Cyclic derivatives in Nazarene Arabic cannot be generated through base correspondence

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Summary: We present a new challenge for Base-Derivative Correspondence (B-D Correspondence; see, e.g., Benua 1997) as an alternative theory to *the cycle* proposed by Chomsky and Halle (1968). The challenge comes from the distribution of stress and vowel length in Nazarene Arabic (henceforth NZA), an understudied variety of Palestinian Arabic spoken in Nazareth. We show that the NZA pattern cannot be generated by a non-cyclic version of Optimality Theory (OT; Prince and Smolensky 1993), but can be accounted for in a cyclic version of the theory, such as Stratal OT (Kiparsky, 2000; Bermúdez-Otero, 2011). B-D Correspondence, the mechanism intended to generate cyclic patterns in parallel OT, cannot solve the challenge because the cyclic application of vowel lengthening, stress, and vowel shortening in NZA generates derivatives that depart from their bases. Overall, this study points out a divergent prediction of the cycle and B-D Correspondence, and provides evidence that phonological theory should include the former mechanism.

Stress and vowel length in NZA (simplified): Stress in NZA obeys the following generalization: stress the ultima if it is superheavy; otherwise, stress the penult if it is heavy (or word-initial); otherwise, stress the antepenult. Vowel length is contrastive in NZA (e.g., [kátab] 'he wrote' vs. [ká:tab] 'he corresponded') but is partially predictable: a systematic process shortens long vowels before CV́:(C) syllables (Younes, 1995). In addition, as shown in (1), a vowel is always long and stressed when it is immediately followed by the rightmost word-internal morpheme boundary. Otherwise, vowels are short and stressless before morpheme boundaries. This is true for all stems and suffixes in NZA without exception. Hypothetical verbs with a short vowel before the rightmost morpheme boundary are systematic gaps (e.g., 2a-2b), as well as hypothetical verbs with a long unstressed vowel before a morpheme boundary (e.g., 2c).

(1) a. nsí:-na 'we forgot'
b. nsi-ná:-ha 'we forgot her'
c. nsi-na-há:-ʃ 'we didn't forget her'

(2) a. *nsí:-na-ha̲-ʃ
b. *nsi-ná:-ha̲-ʃ
c. *nsi-na̲:-há:-ʃ

Assuming the *Bracket Erasure* convention, according to which internal morpheme boundaries are erased at the end of every cycle, the data in (1) can be accounted for in a cyclic theory by the interaction of three processes: lengthening, stress, and shortening. In every cycle, lengthening applies to the vowel immediately preceding the morpheme boundary; stress is assigned according to the NZA algorithm; and shortening targets the pretonic vowel, which was lengthened in the preceding cycle. As illustrated in (3) and also shown by Watson (2002) for a different Arabic variety, the three processes generate the correct outputs, while ruling out the systematic gaps in (2).

(3) /nisi-na-ha-ʃ/ $\xrightarrow[1^{st}\text{ cycle}]{}$ |nsí:-na| $\xrightarrow[2^{nd}\text{ cycle}]{}$ |nsiná:-ha| $\xrightarrow[3^{rd}\text{ cycle}]{}$ [nsinahá:-ʃ]

As can be seen in (3), the cyclic application of the processes creates discrepancies between derivatives and their bases. The long vowel in the output of the first cycle is shortened in the second cycle, while the word-final short vowel is lengthened. The same changes occur between the second cycle and the third cycle. This "ping-pong" pattern poses a challenge to OT and B-D Correspondence.

The challenge for classical OT: What constraint (or constraints) can favor (4a) over (4b) and (4c)?

(4)

		/nisi(:)-na(:)-ha(:)-ʃ/	$\text{WSP}_{\text{Super-heavy}}$	NONFINALITY	$\text{WSP}_{\text{heavy}}$	EXNONFIN
a.	☹	nsi-na-há:-ʃ		*!		
b.		nsi-ná:-ha-ʃ				*!
c.	☞	nsí:-na-ha-ʃ				

The stress constraints in (4) are one possible choice for a language like NZA (EXNONFIN = no stress on final two syllables). The challenge is to dictate a rightmost locus for the long stressed vowel when the ranking should make antepenultimate stress the default (e.g., [máktabe] 'library', *[maktábe], *[maktabé]). Whatever favors (4a) cannot be a faithhulness constraint because, under 'Richness of the Base', the correct output should be derived given any underlying length specification, as denoted by the parentheses in the input of (4). It cannot be a simple markedness constraint either, because any constraint affecting vowel length is equally satisfied (or violated) by all three candidates, which have the same amount of long and short vowels. A complex constraint, which refers to both the length and the edge-proximity of vowels and pushes for rightmost stress, will not solve the challenge. If such a constraint is ranked high enough to favor (4a), it will choose incorrect forms elsewhere, such as *[miʃwar-áːk] over [miʃwáːr-ak] 'your.m.sg walk'.

B-D Correspondence cannot solve the challenge: McCarthy (2005) offers an OT account for the length of stem-final vowels in Arabic, which alternate between short word-finally and long before a suffix. He proposes that short vowels are deleted word-finally, but long vowels are shortened in the same position. McCarthy uses B-D correspondence to ensure that a stem-final short vowel will be deleted before a suffix as well, while a stem-final long vowel will surface before a suffix. This account ensures that there are no word-final long vowels, and no short vowels before suffixes. However, McCarthy's analysis breaks down when more than one suffix attaches to the stem. As shown in (5), a B-D constraint cannot solve the challenge even for a UR with long vowels, because the wrong candidate (5b) is strictly more similar to the base than the correct candidate (5a).

(5)

	/nisiː-naː-haː-ʃ/ *base*: nsináːha	BD-IDENT	WSP Super-heavy	NONFINALITY	WSP heavy	EXNONFINALITY
a. ☹	nsi-na-háː-ʃ	*!		*		
b. ☞	nsi-náː-ha-ʃ					*
c.	nsíː-na-ha-ʃ	*!				

More advanced B-D constraints do not provide a solution. Stanton and Steriade (2014) propose that faithfulness constraints can also require uniformity between derivatives and non-local bases. However, there is no benefit in turning to the remote base, [nsíːna], because it most resembles the wrong candidate (5c). Anti-faithfulness B-D constraints (Alderete 2001) cannot help either. These constraints can motivate derivatives to be unfaithful to their bases but cannot distinguish between (5a) and (5c) because both candidates incur the same violations of faithfulness constraints relative to the base ([nsináːha]). Expanding the theory to allow anti-faithfulness to non-local bases is also futile because (5b) is the least faithful candidate relative to the remote base ([nsíːna]).

A Stratal OT analysis: For space reasons, the tableaux in (6) show a sketch of the analysis of the last two cycles in (3). Assuming Bracket Erasure, the rightmost morpheme boundary is the only one presented in each derivational step. For this reason, a constraint that motivates lengthening, *V̆+, can outrank the stress-related constraints (only crucial violations shown) to dictate the correct locus of the stressed vowel. Another constraint, *V:CV́:, can motivate the shortening of pretonic vowels.

(6) A cyclic derivation of [nsinahάːʃ] 'we didn't forget her' in Stratal OT: Steps II and III

II	/nsíːna-ha(ː)/	*V̆+	EXNONFIN	*V:CV́:
a.	nsíːna-ha	*!		
b.	nsiːnáː-ha		*	*
c. ☞	nsináː-ha		*	

III	/nsináːha-ʃ/	*V̆+	NONFIN	*V:CV́:
a.	nsináːha-ʃ	*!		
b.	nsinaːháː-ʃ		*	*
c. ☞	nsinahάː-ʃ		*	

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