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A PHONOLOGICAL ANALYSIS OF STANDARD CHINESE AND STANDARD HUNGARIAN SYLLABLES

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ABSTRACT

Until this point a phonological comparison between Standard Chinese syllables and Standard Hungarian syllables has not been covered in academic studies. The aim of this paper is to fill this gap and test some syllable theories in Standard Chinese and Standard Hungarian. First, the notion of syllable and relevant concepts are discussed. Then syllable inventory and the syllable structure of Standard Chinese and Standard Hungarian are analyzed. Finally, some constraints and phonological processes about syllables are introduced. Compared to Hungarian, syllables in Chinese are not arbitrary repetitions of onset and rhyme but are very restricted in structure. Chinese syllables are unmarked, while Hungarian syllables are marked syllables. I believe the analysis of this paper could significantly contribute to both theories of linguistics and second language education practice.

KEYWORDS

Standard Chinese; Standard Hungarian; Syllables

INTRODUCTION

The number of learners of Standard Chinese in Hungary has experienced a change from single digits to thousands over the decades (Simay & Fan, 2020). Standard Chinese is the official language of mainland China and Taiwan. It is taught in schools and used in media communication (Lin, 2007, 3. p). To fulfill the demand for Chinese language learning, Chinese educational institutions in Hungary have also spread from a single centerpoint to the whole country. Since the Prime Minister of the Republic of Hungary visited China in 2003, Hungary has established a Chinese-Hungarian bilingual primary and secondary school (currently called Magyar-Kínai Két Tanítási Nyelvű Általnos Iskola és Gimnázium), six Confucius Institutes, and three Confucius Classrooms. Therefore, Chinese phonetics and phonology related research in Hungary is becoming more and more important. However, until now, there have been no studies on the phonological comparison between Standard Chinese syllables and Standard Hungarian syllables. Therefore, this paper aims to fill that gap. Standard Chinese will be the target language, in other words, this paper will mainly focus on the Standard Chinese syllables which do and do not exist in Standard Hungarian. I believe it will contribute to both the theory of linguistics and education practice.

Concerning the question of syllable constituents, within the framework of government phonology and element theory, Harris (1994) and Kaye et al. (1990) argued that the syllable is not a genuine constituent in phonology, because syllables do not display the distributional effects associated with government relations. However, as I will show, this is not true for Standard Chinese (SC will be used hereafter), in SC no single onset position displays a maximal inventory of contrasts, and onsets are sensitive to the property of the following items, vice versa. The concept of the syllable as the basic phonological unit has always been uncon-

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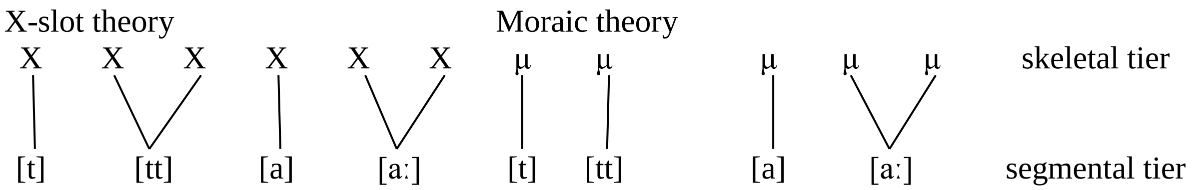
troversial in traditional Chinese phonological analyses. Generative grammar has come to appreciate the syllable as an essential concept for understanding phonological structure (Kenstowicz, 1994, 250. p). Kenstowicz (1994) and Blevins (1995) give evidence for the existence of syllable as constituent. Firstly, native speakers have clear intuitions on where syllable boundaries occur. Secondly, there are phonological processes or constraints which take the syllable as their domain of application. For example, syllables help us to explain why the first [t] in a word such as *a[tʰ]rocious* is aspirated in English (Kenstowicz, 1994, 251. p). Finally, the syllable is the domain for stress and tone. For example, the syllable is the domain for tones in SC (Zhu, 2018). Therefore, the phonological string is parsed into syllables, and the syllable is a true legitimate phonological constituent. Hayes (2009, 250. p) also states that syllables are units that bear stress and serve as the anchor points for tones.

According to Blevins (1995), the syllable has a fixed position in the universal prosodic hierarchy, and syllables are the structural units providing melodic organization to phonological strings. A skeleton position of the syllable may associate with either a consonant or a vowel. According to the X-slot model (Kaye & Lowenstamm, 1984; Levin, 1985), the skeleton can be represented by a sequence of empty slots labeled as Xs. Mora is an alternative way to represent the positions on the phonological skeleton (Hyman, 1985; McCarthy and Prince, 1986; Hayes, 1989). [t] vs. [tt], or [a] vs. [aː] can be represented by the dual association of the segmental material to either Xs or morae (Figure 1.). In this paper I will use Xs to represent skeletal positions.



1. *Figure: Phonological Skeleton*
Source: Kenstowicz, 1994, 428. p

SYLLABLE INVENTORY IN STANDARD CHINESE AND STANDARD HUNGARIAN

SC is typically classified as an analytic or isolating language in which each morpheme is usually a word. In modern Chinese, 95 percent of morphemes are monosyllabic (Chen, 1999, 138-9. p). Chinese is also a tone language, a language in which changes in the f_0 ('pitch of voice') can be used to denote differences in word meaning. Lin treats tone as a third type of speech element in additon to consonants and vowels (Lin, 2007, 4-7. p). Meanwhile Duanmu (2007, 236. p) argues that tones reside on segments and tone features are essentially similar to other segmental features. Since Hungarian has no tones, in the following analysis, the role of tones in SC will not be discussed. Syllable boundaries are clear in Chinese, the inventory of possible syllable types is small (Table 1).

1. *Table: The syllable inventory of Chinese (disregarding tone)*

V	[ɤ] 'hungry'	GV	[ja] 'duck'	CGV	[two] 'many'	CGVG	[xwaj] 'bad'
		VG	[aj] 'love'	GVG	[jɑw] 'medicine'		
		CV	[ma] 'horse'	GVC	[jɛn] 'salt'		
		VC	[an]	CVG	[laj]	CGVC	[xwan]

			'peace, safe'		'come'		'to exchange'
				CVC	[lan] 'blue'		

Source: Based on Lin, 2007, 107. p

In Table 1 and Table 2, V refers to vowel, G refers to glide, and C refers to consonant. The smallest syllable of Chinese is merely a V, and the biggest one is limited to CGVG or CGVN. And in Chinese, prevocalic glides are limited to [j, w, ɥ], postvocalic glides are limited to [j, w], and final nasals are limited to [n, ŋ].

Compared to Standard Chinese, the possible inventory of syllable types in Standard Hungarian is relatively bigger (Table 2).

2. Table: The syllable inventory of Hungarian

V te.**a** 'tea'	CV ma 'today'	CVC nap 'day'	CVVC ta**lán** 'perhaps'	CVVCC bánd 'repent'	CCCVCC spricc 'squirt'
	VC **em**.ber 'man'	CVV ló 'house'	VVCC ónt 'tin'	CCVVC prém 'fur'	CCCVVCC sztrájk 'strike'
	VV rá.di.**ó** 'radio'	VVC ágy 'bed'	CVCC rakj 'put'	CCVCC tromf 'trump'	
		CCV **pla**.kát 'poster'	CCVV **tré**.fa 'joke'	CVCCC verszt 'verst'	
		VCC ott 'there'	CCVC sznob 'snob'	CCCVV **strá**.zsa 'joke'	
			CCCV **szkle**.ró.zis 'sclerosis'	CCCVC **spric**.cel 'spray'	

Source: CCC examples are from Siptar & Torkenczy, 2000, 97-99. p

There is a sound *j* in Standard Hungarian which is treated as a consonant liquid by Siptar & Torkenczy (2000, 16-17. p). Firstly, *j*V-initial words select the preconsonantal allomorph of the definite article *a*, not its prevocalic allomorph *az*, e.g. *a játek* 'the toy', **az játek*. Secondly, the initial consonant of the suffix *-val* 'with' fully assimilates to stem final consonants but appears as *v* after vowel-final stems (cf. *lábbal* 'with foot', **lábval*, vs. *szóval* 'with a word', **szóal*). Therefore, the fact that, e.g., 'with butter' is *vajjal* rather than **vajval* suggests that *j* is a consonant. Thirdly, the example, *vajjal* also shows that intervocalic *j* can be geminated (long): this in itself is enough to render any kind of diphthong interpretation impossible. Finally, there are no co-occurrence restrictions between *j* and its following/preceding vowels. Based on these facts, in Hungarian phonological system *j* is treated as a consonant,

Ye (2013) carried out a phonetic comparison between SC and SH syllables in Table 3:

3. Table: Distribution of Consonants (C) and Vowels (V) in a syllable

	Distribution of consonants and vowels
Hungarian	CV, V, VC, CVC, CCV, CCCV, CCVC, CCCVC
Chinese	CGVC, CGVG, CVG, CVC, GVG, GVC, CV, VG, VC, V

In Table 3 two types of syllables GV and CGV in SC, and consonant clusters in SH (Table 2) are not mentioned, examples are not shown, either. In addition, Ye did not carry out further phonological analysis between SC and SH syllables, which will be discussed in the following analysis.

SYLLABLE STRUCTURES OF STANDARD CHINESE AND STANDARD HUNGARIAN

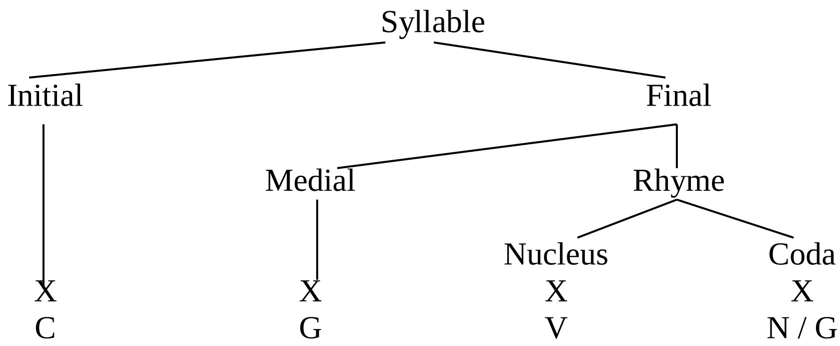
When discussing syllable structure, some syllabic constituents are always mentioned. Onset is the beginning of a syllable, and coda is the end of a syllable, and they must be consonantal. The nucleus of a syllable is at the syllable core as its sonority peak, while nucleus and coda together constitute the rhyme. In traditional Chinese phonological/phonetic analysis, the concepts of *initial*, *medial* and *final* are used to represent syllable structure, final consists of a medial and a rhyme. The initial is the beginning of a non-glide consonant of a syllable, and the final is the rest of the syllable after the initial consonant.

Zhu (2018, 34. p) states that to use phonetic concepts vowel, glide and consonant directly in phonology is inappropriate. Phonologically their place in the syllable structure must be considered. In Zhu's theory, the basic phonotactic structure of a syllable in Chinese is “initial + medial + rhyme”. The rhyme of a syllable consists of a nucleus and an optional coda. Thus, Zhu treats the prevocalic glides as part of neither onset nor rhyme, as shown below.

Initial	Medial	Nucleus	Coda
C	G	V	G/N

Whether the prevocalic medial glide has its own X slot, different researchers have different answers. For example, Duanmu (2017) argues that prevocalic glides should be treated as part of the onset, not of the rhyme. The onset of a syllable can be a simple sound or a complex sound, the latter of which is a combination of a consonant phoneme and a glide, because they fill just one timing slot. For example, [ʃw], [tj] and [lɥ] are underlying branching onsets in Chinese, but merge in the surface representation, so transcribed as one complex sound [$ʃ^w$], [l^j] and [$l^ɥ$] respectively. Lin (2007, 108. p) also regards prevocalic glides as part of the onset but treats them as forming a branching onset with two X slots. The status of prevocalic glides [j, w, ɥ] in Chinese is the most controversial issue. Yang (2006) and Myers (2015) carried out a literature review about the different view about medial glides. There are also different views about the status of postvocalic glides. Duanmu (2007, 82. p) argues that both postvocalic glides and postvocalic nasals are codas. Comparing with Duanmu, Lin (2007, 108. p) treats postvacolic glides as part of branching nuclei.

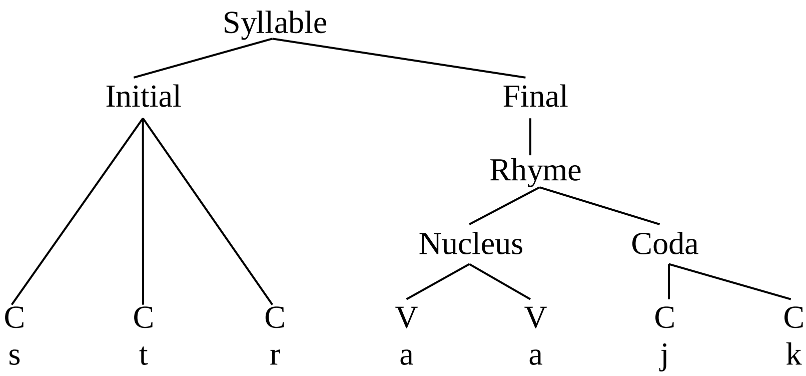
Given the puzzling diversity in the literature, in order to look for phonetic evidence to decide whether prevocalic glides should be treated as part of the onset or of the rhyme, Hsieh et al. (2016) carried out phonetic research using Electromagnetic Articulography, reporting that initials and medials do not occur simultaneously. So, in the present research, following the traditional Chinese phonological/phonetic analysis, I retain the syllable as a convenient way of referring to the combination of an initial and a final (Figure 2.). A prevocalic glide is treated as a medial with its own X slot, and a postvocalic glide is treated as a coda with its own X slot. A syllable tree is always used to represent Chinese syllables.



(C is consonant, G is glide, V is vowel, N is nasal)

2. Figure: The traditional analysis of the Chinese syllable
Source: Lin, 2007, 107. p

As for Hungarian, there are different views about the syllabic status of syllable initial consonant clusters and syllable final consonant clusters, shown in Table 2. Siptár & Törkenczy (2000, 103. p) argue that there is no complex onset in Hungarian, these consonants are edge clusters. The maximal onset in Hungarian is C. As for coda of Hungarian, they argue that there are complex codas, but the maximal size is CC, the word final C of CCC clusters is also due to some edge effect. For example, the non-final word-initial consonants and word final suffixes '-d, -sz, -j and some instances of –t' belong to a subsyllabic constituent called appendix (Siptár & Törkenczy, 2000, 95-152. p). But Kahn (1980) regards word-intial clusters as onests and word-final clusters as codas. Considering that Chinese is the primary focus of this paper and given that in Chinese there is no appendix this paper follows Kahn's idea. Thus, using traditional Chinese analysis, *sztrájk* 'strike' in Hungarian is represented as:



3. Figure: Hungarian syllable structure based on traditional Chinese analysis

Therefore, unlike in Chinese, in Hungarian there is no medial in a syllable. In contrast, Chinese has no branching onsets, branching nuclei and branching codas, while Hungarian has each of these.

SYLLABLE CONSTRAINTS OF STANDARD CHINESE AND STANDARD HUNGARIAN

Phonologists have found it useful to arrange the manners of articulation in a hierarchy based loosely on the acoustic sonority ('loudness') of sounds; this is called the Sonority Hierarchy (Hayes, 2009, 75. p). Researchers attempt to use sonority ranking to explain recurrent patterns of syllable structure. Kenstowicz (1994, 254. p) states that it has been known for over century that sonority sequencing principles require onset elements to rise in sonority toward the nucleus, and coda elements to fall in sonority from the nucleus onwards. Blevins (1995) states that languages can be described in terms of a small set of binary-valued parameters. Chomsky & Halle (1968) use binary features to represent sonority hierarchy. Based on the major class features of standard phonological theory of Chomsky and Halle, Clements (1990) assumed that sonority is derived from basic binary categories like:

3. Table: Ranking of syllabic segments

Vowel	Liquid	Nasal	Obstruent	
+	+	+	+	syllabic
+	-	-	-	vocoid
+	+	-	-	approximant
+	+	+	-	sonorant
4	3	2	1	rank

Source: Clements, 1990

Clements (1990) proposed the Core Syllabification Principle:

The Core Syllabification Principle (CSP):

a. Associate each [+ syllabic] segment to a syllable node.

b. Given P (an unsyllabified segment) preceding Q (a syllabified segment), adjoin P to the syllable containing Q if P has a lower sonority rank than Q (iterative).

c. Given Q (a syllabified segment) followed by R (an unsyllabified segment), adjoin R to the syllable containing Q if R has a lower sonority rank than Q (iterative).

Clements suggests that the underlying representations of any language are fully syllabified in accordance with certain principles of core syllabification, which are sensitive to sonority constraints. According to Clements, syllables that conform to the CSP are unmarked syllables, and those that violate it are marked syllables.

Under this principle, Chinese syllables are all unmarked syllables. After applying CSP, there are no unsyllabified consonants anymore. In Hungarian, on the other hand, in addition to unmarked syllables, there are marked syllables which violate CSP by presenting sonority plateaus (two adjacent consonants at the beginning or end of a word have the same sonority rank) or sonority reversals (the sonority profile first rises, then drops again as we proceed from the edge of the word inward), for example:

- Consonant sequences with sonority plateaus:

szpícs 'speech', *akt* 'nude'(noun), *sakk* 'check', *hívd* 'call'(sg. imp. def.)

- Consonant sequences with sonority reversals:

ajánl 'recommend'(3sg pres. indef.), szomj 'thirst'(sg. imp. indef), lopj 'steal'(sg. imp. indef.)

Source: examples are from Siptar & Torkenczy, 2000, 106-107. p

CONSTRAINTS OF RHYMES

In this paper, I side with the view that a postvocalic nasal or glide is part of a branching rhyme. Therefore, in Chinese there are two types of rhymes (Figure 4.).

4. Figure: Rhymes in Chinese

Let us first consider the nuclei in Figure 4a. Segments appearing in the nucleus position can be /a, ə, i, u, y/. In Chinese neither the low vowels nor the mid vowels contrast in nuclear postion, but in Hungarian, mid vowels /o, o:, ɛ, e:/ contrast in nuclear position.

Binary rhymes in Figure 4b. have separate segments in each position. And as we are about to see, Chinese imposes certain restrictions on the way segments are distributed between the two positions. There are four types of branching rhymes according to the choice of the right-hand-side terminal of binary-branching, as shown in Table 5.

5. Table: Branching Rhymes in Chinese (Zhu, 2010, 307.p)

[aj, ej]	j-final
[ɑw, ow]	w-final
[an, ən, in, un, yn]	n-final
[ɑŋ, əŋ, iŋ, uŋ, ʊŋ]	ŋ-final

Segments appearing in the nucleus of binary rhymes are typically associated with mid vowels or low vowels. Only if the coda is filled by a nasal consonant, can the nucleus be associated to a high vowel. Glides and nasals are anchored to the right-hand-side position of binary rhymes, and their presence is lexically significant.

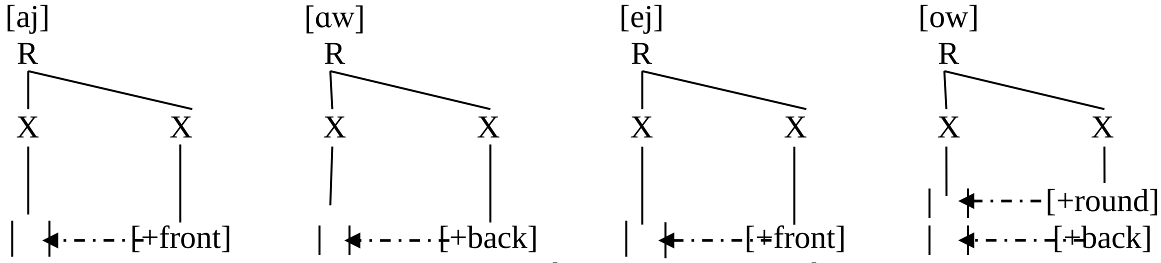
Duanmu (2007, 60. p) proposed the following constraint on Chinese rhymes:

Rhyme-Harmony: Nucleus and Coda cannot have opposite values in [round] or [back].

*[+back] [-back], *[-back] [+back],

*[+round] [-round], *[-round] [+round]

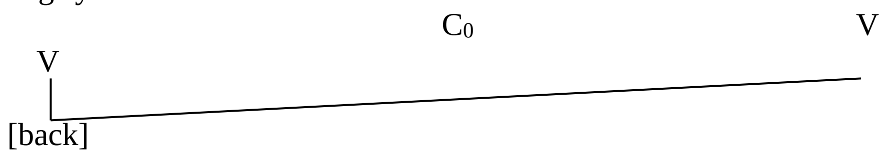
However, this rule can apply only if the nucleus vowel is a mid vowel. If the nucleus vowel is low, Rounding Harmony is not applied. In other words, Backness Harmony and Rounding Harmony are two related but non-identical harmony constraints, applying to different vowels. Thus, [front] and [back] are harmonically active in Chinese, when they appear in the right-hand-side position of a rhyme in Chinese, they can trigger place assimilation and extend to the left position. [round] can also trigger place assimilation and extend to the left position if the nucleus is filled by a mid vowel (Figure 5.).



5. Figure: Binary Rhyme Harmony in Chinese

Backness Harmony and Rounding Harmony are also attested in Hungarian, but the application domain is completely different from Chinese. A vowel can assimilate to a vowel in another syllable, Marlett (2001) proposed two rules:

(1) Backness Harmony: A vowel assimilates in backness to the vowel in the immediately preceding syllable.



(2) Rounding Harmony: Mid vowels assimilate in rounding to a front vowel in the immediately preceding syllable.

For example (Siptár & Törkenczy, 2000 72. p):

tűz-höz 'fire'	*sofőr-höz 'driver'*
víz-hez 'water'	*kódex-hez 'codex'*
ház-hoz 'house '	*nüansz-hoz 'nuance'*

Backness Harmony and Rounding Harmony are not syllable internal constraints, but they are transsyllabic constraints, which apply to two vowel segments belonging to different syllables. In addition, vowel harmony in Hungarian is from left to right, in other words, suffixes are normally controlled by the stem.

Let us now consider the rhymes with nasal codas. In Chinese, the coda position is limited to [n] and [ŋ], which contrast in that position. In Hungarian, [n] is unspecified: in coda clusters C1C2, if it is a "nasal+stop" sequence, then C1 must be place-bound unless both of them are coronal. [ŋ] is a variant of [n], which occurs before [k, g]. For example, *sonka* [ʃoŋkɔ] 'ham' and *henger* [hɛŋgɛr] 'cylinder'. Because of this difference Chinese nasal codas are relatively difficult to acquire for Hungarain students.

CONSTRAINTS BETWEEN INITIAL AND MEDIAL

In Chinese the single initial onset position does not display the maximal inventory of contrasts, which means that the onset is sensitive to the nature of the segment that occurs in the following position and vice versa.

If one looks at the Chinese onset consonant sounds, in Chinese language textbooks for non-native Chinese language learners, it is usually mentioned that there are altogether 21 consonant sounds that may occur in the initial position. However, some scholars such as Chao (1948), Li (1966) and recently Zhu (2010), argue that there are 22 consonant sounds in Chinese at the initial position, adding Ø zero onset as one of the consonant initials. In my study, I mainly focus on learners who are not native speakers of Chinese. That is why I stick to the view that there are only 21 possible consonant sounds in the initial onset position in Chinese.

6. Table: Chinese 21 consonant initials in IPA

	Bilabial		Labio-dental	Dental		Post-alveolar		Alveolo-palatal		Velar	
Stop	[p]	[p^h]		[t]	[t^h]					[k]	[k^h]
Fricative			[f]	[s]		[ʂ]		[ɕ]		[x]	
Affricate				[ts]	[ts^h]	[tʂ]	[tʂ^h]	[tɕ]	[tɕ^h]		
Nasal	[m]			[n]							
Central approximant						[ɹ]					
Lateral approximant				[l]							

Source: Adapted version of Lin, 2007, 41. p

Among these 21 consonant sounds in the initial position, some sounds with the same place of articulation are pronounced in a similar way, but they are different in terms of aspiration. In Table (6), those voiceless unaspirated (e.g. [p]) are on the left and those voiceless aspirated (e.g. [p^h]) are on the right side. In Chinese, there are three pairs of aspirated and unaspirated stops: [p^h, p], [t^h, t], and [k^h, k], and three pairs of aspirated and unaspirated affricatives: [ts^h, ts], [tɕ^h, tɕ], and [tʂ^h, tʂ]. Fricatives have no aspirated/unaspirated pairs. [tɕ], [tɕ^h], and [ɕ] are in complementary distribution with the dental affricates/fricatives [ts], [ts^h], and [s], the post-alveolar affricates/fricatives [tʂ], [tʂ^h], and [ʂ], and velars [k], [k^h], and [x] (Duanmu, 2007; Lin, 2007; Zhu, 2010). While [tɕ], [tɕ^h], and [ɕ] occur only before high front vowels [i] and [y] or glides [j] and [ɥ], the others, namely [ts], [ts^h], [s], [tʂ], [tʂ^h], [ʂ], [k], [k^h], and [x], never occur before high vowels or high glides. In Chinese, all nasals and approximants are voiced. [ɹ] is transcribed as a liquid [ɻ] by Zhu (2010) (307. p) but as a voiced fricative [ʐ] by Duanmu (2007, 24. p).

Medial position is limited to glides [j, w, ɥ] in Chinese. Table 7 shows the interesting case of initial onset and medial clusters, which can be categorized into three types according to their right-hand-side part:

7. Table: Constraints between Onset and Medial in Chinese

[pj, p^{h}j, mj, *fj], [tj, t^{h}j, nj, lj], [tɕj, tɕ^{h}j, ɕj] *[tʂj, tʂ^{h}j, ʂj, ɻj], *[tsj, ts^{h}j, sj], *[kj, k^{h}j, xj]	j-final
[tʂw, tʂ^{h}w, ʂw, ɻw], [tsw, ts^{h}w, sw], [kw, k^{h}w, xw], [pw, p^{h}w, mw, fw], [tw, t^{h}w, nw, lw] *[tɕw, tɕ^{h}w, ɕw]	w-final
[tɕɥ, tɕ^{h}ɥ, ɕɥ], [nɥ, lɥ] *[tʂɥ, tʂ^{h}ɥ, ʂɥ, ɻɥ], * [tsɥ, ts^{h}ɥ, sɥ], *[kɥ, k^{h}ɥ, xɥ] *[pɥ, p^{h}ɥ, mɥ, fɥ], [*tɥ, *tɥ]	ɥ-final

From the phonological patterns in Table 7, we can see that: 1) [n, l] are the most unmarked ones, which can precede any glide. Then velars [k, kh, x], dentals [ts, tsh, s] and post-alveolars [tʂ, tʂh, ʂ, ɻ] only co-occur with [w]. Alveolo-palatals [tɕ, tɕ^h, ɕ] are only allowed to co-occur with a high front vowel glide. According to historical evidence (Wang, 1980, 79. p), [tɕ, tɕ^h, ɕ] had the earlier pronunciation [k, k^h, x] or [ts, ts^h, s]. They underwent palatalization when they precede a palatal [j]. This may be viewed as an assimilation in which [j] came to be interpreted on the adjacent consonant, hence [k, k^h, x] + [j] → [tɕ, tɕ^h, ɕ] and [ts, tsh, s] + [j] → [tɕ, tɕ^h, ɕ]. In this way, children end up acquiring a grammar that describes only the synchronic properties of their native phonology.

CONSTRAINTS BETWEEN INTIAL ONSET AND NUCLEUS

Let us now consider the onset-nucleus relation. In Chinese, high vowels and high glides show similar distributional effects.

8. Table: Constraints between Onset and Nucleus in Chinese

	/i/	/u/	/y/	/a/	/ə/
[p, p^h, m]			*		
[f]	*		*		
[t/t^h]			*		
[n/l]					
[tɕ, $tɕ^h$, ɕ]		*		*	*
[tʂ, $tʂ^h$, ʂ, ɻ]	*		*		
[ts, ts^h, s]	*		*		
[k, k^h, x]	*		*		

In Hungarian there is no such restriction, generally onsets are not sensitive to the nature of the vowel that occurs in the following postion, and the onset position almost displays a maximal inventory of contrasts. For example, [ki, tsi, sy, fy, ty] are all well-formed. Siptár & Törkenczy (2000, 9. p) state that 'Principle of Free Cooccurrence' appears to be true in Hungarian phonology and constraints on syllable well-formedness seem to apply to subsyllabic constituents and not to the syllable itself. 'Principle of Free Cooccurrence' means that a syllable is composed of any well-formed onset followed by any well-formed rhyme.

CONSTRAINTS BETWEEN MEDIAL AND NUCLEUS, BETWEEN MEDIAL AND CODA

Backness Harmony and Rounding Harmony also apply to medial and nucleus in Chinese, for example [ja], [je], [wɑ], [wo] and [ɥe]. Thus, the medial in binary rhymes behaves like some special kind of "coda" in Chinese, but [ɥ] is not allowed to occur in the coda position. But in Chinese, medial glides are not allowed to agree in the features [back] or [round] with coda glides, for example, *[jVj], *[ɥVj], *[ɥVj] or *[wVw] are all ill-formed. And even though [j] and [w] can co-occur in a syllable, if the initial is a labial initial, coda [j] cannot cooccur with medial [w] (e.g.*[pwaj] is ill-formed).

Finally, in Chinese no alternations occur in syllable initial position or syllable final position. In other words, generally transsyllabic constraints do not apply to Chinese (as long tone is not considered), because the underlying forms already conform to given restrictions. In a different manner from Chinese, there are transsyllabic constraints involving vowels and consonants in Hungarian, which are constraints applying to adjacent segments belonging to different syllables.

CONCLUSION

This paper has shown the syllable inventory of Chinese and Hungarian. Hungarian has more syllable types than Chinese, and the syllable inventory is considerably bigger than Chinese as well. A comparison of the syllable structures in Chinese and Hungarian was summarized as: There are complex onsets, complex nuclei, complex codas in Hungarian, but not in Chinese. In contrast, there is medial as a syllable constituent in Chinese, but not in Hungarian. This paper has also introduced some contraints and phonological processes about syllables in Chinese and Hungarian. As opposed to Hungarian, syllables of Chinese are not arbitrary repetitions of onset and rhyme, but very restricted. Also, Hungarian syllables can be marked or unmarked, but Chinese syllables are all marked ones.

This study provides significant insights into the phonological comparison between Standard Chinese syllables and Standard Hungarian syllables, particularly in the context of Chinese. This research expands the understanding of cross-linguistic phonological markedness theory. It also tests and refines existing syllable theories. The findings contribute to the theoretical discussion about universal versus language-specific phonological processes. From an educational perspective, these findings can guide language instructors in creating more effective teaching methods, materials, and assessment tools, ultimately improving learners' phonological competence in Chinese. However, in addition to the systematic syllable gaps we mentioned in this paper, there are other syllable constraints in Chinese as well, which need to be investigated in further research.

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