GENERATIVE APPROACHES TO MEHRI VERBS[1]

K. Morgan Rood
Georgetown University | kr364@georgetown.edu
NACAL 41 | February 16, 2013

1. INTRODUCTION

1.1 The Mehri Language

- Modern South Arabian (Semitic)
- Unwritten, spoken in the southern Arabian peninsula (~135,000 speakers)
- Omani Mehri vs. Yemeni Mehri
  - Some differences in phonology and structure
  - This project will discuss Mehri generally, and make notes when data is exclusive to one community.
- Verb templates typical of Semitic, similar to Arabic awzaan and Hebrew binyanim

1.2 Goals

- Closely investigate the templates for generalizations about syllable structure and the distribution of schwas
- Propose a phonological rule of schwa epenthesis for Mehri verbs
- Examine two possible analyses of the Mehri verb system: prosodic archi-templates and Optimality Theory (OT)
- Conclude that root-based OT is the most successful analysis of Mehri verbs, and propose a constraint ranking to generate these verbs
- Position the analysis within the wider discourse on morphophonology of Semitic languages

2. MEHRI TEMPLATES

2.1 Form

(1) Previous Accounts of the Mehri Templates

	Watson (2012)	Rubin (2010), Johnstone (1987)	Simeone-Senelle (2011)
Ga[2]	CCo:/u:C	CəCu:C	CəCó:C
Gb	Ci:CaC	Ci:CəC	Cé:CəC
D/L	(a)C(C)o:CaC	(a)Co:CəC	(a)Có:CəC
H	haCCu:C	həCCu:C	(hə)CCó:C
ʃ1	ʃaCCu:C	ʃəCCu:C	ʃəCCó:C
ʃ2	ʃCa:/e:CaC	ʃəCe:CʃəC	ʃəCé:CəC
T1	CatCaC	CátCəC	Cá/á:tCəC
T2	aCtaCu:C	əCtəCu:C	əCtəCó:C

[1] Many thanks to Ruth Kramer and Aynat Rubinstein for their invaluable support throughout this project.
[2] Johnstone (1987), Watson (2012), and Simeone-Senelle (2011) have different names for the 8 templates. For the sake of simplicity, we will be using only the designations from Rubin (2010).

- As seen above, the templates consist of triliteral root consonants and a vocalic pattern.
- Many vocalic discrepancies can be attributed to the lack of a codified vowel space in Mehri. Watson (2012), Rubin (2010) and Simeone-Senelle (2011) each use different sets of vowels in their transcriptions.
- Working assumptions regarding transcriptions (for discussion: Johnstone 1987; Rubin 2010; Simeone-Senelle 2011, Watson 2012):
    - [-back, - low] = [i:] or [e:], difficult to distinguish = [i:] for our purposes
    - [+back, - low] = [u:] or [o:], difficult to distinguish = [u:]
    - At least one short, central, unstressed vowel = [ə]

(2) Working Templates for Present Purposes

Ga	CəCu:C
Gb	Ci:CəC
D/L	(a)Cu:CəC
H	həCCu:C
ʃ1	ʃəCCu:C
ʃ2	ʃəCi:C(ʃ)əC
T1	Ca(:)tCəC
T2	əCtəCu:C

2.2 Some Data

- There is no exemplar *fa'al* verb in Mehri, but a few example verbs can highlight the Mehri templatic system (all Omani verbs from Rubin 2010):

- /ktb/
    - Ga *kətu:b* "write";
    - ʃ1 *ʃəktu:b* "have s.o. write (a charm)"
- /mrz/
    - Gb *mi:rəɣ* "be ill";
    - H *həmru:ɣ* "nurse, look after";
    - ʃ1 *ʃəmru:ɣ* "fall ill, be ill"
- /hrb/
    - T1 *hatrəb* "be at war with one another";
    - T2 *əhtəru:b* "be at war with one another"
- /gls/
    - ʃ2 *ʃəge:ləs* "quarrel with; scold s.o";
    - T1 *gatləs* "quarrel with one another"
- /ftk/
    - H *həftu:k* "take out/off/away";
    - T1 *fattək* "be released, set free"
- /slm/
    - Gb *si:ləm* "be(come) healthy, safe";
    - D/L *so:ləm* "save, preserve; surrender";

- /rkb/
    - D/L *aro:kəb* "put [a pot] on the fire";
    - H *hərku:b* "mount s.o."

2.3 Syllable Structure

2.3.1 Generalizations from Watson (2012) and Simeone-Senelle (2011)

- Syllables with unrestricted distribution: CV, CVV, CVC
- Restricted distribution: CVVC
- Consonant clusters are restricted to certain word-initial and word-final environments

2.3.2 Additional Generalizations

- Syllables have onsets (with the exception of a few word-initial syllables)
- Syllables usually have codas
- There is always a coda on the word-final syllable
- The nuclei of the syllables are vowels: either long vowels or schwas
- There are no tautosyllabic consonant clusters within the templates

(3) Syllabified Mehri Templates

Ga	Cə.CuC
Gb	Ci:.CəC
D/L	(a).Cu:.CəC
H	həC.Cu:C
ʃ1	ʃəC.Cu:C
ʃ2	ʃə.Ci:C.(ʃ)əC
T1	Ca(:)t.CəC
T2	əC.tə.Cu:C

2.4 A Proposal for Schwa Epenthesis

- The vocalic pattern of Mehri templates consists of only long vowels and schwas.
- The distribution of the schwa is entirely predictable: *Schwas are epenthesized to break up consonant clusters*
- Resulting consonant clusters if schwas are deleted:

(4) Syllable Structure without Schwa

	Syllabified Templates	Syllable Structure with Deleted Schwas
Ga	Cə.Cu:C	**CC**u:C
Gb	Ci:.CəC	Ci:**CC**
D/L	(a).Cu:.CəC	(a).Cu:**CC**
H	həC.Cu:C	**hCC**u:C
ʃ1	ʃəC.Cu:C	**ʃCC**u:C
ʃ2	ʃə.Ci:C.(ʃ)əC	**ʃC**i:**C(ʃ)C**
T1	Ca(:)t.CəC	Ca(:)**tCC**
T2	əC.tə.Cu:C	əC.**tC**u:C

- The consonant clusters, in bold, are exactly and only where schwas are epenthesized
- This analysis extends to the affixes: previously analyzed as {hə-, ʃə-, -ʃə-}, now simply {h-, ʃ-, -ʃ-}
- The prefix [ə-] will remain analyzed as a vocalic prefix, on the assumption of the existence of a lexical schwa (in contrast with an epenthetic schwa)
- We thus conclude that schwas are epenthesized because of a phonological rule forbidding consonant clusters.

2.5 Section 2 Summary

- We have examined the 8 Mehri verb templates and some data demonstrating the system.
- We made generalizations about the syllable structure of Mehri, including the fact that consonant clusters are not attested in the verb templates.
- Finally, we proposed a phonological rule of schwa epenthesis that accounts for the distribution of the schwa in Mehri verbs.

3. Attempting New Templates

5.1 Archi-Templates

- Overarching template(s) that can account for all and only the other templates (Bat-El 2011)
- These templates have been derived in other Semitic languages (Arabic, Hebrew), and this section will determine if the same can be done for Mehri.
- Because schwas can be accounted for via a phonological rule, we can now re-examine the templates without the schwas:

(5) Configurations without Schwa Epenthesis

Designation	Configurations without Schwas
Ga	CCu:C
Gb	Ci:CC
D/L	(a).Cu:CC
H	hCCu:C
ʃ1	ʃCCu:C
ʃ2	ʃCi:C(ʃ)C
T1	Ca(:)tCC
T2	əC.tCu:C

- Excluding the affixes, the Mehri templates consist only of three root consonants and one long vowel
- The long vowel can be in either of two positions, and thus Mehri templates can be boiled down into these two basic templates:

(6) a. CV:CC
b. CCV:C

- Conclusion: Mehri verbs can be derived through the following steps:
  1. Begin with either (6a) or (6b)
  2. Add root consonants, vowel, and affixes (if any)
  3. Apply schwa epenthesis rule

5.2 Problems with the New Templates

- /CV:CC/ and /CCV:C/ are not composed of recognizable units of prosody (mora, syllable, foot, prosodic word).
- They are not attested syllables in Mehri. The syllable in (6a) is too heavy to be a foot.
- Even if we assume final consonant extraprosodicity, as McCarthy did with Arabic templates (1993), (6a) and (6b) both consist of a single trimoraic syllable.
- The Prosodic Morphology Hypothesis presupposes that templates are composed of authentic units of prosody (McCarthy 1993)
- Thus /CV:CC/ and /CCV:C/ are not suitable for archi-templates.

6. An Alternative to Templates: Optimality Theory

6.1 Optimality Theory (Prince and Smolesnky 1993)

- A constraint-based framework (as opposed to rule-based), whereby outputs are determined by a set of ranked constraints.
- The input consists of morpheme(s), and a list of possible output candidates is generated.
- The candidates are then evaluated based on their obedience of the ranked constraints.
- The candidate that violates the least number of highly-ranked constraints is considered the optimal candidate and becomes the output.

6.1 Semitic Languages and Optimality Theory

- Root-based approach (Kramer 2007, Bat-El 2011, Tucker 2011)
  - Input includes the triliteral root and the vocalic pattern, which is entered as an affix
  - The vocalic pattern is then positioned via alignment constraints
  - The theoretical assumption presupposes that the triliteral root constitutes its own morpheme.

6.2 Relevant Markedness/Faithfulness Constraints

- Several widely-attested constraints will be necessary for our analysis

  a. *Complex; no complex onsets or codas
  b. *Coda; no codas
  c. DepIO; no epenthesis
  d. FinalC; prosodic words must end in a consonant[3]

- FinalC appears to be undominated in our data, and thus *Coda must be lower-ranked.
- *Complex being ranked higher than DepIO will account for our previous phonological rule. Schwa epenthesis can now be explained in terms of constraints.

[3] FinalC (formally AlignR (PrWd, C)) is referenced as a Semitic constraint by Bat-El (2011) and attributed to McCarthy (1993)

(6) Ranking Demonstration of *COMPLEX and DEPIO

a. DEPIO ranked higher than *COMPLEX

{CVCC}	DEPIO	*COMPLEX
☞a. CVCC		*
b. CVCəC	*!	

b. *COMPLEX ranked higher than DEPIO

{CVCC}	*COMPLEX	DEPIO
a. CVCC	*!	
☞b. CVCəC		*

- As seen above, the winning candidate in (6a) does not have schwa epenthesis, while the winning candidate in (6b) does.
- Because consonant clusters are always broken up by schwa epenthesis, the ranking in (6b) is the optimal ranking for Mehri.

6.3 Alignment Constraints

- The central alignment constraint for our purposes, as developed by McCarthy and Prince (1993), will align both the vocalic patterns and the traditional affixes:

    e. ALIGN-L (Aff, PrWd); affix is aligned with the left edge of the prosodic word

- All the alignment constraints are in competition with:

    f. ALIGN-L (Stem, PrWd); stem is aligned with the left edge of the prosodic word (Bat-El 2011)

- Alignment constraints are evaluated along a gradient, meaning the number of violations is equivalent to the number of segments away from edge (Bat-El 2011)

6.4 Aligning the Vocalic Patterns

- Vocalic pattern is entered into the input as an affix
- 3 types of long vowels: [u:], [a:], [i:]
- [u:] aligns to the right of the prosodic word, while the other vowels align to the left.

    g. ALIGN-L (V: PrWd); V is aligned with the left edge of the prosodic word
    h. ALIGN-R (U: PrWd); U: is aligned with the right edge of the prosodic word

- If ALIGN-R (U: PRWD) is ranked higher than ALIGN-L (V: PRWD), then [u:] will align right, while the other vowels will align left.
- This analysis can also be flexible with respect to the continuing [u:, o:] and [e:, i:] phonemic discussion, as the alignment constraints could be composed in terms of [+back, -low] and [-back, -low], respectively.
- In order to keep the long vowels from aligning all the way to the left (thus beginning the word), we require one more markedness constraint:

i. ONSET; must have onsets

- If ONSET is ranked higher than ALIGN-L (V: PRWD), then no candidate beginning with a vowel will be the optimal candidate.
- This can be demonstrated with the Ga verb *kətu:b* "to write":

(7) OT analysis of Omani Ga verb *kətu:b,* "to write" (Rubin 2010):

{ktb} + {u:}	FINALC	*COMPEX	ONSET	ALIGN-L (Stem, PrWd)	ALIGN-R (U:, PrWd)	ALIGN-L (V: PrWd)	DEP IO	*CODA
a. ku:tb		*!			**	*		*
b. ktu:b		*!			*	**		*
c. ku:.təb					**!*	*	*	*
☞d. kə.tu:b					*	***	*	*
e. u:k.təb			*!	*	****		*	**
f. kət.bu:	*!					****	*	*

- This tableau correctly predicts that the optimal candidate will be (7d), despite its violating ALIGN-R (U: PrWd) once, ALIGN-L (V:, PrWd) three times, and DEPIO once.
- A tableau for the Gb verb *mi:rəʐ* will demonstrate how [i:] and [u:] align differently:

(8) OT analysis of Omani Gb verb *mi:rəʐ,* "be ill" (Rubin 2010):

{mrz} + {i:}	FINALC	*COMPEX	ONSET	ALIGN-L (Stem, PrWd)	ALIGN-R (U:, PrWd)	ALIGN-L (V: PrWd)	DEPIO	*CODA
a. mi:rz		*!				*		*
b. mri:z		*!				**		*
☞c. mi:.rəz						*	*	*
d. mə.riz						**!*	*	*
e. i:m.rəz			*!	*			*	**

- The above tableau correctly predicts that (8c) will be the optimal candidate.

5.5 Aligning Other Affixes

- The ranking thus far can generate Ga and Gb verbs. What about the derived stems?
- ALIGN-L (Aff, PrWd) can also be extended to other affixes, including [h-], [ʃ], [-t-]
- Thus we have:

j. ALIGN-L (h, PrWd); align [h] with the left end of the prosodic word
k. ALIGN-L (ʃ, PrWd) ; align [ʃ] with the left edge of the prosodic word
l. Align-L (t, PrWd); align [t] with the left edge of the prosodic word
m. ALIGN-L (ə, PrWd); align [ə] with the left edge of the prosodic word

- If ALIGN-L (Aff, PrWd) is ranked higher than ALIGN-L (Stem, PrWd), then the affix will be a prefix. In the reverse, the affix will be an infix (Bat-El 2011).
- The alignment of the prefix [h] for the H verb *həmru:ʐ* is shown in (9):

(9) OT analysis of the Omani H verb *həmru:ʒ* "to nurse" (Rubin 2010):

{mrz} + {u:} + {h}	FINALC	*COMPEX	ONSET	ALIGN-L (h, PrWd)	ALIGN-L (Stem, PrWd)	ALIGN-R (U:, PrWd)	ALIGN-L (V: PrWd)	DEPIO	*CODA
a. hə.mə.ruz					**	*	*****	**!	*
☞b. həm.ru:z					**	*	*****	*	**
c. mər.hu:z				*!**		*	*****	*	**
d. hu:m.rəz					**	**!**	*	*	**
e. həm.rə.zu:	*!				**		******	**	*

- The tableau correctly predicts that (9b) will be the optimal candidate. Note that the tiebreaker between (9a) and (9b) is lowly-ranked DEPIO. This demonstrates that schwas can be epenthesized only when absolutely necessary to obey *COMPLEX.
- An infix together with a prefix is demonstrated below, with the T2 verb *əhtəru:b:*

(10) OT analysis of Omani T2 verb *əhtəru:b* "to be at war with one another" (Rubin 2010):

{hrb} + {u:} + {ə} + {t}	FINALC	*COMPEX	ALIGN-L (ə, PrWd)	ONSET	ALIGN-L (Stem, PrWd)	ALIGN-L (t, PrWd)	ALIGN-R (U:, PrWd)	ALIGN-L (V: PrWd)	DEPIO
a. ə.hət.ru:b				*	*	***!	*	*****	*
b. əht.ru:b		*!		*	*	**	*	*****	
c.ət.hə.ru:b				*	**!	*	*	*****	*
d. təh.ru:b			*!		**		*	*****	
☞e. əh.tə.ru:b				*	*	**	*	*****	*

- The tableau in (10) is able to derive a more complicated Mehri verb - juggling a prefix, infix, and aligned vowels - and thus we conclude that the rankings proposed above can accurately generate the Mehri verb templates.

6. CONCLUSION

- Prosodic templates and Optimality Theory were both engaged to develop a morphophonological analysis of the Mehri verb system.
- The templates were not satisfactory as they did not comply with the theoretical assumption that templates should consist of authentic units of prosody.
- However, OT could account for the empirical generalizations made above, namely, syllable structure and schwa epenthesis.
- The constraint rankings proposed above successfully derive the various Mehri templates.

Implications and Further Research

- Within a broader context, there is an apparent gap in generative linguistic research on Mehri, and the Modern South Arabian languages in general.
- Much is known about the morphophonology of other Semitic languages, and this knowledge has contributed to the development of phonological theories (autosegmentalism, OT, etc.)
- This project has analyzed Mehri with similar tools and has determined that Mehri patterns in a similar manner as other Semitic languages.

- Further research will include an investigation of the Mehri morphological evidence demonstrating that the Semitic root constitutes its own morpheme, and should be treated as such in the process of word formation.

REFERENCES

Bat-El, Outi. 2011. *Semitic Templates.* Blackwell Companion to Phonology.

Dekkers, van der Leeuw, and van de Weijer, eds. 2000. *Introduction.* Optimality Theory. Oxford University Press.

Johnstone, T.M. 1981. Mehri Lexicon and English-Mehri Word-List. London: School of Oriental and African Studies.

Kramer, Ruth. 2007. *Nonconcatenative Morphology in Coptic.* Phonology at Santa Cruz. UC Santa Cruz: Linguistics Research Center.

McCarthy, John J. 1981. *A Prosodic Theory of Nonconcatenative Morphology.* Linguistic Inquiry, 12:3. 373-418. The MIT Press.

McCarthy, John J. 1993. *Template Form in Prosodic Morphology.* University of Massachusetts, Amherst.

McCarthy, John J and Alan Prince. 1993. *Generalized Alignment.* Yearbook of Morphology. 1993.

Prince, Alan and Paul Smolensky. 1993. Optimality Theory: Constraint Interaction in Generative Grammar. Malden, MA: Blackwell.

Rubin, Aaron D. 2010. The Mehri Language of Oman. Leiden-Boston: Brill.

Simeone-Senelle, Marie-Claude. 2011. *Modern South Arabian.* Weninger, Stefan, ed. The Semitic Languages: an International Handbook. Berlin: Mouton.

Tucker, Matthew. 2011. *Iraqi Arabic Verbs: The Need for Roots and Templates.* Proceedings of the 28th West Coast Conference on Formal Linguistics, ed. M Washburn, K McKinney-Bock, et al. 196-204. Somerville, MA: Cascadilla Proceedings Project.

Watson, Janet C. E. 2012. The Structure of Mehri. Wiesbaden: Harrassowitz Verlag.