. On every type of quantificational expression in Chinese. In Anastasia Giannakidou and Monika Rathert (eds.), *Quantification, definiteness, and nominalization*, 53-75. Oxford: Oxford University Press.
- Cheng, Lisa Lai-Shen and Rint Sybesma. 1999. Bare and not-so-bare nouns and the structure of NP. *Linguistic Inquiry* 30(4): 509-542.
- Cheung, Candice Chi Hang. 2012. Adjectival modification in Mandarin: Evidence for the adjunction analysis. *Studies in Chinese Linguistics* 33(1): 41-62.
- Chomsky, Noam. 1995. *The minimalist program*. Cambridge, MA: The MIT Press.
- Cinque, Guglielmo. 2006. *Restructuring and functional heads: The cartography of syntactic structures* vol. 4. New York: Oxford University Press.
- Feng, Yuli. 2014. *A semantic study of distributive effects in Mandarin Chinese*. PhD Dissertation. City University of Hong Kong.
- Guo, Jimao. 1999. Zai-tan liangei chongdie de jufa [Reanalysis of grammatical meaning of classifier reduplication]. *Chinese Language Learning* 4: 6-9.
- Guo, Rui. 2002. *Xiandai hanyu cilei yanjiu [Studies of parts of speech in modern Chinese]*. Beijing:

The Commercial Press.

- Guo, Yanyu. 2013. *Xiandai hanyu liangci chong-die-shi shengcheng yufa yanjiu* [The study of classifier reduplication in Mandarin Chinese in the framework of generative grammar]. Ms. Peking University.
- Halle, Morris and Alec Marantz. 1993. Distributed morphology and the pieces of inflection. In Kenneth Hale and Samuel Jay Keyser (eds.), *The view from Building 20: Essays in linguistics in honor of Sylvain Bromberger*, 111-176. Cambridge, MA: The MIT Press.
- Harley, Heidi. 2013. Getting morphemes in order: Merger, affixation, and head movement. In Lisa Lai-Shen Cheng and Norbert Corver (eds.), *Diagnosing syntax*, 44-74. Oxford: Oxford University Press.
- Higginbotham, James. 1987. Indefiniteness and predication. In Eric J. Reuland and Alice G. B. ter Meulen (eds.), *The representation of (in)definiteness*, 43-70. Cambridge, MA: The MIT Press.
- Hsieh, Miao-Ling. 2008. *The internal structure of noun phrases in Chinese*. Taipei: Crane Publishing Company.
- Huang, C.-T. James, Yen-hui Audrey Li, and Yafei Li. 2009. *The syntax of Chinese*. Cambridge: Cambridge University Press.
- Jiang, Yue-e. 2001. Shi-lun liangci chongdie xingshi yi-ji 'yi + liangci' chongdie xingshi [Discussion on the forms of reduplicated classifiers and the forms of yi 'one' + reduplicated classifiers]. Ms. Peking University.
- Julien, Marit. 2002. *Syntactic head and word formation*. Oxford: Oxford University Press.
- Kim, Kyumin and Paul B. Melchin. 2018. Modifying plurals, classifiers, and co-occurrence: The case of Korean. *Glossa: A Journal of General Linguistics* 3(1): 25. 1-29.
- Kim, Kyumin, Elizabeth Ritter, Martina Wiltschko, and Hotze Rullmann. 2017. 2+2=3: Number contrasts in Blackfoot. *Glossa: A Journal of General Linguistics* 2(1): 96. 1-15.
- Kimper, Wendell. 2008. Syntactic reduplication and the spellout of movement chains. Ms. University of Massachusetts, Amherst.
- Lam, Charles. 2014. A unified analysis of classifiers and reduplication across nominal and verbal domains. In Chuck Bradley, Charles Lam, and Mengxi Lin (eds.), *Proceedings of the 9th Purdue Linguistics Association Symposium*, 10-25. West Lafayette, IN: Purdue University.
- Larson, Richard K. 2018. AP-de (地) adverbs in Mandarin. *Studies in Chinese Linguistics* 39(1): 1-28.
- Lee, Peppina Po-Lun. 2020. On the semantics of classifier reduplication in Cantonese. *Journal of Linguistics* 56(4): 701-743.
- Lee, Thomas H. 1986. *Studies on quantification in Chinese*. PhD Dissertation. University College London.
- Li, Charles N. and Sandra A. Thompson. 1981. *Mandarin Chinese: A functional reference grammar*. Berkeley and Los Angeles, CA: University of California Press.
- Li, Yen-hui Audrey. 1999. Plurality in a classifier language. *Journal of East Asian Linguistics* 8(1): 75-99.

- Li, Yumin. 1998. Lun shu-liang-ci de fudie [Discussion on reduplication of classifiers]. *Studies in Language and Linguistics* 1: 30-39.
- Lin, Jo-Wang. 1998. Distributivity in Chinese and its implications. *Natural Language Semantics* 6(2): 201-243.
- Lipták, Anikó and Andrés Saab. 2019. Hungarian particle reduplication as local doubling. *Acta Linguistica Academica* 66(4): 527-574.
- Lu, Bingfu. 1988. Dingyu de wai-yan-xing, nei-han-xing ji-qi shunxu [Extention, connotation and order of the prenominal modifiers]. In magazine office of Studies of the Chinese language (eds.), *Yu-fa yan-jiu he tan-suo* [Studies and exploration on grammar] 4, 102-115. Beijing: Peking University Press.
- Lü, Shuxiang and Changrong Rao. 1981. Shi-lun fei-wei-yu xingrongci [Discussion on non-predicative adjectives]. *Zhongguo yuwen* [Studies of the Chinese Language] 2: 81-85.
- Lyons, Christopher. 1999. *Definiteness*. Cambridge: Cambridge University Press.
- Maas, Utz. 2005. Syntactic reduplication in Arabic. In Bernhard Hurch (ed.), *Studies on reduplication*, 395-429. Berlin: De Gruyter Mouton.
- Matushansky, Ora. 2006. Head movement in linguistic theory. *Linguistic Inquiry* 37(1): 69-109.
- Moravcsik, Edith A. 1978. Reduplicative constructions. In Joseph Greenberg (ed.), *Universals of human language*, 297-334. Stanford, CA: Stanford University Press.
- Paul, Waltraud. 2010. Adjectives in Mandarin Chinese. In Patricia Cabredo Hoffher and Ora Matushansky (eds.), *Adjectives: formal analyses in syntax and semantics*, 115-151. Amsterdam/Philadelphia: John Benjamins Publishing Company.
- Paul, Waltraud. 2015. *New perspectives on Chinese syntax*. Berlin: De Gruyter Mouton.
- Pereltsvaig, Asya. 2007. The universality of DP: A view from Russian. *Studia Linguistica* 61(1): 59-94.
- Ritter, Elizabeth. 1991. Two functional categories in noun phrases: Evidence from modern Hebrew. In Susan Rothstein (ed.), *Perspectives on phrase structure: Heads and licensing*, 37-62. Bingley: Emerald Group Publishing Limited.
- Roberts, Ian. 2010. *Agreement and head movement: Clitics, incorporation, and defective goals*. Cambridge, MA: The MIT Press.
- Ross, Claudia and Jing-heng Sheng Ma. 2014. *Modern Mandarin Chinese grammar: A practical guide*. London and New York: Routledge.
- Schwarzschild, Roger. 1996. *Pluralities*. Dordrecht: Kluwer.
- Shi, Yuzhi. 1996. Shi-lun hanyu de jufa chongdie [Discussion on syntactic reduplication in Mandarin]. *Studies in Language and Linguistics* 2: 2-13.
- Sproat, Richard and Chilin Shih. 1988. Prenominal adjectival ordering in English and Mandarin. In James Blevins and Juli Carter (eds.), *Proceedings of the Eighteenth Annual Meeting of North East Linguistics Society*, 465-489. Amherst: Graduate Linguistics Student Association, University of Massachusetts.
- Sui, Na and Jianhua Hu. 2017. Liangci congdie de jufa [The syntax of classifier reduplication].

- Zhongguo yuwen [Studies of the Chinese Language]* 1: 22-41.
- Szabolcsi, Anna. 1987. Functional categories in the noun phrase. In Istvan Kenesei (ed.), *Approaches to Hungarian vol. 2*, 167-190. Szeged: József Attila University.
- Tomioka, Satoshi and Yaping Tsai. 2005. Domain restrictions for distributive quantification in Mandarin Chinese. *Journal of East Asian Linguistics* 14: 89-120.
- Travis, Lisa. 2001. The syntax of reduplication. In Min-Joo Kim and Uri Strauss (eds.), *Proceedings of the Thirty-first Annual Meeting of North East Linguistic Society*, 455-469. Washington, DC: Graduate Linguistics Student Association, Georgetown University.
- Travis, Lisa. 2003. Reduplication feeding syntactic movement. In Stanca Somesfalean (ed.), *Proceedings of the 2003 Canadian Linguistic Association Annual Conference*, 236-247. Montréal: Département de linguistique et de didactique des langues, Université du Québec à Montréal.
- Wiltschko, Martina. 2008. The syntax of non-inflectional plural marking. *Natural Language & Linguistic Theory* 26(3): 639-694.
- Wu, Yicheng and Adams Bodomo. 2009. Classifiers ≠ determiners. *Linguistic Inquiry* 40(3): 487-503.
- Yang, Henrietta Shu-Fen. 2005. *Plurality and modification in Mandarin nominal phrases*. PhD Dissertation. University of Texas at Austin.
- Yang, Kairong. 2003. “Liangci chongdie + dou + VP” de jushi yuyi ji-qi dongyin [The meanings and motivations of the pattern “reduplicated measure word + dou +VP”]. *Chinese Teaching in the World* 4: 13-21.
- Yang, Xuemei. 2002. “Ge-ge”, “mei-ge” he “yi-ge-(yi)-ge” de yufa yuyi fenxi [A syntactic and semantic analysis of ge-ge, mei-ge and yi-ge-(yi)-ge]. *Chinese Language Learning* 4: 26-31.
- Yip, Chak Lam Colum. 2018. *Evidence for DP in Chinese from reduplicative classifiers and DP-internal information structural phenomena*. PhD Dissertation. University of Washington.
- Zhang, Niina Ning. 2013. *Classifier structures in Mandarin Chinese*. Berlin: De Gruyter Mouton.
- Zhang, Qiaoying. 2009. Hanyu zhong mingci he liangci de chongdie yanjiu [The study of reduplication of nouns and classifiers in Mandarin]. Ms. Peking University.
- Zhu, Dexi. 1982. *Yufa jiangyi [Lectures of grammar]*. Beijing: The Commercial Press.

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Received: 2021. 11. 02.

Revised: 2022. 02. 03.

Accepted: 2022. 03. 09.