UDC 811.111'342.42:811.162.4'342.42

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THE CVX THEORY OF SYLLABLE: THE ANALYSIS OF WORD-FINAL RHYMES IN ENGLISH AND IN SLOVAK

Abstract
The CVX theory of syllable by S. Duanmu claims that the maximal rhyme size in all languages is VX, i.e. VV or VC (Duanmu 2009). Duanmu's analysis of word-final rhymes in English shows that all coda clusters form a complex sound or can be explained by morphology. Long vowels can be represented as short and thus the rhyme size does not exceed VX. The data from Slovak cast doubts on the universal nature of the CVX syllable theory. In Slovak, word-final consonant clusters form complex sounds only rarely and not all consonants beyond the VX limit have morphological solution. Moreover, the dominant feature of Slovak vowels is their length, which expands the number of timing slots in the rhyme structure template.

Key words: CVX syllable theory, consonant clusters, complex sound, word-final rhymes

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1. Introduction

The CVX theory of syllable structure by S. Duanmu (2009) assumes that the maximal syllable size in all languages is CVX (CVC or CVV) and any extra sounds at word edges either have a morphological solution or can be treated as complex sounds (ibid.).

This so-called morphological approach to syllable structure is based on the analysis of the data from five languages that allow large consonant clusters: Standard Chinese, Shanghai Chinese, Jiarong, English and German (Duanmu 2009: 71). The evaluated languages belong to two language families – the Sino-Tibetan and the West-Germanic. As is well-known, the phonotactic possibilities and constraints of genetically close languages are usually at least partly related. In my opinion, this fact relativizes the supposed universal character of the CVX model of syllable.

In order to examine the validity of the proposed universal CVX syllable structure, I have undertaken a research aimed at testing this theory on the Slovak language, which is typologically different from the other languages mentioned above (Gregová 2010, 2011). Slovak belongs to the West-Slavonic languages, which are all highly inflectional and allow relatively long sequences of consonants. The research compares and contrasts the syllable structure and the phenomena pertinent to the CVX theory in English, one of the languages that Duanmu tested his theory on, and in Slovak.

In the first stage of the research, I compared the possible word-initial and word-final consonant clusters in English and in Slovak (Gregová 2010). The analysis showed that the total number of possible consonant clusters in Slovak is much higher than in English and their structure is more heterogeneous.

The second stage of the research focused on the single-slot analysis of syllable onset, i.e. the analysis of the word-initial consonant clusters, in terms of three basic concepts of the CVX theory (see below) and the notion of a complex sound (Gregová 2011). It seems that whereas the single-slot analysis of some languages perfectly fits Duanmu's assumptions (cf. Marlo 2004, Duanmu 2009), in Slovak the simplification of syllable onset may cause difficulties and at least a two-slot onset template is required in this language.

In this paper, I will first briefly introduce the CVX syllable theory, and then I will consider word-final rhymes, including an analysis of word-final consonant clusters in English and in Slovak.

2. The CVX theory

Duanmu's idea that the maximal syllable size in all languages is CVX (CVC or CVV) is based on three morphological concepts:

(1) **The Affix Rule**: "Affix or affix-like sounds can be pronounced, whether they can fit into a syllable or not" (Duanmu 2009: 50). For example, the final consonant [s] in the monosyllabic word *pets* [pets] is not the part of a syllable whose structure is then only CVC. This final [s] that represents the sound form of the real suffix -(e)s is accounted for by morphology (the Affix Rule). Similarly, the syllable structure of the word *ax* [æks] is only VC because the final [s] can be accounted for by morphology, too. It is an affix-like sound or a "perceived suffix" covered by the Affix Rule (Duanmu 2010: 8).

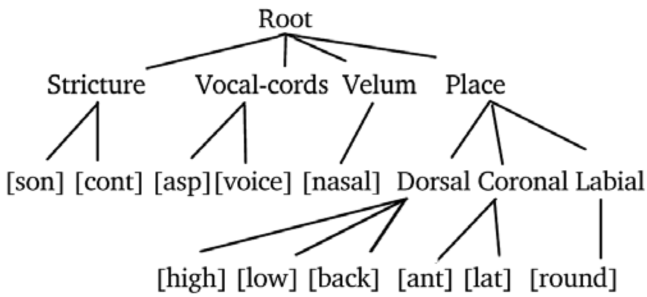
(2) **The Potential Vowel:** extra consonants at word edges are predictable from morphology: in languages having suffixes starting in a vowel, an extra consonant is allowed in a word-final position. This consonant can function as the onset of the suffix vowel. Analogically, in languages that have prefixes ending in a vowel, an extra consonant can be in a word-initial position in order to form a coda of the prefix with a vowel at its end (Duanmu 2009: 70, 150). For example, the final [p] in the word *help* is an extra C when the word is in isolation (supported also by the Anti-Allomorphy; see below), but this [p] functions as the onset of the following V in the word *helping* – [hel]p, [hel][pɪŋ] (Duanmu 2010: 10).

(3) **The Anti-Allomorphy**: "Keep a morpheme in the same shape regardless of the environment" (Duanmu 2009: 47). This rule also supports the syllabification of *help* [help] as a VCV + extrasyllabic consonant [hel]p (ibid.: 47).

The question of how many underlying sounds can be in each of three CVX slots is answered by the concept of a **complex sound**. The extreme case is represented by six underlying sounds which merge into three complex sounds: e. g. in the word *prints* [prɪnts] the CVX structure is [p^r ɪ̃t^s]. [p^r] is formed from [p] and [r]; the nasalized [ɪ̃] is formed from [ɪ] and [n], and the affricate sound [t^s] is formed from [t] and [s] (ibid.: 70).

The notion of a complex sound has its roots in the articulator-based feature theory that distinguishes articulators and features. Articulators as the movable parts in the vocal tract participate in speech production, and the gestures made by these articulators constitute features (Marlo 2004: 79). The schematic structure of the articulator-based feature geometry is represented in Figure 1.

Figure 1. Articulator-based Feature Geometry

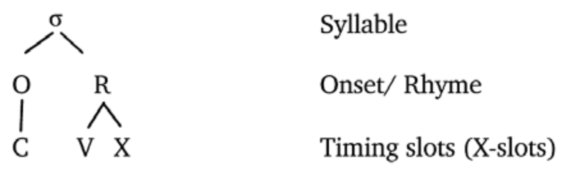


(Marlo 2004: 80)

A complex sound can be seen as a merge, i.e. the gestural overlap of two (or more) sounds (Duanmu 2009: 25). This merging of sounds is governed by the **No Contour Principle** which says that "an articulator cannot make the same feature twice within one sound" (ibid.: 174). A single sound cannot be characterised simultaneously by both [+nasal] and [-nasal], because conflicting gestures cannot overlap, they must be made in sequence and require more than one timing slot (Duanmu 2010: 16). For example, [b] is characterised by Labial [-nasal], [m] is Labial [+nasal], therefore [bm] cannot form a complex sound. Only those sounds can form a complex sound whose articulatory features can overlap (ibid.: 5). Overlapping gestures are made simultaneously and thus a complex sound takes just one timing slot (Duanmu 2010). For example, the gesture of [p] is Labial and that of [l] is Coronal, so they are independent and can overlap. Therefore, [pl] forms a complex sound and fits in a single slot (ibid.).

All in all, in Duanmu's approach to syllable structure, there is only a single slot for onset and two slots for rhyme (cf. Duanmu 2009, 2010). The structure of the syllable (schematically presented in Figure 2) is either CVV (e.g. *bee* [bi:]) or CVC (e.g. *bet* [bet]) and any extra consonants at word edges can be explained by morphology.

Figure 2. CVX syllable structure



(Duanmu 2009: 41)

3. The analysis of word-final rhymes in English

As already mentioned, English was one of five languages on which Duanmu (2009) tested his theory. All English possible (and even impossible) word-initial, word-medial and word-final consonant clusters were thoroughly analysed in terms of the main concepts of the so-called morphological approach to syllable structure. Since this paper deals with word-final rhymes (and word-final clusters) only, I will now briefly summarise Duanmu's analysis of the English word-final rhymes in order to exemplify the language that fits the CVX syllable structure.

A word in English can end with a vowel or with one, two, three or four consonants (Roach 2000: 73). The highest number of consonants in the word-final consonant cluster, i.e. in coda, is four. The centre of the syllable can be a short monophthong (representing one timing slot V), a long monophthong (represented by two timing slots VV) or a diphthong (represented by two timing slots VV)[1]. This means that the maximal structure of the English word-final rhyme is [VVCCCC]. But Duanmu's theory proposes only the rhyme structure [VV] – long vowel or diphthong and no coda or [VC] – short vowel and one consonant in coda. Thus, how

[1] The analysis of syllables with syllabic consonants in their centre is identical with the analysis of syllables with short monophthongs (both represent one timing slot).

is it possible to reduce the rhyme structure into only two slots? And how can extra sounds at word edges be accounted for?

In English, there are 24 consonantal phonemes (cf. e.g. Roach 2000, McMahon 2002) and any consonant can be final except /h, w, j/ (Roach 2000: 59). If there is only one segment in coda and the syllable centre is formed by a short vowel, the structure of the rhyme proposed by Duanmu is preserved, and is [VC], e.g. *but* [bʌt]. If a long vowel or a diphthong creates the peak, e.g. *mine* [maɪn], *part* [pɑ:t], the rhyme structure is [V:C], i.e. [VVC]. This special case is solved by the simplification of [V:C] into [VC], "where V is tense and short but still distinct from a lax vowel" (Duanmu 2009: 45)[2]. If this analysis is applied, the rhyme size is [VX][3].

The comparison of several sources (cf. Gregová 2010) has shown that there are 55 final two-consonant clusters in English.

Final CC clusters in English

ending with consonants [t] and [d]:	pt, bd, kt, gd, mt, md, nt, nd, ŋt, ŋd, ft, vd, δd, st, zd, ʃt, ʒd, lt, ld, ʧt, ʤd (21)
ending with consonants [s] and [z]:	ps, bz, ts, dz, ks, gz, mz, ns, z, ŋz, fs, vz, θs, δz, ls, lz (16)
ending with consonant [θ]:	pθ, tθ, kθ, nθ, ŋθ, fθ, lθ (7)
ending with some other consonant:	mp, mf, nʧ, nʤ, ŋk, ŋg, sp, sk, lp, lf, lk (11)

(cf. Gregová 2010)

Most two-consonant clusters (44) end with one of the coronals /t, d, s, z, θ/ as the final ones. These clusters have a morphological solution – the final consonants can be accounted for by the Affix Rule (see above), which covers both real and potential affixes. For example, *blessed* [blest] is a monosyllabic word whose rhyme exceeds [VX] – it is [VCC]. The final C [t] is a real suffix. In the monosyllabic word *want* [wɒnt] the final C is a

[2] This simplification is possible in languages like English whose vowels are different in terms of length (quantity) and quality, too (cf. e.g. Giegerich 1992).

[3] Analogically, the assumption that long vowels (i.e. long monophthongs and diphthongs) "can be accounted for by the idea that [V:C] can be analysed as [VC]" (Duanmu 2009, p.158) is applied also on the rhymes with two-, three-, and four-consonant clusters which are then not treated separately in this paper.

potential suffix. These real and potential suffixes are extra-syllabic. They are not the part of a syllable and the rhyme size does not exceed [VX]: *blessed* – syllabification [bles]t, rhyme [es] – [VC]; *want* – syllabification [wɒn]t, rhyme [ɒn] – [VC] (for details cf. Duanmu, 2009, pp. 154 – 155).

If the Affix Rule cannot be applied (e.g. in the word *camp* [kæmp]), the extra consonant at word edge is supported by the Potential Vowel and/or the Anti-Allomorphy (see above): *camp* – *camping*, syllabification kæm[p] – kæm[pɪŋ] (cf. ibid.).

The final three-consonant clusters are quite numerous in English too: there are 39 of them. They end with /s, z, t, d/ which, as already mentioned, can easily be covered by morphology since they represent separate morphemes.

Final CCC clusters in English

ending with consonants [t] and [d]:	pst, tst, kst, mft, mst, ntʃt, ndʒd, ŋst, lmd, lpt, lbd, lft, lvd, lnd, ltʃt, ldʒd, lʃt, lkt (18)
ending with consonants [s] and [z]:	pθs, pts, tθs, kθs, kts, mps, mfs, mts, nts, ndz, ŋts, fθs, fts, sts, lmz, lps, lbz, lθs, lnz, ldz, lks (21)

(cf. Gregová 2010)

For example, the rhyme structure in the word *depths* [depθs] is [VCCC]. The final [s] can be solved by the Affix Rule. The remaining segments still exceed the structure [VX]. The consonant cluster [pθ] is a good complex sound since the gestures of [p], which is Labial, and [θ], which is Dental, are independent and can overlap, filling in only one timing slot. Thus the word *depths* [depθs] is syllabified as follows: [dep^{θ}[s], with the rhyme structure [VC], i.e. [ep^{θ}] and unsyllabified [s].

The schematic structure of the word-final rhyme in *arranged* [əreɪndʒd] is [VVCCC]. The final C [d] is supported by the Affix Rule, while the penultimate C [dʒ] is extra-syllabic too, accounted for by the Potential Vowel. What remains is [eɪn – VVN]. In Duanmu's approach "*[VVN] can be analysed as [*ṼṼ*]*" (for details cf. Duanmu 2009: 158). The maximal size of the word-final rhyme in *arranged* is then still VX and is [ṼṼ].

The highest number of consonants in English coda is four. There are seven word-final four-consonant clusters in English.

Final CCCC clusters in English
ending with consonant [s]: ksθs, ksts, mpts, lfθs, ltst, lkts (6)
ending with consonant [t]: ntst (1)

(cf. Gregová 2010)

The largest size of word-final rhyme VX is preserved also in words that end with a four-consonant cluster. Word-final consonants are explained by morphology – the Affix Rule, the Potential Vowel, the Anti-Allomorphy, or the notion of a complex sound can be applied. For example, the word *texts* [teksts] has the rhyme [VCCCC]. The final coronal [s] is solved by the Affix Rule. The penultimate [t] can be accounted for by the Anti-Allomorphy or the Potential Vowel. [ks] is a good complex sound. The rhyme structure is then [VC] – [ek^s] (cf. Duanmu 2009: 154 – 156).

4. The analysis of word-final rhymes in Slovak[4]

A word in Slovak can end with a vowel or with one, two or three consonants. The highest number of consonants in the final position of Slovak words, i.e. in syllable coda, is three. Similarly to English, the syllabic nucleus can be a short monophthong (one timing slot – V), a long monophthong (two timing slots – VV) or a diphthong (two timing slots VV)[5]. The maximal size of word-final rhyme is [VVCCC] in Slovak (cf. Gregová 2010).

In the Slovak language, there are 27 consonantal phonemes /p, b, m, f, v, t, d, n, s, z, c, ʒ, r, l, š, ž, č, ǯ, ť, ď, ň, ľ, j, k, g, x, h/ and all of them can occur in the final position of a word. If the syllable nucleus is a short vowel, the rhyme structure is [VC], e.g. *dom* 'house' – syllable structure CVC. If a long monophthong or a diphthong creates a centre, the final C is accounted for by morphology (the Potential Vowel or/and the Anti-Allomorphy) and

4 The analysis covers both word-final rhymes without inflection, i.e. the basic form of a word, and with inflection.

5 The centre of the Slovak syllable can also be formed by a syllabic consonant that, functioning as a vowel, can be either short (one timing slot) or long (two timing slots).

the rhyme size [VX] is preserved, e.g. the monosyllabic word *pár* 'couple'[6] with the segmental structure CVVC and the rhyme [VV] + extrasyllabic C.

The detailed evaluation of several sources (Sabol 1969a, 1969b, Petriščáková 2006, Short Dictionary of Slovak Language online */Krátky slovník slovenského jazyka/*, Slovak National Corpus */Slovenský národný korpus/*) has shown that there are 53 final two-consonant clusters in Slovak[7].

Final CC clusters in Slovak[8]

starting with oral plosive:	ps, kt, ks (3)
starting with nasal plosive:	mp, mb, mf, nt, nd, nk, ng, nc, nč, nš (10)
starting with fricative:	st, zd, sť, zď, sk, št, žd, šť, žď, ft, vk, xt, lp, lt, ld, lk, lc, ls, lz, lf, lm, rp, rt, rd, rk, rc, rč, rs, rz, rš, rf, rv, rm, rn, rň, jt, jd, jk, jf, jn (40)[9]

In terms of the articulator-based feature geometry, 19 word-final CC clusters [ps, kt, sk, ks, ft, vk, xt, lp, lk, lf, rp, rk, rs, rz, rš, rf, rv, jk, jf] can be represented as complex sounds. Consonants in these clusters either involve different articulators, or they have the same articulator but without conflicting gestures. For example:

(1) [p] Labial, [s] Coronal – [p^s] = complex sound
(2) [l] Coronal, [k] Dorsal – [l^k] = complex sound
(3) [r] Coronal [+anterior, +fricative]

[6] Considering Kuriłowicz's idea that the beginning of the word is at the same time the beginning of the first syllable and that the end of the word represents the end of the last syllable (Kuriłowicz 1948), this paper deals with rhymes in monosyllabic words only.

[7] This contribution does not report all possible combinations of consonants in the Slovak language. Only the most productive clusters occurring in the domestic vocabulary are taken into account (cf. Gregová 2010).

[8] Since none of these CC clusters or segments in them can be treated as affix or affix-like sound, their division, contrary to English, is based on the manner of articulation of the individual consonants. This type of classification is more useful for a complex sound analysis that is necessary for the morphological explanation of word-final clusters in Slovak.

[9] Most of these CC clusters are the result of the inflectional processes and contextual occurrences of words. Otherwise, the number of word-final CC clusters in the basic forms of Slovak words is much lower.

[s] Coronal [+anterior, +fricative]
[r^s] = complex sound.

If any of these 19 CC clusters forms a rhyme whose peak is a short vowel, the rhyme structure is [VC], where C represents a complex sound. For example:

(4) *stisk* [sťisk][10] 'squeeze' – rhyme structure VC [is^k]

(5) *necht* [ňext] 'nail' – rhyme structure VC [ex^t].

Three of these clusters – [sk], [rs] and [rz] – occur in words where they form rhyme with a long vowel. e.g. *ložísk* < G pl. of *ložisko* 'lead', *mravenísk* < G pl. of *mravenisko* 'anthill', *bárs* 'betide'. As already mentioned, Duanmu proposes the simplification of [VVC] into [VC]. But in Slovak, it is impossible to represent the difference between vowels belonging to the same vocalic timbre without referring to their length. The sound form of Slovak monophthongs and diphthongs is relatively stable; they are not reduced, but are fully pronounced in every syllable (Kráľ and Sabol 1989). Moreover, from the aspect of the close/open quality of vowels, the Slovak vocalic sounds are neutral. The vowel pairs in Slovak do not have a different quality; they differ only in their quantity – vowels are either short or long (ibid: 200 – 201). The length of vowels, vocalic quantity, has a phonological-distinctive function in standard Slovak – it differentiates the meaning of words and word forms (cf. Gregová 2008). For example, *sud* 'barrel' vs. *súd* 'tribunal', *udaj* 'sell' vs. *údaj* 'data', etc. Thus, Slovak long monophthongs and diphthongs always have to be represented by two timing slots, i.e. [VV]. This indicates that at least one more slot may be necessary for word-final rhymes in Slovak.

CC clusters [mp, mb, mf, nt, nd, nk, ng, nc, nč, nš, st, zd, sť, zď, šť, žď, št, žd, lt, ld, lc, lš, lz, lm, rt, rd, rč, rm, rn, rň, jt, jd, jn] are not good complex sounds, because they have conflicting gestures. For example:

(6) [m] Labial [+nasal], [p] Labial [-nasal] – [mp] is not a complex sound

(7) [n] Coronal [-fricative, +nasal]
[š] Coronal [+fricative, -nasal]
[nš] is not a complex sound.

[10] When the sound form of a word is different from its graphic form, the pronunciation is in brackets. When there is no difference between the spelling and the pronunciation of Slovak words, only the graphic form is used.

But the final C in these clusters can be covered by morphology (the Anti-Allomorphy, the Potential Vowel). And when these clusters are preceded by a short vowel, the rhyme size is, in accordance with the CVX theory, [VX]. For example:

(8) *vinš* 'verse' – syllable structure [CVC]C, rhyme [VC]

(9) *dosť* 'enough' – syllable structure [CVC]C, rhyme [VC].

Moreover, clusters [nš, sť, šť] can also be easily solved by the Affix Rule (or better Affix-like Rule) since consonants [š] and [ť] function as grammatical suffixes in Slovak.

21 CC clusters that are not good complex sounds [mp, mb, nt, nd, nk, ng, st, zd, sť, zď, št, žd, šť, žď, lt, ld, lm, rt, rd, rm, jd] occur in syllables where the nucleus is a long vowel or a diphthong. The traditional scheme of the rhyme is then [VVCC]. But clusters [sť, šť] have a morphological solution. For example:

(10) *plášť* [pla:šť] 'overcoat' – CCVVCC, final C can be explained by the Affix Rule, penultimate C can be accounted for by the Potential vowel, so the rhyme is then only [VV].

CC clusters starting with a nasal consonant do not violate the rhyme size [VX] either, even if they are preceded by a long vowel or diphthong. For example:

(11) *žúmp* [žu:mp] < G pl. of *žumpa* 'cesspit' – CVVCC, final C is supported by the Potential Vowel, VVC with nasal C is covered by the analysis of [VN] as [Ṽ] (for details cf. Duanmu 2009). The syllable structure is then [CṼṼ]C, rhyme [ṼṼ].

The remaining CC clusters [st, zd, zď, št, žď, lt, ld, lm, rt, rd, rm, jd] represent a violation of the CVX theory. Only the final C is predictable from morphology as extra-syllabic (the Potential Vowel), and one more slot is necessary for the rhyme. For example:

(12) *hviezd* < G pl. of *hviezda* 'star' – syllable structure [CCVVC]C, rhyme [VVC].

As to the three-consonant clusters in Slovak, the materials analysed show only four word-final CCC clusters.

Final CCC clusters in Slovak

starting with nasal plosive: nkt (1)

starting with fricative: jsť, jzď, jsk (3)

The cluster [nkt] occurs only in rhymes with a short monophthong. For example, in the word *punkt* 'dot' – CVCCC. [kt] is a good complex sound ([k] Dorsal, [t] Coronal) and the remaining [un] can be simplified by the analysis of [VN] as [Ṽ]. The rhyme structure is [ṼC], where [Ṽ] stands for [ũ] and C is the complex sound [k^t].

Although the cluster [jsk] is rare and occurs only in rhymes with a short vowel as a peak, it does not fit the rhyme structure [VX]. For example, in the word *vojsk* < G pl. of *vojsko* 'military forces', the rhyme is [VCCC], and the final C can be accounted for by the Potential Vowel, but [js] cannot be treated as a complex sound because of conflicting gestures: ([j] is Coronal [-anterior] and [s] is Coronal [+anterior]). At least one more timing slot is required for this word-final cluster.

The cluster [jsť] and its contextual version [jzť] fit the rhyme size proposed by Duanmu's theory. The final C [ť] has morphological solution (the Affix Rule). Neither [js] nor [jz] can be complex sounds, because of the already mentioned conflicting gestures (the feature specification of [z] is identical to the feature specification of [s], and they differ only in the presence or the absence of the feature Voice). But the penultimate consonants [s], [z] can be explained by the Potential Vowel. The rhyme size is [VC]. In occurrences with long vowels, e. g. in verbs *dôjsť* [duojsť] 'to arrive, to come', *nájsť* [na:jsť] 'to find' the final [ť] can similarly be unsyllabified (the Affix Rule), the penultimate C is solved by the Potential Vowel. The syllable scheme of this example is CVVC[C[C] with the rhyme size [VVC].

5. Conclusion

The morphological approach to syllable structure by S. Duanmu (2009) assumes that the maximal syllable size in all languages is CVX (CVC or CVV) and any consonants beyond this limit are predictable from morphology (the Affix Rule, the Anti-Allomorphy, the Potential Vowel) or can be treated as complex sounds. Duanmu has tested his theory on five languages from two language families. And so the question arises here if the genetic closeness of the languages evaluated does not relativize the proposed universal nature of the CVX theory.

In order to examine the validity of this universal syllable size, I have undertaken a research aimed at testing this theory on the Slovak language, which is typologically different from all the languages analysed so far (cf. Marlo 2004; Duanmu 2009, 2010). The data from the analysis of syllable onset, i.e. the analysis of word-initial consonant clusters, in the Slovak language has shown that the maximum number of consonants in the initial position of a Slovak word, i.e. the maximum number of consonants in syllable onset, is four. But not all consonant clusters can be explained by morphological concepts of the CVX theory and/or they do not form a complex sound. It seems that at least a two-slot onset template is required in the Slovak language (cf. Gregová 2011).

This paper concentrates on the word-final rhymes in English – the language that fits Duanmu's syllable model – and in Slovak. Traditionally, the largest structure of the English word-final rhyme is [VVCCCC]. In Duanmu's approach, the rhyme structure is only [VV] or [VC]. Unsyllabified consonants are accounted for by morphology as real or potential affixes (the Affix Rule). If the Affix Rule cannot be applied, the consonants beyond [VX] limit are covered by the Potential Vowel and/or the Anti-Allomorphy (cf. Duamnu 2009). This two-slot template for syllable rhyme is supported by the possibility to simplify [V:C] into [VC], since English vowels differ not only in their length, but especially in their quality.

The situation in the Slovak language is slightly different. The maximal structure of word-final rhyme is [VVCCC], but neither long monophthong nor diphthong can be represented by only one timing slot. There is no qualitative difference between related short and long vowels. Moreover, quantity has a phonological-distinctive function in Slovak. The difference among vowels that belong to the same vocalic timbre has to be represented with regard to their length. The application of the Affix Rule is limited, and not all consonant clusters can be analysed as complex sounds.

The possible structure of word-final rhymes in Slovak can be summarized as follows:

(1) short monophthong + C (any consonant) – rhyme [VC],
(2) long monophthong/ diphthong + C (any consonant) – final C solved by morphology
(the Potential Vowel, the Anti-Allomorphy) – rhyme [VV],
(3) short monophthong + CC (complex sound) – rhyme [VC^s][11],
(4) long monophthong/ diphthong + CC (complex sound) – rhyme [VVC^s],

[11] Cs stands for a complex sound.

(5) short monophthong + CC (not complex sound) – final C explained by morphology
(the Potential Vowel, the Anti-Allomorphy) – rhyme [VC],

(6) long monophthong/ diphthong + CC (not complex sound):
   a) final C possible suffix – final C has morphological solution (the Affix Rule), penultimate C accounted for by the Potential Vowel and/or the Anti-Allomorphy – rhyme [VV],
   b) penultimate C is nasal – final C supported by the Potential Vowel and/or the Anti-Allomorphy, [VVN] analysed as [ṼṼ] – rhyme [ṼṼ],
   c) final C covered by morphology (the Potential Vowel, the Anti-Allomorphy) – rhyme [VVC],

(7) short monophthong + CCC (N + CC as possible complex sound) – final CC represents a complex sound, [VN] simplified as [Ṽ] – rhyme [ṼC^s],

(8) short monophthong + CCC (not complex sound) – final C accounted for by morphology
(the Potential Vowel, the Anti-Allomorphy) – rhyme [VCC],

(9) short monophthong + CCC (final C is [ť]) – final C explained by the Affix Rule, penultimate C solved by the Potential Vowel – rhyme [VC],

(10) long monophthong/diphthong + CCC (final C is [ť]) – final C supported by the Affix Rule, penultimate C covered by the Potential Vowel – rhyme [VVC].

As is clear, although the highest number of consonants in the final position of Slovak words (syllables) is only three, not all of them can be clarified by the morphological concepts of Duanmu's theory (cf. 4, 6c, 8, 10) and one more timing slot is necessary for the Slovak word-final rhymes.

In the next stage of this research, consonant clusters in the word-medial position will be analysed in order to complete the evaluation of the Slovak syllable in terms of the CVX theory. Further research should also encompass additional languages from other language families so as to verify the proposed universal nature of the maximal CVX structure of syllable.

References

Duanmu, S. (2009). *Syllable Structure. The Limits of Variation*. Oxford: Oxford University Press.

Duanmu, S. (2010). The CVX Theory of Syllable Structure. Available at http://www-personal.umich.edu/~duanmu/CUNY-CVX-2010Oct.pdf

Giegerich, H. J. (1992). *English Phonology. An Introduction*. Cambridge: Cambridge University Press.

Gregová, R. (2008). Quantity in Slovak and in British English. *SKASE Journal of Theoretical Linguistics,* 5 (1), 17-41. Available at http://www.skase.sk/Volumes/JTK11/pdf_doc/2.pdf.

Gregová, R. (2010). A Comparative Analysis of Consonant Clusters in English and in Slovak. *Bulletin of the Transilvania University of Braşov*, 3 (52), 79-84.

Gregová, R. (2011). The CVX Theory of Syllable. A Single-slot Analysis of the Initial Consonant Clusters in English and in Slovak. *Bulletin of the Transilvania University of Braşov,* 4 (53), 205-212.

Kráľ, Á. and J. Sabol (1989). *Fonetika a fonológia*. Bratislava: Slovenské pedagogické nakladateľstvo.

Kuryłowicz, J. (1948). Contribution à la thèorie de la syllable. *Biuletyn Polskiego towarzystwa językoznawczego* VIII, 80 – 114.

Krátky slovník slovenského jazyka [online dictionary]. <http://kssj.juls.savba.sk/>

McMahon, A. (2002). *An Introduction to English Phonology*. Edinburgh: Edinburgh University Press.

Marlo, M. (2004). CVX Theory in CCCCCCVX Languages: Implications for Universal Grammar. *Journal of Universal Language,* 5, 75-99. Available at www.unish.org/unish/DOWN/PDF/Michael%20Marlo.pdf

Petriščáková, K. (2006). *Pohľad na problematiku dvojčlenných konsonantických skupín v slovenčine*. MA thesis, Masaryk University, Brno, Czech Republic. Available at http://is.muni.cz/th/40153/ff_m/petriscakova.txt

Roach, P. (2000). *English Phonetics and Phonology. A Practical Course*. Cambridge: Cambridge University Press.

Sabol, J. (1969a). Frekvencia trojčlenných konsonantických skupín v spisovnej slovenčine. *Jazykovedný zborník, 2*, 129-149.

Sabol, J. (1969b). Štvorčlenné konsonantické skupiny v slovenčine. *Slovenská reč,* 34 (1), 30-33.

Slovenský národný korpus – prim-5.0-public-all. Bratislava: Jazykovedný ústav Ľ. Štúra SAV 2011. Available at http://korpus.juls.savba.sk/dicts.html

Received: 14 June, 2011
Accepted for publication: 25 September, 2011

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АНАЛИЗА ФИНАЛНИХ РИМА У ЕНГЛЕСКОМ И СЛОВАЧКОМ ЈЕЗИКУ

Сажетак

Према Дуанмуовој CVX теорији слоговне структуре, максимална дужина риме у свим језицима је VX, односно VV или VC (Дуанму 2009). Дуанмуова анализа финалних рима у енглеском показује да сви финални консонантски кластери образују комплексан глас или се могу објаснити морфолошким средствима. Дуги вокали могу се представити као кратки, те тако дужина риме не прелази VX. Подаци из словачког бацају сенку сумње на универзалност CVX теорије слоговне структуре. У словачком, финални консонантски кластери тек ретко образују сложене гласове, нити се сви консонанти који излазе ван границе VX могу морфолошки објаснити. Штавише, доминантна карактеристика словачких вокала јесте њихова дужина, која повећава број временских размака у структури риме.

Кључне речи: CVX теорија слоговне структуре, консонантски кластери, сложени глас, финална рима