

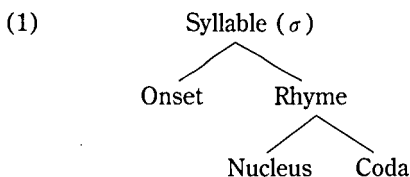
A Comparison of the Syllable Structures of Standard Chinese and English

Bing XIA

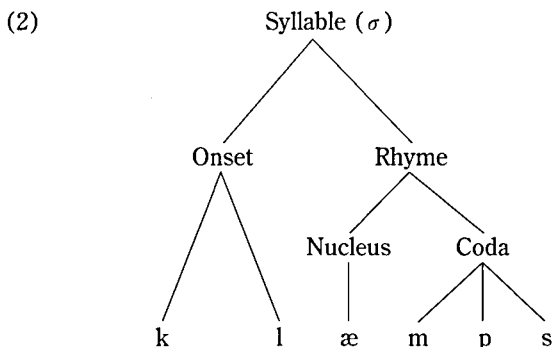
I. Introduction

The aim of this paper is to analyze and compare the different points of syllable structures of Standard Chinese (henceforth SC) and English from the point of views of universal grammar. We conclude that the syllable structures of SC are much more natural than those of English in the consideration of universal syllable structure.

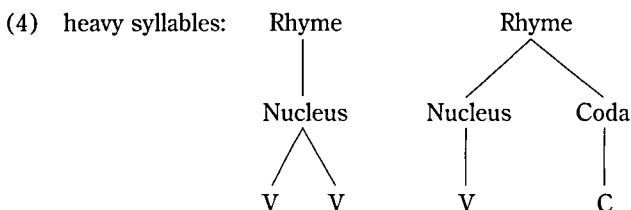
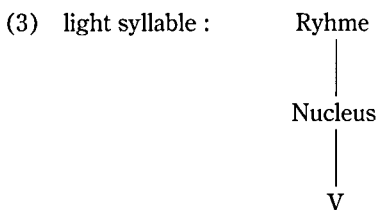
A syllable is any of the units into which a word is divided, containing a vowel sound and usually one or more consonants (*Oxford Advanced Learner's dictionary* 2003: 1536). A syllable consists of syllabic sounds which are the cores of the syllable, and non-syllabic sounds which are the segments before or after the syllabic sounds. Usually, the syllabic sounds are vowels which are more sonorous than other sounds. According to Selkirk (1982), a syllable consists of two parts, which are onset and rhyme. Rhyme can also be divided into two parts, nucleus and coda. The syllable structure can be illustrated as follows:

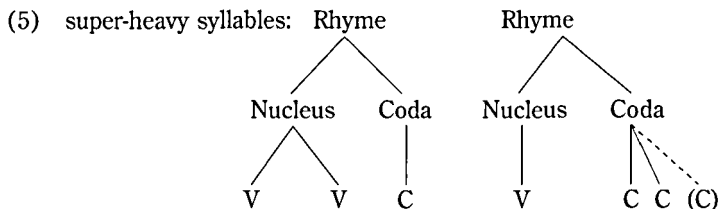


The English word 'clamps' [klæmps] is structured as follows:



A syllable has two structures, the light syllable and the heavy syllable. The light syllable contains a non-branching nucleus V, while heavy syllables contain a branching nucleus VV, or a branching rhyme VC (CC). A heavy syllable with more than one nucleus or coda is properly defined as a super-heavy syllable, VVC or VCC(C).





When we consider the issue of light syllables and heavy syllables, we can find a common point between the syllable structure of SC and that of English. This common point is that when a syllable of both languages is an accented-syllable, it must be a heavy syllable, while when a syllable is an accentless-syllable, it must be a light one.

In this paper, section II and section III give explanations of the syllable structure of SC and that of English respectively. Section IV presents a comparative study on the syllable structures of these two languages, while section V gives a conclusion.

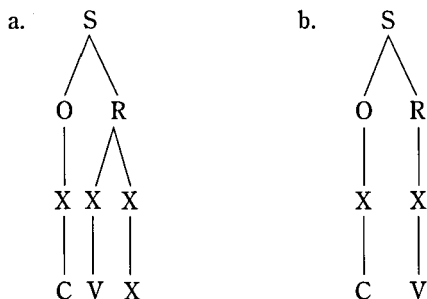
II. The Syllable Structures of Standard Chinese

According to the proposal of Duanmu(1993), SC has two forms of syllables, heavy syllables /*(C)VX*/ and light syllables /*(C)V*/. Lexical words are mostly heavy syllables. Light syllables are usually grammatical words, such as the past tense aspect marker [lǎ]. A heavy syllable can consist of a rhyme with two phonemes /*-VX*/, where V is a vowel, and X is a vowel or a nasal. And a light syllable can consist of up to two underlying phonemes /*CV*/.

According to the present analysis, SC has only two syllable structures: heavy syllables, which have three segments /*CVX*/, and light syllables, which have two segments /*CV*/. All heavy syllables have the

structure (6a), which has two rhyme slots. All light syllables have the structure (6b), which has one rhyme. In (6), /C/ is an onset, /V/ is a nucleus, and /X/ is a coda.

(6) SC syllable structure



2.1. SC Onset

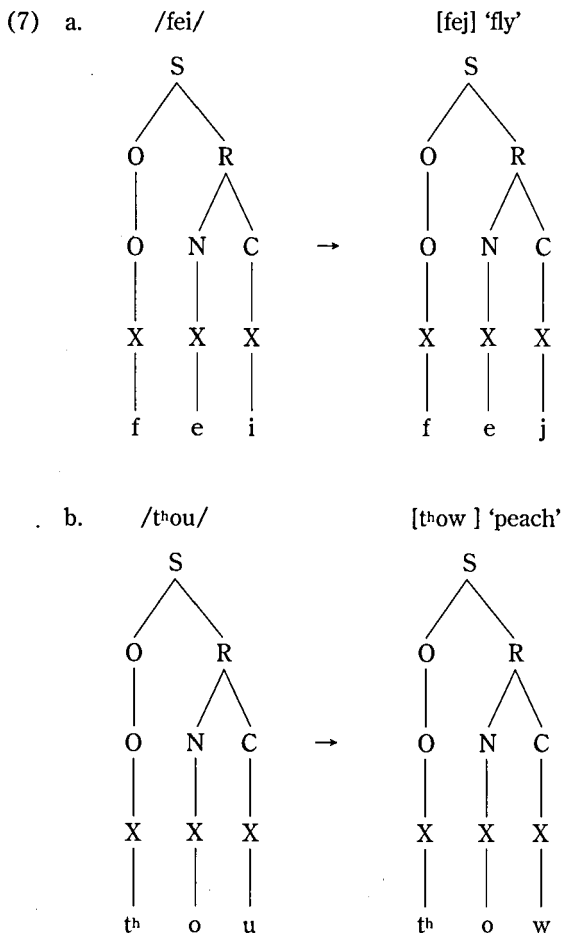
In the underlying level, the onset of a syllable consists of a consonant (/p-a/ 'eight') or a vowel (/i-a/ 'duck'), or a CG (consonant-vowel) combination (/li-a/ 'two'). And in the surface level, the vowel in onset is pronounced glide like [j-aa] 'duck' and [lj-aa] 'two'. [lj] in the onset is called a CG combination, and it is considered as one sound in SC. According to the present analysis, consonants, glides and CG combinations should be considered to be in the onset positions of a syllable.

2.2. SC Nucleus and Coda.

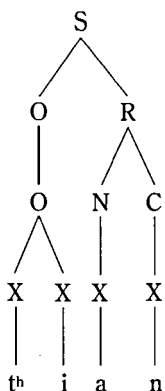
2.2.1. Heavy syllable

It is well known that heavy syllables in SC are longer than light syllables and that all heavy syllables have a similar duration. In the coda

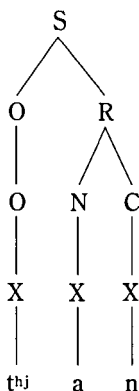
position, SC heavy syllables, end with vowel sounds /i /, /u/ and nasal sounds /n/, /ŋ/ in the underlying forms. However, vowel sounds /i/ and /u/ are pronounced as glide sounds [j] and [w] respectively in the surface. The following are the examples of SC syllable structures of heavy syllables:



c. /tʰian/

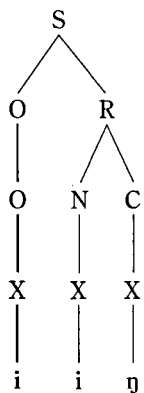


[tʰian] 'sky'

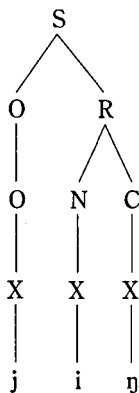


→

d. /iŋ/



[jŋ] 'silver'

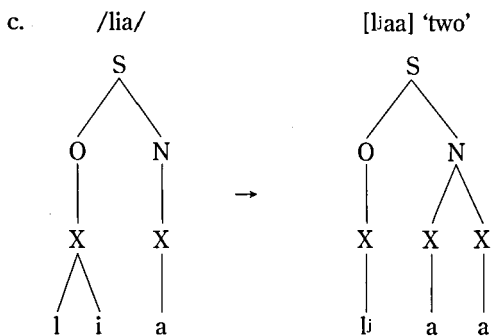
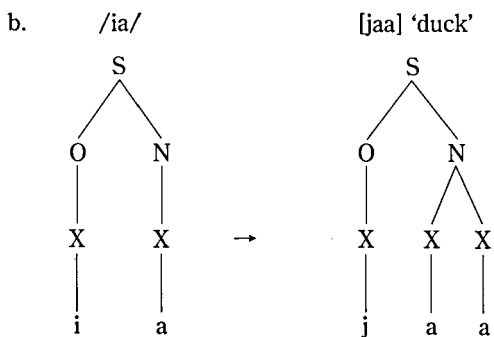
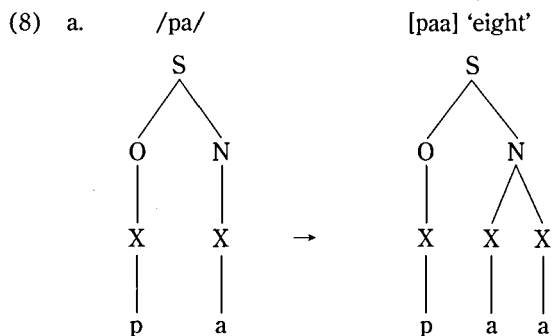


→

2.2.2. Light syllable

A light syllable has no coda. The underlying form of a light syllable structure is /CV/. Usually a short vowel has a longer pronunciation as two vowels [CVV] in the surface form. We can say that a short vowel is prolonged as two vowel sounds. The original short vowel has the same duration as the reproduced one. The surface form [CVV] of a light

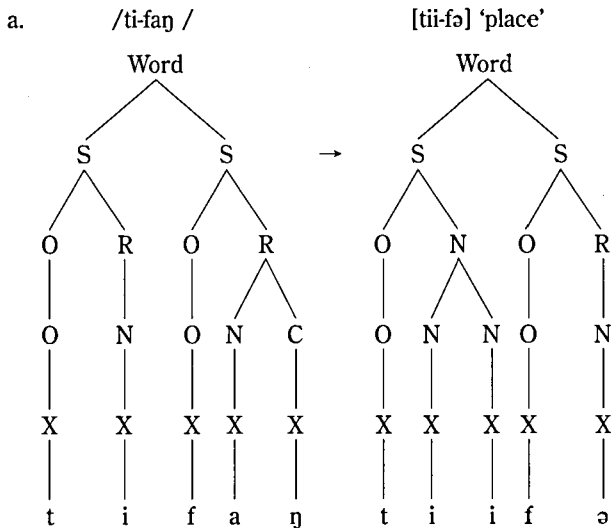
underlying syllable /CV/ can be recognized as a heavy syllable. The following are examples:

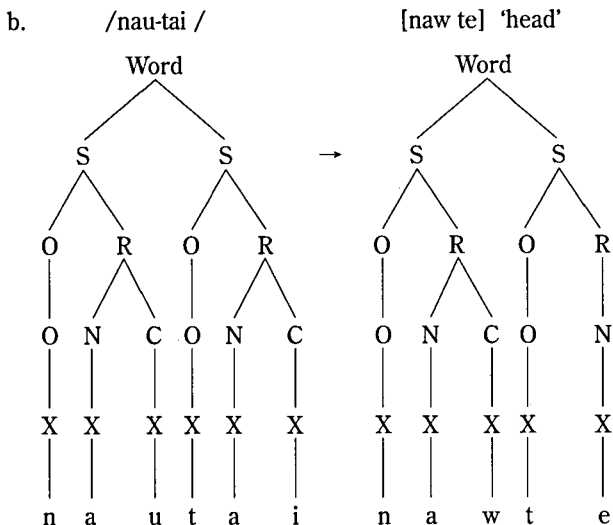


(9) Rhyme reduction in light SC syllables:

/mu-^hou/ → [muu^ho] 'wood'

/nau- tai/ → [naw te] 'head'





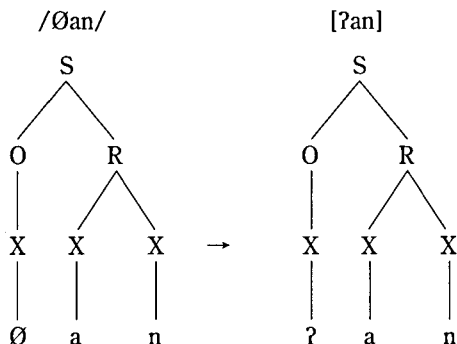
In (9a), the first light syllable /ti/ becomes a heavy one [tii] in the surface and the second heavy syllable /faŋ/ becomes a light one [fə]. In (9b), the first heavy syllable /tau/ in the underlying form is still a heavy syllable [taw] in the surface form and in the second heavy syllable, the coda /i/ is dropped, the rhyme duration becomes short, and then the second heavy syllable /tai/ becomes a light one [te] in the surface.

2.3. SC Zero Onset

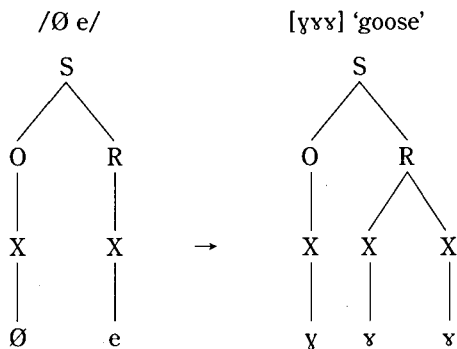
There is also the case when, if a heavy SC syllable does not begin with a consonant, a glide, or a CG combination mentioned before, a glottal stop [ʔ] or a velar fricative [ɣ] is pronounced at the beginning of the onset. The sounds are called the 'zero' onset indicated with [Ø] in the phonemic level.

2.3.1. Insertion of an onset consonant at the beginning of a word

a. glottal stop insertion



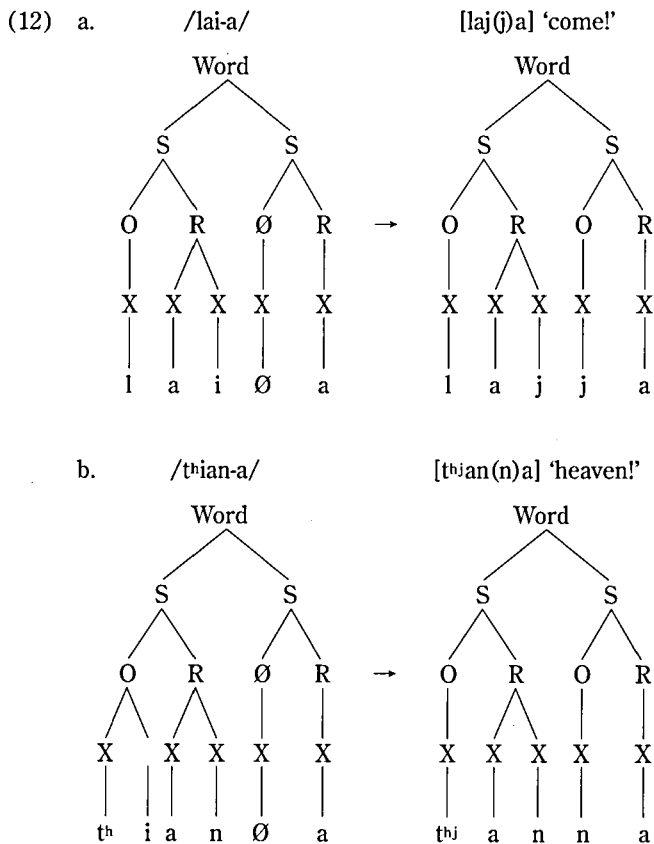
b. voiced velar fricative insertion



2.3.2. Insertion of an onset consonant in the light syllable in the second element

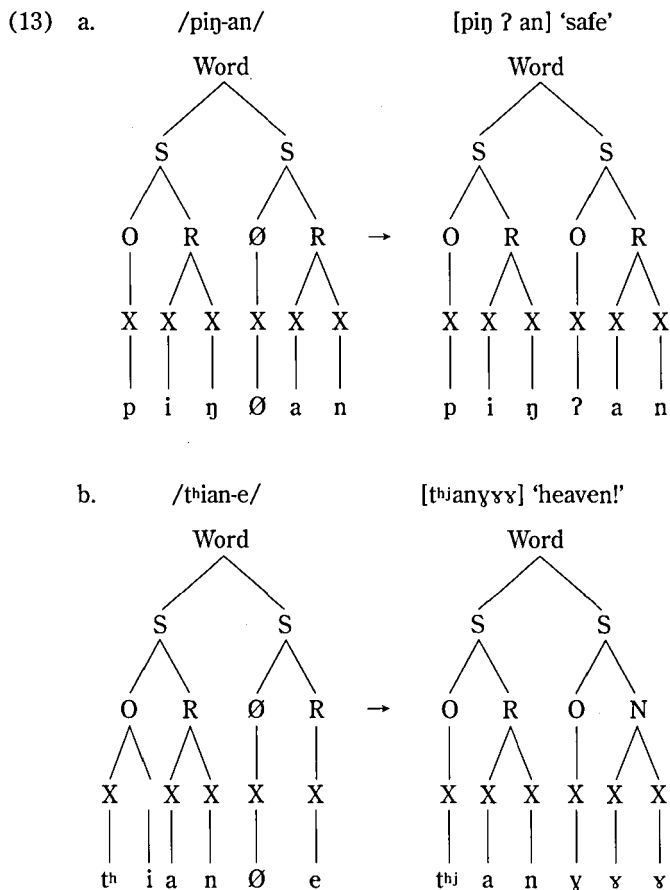
- (11) a. /tʰian-a/ → [tʰian(n)a] 'Heavens!'
 b. /maŋ-a/ → [maŋ(ŋ)a] 'Busy!'
 c. /lai-a/ → [laj(j)a] 'come!'
 d. /tu-a/ → [tuu(w)a] 'Read!'

Let us take the words /lai -a/ → [laj(j)a] 'come!' and /tʰian-a/ → [tʰian(n)a] 'Heavens!' (here [a] is an interjection) to show the syllable structures as follows:



From the examples above we can see that in the case of light syllables, the obligatory onset can be nasal sounds or glide sounds which are reduplications of the codas of the preceding heavy syllables, which depend on the proceeding sounds.

2.3.3. Insertion of an onset consonant in the heavy syllable in the second element



As illustrated above, unlike (12 a. b) in a light syllable, a glottal stop and a voiced velar fricative are inserted in (13a) and (13b) respectively. This fact proves that the insertion of an onset consonant in the heavy syllable in the second element has the same insertion as an onset consonant at the beginning of a word.

III. The Syllable Structures of English

1. English Onset

The consonants to the left of the nucleus are considered to be onset consonants in English. An onset could be a consonant or a consonant cluster. Let us take a look at the following examples:

- | | | | | | |
|------|--------|--------|--------|----------|--------|
| (14) | a. eye | b. pie | c. pry | d. *pfry | e. spy |
| | eat | seat | sleeve | *tsleeve | street |
| | ink | wink | swing | *kswing | spring |

From the examples above, we can see that the syllables of English need not have onsets like (14a). If there is an onset, it may contain one consonant (14b) or two (14c). Let us then consider why (14d) are ill-formed syllables, and why (14e) syllables are appropriate.

When we think about this question, onset consonant's ordering should be mentioned here.

The possible sound patterns of initial consonant clusters can be represented as follows:

- (15) onset cluster ordering
- $$s \left\{ \begin{array}{c} p \\ t \\ k \end{array} \right\} \left\{ \begin{array}{c} (l) \\ r \\ (w) \\ j \end{array} \right\} + V$$

From (15), the possible onset segments will be as follows:

- a. S: sea, sit
- b. SC: sport, start, school
- c. SCG/L: squeeze, spring, string
- d. SG/L: spirit, sleep, stop
- e. CG/L: pray, tree, class
- f. G/L: lend, ring
- g. C: pin, tin, kick
- h. Ø: eye, ear

2. English Nucleus and Codas

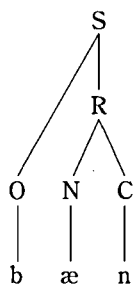
Each vowel segment in a syllable makes up a syllabic nucleus, and any consonants to the right of the nucleus form the coda in English. A nucleus of English can be a vowel or a diphthong. A coda of a syllable is a consonant or a consonant cluster that follows the nucleus. Some examples are given as follows:

- | | | | | | |
|------|--------|---------|----------|-----------|-----------|
| (16) | a. pie | b. seat | c. clamp | d. *filmp | e. clamps |
| | free | fell | film | *fɪrlm | desks |
| | | fill | clasp | *clamsp | acts |

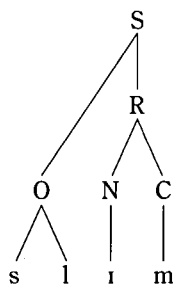
English syllables do not need to have codas like (16a). In addition, similar to onsets, codas can have a consonant or consonant cluster as in (16b.c.e). Here again we are faced with the same problem where (16d) is also ill-formed, because, the first of all, sonorants cannot be the first two elements of codas, and, the second nasal- /s/ - stop sequence is not allowed in English.

The following are examples of English structures:

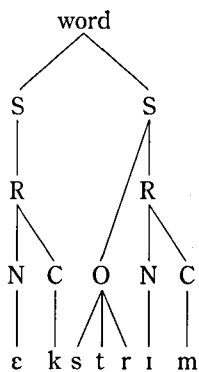
(17) [bæn] 'ban'



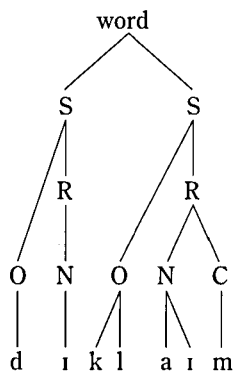
[slɪm] 'slim'



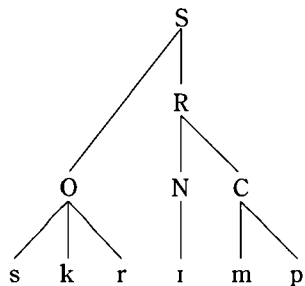
[ɛkstriːm] 'extreme'



[dɪ kləɪm] 'declaim'



[skrɪmp] 'scrimp'



IV. A Comparison of the Syllable Structures of Standard Chinese and English.

First, let us observe the following syllable structures:

- (18)
- a. CV
 - b. V
 - c. CVC
 - d. VC

We can see that all languages have the syllable structure CV, (18a), while some languages lack each of the other three types. Furthermore, structure (18d) is the most highly marked in the sense that any language that has (18d) must have (18a-c). So we can conclude that syllable structure CV belongs to the grammar of all languages. In general, we can say that the CV syllable structure is universal for all languages in the world.

In this paper, emphasis is placed on the analysis of the different points of the syllable structures of SC and English, in order to find out which language is more natural from a universal grammar point of view.

4.1. The Differences of Onsets

First, let us observe the differences of onsets. In English onsets are not necessary, but in cases where they are present, they can be consonants or consonant clusters. However, SC must have one consonant in onsets in the surface form. From section two, we can see clearly that onsets can be a consonant, a glide or CG combination. A CG combination consists of a

consonant C and glide G. All CG combinations occur before a nuclear vowel. Phonetically, CG is a single sound in SC. For example, in [swan], [s] and [w] are articulated at the same time. In contrast, [sw] in English words like *sway* are two sounds, in that the lip rounding of [w] occurs after [s]. The reason CG is a single sound in SC is that there is only one rhyme slot in the onset, where C and G must share the same space. However, regardless of whether there is an onset in an underlying form as mentioned above, there must be an obligatory sound in the surface form. In this sense, we can make a conclusion that onsets of SC syllables are more natural than those of English, because it completely follows the onset rule of universal grammar that the onset has only one phonetic sound.

4.2. The Differences of Nucleus

In English, a vowel or a diphthong can be in the position of a nucleus, and nasal sounds [m], [n] and glide sounds [l] and [r], which are more sonorous than other consonant sounds, can be seen as syllabic sounds, called syllabic consonants. Syllabic consonants are also possible in the positions of a nucleus. For example, the underlying forms of the words 'bottom' and 'apple' are /batəm/ and /æpəl/, and the surface forms are [batm̩] and [æpl̩] where the syllabic sound are in the nucleus position.

In SC, in the case of light syllables, the underlying syllable structure is /CV/. However, in the majority of these cases, the vowel sounds are prolonged and pronounced as [CVV] in the surface form. This phenomenon also can be found in light syllable structures in English and Japanese. For example, the short form of 'professional' [prəfɛʃənəl] is written in 'pro' and it is pronounced [prou] as diphthong; likewise, Japanese 'te' (hand) and 'na' (name) are pronounced [tee] and [naa] in the Kansai dialect. In this respect, all the three languages follow the universal

rules. However, SC only allows long vowels in the nucleus position in the surface form [CVV] of a light syllable, while a diphthong in English is also permitted in a nucleus. As discussed in section II (2.2.1 heavy syllable) there is a remarkable fact to note, which is that the second vowel of a diphthong in a heavy syllable is pronounced as a glide in the surface. That is why the second vowel of a diphthong should be in the coda position in SC. SC syllables are more natural than those of English, in the sense that a two-vowel sequence should be a vowel-consonant sequence in the surface syllable structure.

4.3. The Difference of Coda

English does not need codas, and even if it has them, they can be consonants or consonant clusters. English allows up to three consonants in its coda positions. In contrast, there is only one rhyme slot for a coda in a SC syllable, which means there is maximally only one sound allowed in the position of a coda. In the case of a heavy syllable, a SC syllable ends with /i/, /u/, /n/ and /ŋ/. The vowels /i/ and /u/ change to glide sounds [j] and [w] if they follow other vowel sounds. Therefore, together with nasal sound [n] and [ŋ], they should be in the position of a coda. In the case of a light syllable, the coda is dropped and is no longer present. Therefore, the rhyme structures of SC and English in the underlying form can be presented as follows:

(19)	SC	English
	/V/ → [VV]	/V/ → [V]
	/VV/ → [VG]	/VC/ → [VC]
	/Vn/ → [Vn]	/VCC/ → [VCC]
	/Vng/ → [Vŋ]	/VCCC/ → [VCCC]

In comparison with English coda structures, SC rhyme structures are more natural. Although both of the coda structures violate the universal rule of no coda, the maximum number of SC codas is only one, whereas in English there can be up to three.

In general, in this section we compared the syllable structures of SC and English from the aspects of onsets, nucleus and codas respectively. From this comparison study, we can arrive at the conclusion that the syllable structures of SC are much more natural than those of English.

V. The Concluding Remarks

Up to now, we have discussed the syllable structures of SC and English in section II and section III, respectively, which was followed by a comparative study in section IV. From what we have analyzed and compared before, the syllable structures of the two languages can be generalized in the following chart:

(20) The syllable structures of SC and English

SC syllable structure			English syllable structure
light syllable	underlying form	(C)V	$(C_0^3)V$
	surface form	CVV	
Heavy syllable	underlying form	(C)VX	$(C_0^3)V_1 (C_0^3)$
	surface form	CVG CVC	

In the preceding sections and the chart above we have accomplished the following tasks:

The first task was analyzing the syllable structures of SC. We found that since there is only one slot for an onset in a SC syllable, a consonant, a glide or a CG combination can be in the onset. In addition, providing that there are no any cases of the previously mentioned underlying form, there should be an obligatory sound in the surface form. In the case of heavy syllables, syllables end with nasal sounds [n], [ŋ] and glide sounds [j] and [w] in the surface. Additionally, since diphthongs are not allowed in the nucleus, only one vowel sound is permitted in the position of nucleus and thus [n], [ŋ], [j] and [w] should be in coda positions.

The second task was discussing the syllable structures of English. It is commonly accepted that the consonants to the left of the nucleus are considered to be the onset. A nucleus can be a single vowel or diphthong, and the consonants to the right of the nucleus are considered to be the coda in English.

The third task was a comparison between SC syllable structures and English ones. Finally, from the point of view of universal grammar, we reached the conclusion that the syllable structures of SC are much more natural and universal than those of English.

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