What's the word? Phonology is still structured

Cheman Baira A'gitok
McGill University

The standard view in phonology is that segments are organized into a hierarchical structure. This hierarchical structure, called the prosodic hierarchy (Nespor & Vogel, 1986; Selkirk, 1984), is proposed to arise from the mapping of syntactic structure onto phonological constituents (Revithiadou & Spyropoulos, 2010; Selkirk, 2011). Recently, however, this view has been challenged. There are proposals that phonologically relevant constituents can be recast in terms of syntactic phases dispensing with the prosodic hierarchy entirely (Scheer, 2011; Scheer & Cyran, 2017). This paper will defend prosodic structure with primary evidence from progressive gemination process in Garo (A'gitok, 2022; A'gitok & Athanasopoulou, 2023), and supplemental evidence from phonotactic patterns in the language.

Garo, a Sino-Tibetan language spoken in Northeast India, has a process of progressive gemination across morpheme boundaries within words. Crosslinguistically it is common for intervocalic morpheme final consonants to syllabify as the onset of the following syllable (Blevins, 1996; Clements, 1990). In Garo, however, when a consonant final morpheme combines with a vowel initial morpheme, the consonant does not syllabify solely as the onset of the following syllable. Instead, there is progressive gemination of the consonant, e.g., /wa*t*-a/ → [wa*t*.*t*a] 'send-PRE' (PRE = present tense) (A'gitok, 2022). Progressive gemination applies in both suffixation (1) and compounding (2). It is blocked across word boundaries in syntactic phrases however, shown in (3). Progressive gemination can thus be generalized as taking place at morpheme junctures within prosodic words.

1)	/wa*t*-a/	→	[wa*t*.*t*a]	'send-PRE'	*[wa.t^{h}a.t^{h}a]
2)	/sa*l*/ 'sun' + /a‿am/ 'cloud'	→	[sa*l*.*l*a‿am]	'east'	*[sa*l*.a‿am]
3)	/ama*k* apsanko/	→	[a.ma*k* ap.san.k^{h}o]	'same monkey'	*[ama*k* *k*apsank^{h}o]

Theories that draw a direct connection between syntactic phases and phonological domains need to posit that every morpheme is a phase to account for progressive gemination in Garo. If every morpheme is a phase, the morpheme final consonant will be blocked from resyllabifying as an onset of the following syllable by the phase boundary. Gemination can in turn be proposed to arise due to the next phase being able to see the previous phase. There are two issues with this approach, one being that all morphemes in the language would need to trigger spellout. Phasehood though is reserved for specific projections in the syntax, e.g., CP and vP (Chomsky, 2000); even recent extensions limit phasehood to TP and DP (Den Dikken, 2007). Additionally, there is the problem of needing to spell out inflectional suffixes as independent words. Inflectional suffixes do not form independent words and are seen to be affixal clitics in a recursive prosodic word (Goad et al., 2003).

I propose that, in prosodic phonology, the progressive gemination in Garo can be accounted for by positing a recursive prosodic word structure. The alignment constraint along the lines of McCarthy & Prince (1993) that maps morphosyntactic structure to a recursive prosodic word structure can be formulated as *ALIGN (M, R; ω, R)*, which aligns the right edge of morphemes with the right edge of prosodic words. For a word such as /wa*t*-a/ → [wa*t*.*t*a], the alignment constraint first maps the morpheme /wat/ to a self-contained prosodic word $_{\omega}$(wa*t*)$_{\omega}$. Subsequently, introduction of tense suffix /-a/ results in another prosodic word layer encompassing both /wat/ and /-a/: $_{\omega}$($_{\omega}$(wa*t*)$_{\omega}$ *t*a)$_{\omega}$, as shown in Figure 1. I assume that each syllable has an onset constituent even if it is not filled by a consonant.

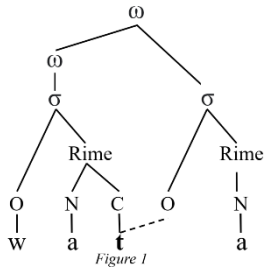

Figure 1

Progressive gemination applies within prosodic words since the empty onset position can doubly associate the morpheme final consonant as it lacks melodic content entirely (as also seen in the figure). Double association fares better as an analysis for gemination compared to feature copying: voiceless stops are aspirated in onset position in Garo, but in progressive gemination, they surface without aspiration, which is consistent with double linkage (geminate inalterability) (Davis, 2011; Hayes, 1989; Kirchner, 2000).

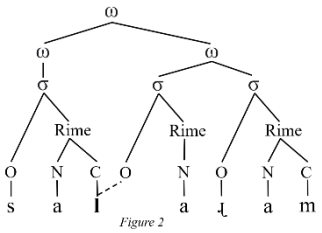

Figure 2

Progressive gemination being limited to the prosodic word is also seen in compound words in Garo (2). Compounds have been uncontroversially analyzed to form a recursive prosodic word where the constituent parts in the compound are also self-contained prosodic words (Peperkamp, 1997) shown in Figure 2 for Garo. The need for the progressive gemination to be delimited by the prosodic word domain is seen by comparing compound words in Garo with words in syntactic phrases where there is no gemination. The restriction of progressive gemination to prosodic words – both inflected words and compounds, which have different structures, lines up with the predictions made by the prosodic hierarchy hypothesis that each prosodic domain is associated with specific phonological processes (Nespor & Vogel, 1986).

The recursive prosodic word structure is also supported by phonotactic patterns in Garo. Morpheme internally, the syllable contact respects crosslinguistically common phonotactic constraints such as place and voicing agreement (Gordon, 2016), e.g., /mə*kk*a/ → [mə*k.k*^{h}a] ‘rain’ which has an underlying geminate, and falling sonority from coda to onset (Murray & Vennemann, 1983; Seo, 2011), e.g., /mande/ → [man.de] ‘person’. In contrast, syllable contact across morpheme boundaries has free phonotactics, displaying voice disagreement, e.g., /na*p-b*o/ → [na*p.b*o] ‘enter-IMP’, place disagreement, e.g., /nə*k-b*aʔ-a/ → [nə*k.b*aʔ.a], and even rising sonority coda-onset clusters, e.g., /ta*p-ɻ*oŋ-a/ → [t^{h}a*p..ɻ*oŋ.a] ‘paste-HAB-PRE’. The recursive prosodic word structure proposed in this paper has a prosodic word boundary at the right edge of morphemes, i.e., between the coda and onset which prevents individual feature assimilation. Complete delinking of the melodic content of either the coda or onset is blocked, so gemination through complete assimilation is ruled out. Rising sonority coda-onset clusters are tolerated due to the intervening prosodic word boundary.

This paper showed that theories that recast prosodically relevant chunks in terms of syntactic phases fail to account for progressive gemination in Garo. For the phase based theory to work for Garo the theoretical machinery would have to be extended to grant phasehood to all morphemes in the language, and additionally allow inflectional suffixes to form self contained prosodic words. Such an overextension is clearly undesirable. The prosodic hierarchy on the other hand does not face the same problems since there is no need to amend the theory in order to account for the Garo data. Both recursive structures and alignment constraints are already present in the theory. In summary, prosodic domains are necessary in phonological analysis and phonologically relevant chunks cannot be solely syntactic.

References

A’gitok, C. B. (2022). Garo gemination : A case of faithfulness producing non-moraic geminates. *Proceedings of the 2021 Annual Conference of the Canadian Linguistic Association*.

A’gitok, C. B., & Athanasopoulou, A. (2023). What makes a geminate ? an acoustic study of consonants in garo. In R. Skarnitzl & J. Volín (Eds.), *Proceedings of the 20th International Congress of Phonetic Sciences*.

Blevins, J. (1996). The Syllable in Phonological Theory. In J. A. Goldsmith (Ed.), *The Handbook of Phonological Theory*.

Chomsky, N. (2000). Minimalist Inquiries: The framework. In R. Martin, D. Michaels, & J. Uriagereka (Eds.), *Step by Step: Essays on Minimalist Syntax in Honor of Howard Lasnik*.

Clements, G. N. (1990). The role of the sonority cycle in core syllabification. In *Papers in Laboratory Phonology*.

Davis, S. (2011). Geminates. In *The Blackwell Companion to Phonology*. John Wiley & Sons.

Den Dikken, M. (2007). Phase extension contours of a theory of the role of head movement in phrasal extraction. *Theoretical Linguistics*.

Goad, H., White, L., & Steele, J. (2003). Missing inflection in L2 acquisition: Defective syntax or L1-constrained prosodic representations? *Canadian Journal of Linguistics*.

Gordon, M. (2016). *Phonological Typology*.

Hayes, B. (1989). Compensatory Lengthening in Moraic Phonology. *Linguistic Inquiry*.

Kirchner, R. (2000). Geminate Inalterability and Lenition. *Language*.

McCarthy, J. J., & Prince, A. (1993). Generalized Alignment. *Yearbook of Morphology*.

Murray, R. W., & Vennemann, T. (1983). Sound Change and Syllable Structure in Germanic Phonology. *Language*.

Nespor, M., & Vogel, I. (1986). *Prosodic Phonology*.

Peperkamp, S. (1997). *Prosodic words*. Universiteit van Amsterdam.
Revithiadou, A., & Spyropoulos, V. (2010). Syntax-Phonology Interface. In N. C. Kula, B. Botma, & K. Nasukawa (Eds.), *Bloomsbury Companion to Phonology*.
Scheer, T. (2011). Chunk definition in phonology: prosodic constituency vs. phase structure. *Modules and Interfaces*.
Scheer, T., & Cyran, E. (2017). Interfaces in government phonology. In *The Routledge Handbook of Phonological Theory*.
Selkirk, E. (2011). The Syntax-Phonology Interface. In J. A. Goldsmith, J. Riggle, & A. C. L. Yu (Eds.), *The Handbook of Phonological Theory*.
Seo, M. (2011). Syllable Contact. *The Blackwell Companion to Phonology*.