Vowel hiatus and prosodic structure in Ikpana (Logba)

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This paper focuses on novel data on the relationship between syntax and phonology from Ikpana (Logba [lgq], Kwa: Niger-Congo), an endangered language spoken in the lower Volta region of Ghana. Vowel hiatus resolution at word boundaries in the language is a domain-sensitive phenomenon. At certain word boundaries, vowel hiatus is frequently dispreferred, and vowel reduction is used as a repair strategy. At other word boundaries, vowel hiatus most commonly surfaces as such. This non-categorical alternation between a faithful output and vowel reduction is determined by both the syntactic environment and the syntactic construction in which underlying hiatus occurs, suggesting the need for the phonological module of grammar to reference syntactic structure, either directly or indirectly.

In Ikpana (SVO), nouns and verbs are generally both vowel-initial and vowel-final, generating underlying hiatus in a variety of syntactic environments (1).

(1) a-vá o-zá i-mbi a-fá-nu
CM-deer 3SG-cook.PST CM-rice CM-house-POSTP
'The deer cooked rice in the house.'

The data presented here was collected from three native speakers of Ikpana during a field trip to Logba Alakpeti (lower Volta region, Ghana) in the summer of 2018. A corpus was formed, counting 278 single clause sentences with a total of 746 instances of underlying vowel hiatus at word boundaries. The sentences in this corpus were designed explicitly to elicit a full range of vowel contrasts at each boundary as well as a balanced number of simple transitive, focus, and ditransitive constructions. Based on the data, there are clear differences in frequency of vowel reduction at different syntactic boundaries, as shown in Table 1. Therefore, it must be the case that different morphosyntactic environments are associated with different processes in the phonology (i.e. vowel reduction vs. no reduction).

		adverb-subject	object-subject	subject-verb	verb-object	verb-adverb	object-adverb	object-object	object-PP
simple transitive	no adjunct			25.0	85.7				
	PP			25.0	20.0				13.3
	adverb			25.0	69.8		41.9		
	fronted adverb	25.0		63.8	68.8				
transitive with fronted object	no adjunct		21.4	100.0					
	adverb		14.3	50.0		85.7			
ditransitive	no adjunct			N/A	91.7			8.3	
	fronted adverb	8.3		0.0	58.3			16.7	

Table 1: Frequency of vowel reduction (in %) per syntactic boundaries and clause types with or without adjuncts

In this paper, I argue that the presence or absence of deletion in hiatus contexts is determined by prosodic boundaries, where vowel reduction for vowel hiatus resolution purposes is more likely to occur within phonological phrases (p-phrases) than across phonological phrase boundaries (Selkirk 1978, 1986, Nespor & Vogel 1986). In Table 1, high frequencies (above 50%) of vowel reduction (in yellow) suggest that the two syntactic constituents at the word boundary are part of the same phonological phrase. Low frequencies of vowel reduction (below

or equal to 50%, in blue) suggest the presence of an intervening phonological phrase boundary at the word boundary. The vowel reduction frequency for subject-verb and verb-object environments appears strikingly contrastive in different types of constructions.

Adopting Match Theory (Selkirk 2011), I provide an analysis for these facts. I account for the prosodic structure of Ikpana above the word level using a constraint-based approach in which the active constraints target purely phonological properties (i.e. faithfulness and markedness constraints, Prince & Smolensky 1993) but also properties of the syntax-phonology mapping (namely MATCH, BINMIN/BINMAX, and PROSODICPROMINENCE constraints, Selkirk 2011).

(2)

O S V	observed	predicted	BINMIN(R) 1.35	PROSPROM 1.26	MATCH(XP,φ) 0.10	BINMAX 0.02	
O S V	0.21	0.15		-1	-3	-1	-1.58
O S / V_	0	0.04	-1	-1	-2		-2.81
☞ O / S V_	0.79	0.61			-2		**-0.20**
O / S / V	0	0.19	-1				-1.35

In this analysis, variation across utterances of the same type is accounted for using weighted constraints (Pater 2009). It is modeled using a Maximum Entropy (MaxEnt, Goldwater & Johnson 2003, Hayes & Wilson 2008). The tableau in (2) for fronted object constructions without adjuncts (Table 1, line 5) shows that the output candidate with the highest harmonic score (last column) is also the candidate with the highest frequency, both attested in the data (second column) and predicted by the MaxEnt model (third column). [1]

The contributions of this paper are twofold. First, Ikpana is an endangered language that has only been partially described. In particular, very little is known about Ikpana phonology and prosody (Dorvlo 2004). This paper provides a novel description of some crucial prosodic and phonological facts in the language. Second, this project sheds light on the ongoing debate within the field of generative linguistics regarding the nature of the syntax-prosody interface. The data from Ikpana discussed above suggests that prosodic and syntactic structures are intricately linked. In other words, the module in charge of building prosodic structure in human language has access to syntactic information. If prosody is built at PF, then PF must have access to more syntactic information than is commonly assumed. Otherwise, prosody must be built either in the syntax proper or at spell-out as claimed by Selkirk (2011). Future work will look at the effect of vowel quality and tone on vowel reduction in hiatus contexts, and will study tone spreading patterns and other tonal phenomena in Ikpana as potential (counter-)evidence for the prosodic structure and analysis proposed in this paper.

Selected References

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[1] In (2), the symbol / references surfacing hiatus and _ references the syntactic position the focused object departs from.