

Book review

Syllable Structure. The Limits of Variation

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Renáta Gregová

San Duanmu's book offers a 'systematic study of syllabic structure' (p. xii) and related phonological issues (for example, features, sounds, stress and tone) in terms of the CVX theory¹ of syllable that is proposed as 'the upper limit on syllable size' (p. 51) in all languages and that derives the variations of syllable parameters from morphology. Therefore, it represents the so-called morphological approach to syllable structure.

The arrangement of the book follows the traditional structure with the table of contents, preface and acknowledgment at its beginning and the bibliographical references, author index (pp. 257-271), language and subject indexes (p. 272 and pp. 273-275 respectively) at its end. The main body of the book is divided into twelve chapters and each chapter concludes with a short summary of the main problems addressed by the chapter

Arising from a well-known fact that although native language users usually can intuitively count the number of syllables, syllable boundaries are not always clear, and even linguistic definitions of the structure and function of this unit are not uniformly subscribed to (p. 1; cf. for example Abercrombie 1967: 34, Roach 2000: 70), the author outlines in chapter 1 (pp. 1-10) the main aim of his book, which is to find answers to two questions: 'What is the maximum syllable size in human languages?', and 'Which syllables within the maximal size are or are not used in different languages, and why?' (p. 5).

Before the analysis itself, the reader is provided with a brief review of basic terms from generative linguistics connected with the syllable and its structure that are quite familiar but, as the author shows, not always unambiguous.

Chapter 2 (pp. 11-35) is devoted to the delimitation of some significant notions indispensable for syllable structure analysis. In comparing different approaches and/in different languages, the author defines a SPEECH SOUND as:

[...] a set of features such that (a) the features are made in one unit of time and (b) no feature is made twice by the same articulator (p. 17).

Since '[...] the sounds are made of features' (p. 18), several different theories on features are discussed, and those articulatory features that are essential for this study are briefly explained. Special attention is paid to the explanation of a COMPLEX SOUND and the representation of affricates. The notion of complex sound is, as the author points out, essential for the understanding of the CVX theory (p. 35). Likewise, affricates usually present a problem in feature theory (p. 21; see also Giegerich 1992). D's solution is lucid and clear: affricate sounds are made with the simultaneous features (or, as he calls them, GESTURES) [+stop] [+fricative]. This, I think, faithfully reflects the phonetic nature of affricate sounds (the combination of a closure and narrowing; cf. for example Král' & Sabol 1989: 242).

In explaining the above mentioned phenomena, many crucial terms and processes connected with phonetics and phonology are clarified inconspicuously as if by the way. For

example, the relation between the graphic symbols and the sound symbols of a language, a minimal pair, phonemic economy, or the basic principles of Goldsmith's (1976) autosegmental phonology (pp. 12-17).

Having been provided with a clear and comprehensible account of important terms and concepts from generative phonology, the reader is presented with the CVX theory in chapter 3 (pp. 36-71).

In order to highlight the fact that phonetic definitions say little or usually nothing about the syllable boundaries, D mentions two well-known theories: the prominence theory (Jones 1964) and the chest-pulse theory (Abercrombie 1962). The author stresses that '[i]t is unclear why some phonetic peaks are not treated as syllables, such as the [s] in stop [...]' (p. 38). The centre of the syllable is formed by the most prominent sound. A sound is prominent due to its '[i]nherent sonority [...], to length or to stress [...]' (Jones 1964: 55). Of course, it is true that the sound [s] represents a phonetic peak and is acoustically marked by great noisiness (Giegerich 1992: 118), but it is not a prominence peak since it has almost no degree of sonority and has no tone element in its acoustic spectrum (Jones 1964; Zimmermann 2002: 24).

All the other questions connected with the syllable, for instance word-edge consonants, CV analysis, the CVX theory itself, the peak rule, and rhymes and their structure, are delimited within the framework of the generative approach to phonology.

D's CVX theory is based on the statement that '[t]here is a correlation between the morphology of a language and the maximal syllable size of monosyllabic words' (p. 52). It presupposes no syllable parameters and achieves a more consistent syllable size. By contrast, as the author further argues, the traditional (that is, phonological) analyses '[...] assume a wider range of syllable sizes and a much greater degree of over-prediction' (p. 52).

So as to illustrate ambiguity in syllabifying words, the author questions the speaker's intuition, and compares four different approaches to syllabification: the Law of Initials and the Law of Finals by Vennemann (1988) and Blevins (2003), Maximising stressed syllables (Hoard 1971, Bailey 1978, Wells 1990, Hammond 1999), the Maximal Onset Rule by Pulgram (1970) and Kahn (1976) and the Weight-Stress Principle. The latter seems to be the 'most desirable' for D's analysis.

The evaluation of Blevins' (1995) and Clements and Keyser's (1983) parameters for maximal syllable size reliably assures the reader that the maximal syllable size in all languages is CVX and therefore there is no need for any parameters (p. 67). Let me now briefly indicate the basic idea(s) of the CVX theory. In comparison to other theories, the CVX theory brings together two simplifications: (1) the maximal syllable size of non-edge syllables is CVX (CVC or CVV); (2) 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 (p. 70).

The question of how many underlying sounds can be in each of the three CVX slots is answered by the concept of a complex sound. The extreme case is represented by six underlying sounds, as in the example shown in Table 1, where six underlying sounds merge into three complex sounds: [pʳ] formed from [p] and [r]; the nasalized [ĩ] formed from [i] and [ŋ], and the affricate sound [tʰ] that is formed from [t] and [s] (p. 70):

Word	Sounds	CVX
<i>Prints</i>	[prɪnts]	[p ^r ɪ t ^s]

Table 1 *The CVX syllable with six underlying sounds*

The following chapters of the book provide convincing arguments in favour of the CVX theory. Chapter 4 (pp. 72-85) begins with the comparative analysis of the syllable structure in Chinese based on the traditional approach and the CVX theory. The author then discusses the question of syllable boundaries, the obligatory or optional character of onset in Chinese syllable, the structure of stressed and unstressed syllables, and syllable types in final and non-final positions in Cantonese and Fuzhou. Although this part of the book is relatively demanding for readers who cannot speak Chinese, it seems to be very useful and motivating for those who are interested in the phonetics and/or phonology of a non-Indo-European language.

Chapters 5 (pp. 86-111) and 6 (pp. 112-128) are much more beneficial for non-speakers of Chinese. In chapter 5 there is a brief survey of the inventory of sounds, tones and syllables in Standard Chinese, accompanied by the statistical data on the frequencies of syllables, phonemes, onsets, rhymes and tones. This is, quite simply, the information that enables the reader to become more familiar with the theory on the sound level of this language. Surprisingly, the most frequent syllable in Chinese is not CV, which is considered to be the optimal syllable and occurs in all (or at least in most) Indo-European languages, but CC (p. 92). Moreover, the most frequent syllable is made of the sounds [ʂ] and [ɥ] which, as the author emphasises, are not very common in languages. The other peculiarity of Chinese is the existence of [z] and [ɥ] as syllabic consonants.

A special part of this chapter is dedicated to homophone density and frequency (p. 110). D's conception of homophones is rather unusual. He mentions two ways of defining homophones: first as '[...] words that are spelled differently but pronounced the same', and then as the '[...] words that have different meaning but are pronounced the same' (p. 108). In the statistical survey he uses the terms 'homophone density by meaning' and 'homophone density by spelling' (p. 110). These suggest different approaches to homophones and not two variations within the same delimitation (different spelling, the same pronunciation and different meaning, *vs.* the same spelling, the same pronunciation and different meaning, cf. for example Matthews 2007).

Another arguable claim is about the continuous shrinkage of syllable inventory in modern Chinese *vs.* 'no similar scale of syllable loss in English' (p. 110). Most Chinese words are monosyllabic, and Chinese is a tonal language too. Thus, simply said, syllables are often identical with words, and the disappearance of words, that is, syllables in Chinese, is a normal phenomenon in the lexicon caused by many internal and external factors typical also for other languages (cf. for example Fisiak 1995: 22-23). However, in English a syllable is ONLY a sound unit without meaning, taking part in the meaningful units of higher language level, namely words. Thus, the comparison of the 'shrinkage' of syllables in Chinese and English is,

in my view, a comparison of incomparables, because the status of syllables in Chinese is not the same as it is in English.

Chapter 6 (pp. 112-128) contains the statistical survey and frequency data about the sounds in Shanghai Chinese, another language whose syllables do not exceed the maximal size of CVX (p. 113). D explains the lack of contrast in the height of nasalized vowels by the claim that the lowered velum '[...] reduces the space in the oral cavity for tongue height movement' (p. 119). This articulatory reason is disputable. Although it is well-known that the number of nasalized vowels is reduced due to the acoustic effect of nasalization that affects the perceptual distinctiveness of vocalic sounds (Beddor 1993), there is no articulatory evidence for the velum-tongue interference in the process of articulating speech as far as I am aware. Moreover, in Arawakan languages (a language family of South America and the Caribbean) there are many languages with nasalized vowels contrasting in height (Hajek 2005).

The detailed description of the tonal inventory in Chinese that helps non-speakers understand the importance of syllable and various tones in this tonal language can be found in chapter 7 (pp. 129-147).

The maximal syllable size in English in terms of the CVX theory is presented in chapter 8 (pp. 148-181). According to traditional phonology, the maximal string of sounds in English is CCCVXCC, although initial and final CCC are restricted. In initial CCC, the first consonant is [s] and the last is an approximant [r]. The final CC string after VXC must be one of the sounds [s, z, t, d, ø] (p. 148; cf. Roach 2000). Thus the restricted string is SCR VXCTT.ⁱⁱ D argues that both the initial S and final CTT '[...] can be accounted for by morphology and need not be included in a syllable' (p. 148). CR can form a complex sound and therefore the maximal syllable size in English is CVX.

All the author's arguments for the maximal syllable size CVX in both Chinese and English are logical, clear, systematic, persuasive and convincing. I have chosen the analysis of rhymes in non-final positions in English as an example.

The point of departure for the analysis of rhymes and onsets in the English syllable was the CELEX lexicon (Baayen et al. 1993). It contains 160,595 entries, 52,447 of which are lemmas, that is, are uninflected. D's analysis starts with 52,447 lemmas. After removing open and hyphenated compounds and extracting words with one or more rhymes exceeding VX, and then removing affixed words and repetitions, 146 words remained out of which only 106 seem to be exceptions to the VX size. As the author further argues, 106 exceptions out of 52,447 words represent 0.00002%, which is only trivial (pp. 149-151).

According to D's morphological approach, which uses three concepts (the affix rule, potential vowel and anti-allomorphy, p. 155), the analysis of word final rhymes also leads to maximal size VX.

The summary of onset clusters in word initial and non-initial positions supported by statistical data resulting from the thorough analysis of the CELEX lexicon gives the complex picture of the phonotactic possibilities of English sounds.

In order to support his VCX theory, D examines Kenstowicz's (1994) and Gouskova's (2004) analyses based on sonority, and compares them with the complex sound analysis. Naturally, he comes to the conclusion that '[t]he maximal syllable size in English is CVX (CVV or CVC)' (p. 179). The critical evaluation of the previous theories helps the author find a model that would be, with variations in the character of concrete elements, suitable for all languages (p. 181):

[...] the CVX limit provides strong evidence for the existence of a syllable as a phonological entity, despite the lack of precise definition of what syllables are, or the lack of speaker intuition for where word-medial syllable boundaries are.

The account of all the additional issues of the English syllable, such as the sound inventory of General American Englishⁱⁱⁱ or unused syllables in English, is presented in chapter 9 (pp. 182-206). The discussion about the possible and actual monosyllables in English, supplemented by the analysis of the morphological structure of words included in the CELEX lexicon, shows that the number of possible monosyllables is higher than the number of all morphologically simple monosyllabic words, which the author explains by the assertion that '[m]ost possible syllables are unused [...] because English does not need so many words' (p. 194). This appears as a mix up of different language levels. Not all possible syllables are words at the same time, and the fact that a language does not need all possible syllables does not necessarily mean that it does not need so many words. Of course, in the case of monosyllabic words a syllable is identical with a morpheme. Otherwise, a syllable is only a sound unit without meaning, while a morpheme is the smallest meaningful unit. The number of possible syllables reflects the possible combinations of sounds in English without any relation to meaning, and '[s]ound works in the name of meaning, form in the service of content, not vice versa' (Sabol 1989: 59). This means that, out of all possible syllables, only those that are relevant for the meaningful part of a language (speech) are used.

The complex analyses of syllabic structure in German and Jiarong according to the CVX theory are presented in chapters 10 (pp. 207-223) and 11 (pp. 224-236). The arguments supporting the author's proposal that the maximal size of syllable in both languages is not larger than CVX are again well-founded and, as in the previous chapters, supplemented with numerous quantitative data on the structure of rhymes and onsets.

In the final chapter of the book (chapter 12, pp. 237-255) the author summarizes the CVX theory of syllable. In search for the answer to the question 'Why is there so little variation in syllable structure?' D explains the relations of his theory to the theories of grammar, namely Chomsky's (1981) Universal Grammar and Prince & Smolensky's (1993) Optimality Theory. However, his account for possible and actually used syllables seems to be somehow confused with morphemes (p. 252, my emphasis; see also above):

The set of SYLLABLES a language needs is rather small. For example, English and Chinese each have about 10,000 MORPHEMES, of which only half are frequently used.

Syllables or morphemes? The difference between these two different units is not clear throughout the whole book. Do languages have the same one-to-one correspondence as Chinese has in this matter? The syllable boundary can be identical with the morpheme boundary in a word or a word form even in highly inflectional languages, for example Slavonic, but solely when there is no significant contradiction between the sound form of a syllable and the sound form of a morpheme (Sabol 1994).

In sum, the book *Syllable structure. The limits of variation* presents a new morphological approach to the structure of syllable. In order to explain and then support the CVX theory, the author discusses various phonological (or traditional) approaches to syllable structure analysis. The book also clarifies basic terminology from generative phonology, and provides a comprehensive account of the sound levels of five languages: Shanghai Chinese, Standard Chinese, English, German and Jiarong. The result can be very inspiring for scholars and worthwhile for all advanced students of phonology.

ⁱ Where C stands for consonant, V for vowel, and X for consonant or vowel.

ⁱⁱ SCRVXTT stands for [s] sound + consonant + approximant + vowel + vowel or consonant + coronal + coronal (p. 148).

ⁱⁱⁱ Of course, all the previous analyses of the English syllable are based not only on American English but also on British English. Not any generalizations about English would be possible otherwise.

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Renáta Gregová
Department of British and US Studies
Faculty of Arts
P. J. Šafárik University
Petzvalova 4
040 11 Košice
Slovakia
renata.gregova@upjs.sk

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