Codas are Universally Moraic

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Mismatches in weight criteria for different weight-sensitive processes within individual languages present difficulties for theories of moraic structure, particularly regarding coda weight. Previous accounts, which assume that codas are only sometimes moraic to account for the typological variation in CVC's weight status in (1) (Hyman, 1985; Hayes, 1989; Morén, 2000; a.o.), make incorrect predictions for the status of CVC in other weight-sensitive phenomena, including tone, word-minimality, and secondary stress, among others. This paper proposes a theory of Uniform Moraic Quantity as a solution, which captures CVC's flexible weight-status while maintaining the cross-linguistic moraicity of codas and avoiding the incorrect predictions that frustrate the standard "Variable-Weight" approach.

(1) Cross-linguistic Variation in the weight-status of CVC for stress
   a. CVC heavy in Cebuano (Shryock, 1993): {CVV, CVC} > {CV}
      Stress final unless penult heavy: [*ba.ˈsa*] "read" [*ˈʔad.law*] "day" [*am.ˈtɔː*] "person from Amdo"
   b. CVC light in Lhasa Tibetan (Dawson, 1980): {CVV} > {CVC, CV}
      Stress initial or leftmost heavy: [*ˈŋu.gu*] "pen" [*lap.ˈʈeː*] "of the school"
   c. CVR heavy and CVO light in Kwakw'ala (Walker, 1996): {CVV, CVR} > {CVO, CV}
      Stress final or heavy if present: [*nə.ˈpa*] " throw" [*ˈmʾən.sa*] "measure" [*maxʷ.ˈcʾa*] "ashamed"

Data in (2) illustrates the additional weight-sensitive criteria of tone and compensatory lengthening (CL) in Lhasa Tibetan. As shown above, stress is word-initial by default (1b), but CVV attracts stress when present. Thus, the stress criterion treats CVV syllables as heavy and all others as light. Tone, in contrast, permits contour tones to fall on CVV and CVR (R = sonorant consonant), but not on CVO (O = obstruent consonant) or CV in (2a), indicating that both CVV and CVR are heavy while CVO and CV are light (Assuming the weight-based account of contour tones). Finally, CL effects in Tibetan treat all syllables closed by a coda (both CVR and CVO) as heavy, as demonstrated by the data in (2b). When either a sonorant coda or an obstruent coda is deleted in the language, the preceding vowel lengthens (due to mora relinking), as illustrated in words like *tsiː* and *ʧuːku*.

(2) Mismatching weight criteria in Lhasa Tibetan
   a. Tonal criterion: {CVV, CVR} > {CVO, CV}
      [*qhâm*] "Kham" [*mâː*] "war" [*kâː*] "stuck" [*ʈɔ̀k.pá*] "nomad" [*kúk.pá*] "dumb"
   b. Compensatory Lengthening criterion: {CVV, CVR, CVO} > {CV}
      /*tsik*/ → [*tsiː*] "one" /*kəp.ki*/ → [*kəː.ki*] "do, make" /*ʧur.ku*/ → [*ʧuː.ku*] "nineteen"

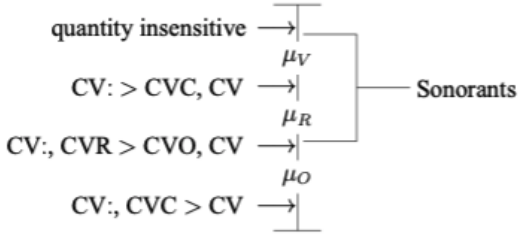
The disparity between the three weight criteria in Tibetan is problematic because CVR and CVO behave differently for each process. CVR is light for stress but heavy for tone and CL. CVO, on the other hand, is light for both stress and tone, but heavy for CL. The traditional view of moraic structure treats the moraicity of codas as a language-specific decision, in which codas sometimes project a mora and other times do not. The data from Tibetan, however, provides a case in which the variable weight analysis fails to make accurate predictions because three separate weight-sensitive processes treat codas differently in terms of weight in identical contexts.

A theory of Uniform Moraic Quantity (UMQ), contra the Variable-Weight approach, requires coda consonants to contribute a mora to the syllable by restricting *GEN* from producing candidates that violate the UMQ. Thus, the standard assumption that coda moraicity is a language-specific parameterized option is rejected under the approach outlined here, as depicted by the moraic structures in (3).

(3) Moraic Structure under the UMQ
   a. Permissible Moraic structure of CVC: /$CV_{\mu}C$/ → $[CV_{\mu}C_{\mu}]_{\sigma}$
   b. Violation of constraint on *GEN*: /$CV_{\mu}C$/ → $[CV_{\mu}C]_{\sigma}$

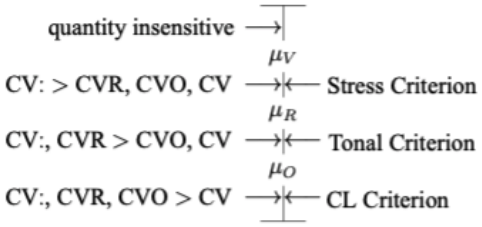
The proposal that CVC syllables are universally bimoraic, gives rise to the question of what provokes the instability of CVC across different processes and languages if it is not connected to variation

in its moraic structure. I contend that variation in CVC's weight status stems from a *Moraic Sonority Metric* that computes syllable weight based on the number of moras of a specified sonority in a syllable rather than the the sum total of moras in a syllable. Whereas the standard "Moraic Quantity" metric evaluates syllable weight by comparing mora count without regard to the sonority values of those moras, the Moraic Sonority Metric assumes moras are inherently encoded with the sonority of the segment that they dominate and uses this information in its weight computations in conjunction with moraic quantity. Crucially, the Moraic Sonority Metric is restricted in the distinctions it can make by the moraic sonority hierarchy in (4), which contains three sonority levels. Vocalic moras (μ_V) are the most sonorant moraic sonority level and are positioned at the top of hierarchy. Sonorant consonant moras (μ_R) make up the middle tier on the hierarchy. While μ_R are less sonorant and lighter than μ_V, they are more sonorant and heavier than obstruent consonant moras (μ_O), which reside at the bottom of the sonority hierarchy and are lighter than both μ_V and μ_R.



(4) The Moraic Sonority Hierarchy

Individual weight-sensitive processes construct their criteria with the aid of the Moraic Sonority Hierarchy by choosing a point on the hierarchy and making a bifurcation. Every sonority level above the bifurcation point is used to compute weight for that process, and every sonority level below the bifurcation point is excluded from weight computations for that process. As demonstrated in (5), a weight-sensitive process with a criterion like CL in Tibetan, in which only CV is light, makes a bifurcation below all of the sonority levels, thus including every moraic sonority level in its syllable weight measurements. This results in every bimoraic syllable being counted as heavy, without regard to the sonority of the moras involved. The tonal criterion in Tibetan, on the other hand, makes a bifurcation between μ_R and μ_O on the hierarchy, which means that only syllables with at least two sonorant moras (either μ_V or μ_R) are treated as heavy because non-sonorant moras (μ_O) fall below the bifurcation and are ignored in the weight computations. Consequently, both CVV and CVR, which each contain two sonorant moras, can host a contour tone, while CVO and CV, which each contain only a single sonorant mora, are incapable of hosting a contour tone. Crucially, even though CVO remains bimoraic under the UMQ, the tonal system in Tibetan treats CVO as light since the mora linked to the obstruent coda falls below the sonority threshold stipulated by the tonal criterion. Finally, weight-sensitive stress in Tibetan establishes its bifurcation point between μ_V and μ_R on the Moraic Sonority Hierarchy in (5), resulting in only vocalic moras being included in weight computations for stress in the language. Consequently, only syllables with two vocalic moras (CVV) are treated as heavy and able to attract stress for the default word-initial syllable, while all other syllable types (CVR, CVO, and CV) are treated as light. Again, this falls out from the fact that the weight-sensitive stress criterion in Tibetan ignores any mora that falls below its bifurcation point in its weight computations. Thus, even though both CVR and CVO are bimoraic in Tibetan, the moras linked to the coda consonants do not contribute to syllable weight for the stress system. In this way, different weight-sensitive processes within a single language can utilize different sonority thresholds on the moraic sonority metric to arrive at mismatching weight criteria. The different bifurcation points also explain cross-linguistic variation in weight criteria for a single weight-sensitive process, like that of stress in (1) above. The Cebuano stress system in (1a) utilizes a bifurcation below μ_O, the Lhasa Tibetan stress system (1b) a bifurcation between μ_V and μ_R, and the Kwakw'ala stress system (1c) a bifurcation between μ_R and μ_O.



(5) Moraic Sonority and Tibetan Bifurcations

In sum, both within-language and cross-linguistic weight criteria variation is captured by the Moraic Sonority Metric. Furthermore, the UMQ simplifies moraic theory by eliminating the variable weight of CVC so that coda moraicity no longer needs to be stipulated.

References: [1] Dawson, W. (1980). *Tibetan Phonology*. [2]Gordon, M. (2006). *Syllable Weight.* [3] Hayes, B. (1989) CL in moraic phonology. [4] Hyman, L. (1985) *theory of phonological weight*. [5] Morén, B. (1999). *Unified Theory of Weight.* [6] Shryock, A. (1993). Metrical analysis of stress in Cebuano. [7] Walker, R. (1996) *Prominence-driven stress.*