

The CVX Theory of Syllable Structure
San Duanmu
University of Michigan

In this paper I introduce the CVX theory of syllable structure (Duanmu, in press), with detailed illustration of how it applies to English, although references will be made to wide range other languages. I also discuss the implications of the CVX theory, including whether the syllable exists, its structure, its relation to metrical structure, syllable boundaries in word medial positions, the Weight-Stress Principle, the role of sonority, allophonic rules, and the limits of variation in syllable structure across human languages.

The CVX theory claims that a word has the general structure $C_M C_E S C_E C_M$, where C_M is one or more affix or affix-like consonants, C_E is one extra consonant, and S is one or more syllables whose maximal structure is CVX (CVV or CVC). The theory relies on two arguments. The first is the analysis of C_M and C_E , and the second is the analysis of non-edge syllables in terms of CVX. For the first part, I argue that C_M and C_E can be attributed to morphology, in the sense that (a) affix or affix-like consonants must be added regardless of whether a neighboring syllable is full, and (b) an initial C_E is found only in languages that have V-final prefixes, so that C_E can serve as its coda, and a final C_E is found only in languages that have V-initial suffixes, so that C_E can serve as its onset. Since C_M and C_E can be accounted for by morphology, there is no need to assume that they must also be part of an adjacent syllable. To show that non-edge syllables are limited to CVX, I offer an exhaustive examination of the English lexicon and show that only those CC onsets that can form a ‘complex sound’ (defined in (1) and (2)) are found (e.g. [kw, pl, pr]), whereas CC onsets that cannot form a complex sound are not found medially (e.g. [sp, sm, θr]). In addition, I show that apparent VXC rhymes (as noted before by Borowsky 1986 and others) can also be accounted for in terms of complex sounds (e.g. VNC → $\tilde{V}C$, as in *symptom*).

If the maximal syllable is indeed CVX, it offers strong evidence for the existence of the syllable, despite the pessimism expressed by many researchers. In addition, it reduces the role of sonority to the ‘peak rule’ (see (3)), while there is no need for sonority to account for onset or coda clusters (because there are no such clusters in CVX). Moreover, the CVX theory suggests that there are clear limits to variation in syllable size; indeed, it is likely that there are no parameters for the maximal syllable size.

The CVX theory also offers a better perspective for interpreting the syllable as a metrical unit. Kiparsky (1979, 1981) suggests that syllable structure can be represented as metrical structure, as shown in (4). However, the structure in (4) is in fact ill-formed metrically, because it contains many stress clashes. In contrast, the CVX structure in (5) preserves Kiparsky’s insight and is metrically well-formed.

The metrical nature of the syllable also supports syllabification based on the Wright-Stress Principle (rather than the Maximal Onset rule). Syllabification is predictable (or unpredictable) only as much as stress is predictable (or unpredictable). I show that syllabification based on the Weight-Stress Principle not only offers a more consistent metrical structure but also offers better interpretations of allophonic variation, as seen in such words as *potato*, *lemon* and *city*.

Definitions and examples:

(1) Complex sound: A complex sound in one that uses two (or more) oral articulators, without violating the No Contour Principle.

(2) No Contour Principle (Duanmu 1994):
 An articulator cannot make the same feature (F) twice within one sound.

*Articulator	*Articulator	*Articulator	*Articulator
^	^	^	^
[+F][-F]	[-F][+F]	[+F][+F]	[-F][-F]

(3) The peak rule:
 The most sonorous sound should fill the V slot of CVX.

(4) Kiparsky's metrical analysis of a CCCVCC syllable

			x			
		x	x			
	x	x	x	x		
[[[W	S]	S][S [S W]]]
		C	C	C	V	C C

(5) Metrical analysis of a CVX syllable

	x	
[W	[S W]]

References:

Duanmu, San. 1994. Against contour tone units. *Linguistic Inquiry* 25.4: 555-608.
 Duanmu, San. (in press). Syllable structure: The limits of variation. Oxford: Oxford University Press.
 Kiparsky, Paul. 1979. Metrical structure assignment is cyclic. *Linguistic Inquiry* 10.3: 421-441.
 Kiparsky, Paul. 1981. Remarks on the metrical structure of the syllable. *Phonologica* 1980: Akten der Vierten Internationalen Phonologie-Tagung, Wien, 29. Juni-2. Juli 1980, ed. Wolfgang U. Dressler, Oskar E. Pfeiffer, and John R. Rennison, 245-256. Innsbruck: Institute für Sprachwissenschaft der Universität Innsbruck.