An analogical bottleneck in Dinka

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Verb inflection in Dinka (West Nilotic, South Sudan) is built around a pervasive system of stem vowel gradation, illustrated here by a partial paradigm (Andersen 1993, 2017). The unmarked form has the basic, unmodified vowel quality (Grade 1), the 3sG is lengthened by one mora (Grade 2), and the 1sG is lengthened and shows a different vowel quality—lowering or diphthongization (Grade 3). This pattern obtains across the entire verbal lexicon, for all stem vowels, with one exception: stems in /a/, such as 'cook', follow their own unique pattern, with a modified vowel (raised and fronted) in Grade 2: ABA instead of AAB. Comparative evidence from Nuer (Reid 2019) suggests that this class of verbs originally had a fixed vowel quality. How then did it end up with a different pattern? We explain this through an

	'count'	'pull'	'call'	'Point at'	'cook'
UNM (Grade 1)	kwèen	mìit	còɔl	рòot	ţàal
3sg (Grade 2)	kwèeen	mìiit	còɔɔl	рòоot	ţὲεεl
1sg (Grade 3)	kwèɛɛn	mjèɛɛt	càaal	ກວ່ວວt	ţàaal

analogical bottleneck: the direct analogical model was not the verbal system as a whole, but rather a single verb class that had become phonologically ambiguous, allowing the pattern to be reinterpreted.

Background. *Morphology*: Verb roots can be short or long. *Morphophonology*: Two cross-cutting stem-vowel alternations: (1) derivational/lexical, going back to an original ±ATR contrast: verbal roots were specified for their ATR value, and earlier +ATR suffixes induced regressive +ATR harmony on -ATR roots. Original +ATR vowels now have breathy voice, and in some cases they are raised vis-à-vis their plain (i.e. non-breathy) counterparts, e.g. underived *pòoot* 'send.3sG' vs. derived centripetal *pùuut*. (2) inflectional vowel gradation, according to the pattern shown above, which goes back to compensatory lengthening triggered by earlier suffixes, and lowering umlaut triggered by suffixal *-a. Verbs in /a/ naturally would not have undergone lowering umlaut, so they originally lacked a vowel quality alternation. *Phonology*. (1) the reflexes of Proto-West Nilotic (PWN) +ATR *Λ (counterpart to -ATR *a) split according to length: *Λ > /ɛ/, *ΛΛ > /ɔɔ/, the latter merging with an etymologically distinct vowel. (2) The original contrast between short /a/ and /ε/ (both plain and breathy) was neutralized.

The analogical model. Verbs in /a/ acquired a vowel quality alternation by analogy, latching onto the one class where there was a phonological overlap: verbs with a breathy /ɛ/ stem. The two classes coincide in their derived subparadigms: compare derived centripetal $b \dot{e} c$ 3SG $\sim b \dot{e} c$ 1SG 'take along' (from plain root $b \dot{e} c$) and $b \dot{e} c$ 3SG $b \dot{e} c$ 1SG 'spear' (from breathy root $b \dot{e} c$). We argue that the stem vowel alternation was projected from breathy verbs onto non-breathy verbs by substituting the morphophonologically equivalent non-breathy vowel. Crucially though, the changes listed above under 'phonology' meant that analogical model was defective: short Grade 1 vowels were indeterminate, and there were no long roots that could serve to disambiguate.

Sequence of changes. *Stage I*: Dinka reflexes of the PWN stem vowels -ATR *a and +ATR * Λ in short and long verbal roots, showing the effects of (i) an early split between short * Λ > / ϵ / and long * $\Lambda\Lambda$ > / δ /, (ii) later compensatory lengthening (Grades 2 and 3) and (iii) lowering umlaut (Grade 3). *Stage II*: phonological neutralization of short /a, a/ and / ϵ , ϵ /. *Stage III*: analogical extension of the breathy root pattern to plain roots, adapting a morphophonological correspondence 'breathy / ϵ / \Rightarrow plain / ϵ /' found in other verb classes. Only phonologically ambiguous short roots were available as an analogical model: change was implemented only where there was positive evidence, producing an aberrant pattern. This shows the importance of local analogy, in spite of the apparent pressures of the overall system.

	Stage I				
	plain root		breathy root		
Grade 1	a	aa	: :	ຼວວ	
Grade 2	aa	aaa	<u>ເ</u>	ວຸວຸວ	
Grade 3	aa	aaa	aa	aaa	

Stage II					
plain	root	breathy root			
a ε	aa	aູ ຍູ	ຼວວ		
aa	aaa	ສູສ	ວູວູວ		
aa	aaa	aa	aaa		

	Stage III					
plain	root	breathy root				
a ε	aa	a្គ <u>ខ</u>	ລູລູ			
33	333	ສູສ	ລູລູລູ			
aa	aaa	aa	aaa			
N	K					

References

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