Monosyllabicity and Disyllabicity in Chinese Prosodic Morphology
論漢語韻律構詞法中單音化與雙音化的二律背反

◎Shengli Feng /
Harvard University / Beijing Language University

◎馮勝利 /
（美國）哈佛大學 / 北京語言大學

Abstract: There has been a controversy in the field of linguistics over the syllabic property of mandarin Chinese: whether it is a monosyllabic or a polysyllabic language. In this paper I propose that there are two rules responsible for the 'monosyllabic myth' in Chinese morphology. I argue that the Morphosyllabicity Rule (MR) operates on the morphemic level, while the Foot Formation Rule (FFR) applies at the syntactic level. Under the two-rule system presented here, it is easy to see why there are two seemingly opposite processes in Chinese morphology: monosyllabic forms are forced to become disyllabic, while disyllabic morphemes develop towards monosyllabicity.
Key words: Monosyllabic Myth, Monosyllabicity, Disyllabicity, Morphosyllable, Foot-Binarity, Prosodic Morphology

提要： 漢語究竟是多音節語言還是單音節語言？本文提出：漢語 "單音神化" 的傳奇源於漢語構詞系統中兩條規則的相互作用：一是語素平面中的 "音節語素律"，二為語素平面後的 "音步雙分律"。本文認為：根據這裏二律互動的理論體系，我們可以合理地解釋為什麼漢語存在兩種表面相互矛盾的詞法運作： "單音形式的雙音化" 和 "雙音語素的單音化"。
關鍵詞： 單音神化、單音化、雙音化、音節語素律、音步雙分律、韻律構詞學

1. Introduction

There has been a 'war' in the field of linguistics over the syllabic property of Chinese language/s: whether Mandarin Chinese is a monosyllabic language or a polysyllabic language. The arguments in the literature for the last thirty years have resulted in two paradoxical generalizations:

1. (i) Mandarin Chinese is a monosyllabic language
   (Ii) Mandarin Chinese is a poly-(di-)syllabic language.

The monosyllabic approach (see, Karlgren 1929, 1949; Li, F. K, 1951; Chao & Yang, 1962; Chao Y.R, 1968; Chou, F.G. 1982, and others) insists that since almost every syllable of Chinese has a meaning, Chinese should be characterized as a monosyllabic language. Thus, Chao writes: "The so called 'monosyllabic myth' is in fact one of the truest myths in Chinese mythology (1968:139)."

The polysyllabic approach (see Kennedy, 1951; DeFrancis, 1950; Jing, 1969; Li & Thompson, 1981 and many others) observes that more than 80% of words in a running text or an ordinary Chinese dictionary consist of two or more syllables.[1] If the majority of words are polysyllabic, there is no reason to consider Chinese a monosyllabic language. As Kennedy has reasoned: we have no record of Chinese ever having even as many as four thousand distinct syllables, a number which if representing only words of one syllable would have been quite inadequate to represent the scores of thousands of expressions that the Chinese with their highly sophisticated cultures must have needed to express themselves (1964:104-118, 274-322).

Although the 'war' seems to be over by now, the controversy remains unresolved. In contemporary linguistic literature, one can easily take the monosyllabic approach for granted,[2] while others may freely take the disyllabic property as given.[3] It seems that no one would deny that modern Chinese is a monosyllabic language in the sense that every syllable has a meaning, while disyllabicity is also a property in its morphology. So the problem we face is: if Chinese is a monosyllabic language, how could it contain more than 80% disyllabic words? On the other hand, if disyllabicity has become a characteristic of the language, how could it still sustain a monosyllabic property? As Tang (1989:569) has put it: "We can certainly assert that the tendency towards disyllabicity of the Chinese lexicon will be developed further rapidly. Of course, we must realize that although the number of monosyllabic words is not high, the frequency of their occurrences is much higher than that of polysyllabic ones. As a result, the question of whether Chinese is a monosyllabic language or a polysyllabic language is still difficult to decide." (My translation)

In this paper, I will propose a two-rule system of Chinese morphology in section 2, based on the theory of prosodic morphology developed by McCarthy and Prince (1993) and Feng (1994, 2000). I shall demonstrate that the morphological system of Chinese can be constructed by two independent rules: a

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[1] According to Chou's calculation (1982:10), there are 1,478 (13%) monosyllabic forms, 6,816 (60%) disyllabic forms, and 3,072 (27%) polysyllabic forms in *Readings in Sayable Chinese* (eds. by Chao, Y.R.1968).

[2] See, for example, Duanmu 1993, Footnote 7.

[3] See, for example, Tang 1989:3,4,568; Li, 1989:1 14)

Morphosyllabic Rule (MR) and a Foot Formation Rule (FFR).[4]

Furthermore, I will argue, in section 3, that these two rules apply at two different levels of the grammar: MR applies at the morphemic level, and FFR at the phrasal (or syntactic) level. Given the two levels for the application of these two rules, it follows that the input of FFR must take the output of the MR. Under this system, the monosyllabic property is determined by the rule of morphosyllabicity (see, 2.1) and the characteristic of disyllabicity is derived from the rule of Foot Formation (see, 2.2). Section four investigates the interaction between MR and FFR, in which the [2-to-1] and [1-to-2] morphological process are discussed. Given the two-rule system hypothesis, a number of theoretical consequences will be summarized in sections five and six.

2. Two Rules in Chinese Morphology

2.1. Morphosyllabic Axiom

It has been widely recognized that morphemes in Chinese are overwhelmingly monosyllabic. However, there are neither generalizations nor linguistic representations to consider the monosyllabicity as a morphological constraint of the language. Traditionally, linguists only gave general statements such as "speaking of morphemes, Chinese is basically monosyllabic language" (Chou, 1984), but never considered it as a rule in Chinese. Some crucial reasons, I think, are these: First, we lack a theory of how it is possible for a language to

observe a monosyllabic rule. Second, there are disyllabic monomorphemes in everyday speech, even though they are very rare. For example (a "." before a syllable indicates it is neutralized):

2. hudie   `butterfly'
   Yuan.yang   `mandarin duck'
   tanglang   `mantis'
   bo.li   `glass'
   pu.tao   `grape'

However, as we will see below, these disyllabic morphemes cannot disprove the general fact that morphemes in Chinese are overwhelmingly monosyllabic. For reasons that will be given below, I would like to suggest that the property of syllabic monomorphemic formation should be considered a general constraint in Chinese morphology. This constraint will be stated using DeFrancis' term (1986:187) as "morphosyllabicity" and formulated in (3):

3. Morphosyllabic Rule (MR) ("M" stands for morpheme and " σ " for syllable):

$$M$$
$$|$$
$$σ$$

In Chinese, a syllable must correspond to a morpheme.

According to MR, the M node dominates a syllable directly hence a syllable is directly correspondent to a morpheme. The mapping between an "M" and a " σ " will immediately result in a type of output of one syllable with one morpheme.

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[4] Therefore in Chinese, syllabic writing is de facto morphemic writing, and thus to call it morphosyllabic is correct, but not fundamentally different from calling it logographic or morphemic. (William G. Boltz 1989. Reviews (11) *Sino-Platonic Papers*,14)

The MR can also be naturally derived from the theory of Prosodic Morphology developed by McCarthy and Prince (1993). More specifically, it is derived from the theory of alignment. Recent studies of the syntax/prosody interface have resulted in an edge based theory (Chen 1987; Selkirk 1986; among others), which proposes that the domains of sentence phonology are specified by rules like "The right/left edge of some grammatical constituent coincides with the corresponding edge of some phonological constituent" (cf. Selkirk 1986). This rule has been defined in terms of edge alignment (ALIGN), with the following general schema by McCarthy and Prince (1993):

4. General Schema for ALIGN

In ALIGN (GCat, GEDGE, PCat, PEdge), the GEdge of any GCat must coincide with PEdge of some PCat, where,

Gcat ≡ Grammatical Category, among which are the morphological categories

Mcat ≡ Root, Stem, Morphological Word, Prefix, Suffix, etc.

PCat ≡ Prosodic Category ≡ μ , σ , Foot, PrWd, PhPhrase, etc.

MEdge, PEdge = Left, Right

McCarthy and Prince's edge alignment schema extends the Chen/Selkirk theory in two ways: the grammatical and prosodic categories subject to alignment are the word?-internal morphological constituents, root, suffix, etc., and the word internal prosodic constituents, syllable, foot, etc.; and alignment of different edges may also be required.

It has been observed that many languages require free-standing (nonclitic) words to be of a minimal prosodic size (typically disyllabic or bimoraic). Subminimal items are either barred from the lexicon entirely or brought up to code through various augmentation processes. As pointed out by Kenstowicz (1993), in Australian language Yidiny, all roots conform to a CVCV(CV) template, and therefore are minimally disyllabic.

If there is a general correlation between certain prosodic categories (mora, syllable) and certain morphological categories (root, morpheme, words) in human languages, then it is reasonable that the MR in Chinese might simply be the result of the general principle of Edge Alignment. The alignment principle is parameterized in terms of a coterminous between a prosodic category syllable and a morphological category morpheme. In other words, the MR is a subcase of a more general principle of Edge Alignment between prosody and morphology. Given this, the Morphosyllabic Rule can be interpreted in terms of Edge? Alignment[5] between syllables and morphemes (`M' strands for root morphemes and ` σ ' for syllables):

5. ALIGN: [M] = [σ]

This constraint relates the prosodic category syllable to the morphological category morpheme, demanding that they begin and end together. This constraint has some interesting linguistic consequences in Chinese grammar (Feng, 1994/2000). It is important to note here the implication that any operation which

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[5] In the on going discussions, we use the symbol ALIGN to indicate an alignment of both edges ALIGN L for left-edge alignment, and ALIGN R for right-edge alignment. Furthermore, ALIGN: [X]=[Y] represents a situation where X and Y not only begin and end together, but also are interchangeable: If it is X, it must be Y. However, ALIGN:[ ]X = [ ]Y stands for a situation where X and Y begin and end together, but Y may not necessarily be X (although X must be Y).

breaks the desired relation between the morphological and prosodic constituency of a form, will be a violation of the constraint, since ALIGN requires sharply defined morpheme edges. For ALIGN to be satisfied, the morpheme final consonant or vowel must occupy the final position in the corresponding syllable, and the morpheme initial C or V must occupy initial position in that syllable. Consequently, a "morpheme mid syllable/consonant" will de align a morpheme (see McCarthy & Prince 1993:38). This explains why there is no re syllabification in Chinese, as shown in (6) (where "?" marks the morpheme boundary):

6.　CV | CVC → *(CVC) VC)

Another important implication of the constraint [ALIGN: M= σ] is that the minimal or primitive constituents for morphological operations in the language are monosyllabic morphemes or words. From a prosodic viewpoint, any combination of two or more morphemes will interfere with the organization of syllables. From a morphological point of view, any association of two or more syllables will affect the morphological structure. Because of this, the organization of the grammar beyond individual syllables (in the prosodic system) or individual morphemes (in morphological system) will involve principles or constraints, both prosodic and morphological.

Note further that the [ALIGN: M= σ] also entails that, the following structure given in (7) must be ill-formed:

7.　　　　　*M

σ　　　σ
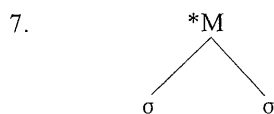
In (7), the M node dominates two syllables, hence disyllabic morphemes will be generated. Obviously, if MR is a general rule in Chinese morphology, structures like the one given in (7) must be ill-formed. In other words, as a result of MR, there would be no syllable that is not a morpheme and no morphemes that contain two or more syllables. In next section, I will provide evidence to support the possibility of taking MR to be a general rule (or constraint) in Chinese morphology.

2.1.1. Morphemization of polysyllabic words

As shown in (2), seemingly counterexamples to the MR can easily be found in Chinese. However, as Sproat & Shih (1993) points out, within some disyllabic morphemes such as hudie (butterfly), in which the two syllables represent only one morpheme, one of the two syllables can be used as an independent morpheme in combination with other morphemes. For example:

8.

hudie `butterfly'	die-yong	`butterfly stroke'
mayi `ants'	xiong-yi	`male ants'
luosi `snail'	luo-wen	`whorl'
chanchu `toad'	chan-su	`toad cake'
tanglang `mantis'	tang-bi dang-che	`antis arm stop car' (an antis stops a car with its arm)
Yuan.yang `mandarin duck'	yuan-lü	`affectionate company'
Bo.li `glass'	bo-qian	`class fiber'
hu.li `fox'	hu-shou	`fox smell'
zhi.zhu `spider'	zhu-wang	`cobweb'
pang.xie `crab'	xie-qing	`greenish-grey (color)'
luo.tuo `camel'	tuo-mao	`camel hair'

Note that if *die-yong* is a compound formed by two

morphemes, *die* must be considered as an independent morpheme. If *die* is a morpheme, then the first part of *hu-die*, i.e. hu, must also be analyzed as a morpheme. That is, given the following diagram, if B in [B C] of (9b) and in [B D] of (9c) is a morpheme of compound words [B C] and [B D], then "a" in [a B] must also be considered as a morpheme.

9. a.   **a   B**
    b.   B   C
    c.   **B   D**

This treatment is parallel to a morphological analysis of *cranberry, huckleberry and boysenberry.* If *berry* is a morpheme, the other part of the words, i.e. *cran* in *cranberry, huckle in huckleberry,* and *boysen* in *boysenberry* must also be analyzed as morphemes although no such forms *cran, huckle* and *boysen* exist in the English lexicon. That is, the morphological theory must allow some morphemes that are not meaningful in isolation. These type of morphemes acquire meaning by virtue of their connection with other morphemes to form words. Likewise, if *die* in *die-yong* is a morpheme, there is no reason not to consider *hu* in *hu-die* to be a morpheme, even though hu may not be independently listed in the lexicon analogous to *cran, huckle* and *boysen.* If *hu* is a morpheme according the above analysis, then the correlation of a syllable with a morpheme satisfies the MR given in (3). In other words, as long as *hu* and *die* are two morphemes, they meet the morphosyllabic constraint: a syllable is directly dominated by a morpheme. If this is the case, the so-called Butterfly-cases would not be 'true' exceptions to the hypothesis that there is actually a

rule in Chinese morphology that a syllable must coincide with a morpheme.

Su (1989) and Sproat & Shih (1993) have provided rich documentation of a strong tendency in Mandarin compound formation to pick one morpheme in a polysyllabic form. This tendency can be seen as a process of morphemization of polysyllabic forms, i.e. to pick up one syllable from a polysyllabic word and make it a morpheme by combining it with other morphemes/words that already exist in the language. Note that the morphemization process happens not only in those where one part of the polysyllabic form was used in classical Chinese (Sproad & Shih, 1993:194), but also in loan words borrowed from other languages. For example,

10. Fute < volt   fu `volt'
     wate < watt   wa `watt'
     mitu < mètre   mi `meter'
     tedilun<terylene   di-lun `terylene', di-mian
`polyester fiber'
     fotuo < Buddha   fo jing `Buddhist sutra'
     Menggu < Mongol   meng yi `Mongolian doctor'

These examples demonstrate that morphemization is an active process in Chinese morphology and provides strong support to the grammatical function of MR. Given this, it is reasonable to conclude that the tendency towards morphemization of a polysyllabic form is motivated by operations of the Morphosyllabic Rule and that this rule functions actively in Mandarin Chinese.

However, we may also note that there are disyllabic morphemes that do not follow the rule given in (3). For example:

11. a. Binglang   `betel nut'
     b. ningmeng   `lemon'
     c. pangguang   `balder'
     d. hu.lu   `bottle gourd'

Furthermore, there are syllabic epenthesis forms in the language:

12 a. xue.me   'look for'
    b. zha.me   'blink'

The two syllables in the above examples are inseparable, and none of them has been used to form a part of another compound. Therefore, these are exceptions to the analysis given above, meaning that the MR may not be the only rule in Mandarin Chinese. Actually, as we will see below, the MR given in (3) must be violated since the Foot Formation Rule (FFR) is also a constraint in the language. We will discuss the interaction between the MR and FFR below. For now, we may safely say that MR applies only to root-morphemes [6], hence it is not sensitive to non-root morphemes. Since the disyllabic forms in (11)[7] and the second syllable in

[6] Root-morphemes are morphemes that can be used to form a *syntactic* compound. Thus, *xie* (crab), in *zi-xie* (purple crab) is a root-morpheme, because it serves as a head of the syntactic compound, but *zi* in *yi.zi* (chair) is not a root-morpheme, because it is a suffix (functional morpheme), and the compound is derivative, rather than syntactic. Epenthesis syllables like the ones in (10) are naturally excluded from root-morphemes.

[7] They can also be accounted for in terms of loan words that are exceptional to native rules.

[8] The distinction between root morphemes and non-root morphemes (excluding functional epenthesis syllables) can also be seen from the fact that re-syllabification in Chinese does not exist between root morphemes demanded by the Edge-Alignment given in (3), but sometimes happens to functional morphemes such as a in the following:

Tian-*a*   Tian-*na*
Heaven-particle   Goodness!

(12)[8] are not root-morphemes, the MR would not see them within this system.

2.1.2. Anti-Disyllabicity

Although disyllabicity has been believed to be a strong tendency in modern Chinese, anti-disyllabicity can also be observed in the language. That is, disyllabic forms of some sort tend to reduce to a monosyllabic form again. Chou (1982) pointed out that the reduction of the nominal suffix *er* must be considered as a process of anti-disyllabicity (1982:9). The reduction of *er* is further elaborated in Xu (1990). He argued that Chinese exhibits a tendency for disyllabic forms to be reduced to monosyllabic forms, by observing that, *hai-er* (child-son) is a disyllabic word formed by *hai* (child) plus a monomorphemic nominal suffix *-er* which was developed from the middle Chinese word *er* meaning `son, small.' However, the second syllable *er* in almost all nouns of Mandarin Chinese has been reduced to only a /r/ feature fused on the proceeding syllable yielding a monosyllabic word. This type of process can be formulated as follows:

13. Monosyllabic Word →Disyllabic Word →
Monosyllabic Word
     hai   *hai-er*   *hair*

He then concludes that the operation of two syllable words becoming one syllable words, i.e. [2-to-1], is a very active morphological process in many Mandarin dialects. The operation here is thus generalized as follows: first, the last morpheme in a two syllable compound loses its meaning with its syllabic status; second, the phonological feature of the reduced syllable is joined to the first one according to general

phonological constraint/s, yielding what Kratochvil (1968) called a fusion syllable. Given the observations provided by Chou (1982), Kratochvil (1968), Xu (1990), and Wang (1994), it seems that even if functional morphemes are beyond its scopes, MR still wants every root-morpheme to be formed by itself independently. Therefore, the suffix has a tendency to lose its syllabic status. If it is so, the er-reduction not only provides examples of anti-disyllabicity, but also argues for the dynamic power of MR.

2.2. Foot Formation Rule

Following Feng (1994, 1998), I would like to suggest further that there is another rule in Mandarin morphology:

14. Foot Formation Rule

$$
\begin{array}{c}
f \\
\diagup \diagdown \\
\sigma \qquad \sigma
\end{array}
$$
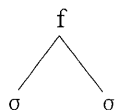
A foot must is formed by at least two syllables.

As indicated in previous studies (see, among others, Chen 1979, Shih 1986, and especially Feng 2000:Ch2), Chinese employees disyllabic foot structure. For example,

15.   A: Jintian ji hao?
    Today what date?
    `What date is today?'

  B: a.   *Wu.   `Five.'
    b.   Wu hao. five-number `Five.'

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  c.   Chu wu. Beginning five   `Five.'
  d.   Shi wu. ten five   `Fifteen.'

16.   a.   Emei, Taihang, Hua-shan, Tai-shan, Jinggang-shan dou shi Zhongguo de ming shan.
  Emei, Taihang, Hua mountain, Tai Mountain , Jinggang mountain are all China's famous mountains.
  Emei, Taihang, Hua, Tai and Jinggang are all famous mountains.
  b.   Emei, Taihang, *Hua, *Tai, Jinggang dou shi Zhongguo de ming shan.
  Emei, Taihang, Hua, Tai, Jinggang are all China's famous mountains.
  Emei, Taihang, Hua, Tai and Jinggang are all famous mountains.

The examples in (15) show that a monosyllable word cannot be used independently within the context cited above. The examples in (16) show that monosyllabic words cannot form an independent foot co-occurring with other feet. These examples suggest that FFR must be considered a prosodic constraint in Chinese grammar. Of course, exceptions to the FFR may be found in cases like the following:

17.   Fan, wo yidianr dou bu xiang chi.
  Food I little all not want eat.
  As for food, I don't want to eat it at all.

A monomorphemic word is used as an independent foot as seen above. However, it must be supported by a pause after it (indicated by `#'), that is:

18.   Fan # wo yidianr dou bu xiang chi.
  Food # I little all not want eat.

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[9] Neutralized suffixes are also motivated in this regard.

As for food, I don't want to eat it at all.

It is well-known (see Chao, 1968:67) that after the topic (and also the subject), there is an overt grammatical pause between the topic and the comment in Chinese, and this is especially true when a monosyllabic form acts independently as a topic or a subject. Hence monosyllabic forms are structurally limited only to appear in the topic and subject positions in Chinese. In this situation, if we take the pause to be some kind of prosodic epenthetic device for the single syllable, this type of foot would be structurally represented as follows (a syllable with a prosodic epenthetic pause):

19.　f
　　　／＼
　　　／　　＼

Fan　　[pause],　　wo yidianr dou bu xiang chi.
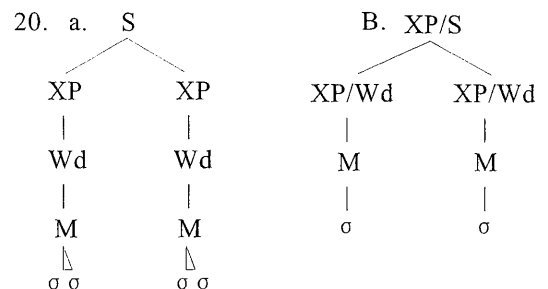Food,　　　　　　I don't want to eat it at all.
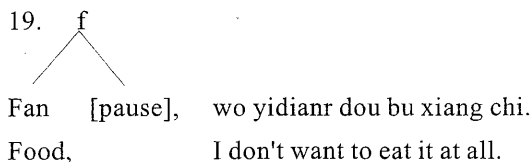
If this is so, the generalization that a monosyllabic word cannot form an independent foot can also hold in situations where a monosyllabic foot occurs.

3. Levels for Operation of MR and FFR

Given the two rules (MR and FFR) outlined above, we are facing a paradoxical situation in Chinese morphology. By MR, monosyllabic words are licensed and hence legitimate in the language. If this is so, why would disyllabic words develop at all? By FFR, any instances of phonological words must be disyllabic, hence all monosyllabic words must be ruled out as a violation of the prosodic minimality. If this is correct, why are there monosyllabic words co-occurring with

disyllabic forms and why is there a tendency of anti-disyllabicity as seen above? Obviously these two rules are mutually exclusive. That is, if there is a rule that requires prosodic morphological units to be formed by only one syllable, a disyllabic rule could not be allowed in the prosodic morphology. On the other hand, if a disyllabic rule is operative in the prosodic morphology, the monosyllabic rule would have been eliminated in that system because these two rules are incompatible. As a result, the operation of one rule will be to the expense of the other. However, these two rules co-exist in Chinese and their output occurs side-by-side. As a result, a theory of Chinese morphology must be developed in such a way that these two rules operate freely in the morphological system.
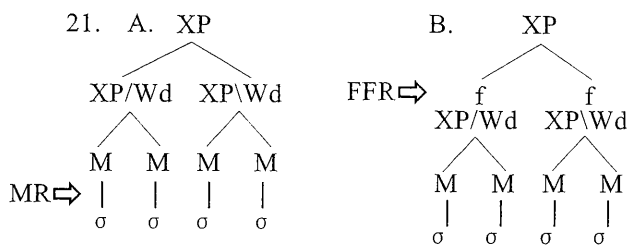
In this paper I shall propose that the MR and FFR are actually located at two different levels of grammar: the MR applies at a level where morphemes or monosyllabic words are constructed, while FFR applies at the post-morpheme level where morphemes (bound or free) are put together, as seen from the following analysis of (20a-b) (`M' strands for morphemes and `Wd' for words).

20. a.　　S　　　　　　　B.　XP/S
　　　　／　＼　　　　　　　／　　＼
　　　XP　　XP　　　　XP/Wd　XP/Wd
　　　｜　　｜　　　　　｜　　　｜
　　　Wd　　Wd　　　　M　　　M
　　　｜　　｜　　　　　｜　　　｜
　　　M　　M　　　　　σ　　　σ
　　　Λ　　Λ
　　　σ σ　σ σ

(20a) represents a structural analysis where syllables are organized into morphemes (M),

morphemes are combined into words (Wd), words are grouped into phrases (XP), and finally, phrases are structured into a sentence (or a larger phrase). This is a possible hierarchical structure for languages like English. Note that there is no constraint on one-to-one correlation between an individual syllable and an individual morpheme in English. However, since MR is a rule in Chinese, a structure like (20a), which is possible in other languages, must be re-structured as (20b) in Chinese. That is, one syllable must correlate directly to a morphological unit (either a morpheme or a monosyllabic word). Since a morpheme (bound/free) plus a morpheme (bound/free) in Chinese must be formed according to the syntax, (20b) is a natural result of morpheme (or syllable) combination.

Given this, it is clear that only after the structure organized by the insertion of lexical items produced by MR, can the application of FFR take place, as illustrated in (21).

21.　A.　XP
　　　　　　／＼
　　XP/Wd　XP\Wd
　　　　／＼　　／＼
　　　M　M　M　M
MR⇨ |　|　|　|
　　σ　σ　σ　σ

B.　　XP
　　　　／＼
FFR⇨　f　　f
　　XP/Wd　XP\Wd
　　　／＼　　／＼
　　M　M　M　M
　　|　|　|　|
　　σ　σ　σ　σ

Since FFR is syllable-based and since MR demands each syllable to be a morpheme, a grouping of syllables will inevitably result in a grouping of morphemes (bound/free). Since the FFR cannot apply without a grouping of syllables, and since syllables (morphemes) cannot be grouped without syntax, the application of FFR on syllables will inevitably involve an operation of syntax.

Note that if the language has only a FFR without the MR, then free-standing words (non-clitic) in Chinese would all have been constructed as disyllabic forms. This is because monosyllabic words violate prosodic minimality. Subminimal items are either barred from the lexicon entirely or are brought into it through various augmentation processes. However, MR is also a dynamic rule in Chinese, and most crucially, it functions at a different level from the FFR. Therefore, an application of one rule cannot stop the operation of another. That is, MR cannot go beyond the morphemic level to prevent the operation of FFR, and FFR cannot apply to levels lower than syllables to interfere with MR. Since each of them has its own domain of application, MR freely produces morphosyllabic forms below phrasal level, while FFR unobstructedly generates Prosodic Words (PrWd, see Feng 2000)) above morpheme level. As a result, Chinese morphology is determined by not only FFR but also MR. This scheme can be represented as in Table 1.

Table 1. Two-Rule System of Chinese Morphology

LEVELS	RULES	PROCESS	LEXICON
Phrasal	FFR	PrWd ／＼	Disyllabic Forms
Morphemic	MR	M M | | σ σ	Monosyllabic Forms

Given this analysis, we see that these two levels make it possible for the co existence of monosyllabicity with disyllabicity in Chinese morphology.

4. Interaction Between MR and FFR

As we have seen before, either MR or FFR has a

separate domain of their application, and because of this, it becomes possible for disyllabic forms to coexist with monosyllabic forms. However, although neither of these two rules would prevent the application of the other, each of them affects the output of the other. This is because the output of MR must appear in phrases where FFR dominates. As a result, the output of MR must be satisfied by FFR at the post-morpheme level. On the other hand, MR is also a rule that dominates at the morphemic level, hence disyllabic morphemes will violate the requirements of MR. The domination relationship is thus formulated as below (where ">>" means "dominates"):

22. Syntactic Level   FFR >> MR

      Morphemic Level   ,   MR >> FFR

This situation can best be interpreted in terms of the Optimality Theory (OT). That is, when FFR dominates MR, the output of MR must be considered as violation of FFR. When MR dominates FFR, the output of FFR may or may not be considered as a violation of MR, depending on whether the disyllabic compounds produced by FFR are represented by one or two lexical morphemes. If the disyllabic forms are represented by a combination of two lexical morphemes, the MR is satisfied, and if it is represented by only one lexical morpheme, the result would be a violation of MR.

Thus, the intervention of one rule on another will inevitably result in the following situation: monosyllabic words always violate the FFR at the post-morphemic level, thus they must be combined with other/s to appear at the phrasal (syntactic compund) level. On the other hand, MR also intervenes to prevent epenthesis of extra syllables from occurring everywhere,

i.e. in a two syllable unit with only one lexical meaning.

Given this, it is not surprising that the dominating relationship of FFR >> MR will give rise to enormous disyllabic forms (or combinations) as exemplified in (23a c) and also causes some prosodically constrained syntactic consequences as shown in (23d g).

23. A. to look for 尋 *zim (Middle Chinese) xue.me (Mandarin)

B. to blink   眨 *tʂɤɛp(Middle Chinese) zha.me (Mandarin)

C. Mama, wo yao shui *(jiao)

     Mom, I want sleep

     Mom, I want to sleep.

D. *zhongzhi shu   zhongzhi shu mu

    plant trees   plant trees woods

E. *ba lian ca   ba lian ca-ca

    ba face wipe   ba face wipe wipe

    to wipe face   to wipe face

F. *jinxing gai   jinxing gai ge

    carry out change   carry out change change

G. *Ma, wo e   le, wo yao chi   Ma, wo e le, wo yao chi fan

     Mom I hungry Asp. I want eat   Mom, I hungry Asp., I want eat-rice.

     'Mom, I am hungry, I want to eat.'   'Mom, I am hungry, I want to eat.'

The examples given in (23a b) show that some monosyllabic words in middle Chinese have developed into disyllabic forms by adding an epenthetic syllable in Mandarin Chinese. Example (23c) shows that, under the pressure of FFR, some intransitive verbs have developed as intransitive VO compounds. Examples (23d g) show that monosyllabic words (objects or verbs) must be ruled

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out prosodically because of their incapability of forming a foot and hence realizing the Nuclear Stress (NS) at the end of the sentence (see Feng 1994, 2000).

Contrary to the requirement for disyllabicity demanded by FFR, the dominating relationship of MR >> FFR functions to motivate and thus protect monosyllabic forms as illustrated in (24).

24. [2 to 1] Process
A.　Hai+er　　　　hair
　　child son　　　children
B.　jin + ri　　　　jir
　　This day　　　today
C.　Shen-me　　　sha
　　What　　　　what

Morpholization
D.　Hudie　　　　die yong 'butterfly swim'
　　Butterfly　　　butterfly stroke
E.　fute　　　　　fu
　　Volt　　　　　volt
F.　sai en si ke xue　'branch (of academic) study'
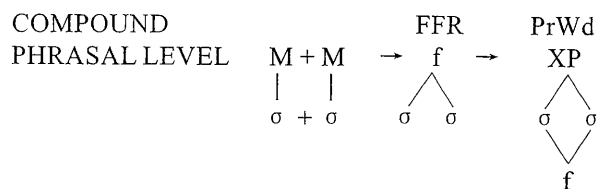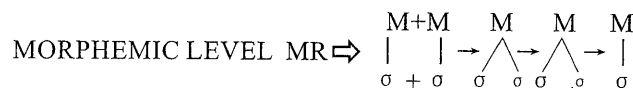　　sci en ce　　　science

As seen before, the reduced syllables in (24a c) may be initiated under purely phonological conditions, but it is important to realize that the possibility of all [2 to 1] morphological processes is possible only if they are protected or licensed by the MR, because the results of such a process would otherwise be impossible under the requirement of FFR. Given this, it would be better to consider the Chinese morphology as a system governed by the cooperation and intervention of the two rules.

The theory presented above implies clearly that the intervention of one rule on the other will inevitably result in [1-to-2] and [2-to-1] morphological processes under certain conditions as seen above. The [1-to-2] process is motivated by the FFR on the phrasal (or syntactic compound) level, in which one monosyllabic form becomes a disyllabic form by combining with another morpheme (or word), or by adding an extra epenthetic syllable. The [2-to-1] process is protected and in some cases demanded by MR. That is, if one of the two morphemes loses its lexical meaning or the two meanings are no longer compositional after a long period of usage, the second syllable of that from will be reduced, yielding a match between one syllable with one morpheme (M= σ). These two types of processes may roughly be schemed as follows ("M" stands for lexical meaning and " σ " for syllable):

25. **Schema of Chinese Morphological Process Constrained by MR & FFR**

$$
\text{MORPHEMIC LEVEL MR} \Rightarrow \quad
\begin{array}{c} \text{M+M} \\ | \quad | \\ \sigma + \sigma \end{array}
\rightarrow
\begin{array}{c} \text{M} \\ \wedge \\ \sigma\ \sigma \end{array}
\rightarrow
\begin{array}{c} \text{M} \\ \wedge \\ \sigma\ .\sigma \end{array}
\rightarrow
\begin{array}{c} \text{M} \\ | \\ \sigma \end{array}
$$

$$
\begin{array}{ll}
\text{COMPOUND} & \text{FFR} \quad \text{PrWd} \\
\text{PHRASAL LEVEL} & \text{M + M} \rightarrow f \rightarrow \text{XP} \\
& \quad |\ \ | \quad\ \wedge \quad\ \wedge \\
& \quad \sigma + \sigma \quad \sigma\ \sigma \quad \sigma\ \sigma \\
& \qquad\qquad\qquad\qquad\quad \vee \\
& \qquad\qquad\qquad\qquad\quad f
\end{array}
$$

Under this schema, it is no longer surprising that there are two paradoxical tendencies ([1 to 2] and [2 to 1] processes) in the Chinese morphology. Furthermore, the 'Monosyllabic Myth' (see DeFrancis, 1986:177-188) can be resolved, at least partially, by the cooperation as well as the intervention between MR and FFR.

of PrWd as seen in Table 1 and (25) may be crucial in resolving the traditional problems of distinguishing phrases from words in Chinese morphology (Feng 2000). Given the notion of PrWd, any instance of combinations of two (monosyllabic) morphemes will fall into the category of PrWd, hence examples such as bai zhi (`white paper') and kan po (`see through') are prosodic words. In the present theory, PrWds are outputs of the morphological system in the sense that a compound must first be a PrWd, even if a PrWd may not necessarily be a compound. Therefore, although kan po is a PrWd, it may be used in other environments as a phrase such as kan de po `be able to see through,' where a functional marker can be inserted in between the two morphemes. According to this analysis, it is natural to have the following categories:

27. Phrase:

bai.de zhi   `papers that are white'
kan.de po   `be able to see through'

PrWd:

bai zhi `white paper; white paper'
kan po `see through; understand thoroughly'

Compound:

bai shu `white potato, sweet potato'
*bai.de shu `sweet potato'
gai shan `change better, improve'
*gai.de shan `be able to change better'

Given the prosodic category of PrWd in Chinese morphosyntax, the peculiar behavior of cases like bai zhi and kan po is accounted for systematically.

Third, although the rule system of Chinese morphology produces a certain degree of redundancy in the lexicon as seen in (26), other systems of the language will be expected to operate on these forms so that they are not pure redundancies. The fact that monosyllabic forms and disyllabic forms have served different stylistic and prosodic purposes in the language, confirms the hypothesis made here. Li J. (1989), for example, observed that disyllabic forms tend to be used in formal occasions while monosyllabic forms are generally very casual. Furthermore, as seen in (23d g) above, strong prosodic positions tend to attract disyllabic forms and exclude monosyllabic forms, indicating that the monosyllabic and disyllabic forms have played different roles in Chinese prosodic system.

Finally, if the two rule system of Chinese morphology is correct, further research may provide evidence from language acquisition as to whether or not these are different steps of acquiring these two rules. Actually, Tang's study (1989:43-92) has already suggested that children exhibit a tendency to first acquire MR with an unproductive FFR. If this is so, it is not surprising that monosyllabic forms exhibit a high frequency of occurrence, given that the stylistic usage of FFR (i.e. forming a foot by using classical words or morphemes) would be a more advanced adult grammar. Obviously, if the theory given here is correct, it may also shed some light on language acquisition regarding the diglossic grammar of children and adults.

*This paper was originally composed in 1994 in order to initiate the field currently known as prosodic syntax. Today, this new field is flourishing in the Chinese-speaking world and the question of the ' monosyllabic myth' discussed here has become more important than ever. I have therefore revised the old paper with great gratitude to the editor, Professor

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