Iraqi Arabic Verbs: The Need for Roots and Prosody

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1. Introduction

It is an old observation that languages with so-called NONCONCATENATIVE TEMPLATIC MORPHOLOGIES (NTM, henceforth) provide a fertile empirical testing ground for theories of morphophonology – prosodic structure is worn on the sleeve in such languages (McCarthy, 1979, 1981; Ussishkin, 2000, 2005). This can be seen in Table 1 where the exemplar root $\sqrt{\text{ktb}}$ is shown in several different derived forms, among them both verbs and nouns, whose patterns of consonants and vowels (known as the TEMPLATE) are suspiciously regular.

Root	*Meaning*	*Template*
kataba	he wrote	CaCaCa
kattaba	he made someone write	CaCCaCa
nkataba	he subscribed	nCaCaCa
ktataba	he copied	CtaCaCa
kitaab	book	CiCaaC

Table 1: Derived forms from the Root $\sqrt{\text{ktb}}$

Despite the long history of work on the Semitic verb, there is much disagreement over whether or not the root has a necessary theoretical existence. While McCarthy (1981), Marantz (1997), Arad (2003) and Arad (2005) assume it does, Ussishkin (2000, 2005) argues that it does not. Additionally, Davis & Zawaydeh (2001) argue that hypocoristic formation requires reference to both word-level prosodic structure and the root. Thus, the question of how best to analyze these NTM systems is still an open one.

Most recently, Kramer (2007) has shown that the analysis of infinitival forms in Coptic requires reference to the consonantal root. Moreover, she shows that one can incorporate the results of the FIXED PROSODY literature, which rejects the root, and works that do not by assuming that roots exist and that templatic form is a by-product of the satisfaction of highly-valued constraints on prosodic markedness at the level of the prosodic word. In this approach, both roots and prosodic optimization play a role in linearizing NTM structures.

The intent of this work is to argue that the approach suggested in Kramer (2007) is fundamentally correct and has generaliziability across Semitic. To do this, it proceeds by way of examination of the verbal system of the dialect of Arabic spoken by the educated class of Baghdad and the surrounding areas, called here Iraqi Arabic after Erwin (2004). §2 shows that Iraqi Arabic provides a novel language-internal phonological argument for the existence of the consonantal root, contrary to the claims of the Fixed-Prosodic literature summarized above. §3 outlines an approach for the derivation of a subset of the Iraqi Arabic verbal system in the framework of Kramer (2007). §4 concludes.

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2. Motivating The Root

Iraqi Arabic, as described by Erwin (2004), provides another argument for the theoretical existence of the consonantal root *qua* morpheme in the form of a series of generalizations across assimilatory processes in the language. The first of these processes is an old one – progressive semivowel assimilation like that discussed for Modern Standard Arabic in McCarthy (1979, 1981) – and is discussed in §2.1. The second of these processes is a previously unobserved one in the form of progressive voicing assimilation in coronals and is discussed in §2.2. The logic of the argument goes like this: if one wants to unify the application of these assimilatory processes, the mismatching directionality will lead to a contradiction in the specification of the assimilatory domain. At this point one can either (i) abandon the generalizations discussed below which unify these assimilatory processes as root-targeting or (ii) admit the status of the consonantal root in Iraqi Arabic.

2.1. Form VIII Assimilations and /j, w, ʔ/

One of the oldest generative arguments for the existence of the root, going back to McCarthy (1979), is also seen in Iraqi Arabic. This dialect shares with Modern Standard and many of the other dialects a reflexive/reciprocal derivational form called form VIII, which is referred to in Arabic grammatical literature as the *ftaʕal* pattern.[1] This pattern is characterized by an infixal -*t*- and the vocalism /a. . . a/.

Crucially for our purposes, the *ftaʕal* pattern induces allomorphy on its base when applied to a class of roots known as WEAK ROOTS. These are roots with {j,w,ʔ} as one of their consonants, such as the root √wsˤl, meaning "arriving, combining." If a root whose weak consonant is in initial position appears in form VIII, the root consonant assimilates regressively to the infixal -*t*-, resulting in surface gemination of the infix, as seen in (1):

(1) Weak Consonants in Iraqi (Erwin, 2004:p.74):
- a. ttiʤah, "to head (for)" (√wʤh; *utiʤah, *wtiʤah)
- b. ttiqan, "to master, know well" (√jqn, *itiqan, *jtiqan)
- c. ttixað, "to take, adopt" (√ʔxð, *ʔtixað)

Crucially, this assimilation is not seen elsewhere in the language at large, as (2) shows.

(2) No Weak Consonant – /t/ Assimilation Elsewhere:
- a. mawwtooni, "they would have killed me"
- b. beythum, "their house"
- c. ʔiʔtilaaf, "coalition"

When one adds to this the observation that {j,w,ʔ} is not a natural class in Iraqi, the conclusion which follows is that the {j,w,ʔ} ∼ -*t*- assimilations are root allomorphy based on template form. In order to capture this generalization, one must make reference to the consonantal root, as root-membership is the only thing which differentiates the weak consonants in (1) from those in (2). This same conclusion is made for roots beginning with /j/ and /w/ (but not /ʔ/) in McCarthy (1979, 1981) for Modern Standard Arabic.

2.2. Voicing Assimilation Contradictions

The same form VIII/*ftaʕal* form which triggers the root semivowel allomorphy in the previous section also shows another morphophonological alternation involving the infixal -*t*- and roots beginning with a voiced coronal. When these roots appear in form VIII, the infixal -*t*- undergoes progressive assimilation for [±VOICE] as shown in (3):

[1] These names come from the pattern associated with the derivational meaning applied to the dummy root √fʕl, "doing, action." Thus the pattern for form VIII is $C_1taC_2aC_3$.

(3) Progressive Voicing Assimilation in Form VIII (Erwin, 2004:p. 74):
   a. ddiʕa, “to claim” (*dtiʕa; $\sqrt{\text{dʕw}}$)
   b. zdiʒam, “to be crowded” (*ztiʒam; $\sqrt{\text{zʒm}}$)

The alternations in (3) and those in (1), when taken together, show that there are interactions between the form VIII infixal *-t-* and the root which preclude an appeal to an account based solely on the root-affix distinction. This is because the semivowel facts would lead one to believe that root faithfulness is less important than affix faithfulness,[2] whereas (3) would lead one to conclude precisely the opposite. Note that here there is simply no issue if the consonantal root is assumed to exist, as the situation there reduces to one in which allomorphy is conditioned by the root.

One possible way to get out of this bind without reference to the root would be to deny that the voicing alternations in (3) are root-specific. However, this will not work, as voicing assimilation in Iraqi at large is regressive, as can be seen in (4):

(4) Regressive Voicing Assimilation in Iraqi (Erwin, 2004:p.36):
   a. ʔaðgalˤ, “heavier” (*ʔaθgal)
   b. ʔazdaas, “sixths” (*ʔasdaas)
   c. maθkuur, “mentioned” (*maðkuur)
   d. ʔaktˤaʕ, “I cut” (*ʔagtˤtaʕ)

Thus, one must conclude that the voicing alternations in (3) are at the very least morphologically conditioned. But could it be the case that these coronal-initial roots simply have idiosyncratic forms in the *ftaʕal* pattern?

It cannot, as the same roots trigger another form of allomorphy in the Iraqi patterns V and VI, named *tfaʕʕal* and *tfaaʕal*. These forms are typically described as the passives or reciprocals of other verbal patterns, and in them the prefixal *t-* undergoes regressive assimilation to the [±voice] value of the initial root consonant:

(5) Regressive Voicing Assimilation in Forms V/VI (from Erwin, 2004):
   a. ddaxxal, ‘to interfere’ (*tdaxxal, *ttaxxal; $\sqrt{\text{dxl}}$)
   b. dzawwaʤ, ‘to marry’ (*tzawwaʤ, *tsawwaʤ; $\sqrt{\text{zwʤ}}$)

Here we have assimilation triggered by particular root consonants, and this assimilation is to a strong prosodic position, ruling out an account in terms of positional faithfulness (Beckman, 1998). Moreover, there is evidence that the voicing alternations in (5) are not produced by the same process at work in (4) above, as this process does not apply to noncoronals (6):

(6) Regressive Voicing Assimilation is only with Coronals (from Erwin, 2004):
   a. twannas, ‘to enjoy oneself’ (*dwannas, *wwannas; $\sqrt{\text{wns}}$)
   b. tbaddal, ‘to be exchanged’ (*dbaddal, *bbaddal; $\sqrt{\text{bdl}}$)
   c. tbaaha, ‘to brag’ (*dbaaha, *bbaaha; $\sqrt{\text{bhj}}$)

If the voicing assimilation at work in (5) were the same as that at work in (4), then we would expect these forms to be voiced, contrary to fact. This means that the regressive assimilation seen in forms V and VI in Iraqi are in fact root-conditioned allomorphy of the *t-* prefix, triggered by particular roots (namely, those with voiced coronals as their initial member).

Taken together, the facts in this section and the last show that Iraqi Arabic displays several assimilatory processes which manipulate the features [±voice] and [±continuant] in three verbal patterns, numbered V, VI, and VIII. However, the facts in these sections also show that there is a unifying

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[2]Note too that this would require denying the Root-Affix Faithfulness Metaconstraint of McCarthy & Prince (1994). This is most likely the approach the Fixed-Prosodic literature would take (Ussishkin, 1999, 2000, 2005). This solution is descriptively adequate for the semivowel assimilation facts, but as (3) shows, this analysis will miss an important generalization about phonological alternations triggered by root consonants *qua* roots.

theme to these processes: in each, a phonological rule is targeting root consonants *qua* roots. Any account which denies the existence of the consonantal root (*e.g.*, Ussishkin, 2000, 2005) will necessarily miss the generalization at play in Iraqi Arabic concerning these root-specific phonological phenomena.

Since the facts from these voicing and continuancy assimilations motivate the existence of an abstract consonantal root, the question then becomes how such a unit is consistently linearized discontinuously in the morphology of Iraqi Arabic. The next section will show that it is here where the observations in the Fixed Prosody literature are key to understanding NTM behavior.

3. Patterns as Prosodic Linearization

The informal idea pursued in Kramer (2007) for Coptic and the one pursued here is that NTM behavior results when the grammar has no other prosodically licit way to linearize morphemes at the prosodic word level. The key insight of the literature on Fixed Prosody (*e.g.*, Ussishkin, 2000, 2005) is therefore that templates do not exist as morphemes, but rather are emergent under the activity of high-ranking constraints on prosodic form.[3]

The analytical task is thus to derive the template forms of the verbal patterns in Iraqi, using the root as input. In order to show that this is possible, §3.1 turns outlining a subset of the Iraqi Arabic derivational verbal forms, which are analyzed in §§3.2–3.3 as prosodic linearization of the root.

3.1. The Data

There are eight verbal derivational forms in Iraqi, three of which will be discussed here.[4] These are forms I, VII, and VIII. Since the activity of the root is central to the present discussion, these forms will be analyzed with two different kinds of roots, those containing two consonants ("biliterals") and those with three ("triliterals"). These forms are all exemplified with the roots √fʕl and √mr in Table 2.[5]

	√fʕl		√mr	
Form	**Triliteral**	**Template**	**Biliteral**	**Template**
I	faʕal	$C_1VC_2VC_3$	marr	$C_1VC_2C_2$
VII	nfaʕal	$nC_1VC_2VC_3$	nmarr	$nC_1VC_2C_2$
VIII	ftaʕal	$C_1tVC_2VC_3$	mtarr	$C_1tVC_2C_2$

Table 2: Verbs to Be Derived

The observation pursued in the Fixed-Prosodic analysis of Arabic given in Ussishkin (2005:ch.5) and the one pursued here is that nonconcatenative linearization happens in Arabic because complex syllable margins are not permitted unless the two consonants have different morphemic identities. Therefore, form I (and II, III, V, and VI, not discussed here) has no complex margins, and forms VII and VIII have complex margins containing a root consonant and the affixal consonant.

Additionally, it is this prohibition on complex margins, we claim, that governs the syllabicity alternations across number of root consonants in Table 2. Specifically, §§3.2–3.3 show that it is possible to analyze the Iraqi Arabic verbal system using only a monovocalic input vowel, /a/. The difference between biliteral and triliteral roots in Table 2 then boils down to fission of the single input vowel in triliteral roots to avoid complex margins, using the input material in (7).

(7) Input to Verbs in Iraqi Arabic:
   a. Form I *faʕal*: / √ROOT/, /a/
   b. Form VII *nfaʕal*: / √ROOT/, /a/, /n-/
   c. Form VIII *ftaʕal*: / √ROOT/, /a/, /t-/

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[3]This makes both the Fixed Prosodic and our approach members of the framework of GENERALIZED TEMPLATE THEORY (McCarthy & Prince, 1994).

[4]For more detailed discussion of the remaining five forms, see Tucker (To Appear).

[5]The former is the dummy root meaning roughly "doing, action," while the latter means "passing (as in time)."

The next two sections turn to showing the details of how this is done.

3.2. Form I/faʕal

The basic verbal pattern in Iraqi Arabic, like most dialects of Arabic, is the form I/*faʕal* pattern (McCarthy, 1981; Ussishkin, 2000; Ryding, 2005). This pattern has a $C_1VC_2VC_3$ template with triliterals and a $C_1VC_2C_2$ template with biliterals, as shown in (8–9):

(8) Biliteral Roots in Form I – marr:

a. ʒabb, 'to like'
(*ʒabbab, *ʒabab; $\sqrt{\text{ʒb}}$)

b. ɣaʃ, 'to cheat'
(*ɣaʃʃaʃ, *ɣaʃaʃ; $\sqrt{\text{ɣʃ}}$)

c. wann, 'to moan'
(*wannan, *wanan; $\sqrt{\text{wn}}$)

(9) Triliteral Roots in Form I – faʕal:

a. tˤubax, 'to cook'
(*tˤbax, *tˤabx, $\sqrt{\text{tˤbx}}$)

b. ʔaxað, 'to take'
(*ʔxað, *ʔaxð, $\sqrt{\text{ʔxð}}$)

c. kitab, 'to write'
(*ktab, *katb, $\sqrt{\text{ktb}}$)

The key insight we use is that biliteral roots do not pose a threat of a complex margin if linearized freely with respect to a single input vowel, *a*, whereas the triliteral roots require fission of this vowel in order to avoid this prohibited configuration. §3.2.1 gives explicit derivations for biliteral roots, and §3.2.2 does the same for triliteral roots.

3.2.1. Biliteral Roots

As the preceding section discussed, the crucial constraint is a ban on complex syllable margins. If this ban is more important than continuous linearization of the input string, then NTM behavior results. This basic behavior is illustrated in (12) using the constraints in (10–11):[6]

(10) *COMPLEX: A cover constraint for:

a. *COMPLEX^{ons}:
No complex onsets.

b. *COMPLEX^{cod}:
No complex codas.

(11) CONTIGUITY (McCarthy & Prince, 1995):
The portion of the input and output strings standing in correspondence forms a continuous string.

(12) *COMPLEX ≫ CONTIGUITY:

/$\sqrt{\text{mr}}$/, /a/	*COMPLEX	CONTIGUITY
☞ a. [(marr)]		*
b. [(amr)]	*!	

Candidate (a) thus wins over the CONTIGUITY-respecting (b) because of the language-wide action of *COMPLEX. However, there is still no explanation of why the winning candidate (a) geminates the final consonant unnecessarily. First, note that the standard Correspondence Theory faithfulness constraints in (13–14) can help ensure the only available augmentation option is gemination.

(13) INTEGRITY: A segment in the output has a single correspondent in the input.[7]

[6] In (10) and the tableaux which follow, we use [brackets] to denote prosodic word boundaries and (parentheses) to denote syllable boundaries.

[7] In this work I do not show or consider candidates which violate UNIFORMITY, the constraint which bans coalescence. For all practical purposes, uses of INTEGRITY in this work can be understood to mean both INTEGRITY and UNIFORMITY.

(14) MAXDEP: A cover constraint for:

a. MAX: No deletion.

b. DEP: No epenthesis.

MAXDEP prevents insertion of extra vocalic or consonantal material, and INEGRITY ensures that fission of the input vowel does not result (though see §3.2.2), as shown in (15). Note, though, that at this point it is not possible to rank *COMPLEX relative to INTEGRITY, as the two constraints do not conflict for biliteral roots.

(15) INTEGRITY, MAXDEP:

/√mr/, /a/	INTEGRITY	MAXDEP
☞ a. [(marr)]		
b. [(ˈmarɪ)]		*!
c. [(ˈmara)]	*!	

However, as to why any augmentation must take place at all, we appeal to the observation that Iraqi Arabic, like many dialects of Arabic, has a quantity sensitive trochaic stress system (McCarthy, 1981; Ussishkin, 2000). Minimal words, moreover, must contain at least one foot (McCarthy, 1993; Ussishkin, 2000). Therefore, the relevant augmentation-forcing constraint is (16), which ensures that feet are minimally bimoraic.

(16) F(OO)TBIN(ARITY):
Feet are binary at the level of the mora.

As to why gemination and not vowel-lengthening occurs, one must look again to stress facts in Iraqi. Consonants in Iraqi are heavy only word-finally. We thus have available the constraints proposed by Rosenthall & van der Hulst (1999) where such effects are captured by ranking (17–18). The crucial interaction is as in (19).

(17) *APPEND(-to-σ):
Coda consonants are not adjoined directly to the syllable node.

(18) *μ/C:
Consonants are not moraic.

(19)

/√mr/, /a/	FTBIN	*APPEND	*μ/C
☞ a. [(marr)]			*
b. [(maar)]		*!	
c. [(mar)]	*!		

At this point, we have a complete understanding of biliteral roots in form I, which is given by the interaction of *COMPLEX and CONTIGUITY. However, this interplay only results in one-syllable outputs when the input root has only two consonants, as *COMPLEX is only operative over melodic material; geminates do not constitute *COMPLEX violations. The next section shows what happens when there are three consonants, and the threat of complex margins is again a real one.

3.2.2. Triliteral Roots

The triliteral roots are always bisyllabic in form I, as the canonical verb *faʕal* in Table 2 shows. As §3.1 discussed, the intuition we appeal to here is that INTEGRITY can be violated under pressure from *COMPLEX. This will result in fission of the input vowel /a/, as (20) shows:

(20) *COMPLEX ≫ INTEGRITY:

/ √fʕl/, /a/	*COMPLEX	INTEGRITY	CONTIGUITY
☞ a. [(ˈfaʕal)]		*	**
b. [(faʕl)]	*!		*
c. [(fʕal)]	*!		*

Here *COMPLEX ≫ CONTIGUITY alone is not enough to linearize triliteral roots, since once the input vowel has fissioned, there are several candidates which linearize it in different positions relative to root consonants. This is where the motivated existence of the consonantal root is key. The relevant notion is that the output form is one which linearizes the root morpheme at the edges of the word. Since §2 showed that the root must be a morphemic entity, a constraint such as (21) can make reference to it:

(21) ALIGN-R(OO)T = ALIGN-{L,R}(root, ω):
The {left, right} edge of every root is aligned to the {left, right} edge of some prosodic word.

If we admit a constraint such as (21) into the grammar, then ranking it above CONTIGUITY suffices to rule out the undesired candidates, as (22) shows:

(22) ALIGN-RT ≫ CONTIGUITY:

/ √fʕl/, /a/	ALIGN-RT	CONTIGUITY
☞ a. [(ˈfaʕal)]		**
b. [(ˈaf)ʕal]	*!	*
c. [(ˈfaʕ)la]	*!	*

Form I/*faʕal* verbs are similar to form I/*marr* verbs insofar as they linearize root material discontinuously under the action of *COMPLEX. The fission of the input vowel allows the activity of ALIGN-RT to be seen more clearly, and we arrive at the partial rankings for Iraqi Arabic in (23):

(23) Morphological Rankings for Iraqi Arabic Thus Far:

a. *COMPLEX ≫ INTEGRITY
b. *COMPLEX ≫ CONTIGUITY
c. ALIGN-RT ≫ CONTIGUITY
d. FTBIN ≫ APPEND ≫ *μ/C

With this simple analysis in place, extending it to forms VII and VIII from Table 2 can be done with minimal augmentation to the constraint inventory, as the next section shows.

3.3. The Pure Affixing Forms

Forms VII and VIII are used in Iraqi to express reflexive counterparts to form I verbs, though this connection of form and meaning is tenuous, and many idiosyncratic meanings exist (Erwin, 2004). However, on the morphological side, these forms are much more well-behaved, and have prosodic structures which are similar to the form I patterns. We thus analyze them exactly like form I, but with additional affixal material. §3.3.1 discusses the form VII pattern with template $nC_1aC_2aC_3$, and §3.3.2 the form VIII pattern with template $C_1taC_2aC_3$.[8]

3.3.1. Form VII/nfaʕal

As seen in §3.2 with form I verbs, form VII displays syllabicity alternations with respect to root consonant number, as (24–25) show:

[8]In both cases, the analysis takes the position of the affix to be given by GENERALIZED ALIGNMENT (McCarthy & Prince, 1993) constraints which fix the affix's position in linear prosodic structure.

(24) Biliteral Roots in Form VII – nmarr:

a. nʒall, ‘to be solved’
(*nʒalal, *ʒanlal; $\sqrt{\text{ʒl}}$)

b. nɣaʃʃ, ‘to be cheated’
(*nɣaʃaʃ, *ɣanʃaʃ; $\sqrt{\text{ɣʃ}}$)

(25) Triliteral Roots in Form VII – nfaʕal:

a. ndiras, ‘to be studied’
(*dinras; $\sqrt{\text{drs}}$)

b. nkital, ‘to be killed’
(*kintal; $\sqrt{\text{ktl}}$)

In order to analyze these forms, it is necessary to make use of the generalization discussed in §3.1 which states that complex margins are tolerated only when affixal material over and above the root is present. If we assume the affix to be linearized with a constraint such as (26), then ranking this constraint over the left-edge version of ALIGN-RT predicts the relevant forms, as shown in (27).

(26) ALIGN-L(*n*, *ω*) (ALIGN-*n*):
Align the left edge of /*n*-/ to the left edge of some prosodic word.

(27) ALIGN-*n* ≫ ALIGN-RTL ≫ *COMPLEX^{ons}

/ $\sqrt{\text{fʕl}}$/, /a/, /n/	ALIGN-*n*	ALIGN-RTL	*COMPLEX^{ons}
☞ a. [(ˈnfaʕal)]		*	*
b. [(ˈnafʕal)]		**!	
c. [(ˈfnaʕal)]	*!		*

Form VII is similar to form I/*faʕal*, with the addition of the ranking argument ALIGN-*n* ≫ ALIGN-RTL. This captures the intuition that *n*- is prefixal in form VII (Ussishkin, 2000:ch.5).

3.3.2. Form VIII/ftaʕal

The last form considered here is the form VIII/*ftaʕal* pattern, discussed in §2. This form, like forms I and VII, also displays syllabicity alternations based on the number of root consonants, and contains only an infixal -*t*- over and above the form I pattern. Thus we have forms such as *ð^{ʕ}t^{ʕ}arr* ($\sqrt{\text{ð}^{ʕ}\text{r}}$), to be compelled to’ and *xtilaf* ($\sqrt{\text{xlf}}$), ‘to differ’. Here again the solution we propose is to assume the existence of a constraint such as (28). However, unlike form VII, here this constraint is ranked below ALIGN-RTL, as (29) shows:

(28) ALIGN-L(*t*, *ω*) (ALIGN-*t*):
Align the left edge of /-*t*-/ to the left edge of some prosodic word.

(29) ALIGN-RTL ≫ ALIGN-*t* ≫ *COMPLEX^{ons}

/ $\sqrt{\text{fʕl}}$/, /a/, /t/	ALIGN-RTL	ALIGN-*t*	*COMPLEX^{ons}
☞ a. [(ˈftaʕal)]		*	*
b. [(ˈfatʕal)]		**!	
c. [(ˈtfaʕal)]	*!		*

With the ranking ALIGN-RTL ≫ ALIGN-*t* ≫ *COMPLEX^{ons}, we now have a complete picture of the verbs under discussion, derived by reference to both the root and prosody. The final section turns to stitching these two notions together into a cross-linguistic picture of NTM behavior.

4. Conclusions

The approach we have outlined for a subset of the Iraqi Arabic verbal system in §3 takes NTM behavior to be a product of a constraint ranking where some prosodic markedness constraint (in Arabic, *COMPLEX) dominates CONTIGUITY, following up on a proposal for Coptic in Kramer (2007). One immediately appealing broader implication of this approach has to do with the typological relationship between NTM and non-NTM languages. The “roots-and-prosody” analysis (RP, henceforth) of NTM languages relies on only three classes of constraints, shown in (30):

(30) Constraints in an RP Approach:

a. *Prosodic/Syllabic Constraints*: FTBIN, *COMPLEX, *APPEND...

b. *Morphological Constraints*: ALIGN-*t*, ALIGN-*n*...

c. *Faithfulness Constraints*: IDENT, DEP, CONTIGUITY...

The constraints in (30a–30c) are, crucially, not novel constraints. They are "industry-standard" and are commonly assumed in many analyses of non-NTM languages. Thus, the only difference in an RP approach between NTM and non-NTM languages is constraint ranking, the basic typological control in Optimality Theory (Prince & Smolensky, 1993/2004).

Backing up a bit, we can see that this conclusion was reached because of the following two claims, common to both the analysis in §3 and Kramer (2007):

(31) Central Claims of the Root-and-Prosody Approach:

a. ROOTS AND VOWELS ARE MORPHEMES: the input to NTM forms consists of the consonantal root and a vowel affix.

b. TEMPLATES ARE GIVEN BY PROSODY: Templates are emergent properties of words which surface from the satisfaction of high-ranking prosodic markedness constraints.

These axioms provide a way to understand NTM behavior without the need for additional components of grammar, association principles, or language-specific constraints, as well as provide a way to unify the insights of the last forty years of generative work on the Semitic verb. While the analysis presented here has only pursued the implications of the assumptions in (31) for half of the Iraqi Arabic verbal system, we hope to have shown the usefulness of these assumptions for morphological analyses of Semitic languages and NTM behavior.

References

Arad, Maya (2003). Locality constraints on the interpretation of roots: The case of Hebrew denominal verbs. *Natural Language & Linguistic Theory* 21:4, 737–778.

Arad, Maya (2005). *Roots And Patterns: Hebrew Morpho-syntax*. Springer, Dodrecht.

Beckman, Jill N. (1998). *Positional Faithfulness*. Ph.D. thesis, University of Massachusetts-Amherst.

Davis, Stuart & B.A. Zawaydeh (2001). Arabic hypocoristics and the status of the consonantal root. *Linguistic Inquiry* 32:3, 512–520.

Erwin, William M. (2004). *A Short Reference Grammar of Iraqi Arabic*. Georgetown University Press.

Kramer, Ruth (2007). Nonconcatenative morphology in Coptic. Kaplan, Aaron & David Teeple (eds.), *Phonology at Santa Cruz 7*, Linguistics Research Center, Santa Cruz, CA.

Marantz, Alec (1997). Words. Ms., Massachusetts Institute of Technology.

McCarthy, John J. (1979). *Formal Problems in Semitic Phonology and Morphology*. Ph.D. thesis, Massachusetts Institute of Technology.

McCarthy, John J. (1981). A prosodic theory of nonconcatenative morphology. *Linguistic Inquiry* 12:3, 373–418.

McCarthy, John J. (1993). Template form in prosodic morphology. *Papers from the Third Annual Formal Linguistics Society of Midamerica Conference* 187–218.

McCarthy, John J. & Alan Prince (1993). *Generalized Alignment*. Rutgers University Center for Cognitive Science.

McCarthy, John J. & Adam Prince (1994). The emergence of the unmarked: Optimality in prosodic morphology. *Proceedings of NELS* 24, 333–379.

McCarthy, John J. & Alan Prince (1995). Faithfulness and reduplicative identity. *University of Massachusetts Occasional Papers in Linguistics* 18, 249–384.

Prince, Alan & Paul Smolensky (1993/2004). *Optimality Theory: Constraint Interaction in Generative Grammar*. Blackwell Publishing.

Rosenthall, Sam & Harry van der Hulst (1999). Weight-by-position by position. *Natural Language & Linguistic Theory* 17:3, 499–540.

Ryding, Karin C. (2005). *A Reference Grammar of Modern Standard Arabic*. Cambridge UP.

Tucker, Matthew A. (To Appear). Roots and prosody: The Iraqi Arabic derivational verb. *Recherches Linguistiques de Vincennes*.

Ussishkin, Adam (1999). The inadequacy of the consonantal root: Modern Hebrew denominal verbs and output–output correspondence. *Phonology* 16:03, 401–442.

Ussishkin, Adam (2000). *The Emergence of Fixed Prosody*. Ph.D. thesis, University of California, Santa Cruz.

Ussishkin, Adam (2005). A fixed prosodic theory of nonconcatenative templatic morphology. *Natural Language & Linguistic Theory* 23:1, 169–218.

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