

The Head of the Chinese Adjectives and ABB Reduplication

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This study investigates whether the head of the Chinese adjective compounds is on the left or right or on both sides. Sproat (1998), Starosta et al (1998), and Ceccagno, et al (2006, 2007) argue that the adjectives are right-headed, and Huang (1998) claims that Chinese adjectives are headless. Using the ABB type of adjectives as evidence, I argued that the head of the Chinese adjectives is more like on the left than on the right. This study supports the Headedness Principle and also calls into questions whether a suffix is the head of a word as traditionally assumed in morphology. On the other hand, it also provides evidence that reduplication is a compounding process as Haugen (2008) has claimed since most of the reduplicated constituents of ABB have a specific lexical meaning and many of them can be used as independent words.

1. Introduction

Compounding is a major and productive means of word formation in Chinese (Ceccagno and Basciano, 2007; Sproat (1999). Although there is a significant difference between Chinese and English in terms of what is a compound (in English, compounds should be composed of two or more words), Chinese linguists basically consider any polysyllabic units as compounds if each constituent has its lexical meaning with certain word properties, and these constituents may be a morpheme, not a word, and cannot be used independently (Li and Thompson, 1981; Starosta et al, 1998). This study will take the same approach in defining compounding in Chinese. However, it is a debate on where the head is located in a Chinese compound.

William (1981) and Lieber (1981; 1992) claim that all the compounds have their heads on the right in English no matter they are nouns, verbs and adjectives. Chinese is very different from English in this regard. Huang (1998) claim that verbs have their heads on the left and adjective are headless; thus Chinese is basically a headless language. Starosta et al (1998) and Ceccagno and Basciano (2006, 2007) argue that generally Chinese compound words are right-headed including adjective compounds. Sproat (1998) also argues that in traditional sense, the adjectives are right-headed and verbs are left-headed. In addition, Packard (2000) proposes a Headedness Principle for Chinese compounds. According to the Headedness Principle, noun words have nominal constituents on the right and verb words have verbal constituents on the left; other word types are left relatively free to vary.

This paper would argue that if Chinese adjectives are type of verbs as many have claimed (Chao, 1968; McCawley, 1992), and they share syntactic properties, and they might also share the morphological properties. We would expect that they should at least share some major morphological properties; particularly, they should have their heads on the left side of adjectives. The ABB type of Chinese adjectives such as 白茫茫 *baimangmang* (a vast expanse of whiteness) and 直挺挺 *zhitingting* (straight and stiff) and word reduplication suggest that adjectives are consistently on the left of the words, thus the head of an adjective compound is on the left. This paper also proposes that the ABB type of adjectives should be treated as compounds because most of the BB constituents in the compounds are not suffixes.

2. The ‘Head’ debate

The Headedness Principle posits that noun words have nominal constituents on the right and verb words have verbal constituents on the left. Other word types are left relatively free to vary. This principle is based on the statistical results of the Chinese adjective formation. According to Packard (2000), 90 % of all Chinese nouns have a noun on the left and 85% of all verbs have a verb on the left. For example,

| | | | |
|-----------|---------|-----------|------------|
| 进 攻 | 走 路 | 石 油 | 石 窟 |
| V V | V N | N N | N V |
| to attack | to walk | petroleum | stone-cave |

As shown in the above examples, the first two words are verb compounds; they both have verbs on the left; while the noun compounds have nouns on the right in the latter cases.

However, Packard (2000) does not give any specific statistic numbers about adjectives, and indicates that the head of adjectives (counted as other types of words) are free to vary. Ceccagno and Basciano (2006) criticized Packard’s Headedness Principle and argue that the Headedness Principle will not adequately describe some of the adjective compounds such as coordinate compounds, attributive verbal compounds and attributive adjectival compounds because these compounds either have their heads on the right or on both sides, but not on the left as posited by the Headedness Principle. The following examples in Table 1 are from Ceccagno and Basciano (2006).

Table 1. Compounds exceptions to the Headedness Principle

| | | | | | | |
|----|------------------|---|-------|-----|---|--|
| 店铺 | <i>dianpu</i> | N | [N+N] | CRD | B | shop + shop = shop |
| 爱恋 | <i>ailian</i> | V | [V+V] | CRD | B | (to) love + (to) love = (to) love |
| 美丽 | <i>meili</i> | A | [A+A] | CRD | B | beautiful + beautiful = beautiful |
| 口算 | <i>kousuan</i> | V | [N+V] | ATT | R | mouth + (to) calculate = (to) do a sum of orally |
| 云集 | <i>yunji</i> | V | [N+V] | ATT | R | cloud + (to) gather = (to) come together in crowds |
| 笔直 | <i>bizhi</i> | A | [N+A] | ATT | R | tool for writing and drawing + straight = straight as ramrod |
| 冰凉 | <i>bingliang</i> | A | [N+A] | ATT | R | ice + cold = ice-cold |

(Legend: N = Noun, V = Verb, A = Adjective, R = Right, B = Both, CRD = Coordinate, ATT = Attributive)

These examples clearly are not covered by the Headedness Principle; however, the Headedness Principle is based on the statistical results of all types of nouns and verbs, so we would assume that these types of exceptions would have been counted in the statistics by Packard; in other words, these types of compounds are not so many in Chinese and does not influence the statistical results.

Huang (1998) argues that Chinese is a headless language in morphology because the category type of a compound cannot be determined by the rightmost member or leftmost member of a compound. He claims that noun compounds are more right-headed; verb compounds are more left-headed and adjective compounds have no particular tendency toward either the rightmost or the leftmost member of a compound. As a result, Chinese compounds in general are headless. He examined the entire dictionary of *Guoyu Ribao Cidian (Mandarin Daily Dictionary)* and found 24,000 disyllabic compounds (include all adjectives). His survey shows that "neither the rightmost member nor the leftmost of a compound can claim to monopolize the privileged status of determining the category of a compound." (Huang 1998, P 261)

I disagree with Huang in that no matter whether it is left-headed or right-headed or on both sides, Chinese words indeed have heads. We cannot say Chinese is headless language just because the head does not have a unitary position in the word.

Modeling Chao's adjective classification, I use the following criteria to determine the form class of adjectives (a) adjectives can be negated by 不 *bu* 'not' (b) can function as predicate; (c) can take 着 *zhe*, 了 *le* and 过 *guo* (d) can have "X" 不 "X" form such as 好不好 *haobuhao* 'good or not'. I examined all the disyllabic adjective compounds in *现代汉语词典 xiandaihanyucidian (Modern Chinese Dictionary)* and find that 2165 out of 2875 adjectives have adjectives on the left side; this counts for 75% of disyllabic

adjective compounds. Interestingly, I also find that 2070 of 2875 disyllabic adjective words have adjectives on the right. It counts for 72% of total adjective compounds. There are 62.3% of adjective compounds (total 1792) having adjective constituents on both sides. The reason is that most adjectives of this type are composed of two synonyms or antonyms.

Table 2 is an comparison between my statistics numbers of disyllabic adjective compounds in < Modern Chinese Dictionary> (MCD, 1996, Commerce Press, Beijing) and Huang's number in *Guoyu Ribao Cidian* (GRC).

Table 2. Comparison between the numbers of disyllabic compounds in GRC and MCD

| | AA | AV | AN | AX* | VA | NA | VV | NN | N | VN | XX | TOTAL |
|-----|------|-----|-----|-----|----|-----|-----|----|----|-----|----|-------|
| GRC | 1609 | 173 | 198 | | ? | 209 | 103 | 90 | 72 | 378 | 66 | 2898 |
| MCD | 1792 | 171 | 128 | 74 | 90 | 188 | 78 | 86 | 52 | 185 | 31 | 2875 |

Note: X in [AX] indicates suffixes; [X X] type includes [Adverb N], [Adv V], [Adv A] and [Numeral N]

Huang's claim might be true as far as adjective is concerned. The total disyllabic adjectives are 2898, and 1609 of them are [A+ A] type, which accounts for 55.5% of all adjective compounds. Using his numbers, I give further computation, and find that there are 1818 adjectives having adjectives on the right side, accounting for 62.7 % of total adjective compounds; 1980 adjectives have an adjective on the left side of a compound and account for 68.3 % of all adjective compounds. This result is basically consistent with my statistics: neither leftmost member nor rightmost member of a compound can dominate the other. The differences between my numbers and his might be caused by different criteria, intuition and judgment on the form class identity of adjectives, verb, noun, etc. Huang does not give his criteria on which the adjectives were identified. In addition, I have counted all the adjectives marked by <书> ("written language") in the Modern Chinese Dictionary. These adjectives are rarely used and closer to classical Chinese, and most of them are [A+A] type adjectives. These additions increase the number of [A+A] type significantly. Huang's dictionary is more a spoken Chinese dictionary than a written Chinese dictionary.

No matter how different between the two statistics might be, the same finding is made: there is no fixed head position in adjectives. The reason is that there is a large proportion of adjectives having adjective constituents on both sides and most of them are synonyms and antonyms; in other words, they are all coordinate adjectives. My statistics is 62.3% and Huang's is 55.5%. We simply cannot tell which side is preferred as the position of the head for adjective compounds. However, it is still an overstatement that Chinese compounds have no heads. Clearly, Chinese nouns have their heads on the right and Chinese verbs have their heads on the left. The only question is whether Chinese adjectives are left-headed or right-headed

3. The ABB reduplication and the head of the adjectives

Although we cannot determine whether the heads of adjectives are on the left side or right side of the words in compounding, in the ABB adjective reduplication process, there is evidence that supports that the heads of Chinese adjectives are on the left hand sides of Chinese adjective words, we call this proposal as Left Headed Hypothesis.

According to Cao (1995), there are 338 ABB adjectives in Chinese. Similarly, I find 336 ABB adjectives in *现代汉语词典 xiandaihanyucidian* (Modern Chinese Dictionary) and *现代汉语八百词 xiandaihanyubabaici* (Modern Chinese 800 Words, Lu, 1996), 293 out of 336 adjectives have adjectives on the left, and it is 87% of total ABB adjectives. Does this suggest that the ABB adjectives have their heads on the left? Before we answer this question, let's first look at Table 3, which illustrates the typical ABB adjective reduplication.

Table 3. ABB reduplication

| A+BB | N+BB | V+BB |
|-----------------------------------|---------------------------------------|--------------------------------------|
| 矮墩墩 (<i>aidundun</i> short) | 水灵灵 (<i>shuilingling</i> , charming) | 笑眯眯 (<i>xiaomimi</i> , smiley) |
| 辣酥酥 (<i>lasusu</i> spicy) | 气鼓鼓 (<i>qigugu</i> , angry) | 颤巍巍 (<i>chanweiwei</i> , shaky) |
| 懒洋洋 (<i>lanyangyang</i> lazy) | 泪汪汪 (<i>leiwangwang</i> , teary) | 喘吁吁 (<i>chuanxuxu</i> , breathless) |
| 空荡荡 (<i>kongdangdan</i> , empty) | 汗津津 (<i>hanjinjin</i> , sweaty) | 醉醺醺 (<i>zui xunxun</i> , drunk) |

As shown in Table 3, there are three types of lexical categories on the left for ABB adjectives. The word stems can be an adjective, a noun or a verb, but the reduplicated part is always an adjective, so does this mean that BB is the head since it determines the category of the whole word? The problem is that it is very hard to determine the word class of BB. Some of them are adjectives because they are used freely as an adjective, and others cannot be used freely and its original word is not an adjective. For example, *茫茫 mangmang* 'vast expanse' in *白茫茫 baimangmang* 'a vast expanse of whiteness' can be used in *茫茫的大海 mangmang de dahai* 'the vast ocean', but we cannot say **醺醺的爸爸 xunxun de baba* 'drunk father' or "*醺醺地醉 xunxun de zui* 'drunk', thus we cannot determine the form class of *醺醺 xunxun* 'drunk'. One approach to this question is to treat BB as a suffix, and the suffix functions as a head and determines the category of the whole word. This will suggest that the head of ABB adjectives is on the right. However, if we further examine the ABB adjectives, we will find the ABB reduplication includes two types of morphological processes: one is compounding and the other is suffixation. I will argue that most ABB adjectives are

compounds and only a minority of ABB adjectives is derivational and has suffixation. The reasons are as follows,

1. Most BBs still have concrete lexical meanings and only a few BBs such as 乎乎 *huhu* and 巴巴 *baba* can be considered as suffixes since they have lost their lexical meanings. Some others may be in the process of losing their lexical meanings and are becoming suffixes. According to my calculation, 91% of ABB adjectives are compounds and only 9% of ABB adjectives are derivational words with suffixes such as 乎乎 *huhu* and 巴巴 *baba*, which will change a word into an adjective.
2. Most BBs can only attach to a very limited number of words or bound roots while a suffix should be very productive and can be attached to a variety of different words, thus we can conclude that most BBs are not suffixes and they should be treated as compounds because BBs still contribute to the meanings of the whole words. Zhang (2005) argues that some BBs can only attach to one adjective such as 漆漆 *qiqi* ‘paint’ only combines with 黑 *hei* ‘dark, black’, 皑皑 *aiai* ‘pure white’ can only combine with 白 *bai* ‘white’
3. Many BBs can be used freely as a words such as (白) 茫茫 *(bai)mangmang* in 茫茫的大海 *mangmang de dahai* ‘vast expanse of the ocean’, (静) 悄悄 *(jing)qiaoqiao* in 春天悄悄地来了 *chuntian qiaoqiao de lai le* ‘Spring has come quietly’ and (亮) 闪闪 *(liang)shanshan* ‘flashing/shining’ in 闪闪的红星 *shanshan de hongxing* ‘flashing/shining red star’.
4. If the head is the suffix on the right of the adjective, we cannot explain the suffixation in which the reduplicated morpheme does not have its original form. For example,

| | | | | |
|------------------|--------------------|----------------------|---------------------|------------------------|
| 甜丝丝 | 凉丝丝 | 蓝盈盈 | 乱糟糟 | 兴冲冲 |
| <i>Tian sisi</i> | <i>liang sisi,</i> | <i>lan yingying,</i> | <i>luan zaozao,</i> | <i>xing chongchong</i> |
| sweet | cold | blue | messy | happy |

There are no such words as “甜丝 *tiansi*” “凉丝 *liangsi*”, “蓝盈 *lanying*” “乱糟 *luan zao*”, “兴冲 *xingchong*”, etc, and the right constituents cannot be a head; thus it is impossible to reduplicate the head if the suffixation is an head operation as traditionally assumed; in other words, the reduplication here is not a head operation on the right. We can only assume that the reduplicated morpheme BB here is a single morpheme or a disyllabic morpheme that are attached to the left constituent of the adjective. If the BB

part has a lexical meaning, then the ABB reduplication is more likely a compounding process than a suffixation. Sometimes, it just reduplicates the second constituent of the word; other times, it just reduplicates a non-constituent and attaches it to the head. In short, the reduplication itself is a kind of compounding construction (Haugen, 2008). Table 4 shows the compounding process.

Table 4. ABB reduplication in Chinese

| | Type | Adj. | Pinyin | Structure | Gloss |
|--------|------|------|--------------------|-----------|--------------------|
| Type 1 | A+BB | 矮墩墩 | <i>aidundun</i> | 矮 + 墩墩 | short |
| Type 2 | AB+B | 赤裸裸 | <i>chiluoluo</i> | 赤+裸 + 裸 | naked; undisguised |
| Type 3 | BA+B | 香喷喷 | <i>xiangpenpen</i> | 香+喷喷 | delicious |

In Type 1, BB as a whole is attached to the left constituent and in Type 2, the right constituent B is reduplicated first and then attached to the left side. Type 3 is actually a two-step reduplication.

1. First step, it is the reduplication on the left morpheme--BBA
2. Second step, BBA switches positions, A goes to the left side and BB goes to the right.

Table 5. BAB reduplication process

| | Step 1 | Step 2 | |
|------|--------|--------|--------------------------------|
| 喷香 → | *喷喷香 → | 香喷喷 | <i>xiangpenpen</i> , delicious |
| 通红 → | *通通红 → | 红通通 | <i>hongtongtong</i> , red |
| 油绿 → | *油油绿 → | 绿油油 | <i>luyouyou</i> , green |
| 煞白 → | *煞煞白 → | 白煞煞 | <i>baishasha</i> , pale |
| 冰冷 → | *冰冰冷 → | 冷冰冰 | <i>lingbingbing</i> , cold |
| 绵软 → | *绵绵软 → | 软绵绵 | <i>ruanmianmian</i> , soft |
| 纷乱 → | *纷纷乱 → | 乱纷纷 | <i>luanfenfen</i> , chaotic |
| 幽静 → | *幽幽静 → | 静幽幽 | <i>jingyouyou</i> , quiet |

Note that AB is not likely to switch positions before the reduplication takes place as there is no motivation to do that. For example, it is not possible to have this type of process in ABB reduplication such as in ” 通红 → *红通 → 红通通 *hongtongtong*, ‘red’. The fact that Shanghai dialect has Step 2 form of the reduplication suggests that our proposal is correct. In Shanghai dialect, the reduplication is not ABB, it is BBA such as 喷喷香 *penpenxiang* ‘delicious’, 通通红 *tongtonghong* ‘red’, 冰冰冷 *bingbingleng* ‘ice-

cold', etc. This shows that the reduplication rules are different among Chinese dialects, thus the head positions are different from those of Mandarin Chinese too.

As seen above, the head of ABB adjectives is always on the left. If it is originally on the right, it should go back to the left after the reduplication operation. This is a strong evidence supporting the Left Headed Hypothesis.

As for the ABB suffixation such as 干巴巴 *ganbaba* 'dry', 湿乎乎 *shihuhu*, 'wet', 巴巴 *baba* and 乎乎 *huhu* have lost their lexical meanings and do not contribute to the meanings of the whole words, so they should be treated as suffixes. However, it is very important to note that an adjective constituent in adjective gestalt word is always the virtual head if the adjective constituent is present and suffixation is not necessarily a head operation if the reduplicative suffix does not change category of the word form class (Lieber, 1992; Marantz, 1982; McCarthy and Prince, 1986). If we look at the ABB adjectives with 巴巴 *baba* and 乎乎 *huhu* as suffixes, there is only one case in 血乎乎 *xuehuhu* 'bloody' that 乎乎 *huhu* changes the form class of the word: 血 *xue* 'blood' is a noun. This clearly indicates that the suffixes such as 巴巴 *baba* and 乎乎 *huhu* do not change the form class of the whole word, thus it should not be treated as the head. As we define the head as:

1. Head percolates its morphosyntactic features onto the rest of the compound.
2. Head determines the properties and the grammatical category of the whole compound.
3. Head is the only obligatory element of a constituent.

According to this definition, 巴巴 *baba* and 乎乎 *huhu* mostly do not percolate its morphosyntactic features onto the rest of the compound and do not determine the form class of the whole word and are not the only obligatory element of a word, thus they are not the heads of ABB adjectives. A suffix is head only if it can change the lexical category of the word base, or if it does not change the lexical category but it changes the syntactic feature of the base (Scalise, 1988). This is exactly the case.

4. Other evidence supporting Left Headed Hypothesis

(1). Reanalysis

Packard (2000) proposes that the identity of morphemic constituents is mainly word-driven and the form class identities of its constituents are generally determined by the form class identity of the word. In other words, the word identity determines the identity of the word head. This morphological process is called re-analysis or percolation. Let's look at the two reanalysis examples: 石雕 *shidiao* 'stone-carving' and 大便 *dabian* 'to move the bowels'

石雕 *shidiao* 'stone-carving' is a noun, but it has a verb 雕 *diao* 'carve' on the right, and there are also other words with 雕 *diao* on their right sides such as 牙雕 *yadiao*

‘ivory carving’, 漆雕 *qidiao* ‘carved lapuer-ware’, 浮雕 *fudiao* ‘relief sculpture’, 贝雕 *beidiao* ‘shell carving’, Packard argues that the productive use of 雕 *diao* ‘carve’ as a noun suggests that 雕 *diao* has undergone a reanalysis process that change its form class from verb into noun. The gestalt word dominates over its internal constituents and the word identity determines the identity of the head. 雕 *diao* ‘carve’ is a verb, but it is on the right side of the noun word, thus it is reanalyzed as a noun.

This reanalysis is also applied to verbs such as 大便 *dabian* ‘to move the bowels’, 小便 *xiaobian* ‘to urinate’. Clearly, both 大 *da* ‘big’ and 小 *xiao* ‘small’ are adjectives, but because they occupy the left-hand side of gestalt [A+ N]v verbs, and left side is the head position for verbs, therefore, they are reanalyzed as verbs, as shown in the following examples:

1. 我 大 完 便 就 去 打球。
wo da wan bian jiu qu daqiu
 I big finish convenience then go play ball
 I will go to play ball after ‘moving the bowels’.

2. 他 小 了 三十 分钟 的 便。
ta xiao le sanshi fenzhong de bian
 he small LE 30 minute DE convenience
 He peed for 30 minutes.

This kind of use for compound words is a reflection of native speakers’ intuitive morphological knowledge about Chinese compounds. Packard's observation is based on verb and noun disyllabic compounds, and these compounds clearly have heads within the gestalt words, in which verb has its head on its left side and noun has its head on its right side. Because native Chinese speakers know that verb tends to have its head on the left and noun tends to have its head on the right, they will construe the left constituent of any verb as the head of the verb and right constituent of any noun as the head of the noun. So Chinese speakers can accept the fact that 大 *da* ‘big’, 小 *xiao* ‘small’ and 雕 *diao* ‘carve’ in 石雕 *shidiao* ‘stone carving’, 大便 *dabian* ‘to move the bowels’ 小便 *xiaobian* ‘to pee’ have changed their form classes due to the percolation of form class of the gestalt word (Packard 2000). Interestingly, this reanalysis process is also applied to adjectives, especially the ABB adjectives. Table 6 shows the ABB adjectives reanalysis process.

Table 6. Adjective reanalysis examples

| N + BB | Reanalysis examples | Pinyin and meaning of the adjectives | Gloss of the sentences |
|--------|---------------------|--------------------------------------|--|
| 肉墩墩 → | 这个人真肉。 | <i>roudundun</i> , fat | The person is very fat. |
| 牛哄哄 → | 这位老板很牛。 | <i>niuhonghong</i> , | The boss is excellent. |
| 油汪汪 → | 这张桌子太油了。 | <i>youwangwang</i> , oily | The table is too greasy. |
| 气鼓鼓 → | 她对这件事很气。 | <i>qigugu</i> , angry | She is very angry with this. |
| 水淋淋 → | 今天买的猪肉太水了。 | <i>shuilinlin</i> , watery | There is too much water in the pork |
| | 这篇文章太水了。 | | This paper is too weak. |
| 毒花花 → | 今天的太阳太毒了。 | <i>duhuahua</i> , scorching | The Sun is scorching. |
| 火辣辣 → | 这位演员终于火了。 | <i>huolala</i> , hot | The actor is popular finally |
| 木呆呆 → | 她的男朋友很木。 | <i>mudaidai</i> , | Her boyfriend is very slow (stonily) |
| 文绉绉 → | 姚明很文，但那没有用。 | <i>wenzhouzhou</i> , | Yao Ming is very gracious, but it is useless |
| 贼溜溜 → | 车上的小偷太贼了。 | <i>zeiliuliu</i> ,sneaky | The thief on the car is very sneaky |
| 面乎乎 → | 有的男人做事很面。 | <i>mianhuhu</i> ,weak | Some men are very weak in doing things |

As we can see in Table 6, the heads on the left-hand sides in the ABB adjectives are all nouns; however, they can be used as adjectives through reanalysis. The reason can be that they occupy the left hand side of the adjective compounds, and the left hand side is the head position for Chinese adjectives; therefore, they are changed into adjectives. Again this supports my Left Headed Hypothesis for Chinese adjectives.

In addition, this form class percolation can be applied to other Chinese adjectives such as attributive adjectival compounds and adjectives with infixes. This is shown in Table 7.

Table 7. Reanalysis in other adjectives

| N +A | Examples | Pinyin and meaning f the adjectives | Gloss of the sentences |
|-----------|----------|-------------------------------------|----------------------------|
| 冰凉 → | 他的手很冰。 | <i>bingliang</i> , ice-cold | His hand is ice-cold. |
| N +里/不+NA | | | |
| 土里土气 → | 这位教授太土了。 | <i>tulituqi</i> , corny | The professor is too corny |

Table 7 further shows us that the reanalysis and percolation is a wide spread phenomenon in Chinese morphology, especially in Chinese adjectives.

(2). Adjective infixes

The Chinese adjectives with infixes also show the same tendency in adjective formation. I find 58 of them in *现代汉语词典 Modern Chinese Dictionary*, and 54 out of 58 adjectives have the adjective on the left, that counts 91% of the adjectives; only 4 of them have a noun on the left. We cannot say that the infix is the head of this type of adjectives. The head is clearly on the left said of the word. Table 8 shows some of the examples.

Table 8. Adjectives with infixes

| A + B + (C+D) | Pinyin | Gloss |
|---------------|----------------------|----------------|
| 白不毗咧 | <i>baibucilei</i> | white |
| 黑不溜秋 | <i>heibuliuqiu</i> | dark, black |
| 花不棱登 | <i>huabulengdeng</i> | multicolored |
| 滑不唧溜 | <i>huabuliuji</i> | slippery |
| 酸不溜丢 | <i>suanbuliudiu</i> | sour |
| 老实巴交 | <i>laoshibajiao</i> | honest |
| 胖不伦墩 | <i>pangbulundun</i> | fat |
| 黑咕隆咚 | <i>heigulongdong</i> | dark |
| 曲里拐弯 | <i>quliguaiwan</i> | bent, crooked |
| 笨了呱叽 | <i>benleguaji</i> | silly. Stupid |
| 糊里糊涂 | <i>hulihutu</i> | confused |
| 怪里怪气 | <i>guailiguaiqi</i> | weird, strange |
| 冷不丁 | <i>lengbuding</i> | sudden |
| 软古囊 | <i>ruangunang</i> | soft |

Zhu (1994) treated B such as 不 *bu* ‘not’ and 里 *li* ‘inside’ in these adjectives as infixes because they are comparatively free and can form quite a few adjectives. He argued that B+ (C+D) is not a suffix because B is independently used. I think it is a better treatment than suffix.

(3). A-not-A question operation on adjective compounds

As many have claimed (Chao, 1968; Tang, 1978; Li and Thompson, 1981; McCawley, 1992), Chinese adjectives are type of verbs because they share syntactic properties with verbs. The most important similarity between Chinese verbs and adjectives is that they both can function as predicate directly and independently; in other words, they can fill in the same syntactic slot in a sentence. We would assume that if they belong to the same form class, then they might also share the morphological properties; in other word, adjectives should have the same or similar morphological operations as verbs do. One of the same operations for verbs and adjectives is A-not-A question operation, as illustrated in Table 9.

Table 9. A-not-A operation in Chinese verbs and Adjectives

| Type | Original form | A-not-A | Pinyin | Gloss |
|-------------|---------------|---------|----------------|--------------------------------|
| V+O | 睡觉 → | 睡不睡觉 | <i>huijiao</i> | To sleep or not |
| O+V | 步行 → | 步不步行 | <i>buxing</i> | To walk or not |
| A+A | 美丽 → | 美不美丽 | <i>meili</i> | To be beautiful or not |
| A+V | 好看 → | 好不好看 | <i>haokan</i> | To be good-looking or not |
| V+A | 开阔 → | 开不开阔 | <i>kaikuo</i> | To be wide or not wide |
| N+A | 笔直 → | 笔不笔直 | <i>bizhi</i> | To be straight like pen or not |
| V+N | 超群 → | 超不超群 | <i>chaoqun</i> | To be outstanding or not |
| A+X(suffix) | 粘乎 → | 粘不粘乎 | <i>nianhu</i> | To be sticky or not |

Packard (2000) argues that this operation applies to the left constituents of verbs because native speakers construe the heads of the verb are on the left side. This operation indeed apply to adjectives as shown in Table 9. In [N+A], [V+N] and [V+ A] type of adjectives, the A-not-A question operation can still apply. This suggests that Chinese speakers take the first left element of the whole adjective word as a head even though it is not an adjective. This is the same as the verb compound 步行 *buxing*, ‘walk or not’. It can have an A-not-A operation on its head 步 *bu* ‘step’, although it is a noun, not a verb. The reason is that the head of Chinese verbs is on the left. Through percolation, the form class of gestalt word determines the form classes of constituents of gestalt words.

Therefore, Chinese speakers construe the left elements of the gestalt adjective words as adjectives.

However, it can also be argued that an adjective can be applied to A-not-A question operation is not because its head is on the left but because the rule of A-not-A questioning requires the first left constituent must be repeated no matter it is head or not. This issue will not be discussed in this paper.

5. Conclusion

This study investigates the headedness of Chinese adjectives and argues that the head of Chinese adjectives is more likely on the left than on the right. Statistically, Chinese adjectives may be two headed or the head are 'free to vary', but the ABB type of adjectives seems to suggest that the head should be on the left. This conclusion supports the Headedness Principle in Chinese. In addition, I also argue that the ABB type of adjective reduplication is more likely to be a compounding process than a suffixation due to the fact that most BB parts of the adjectives still have concrete lexical meanings and many of them can be used freely as independent words. They may be in the process of grammaticalization, and are becoming more and more a suffix. However, even if they are suffixes, they do not change the form classes of the adjective words and thus they are not heads; thus the head of Chinese adjectives is still on the left hand of the adjective words.

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