Prosodic Morphology

Prosodic morphology studies the shapes and sizes of canonical words and affixation in a language. Although it is a new area in Chinese linguistics as well as in general linguistics, many prosodic morphological phenomena have been recognized starting a half century ago. Guò first pointed out the syllable flexibility of Chinese vocabulary items in 1938, while Lǚ first recognized the morphosyntactic preferences between 2+1 and 1+2 syllabic patterns in 1963. For example see (1).

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either borrowed from other languages or passed down from classical Chinese thousands of years ago (Shen 2007). Aside from the complexity of the origins of polysyllabic words, they are neither indigenous in character, nor root morphemic in morphology in Mandarin Chinese (see Sproat and Shih 1996, Feng 2011).

Empirically, the Morphosyllabic Constraint (2) can be tested by the fact that polysyllabic forms were/are often morphemized into, and thus indigenized as, a monosyllabic morpheme in today’s morphological process (Spoart and Shih 1996). For example:

3. fótuó 佛陀 < Buddha (borrowed into China around the first century)
   fó-jīng 佛經 ‘Buddhist sutra’
   fó-diǎn 佛典 ‘Buddhist Document, Sutra’
   fó-fǎ 佛法 ‘Buddhist doctrine/power’
   fó-jào 佛教 ‘Buddhist teaching, Buddhism’
   fó-xué 佛學 ‘Buddhist Study’
   chéng-fó 成佛 ‘become a Buddha’
   dá-fó 大佛 ‘great Buddha’
   huó-fó 活佛 ‘current Buddha’

Furthermore, a well-known phenomenon in Chinese phonology is this: There is no resyllabification process in the language, for example:

CVC|VC → *(CV (CVC) lin-an → *li-nan

The lack of a resyllabification process in Chinese phonology is arguably an effect of the Morphosyllabic Constraint, namely that 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 and...
morphemes in Chinese coincide with syllables, the combination of morphemes coincides with a bigger prosodic category than the syllable in the Prosodic Hierarchy given below. According to the Prosodic Hierarchy proposed in McCarthy and Prince (1993), the next hierarchical category above the syllable is the foot.

5. Prosodic Word (PrWd = Compound)
   - Foot
   - Syllable
   - mora

As seen in (5), the prosodic category above the foot is the Prosodic Word (PrWd) and in fact, a PrWd is realized by a foot. As a result, a foot is essential in determining (or imposing upon) the morphological category PrWd. What is a foot in Chinese?

The foot formation in Chinese can be successfully tested by using nonsense syllable strings (sound translation of foreign names) or syntactically non-structured words (a string of identical numbers), or syntactically equal-structured words (coordinating monosyllabic words) as follows (‘()’ represents rhythmic group):

6. a. (55) (55) ((55)5)
   b. (chái mǐ) (yóu yán) ((jiàng fü) chá)
   c. (jiā lì) ((fó ní) yà)

The rhythmic groups in (6) are rightwardedly organized into disyllabic units (feet) with the stray syllable attached to the last foot when the syllable string contains an odd number. This is called Natural Foot Formation, which is formulated as follows (Feng 1998):
Monosyllabic morpheme/word, and thus, (ii) the majority of Chinese compounds are disyllabic. That is to say, new words, rather than the old and most commonly used ones like 手 ‘hand’, 头 ‘head’, 牛 ‘cow’, 羊 ‘sheep’, etc., that were passed down from thousands of years ago and are thus exceptional to the modern prosodic constraint, are formed almost exclusively by no fewer than two syllables in Mandarin Chinese. Morphological/prosodic rules apply to different classes of morphological categories. Thus the standard size of all new (compound) words is overwhelmingly disyllabic, which is born out as predicted in the following statistic (Zhang 1997): disyllabic words make up 49,641 (70.6%) of the total 70,343 words in Mandarin Chinese.

Second, the NFF also entails that monosyllabic forms cannot stand alone where an independent prosodic unit is required. This is evidenced by the following example.

9. A: 你去哪兒？
Nǐ qù nǎr?
‘Where do you go?’

B: 

a. 我去大興（縣）。
Wǒ qù Dàxīng (xiàn).
‘I am going to the county of Dàxīng.’

‘I am going to the county of Tōng.’

C: 

a. 我去日本（國）。
Wǒ qù Rìběn (guó).
‘I am going to Japan.’

b. *Wǒ qù Měi (guó).
‘I am going to America.’

In Chinese you may answer a question about the date by mentioning any polysyllabic number, but if one wants to specify a monosyllabic number, one has to add the syllable 用 號 ‘number’ otherwise the sentence is unacceptable. The same is true for monosyllabic place names as seen in (9c).
However, the double-directional property of 2+2 will not be shared by the 1+2 and 2+1 rhythmic structures, because 1+2 is rightwarded and 2+1 is leftwarded and as a result, the dual properties that are obtained in the 2+2 rhythmic structure (i.e., being either a phrasal or a word category) cannot be shared by the 1+2 or 2+1 as shown in the following facts.

12. a. 皮鞋工廠
   皮廠
   pixié gōng-chǎng pí chǎng
   leather-shoe worker-mill leather mill
   ‘leather shoe factory’ ‘leather factory’
   鞋工
   pi gōng xié gōng
   leather worker shoe worker
   ‘leather worker’ ‘shoemaker’
   鞋廠
   xié chǎng shoe mill
   ‘shoe-factory’
   b. 皮鞋工
   皮鞋廠
   pixié gōng pixié chǎng
   leather-shoe worker leather-shoe mill
   ‘leather shoe factory’ ‘leather factory’
   *鞋工廠
   *pi gōng
   shoe worker-mill
   ‘shoe-factory’
   大皮鞋
   xiǎo gōngchǎng
   big leather-shoe small worker-mill
   ‘a big leather shoe’ ‘a small factory’

The surprising footing-effect is this: noun compounds favor the rhythmic pattern of 2+1 while the adjective+noun phrases prefer 1+2. It has been commonly assumed that the combination of Noun+Noun (like ‘leather factory’) creates compound words, while that of Adjective+Noun (big factory) produces phrases in Chinese.

The third important implication of the NFF is its grammatical function of the directionality: Left-footing is preferred by word formation while right-footing is favored by phrasal prosody in Chinese prosodic morphology. Compare (10).

However, the unacceptable monosyllabic forms in prosodic parsing, it follows that trisyllabic units should be allowed by the grammar even if they are highly conditioned; in other words, when a monosyllabic morpheme or a word is used, it must attach to a neighboring foot in order to be not ruled out by the NFF. This has in fact resulted in what is called a Super Foot Formation giving rise to trisyllabic compounds in the language.

Given the NFF and the Super Foot Formation (SFF), the sizes of Chinese wordhood produced in morphology will be at minimum two and at maximum three syllables long under the prosodic morphological system outlined above. Aside from loan words and phrasalized expressions, the [2 ≥ word > 3] generalization for word size is true for 82.4% of compound words produced by the prosodic word formation (Zhang 1997, Zhou 1998).

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(Duanmu 1990). Given this, it is expected that the 1+2 pattern is not acceptable for N+N but perfect for A+N because it is a phrasal prosody, as seen in (12). A corpus-analysis (Duanmu 2011) shows that only 1% of N+N compounds in Chinese are formed by the 1+2 syllable pattern such as jīn xiàngliàn 金項鍊 ‘gold necklace’, zhǐ lāohu 衣老虎 ‘paper tiger’, etc. However, even if the jīn- xiàngliàn and zhǐ- lāohu exist in Mandarin Chinese, it does not mean that jīn and zhǐ can be freely used to create 1+2 noun compound, as the following examples show:

13. a. *
   jīn gōngchǎng  *zhǐ gōngchǎng
gold factory  paper factory
   ‘a gold factory’  ‘a paper factory’

Note that “gold necklace” and “gold factory” are different. ‘Gold necklace’ means that ‘the necklace is made of gold’, while ‘gold factory’ means ‘the factory that produces gold’. “Made of gold” and “producing gold” have two different internal-relationships between elements within the nouns (i.e., necklace and factory). When gold is used with a meaning of “made of” as in “gold necklace”, it functions as a property classifying the head “necklace,” which is why it uses the phrase prosody of 1+2 to describe the head, the result of which is acceptable. However, when ‘gold’ is used to mean a “product” as in “gold factory,” it occurs in a position generated by compound formation and hence it cannot use the 1+2 phrasal prosody, and thus the result is unacceptable (13). Interestingly, if jīn-gōngchǎng 金工廠 is understood, even if the semantics is unrealistic, as ‘a factory that is made of gold’, then the result is acceptable exactly like ‘gold necklace’ (the same is true with zhǐ-gōngchǎng 衣工廠 if it is understood as ‘a factory that is made of paper’). Apparently, the prosodic system recognizes the phrasal semantics and compound semantics by allowing the former with 1+2 and later with 2+1, which shows the grammatical function of foot directionality.

Finally the MC, NFF and SFF together derive a notion of the minimal word in Chinese. For example, only by conforming to the size of a minimal word, (i) can a VO be formed to take an outer object as seen in (14a), (ii) can an [Auxiliary+V] become an adjective as in (14b), (iii) can a VO be used as an adverb as seen in (14c), and finally, (v) can a [size+N] be modified by color as seen in (14d).

14. a. *開玩笑
   kāi wánxiào tā
take joke 3SG
   ‘make fun of him’
a’ 取笑他
   qū xiào tā
take joke 3SG
   ‘make fun of him.’
b. *非常可疑
   fēicháng kě yí
extremely can suspicious
   ‘extremely suspicious’
b’ 非常可疑
   fēicháng kě yí
   extremely can suspicious
   ‘extremely suspicious’
c. 並肩戰鬥
   bìng jiān zhàndòu
   juxtapose shoulder fight
   ‘fight side-by-side’
c’ 並肩戰鬥
   bìng jiān zhàndòu
   juxtapose shoulder fight
   ‘fight side-by-side’
d. *黑大車
   hēi dà qīché
   black big vehicle
   ‘a big black vehicle’
d’ 黑大雁
   hēi dà yàn
   black big gander
   ‘a black goose’

As seen above, the prosodic morphology in Chinese has its unique characteristics. First, instead of affixation controlled by prosody as in many other languages, prosody in Chinese morphology mainly affects compound word formation. Second, prosodic morphology in Chinese directly interacts with syntax. Finally, prosody may not only constrain morphology, it is part of morphology, which may better be considered as morphological prosody.
Psycholinguistics, Overview

1. Introduction

In its primary sense, psycholinguistics is an interdisciplinary field in which linguists and psychologists use behavioral evidence to study how language is processed in the normal adult mind, though more broadly psycholinguistics also encompasses the learning of language by children and adults (language acquisition) and the implementation of language processing in the brain (neurolinguistics). This lemma gives an overview of psycholinguistics in its primary sense, reviewing its scope and history and describing some representative studies on Chinese. (For another general review of Chinese psycholinguistics, see Li et al. 2006; for a review of Chinese language acquisition, → Acquisition of L1, Overview; for a review of Chinese neurolinguistics, → Neurolinguistics, Overview.)

2. The Scope of Psycholinguistics

Psycholinguistics is notoriously difficult to define (Tanenhaus 1988). This is even reflected in the name: psycholinguistics (心語語學), a branch of linguistics, is also often called psychology of language (語言心理學), a branch of psychology. Crucial to understanding psycholinguistics is seeing how it relates to, yet differs from, both theoretical linguistics and neurolinguistics.

One tool for addressing this issue is the notion of levels of analysis proposed by the psychologist and neuroscientist David Marr (1982). He noted that any complex system can be described in terms of what it does (its function or abstract computation), how it does it (its representations and algorithms), and how it is realized (its physical implementation). In the case of language, the computational level describes the abstract