Phonological Variations in Kabul Persian: An Optimality Theory Analysis

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ABSTRACT
This paper builds on Henderson's work (1975) to express phonological alternations found in Kabul Persian in terms of Optimality Theory (OT). The phonological differences in the three sub-varieties of Kabul Persian ("Formal," "Deliberate," and "Colloquial") are expressed in terms of slightly different ordering of the same set of universal constraints. This paper invokes a total of four constraints based on faithfulness to the underlying forms and seven constraints related to cross-linguistic markedness. The order of these constraints is demonstrated in a number of tableaux using real language data. The result is a more coherent and unified description of these phonological alternations than offered by previous approaches.

1. Introduction

1.1 Persian

Persian in its various varieties is spoken primarily in Iran and Afghanistan. It is generally divided into Western [pes] and Eastern [prs] (Gordon 2005:439, 315-316). The Western Persian is often called Farsi, and the Eastern Persian is often called Dari. This paper looks at the main sub-varieties of Dari used in the city of Kabul.

1.2 Tri-glossia in Kabul Persian

The form of Dari spoken in Kabul, Afghanistan has three distinct speech varieties. Henderson calls them "Formal (F)," "Deliberate (D)," and "Colloquial (C)" (Henderson 1975:651). Formal is used for radio broadcasts and speeches. Deliberate is used between educated equals. Colloquial is used in every day conversation with close friends and relatives. The difference between these different speech forms is largely phonological. These phonological differences were the topic of a 1975 article "Diglossia in Kabul Persian Phonology" by Michael M. T. Henderson. He observed that children learning the language start with the Colloquial and then move to the Deliberate and then to the Formal. The phonological ordering, however, moves in the opposite direction, so that the Formal pronunciations serve as the underlying forms for the Deliberate and the Colloquial.

1.3 Scope of this Paper

This paper builds on Henderson's work (1975) to express these phonological alternations in terms of Optimality Theory (OT).[1] Optimality Theory uses a set of universal and violable constraints to describe the surface forms in the languages of world. The theory says that every language ranks these constraints in some order to give certain constraints prominence and priority over others. Different rankings produce different sets of phonological systems. Henderson uses the classical model of a rule based system. In the alternations between the various forms of Kabul Person, Henderson lists 14 major rules and two sub-rules, but this paper focuses only on Henderson's rule numbers 1, 2, 2a, 3, and 3a.

2. Phonological Variations

Henderson gives a prose description and classical notation rules for the phonological variations from Formal to Deliberate and Colloquial. The Formal Persian is considered to be the input forms for the Deliberate and Colloquial unless otherwise noted. The following formalisms are Henderson's and the prose is a summary of his explanations.

[1]My expression of Optimality Theory is based on Kager 1999 and the zealous mentoring of Steve Parker at the Graduate Institute of Applied Linguistics during the Spring of 2009. Any value in this paper I owe to them, but any errors I claim completely as my own.

Rule #1 says that unstressed vowels become [-high] and [-tense].

$$V \rightarrow \begin{bmatrix} -high \\ -tense \end{bmatrix} / \begin{bmatrix} \underline{\quad} \\ -stress \end{bmatrix}$$

Rule #2 says that word initial consonant clusters are separated by vowel epenthesis. The segment [ɛ] epenthesizes when the following vowel is [-round], and the segment [ɔ] epenthesizes when the following vowel is [+round]. This rule describes a process from an underlying representation to the Formal and Deliberate speech varieties.

$$Ø \rightarrow \begin{bmatrix} V \\ -high \\ -low \\ -tense \\ \alpha back \end{bmatrix} / \#C\_\_C \begin{bmatrix} V \\ \alpha round \end{bmatrix}$$

Rule #2a describes how the Colloquial speech variety deletes the vowel that was epenthesized in the Formal and Deliberate speech varieties.

$$\begin{bmatrix} V \\ -stress \end{bmatrix} \rightarrow Ø / \#C\_\_C$$

Rule #3 says that [ʔ] and [h] become glides between consonants. If either of the vowels is round, then the glide will be [w], if neither is round then the glide will be [y]. The double slashes // shows that this is a mirror-image rule.

$$ʔ, h \rightarrow \begin{bmatrix} +sonorant \\ +high \\ \alpha back \end{bmatrix} / / V\_\_ \begin{bmatrix} V \\ -low \\ \alpha round \end{bmatrix}$$

Rule #3a says that in the Colloquial speech variety, unstressed [-low] vowels are deleted next to glides.

$$\begin{bmatrix} V \\ -low \\ -stress \end{bmatrix} \rightarrow Ø / / \_\_ \begin{bmatrix} -consonantal \\ +sonorant \\ -syllabic \\ +high \end{bmatrix}$$

3. Relevant OT Constraints

These same phonological processes are better captured using Optimality Theory (OT). OT uses typologically motivated constraints in language specific ranking to represent the real phonetic outputs of the language. These constraints are universal but they are also violable. Each phonetic utterance pays the price of violating a list of universal constraints, but simultaneously reaps the rewards of satisfying the higher ranked constraints. The use of OT constraints is more logical, benign, and restricted than an approach using the classical modal.

The following is a list of the constraints which are invoked in this paper. The list reflects the crucial ordering of the constraints where applicable. Each constraint is defined and represented by a notation. The constraints are divided into *faithfulness* constraints and *markedness* constraints. The faithful constraints look at the relationship between the input and the output. The markedness constraints look only at the output.

3.1 Faithfulness Constraints

3.1.1 IDENT-IO

This constraint says that every feature of every segment in the input will be represented in the output. Or "Correspondent segments in input and output have identical values" (Kager 2006:29). In other words, this constraint says, "Don't change anything."

3.1.2 IDENT-$V_{[+stress]}$

This constraint says that stressed vowels have identical input and output values for all of their features. In other words, "Don't change a stressed vowel." This specific constraint is a sub-constraint under the more general IDENT-IO. A specific constraint will always be ranked before its corresponding general constraint; otherwise it is redundant and invisible.

3.1.3 MAX-IO

This is a constraint against deleting any segments in the input. Kager defines this constraint as saying, "Input segments must have output correspondents" (2006:67). In other words, "Don't delete anything."

3.1.4 DEP

This constraint says that, "Output segments must have input correspondents" (Kager 2006:68). This is a constraint against adding anything to the input form. "Don't add anything" or "Don't epenthesize."

3.2 Markedness Constraints

3.2.1 $C_{[oral]}$

This constraint says that all segments must have an oral place node. Since all vowels in Persian have an oral place node, its effect is seen primarily on consonants. To satisfy this constraint, a segment must have a superlaryngeal node in its feature tree. This constraint declares segments such as [h] and [ʔ] to be ungrammatical, unacceptable, and perhaps even fatally guilty of violating this constraint.

3.2.2 *$V_{[-low]}$

This constraint says that [-low] vowels are marked and ungrammatical. This reflects the fact that some processes in Persian affect [-low] vowels differently than [+low] vowels. The [-low] vowels are allowed only to avoid violating a higher ranked constraint (e.g. IDENT-IO).

3.2.3 *$V_{[+tense]}$

This constraint says that [+tense] (also known as ATR) vowels are marked and ungrammatical. [+tense] vowels are allowed only to avoid violating a higher ranked constraint (e.g. IDENT-IO). All things being equal a vowel will not be [+tense]. These segmental markedness constraints help explain the identity of epenthetic segments and certain alternations.

3.2.4 *σ[CC

This constraint prohibits syllables with complex onsets. It says that two consonants cannot occur in the onset of a syllable. "No complex onsets."

3.2.5 +RDSPREAD[2]

This constraint says to spread the [+round] feature of a [–consonantal] segment to other [–consonantal] segments. The [–consonantal] feature is a way of explaining the natural class that includes vowels and semi-vowels (glides) together. On this class of segments, the labial node spreads on the articulator tier to any segment with an unassigned labial node (for a feature tree see Kenstowicz 1994:146). Association lines may not cross. In other words, the spreading is blocked in either direction when the segment encounters an assigned labial node in a [–consonantal] segment.

[2]These constraints are somewhat awkward and unelegant. They need more refining. But there is some unity with plus or minus round that is seen in epenthetic vowels and the laryngeal to glide alternations.

3.2.6 –RDSPREAD

This constraint says to spread the [-round] feature of a [–consonantal] segment to other [–consonantal] segments. The labial node spreads on the articulator tier to any segment with an unassigned labial node. Association lines may not cross. In other words, the spreading is blocked in either direction when the segment encounters an assigned labial node in a [–consonantal] segment. Epenthetic vowels and glides get their labial features by assimilating with the labial feature of another [-consonantal] segment.

3.2.7 LAZY

This constraint is not a reflection on the work ethic of phonologists or students of phonology. It reflects the fact that people generally use minimal effort to produce acceptable phonetic forms in their languages. It says that segments are more marked when they resist lenition, especially in environments that typically encourage lenition. In other words, "Take the easy road." Robert Kirchner proposes a hierarchy of lenition with vowels being on one end and stops being on the other (Kirchner 1998).

4. Constraint Ordering

4.1 Tableaux

The slight differences in the ranking of these constraints produce the phonological variations in the various versions of Kabul Persian. Many of these constraints are crucially ordered with one another. For the Colloquial and Deliberate Speech varieties IDENT-$V_{[+stress]}$ is ranked above *$V_{[+tense]}$. (Note all Persian phonemes that are $V_{[+high]}$ are also $V_{[+tense]}$). This rule ordering shields stressed vowels from being changed in any way, including becoming [+tense].

(C and D) IDENT-$V_{[+stress]}$ >> *$V_{[+tense]}$ >> IDENT-IO

input: /ʃiˈrin / 'sweet'	IDENT $V_{[+stress]}$	*$V_{[+tense]}$	IDENT-IO
1. ☞ ʃɛˈrin		*	*
2. ʃiˈrin		**!	

(C and D) IDENT-$V_{[+stress]}$ >> *$V_{[+high]}$, *$V_{[+tense]}$ >> IDENT-IO

input: /durˈbin / 'telescope'	IDENT $V_{[+stress]}$	*$V_{[+tense]}$	IDENT-IO
1. ☞ dɔrˈbin		*	*
2. durˈbin		**!	

(C and D) IDENT-$V_{[+stress]}$ >> *$V_{[+tense]}$ >> IDENT-IO

input: /sæˈræk/ 'road'	IDENT $V_{[+stress]}$	*$V_{[+tense]}$	IDENT-IO
1. ☞ sɑˈræk		*	*
2. sæˈræk		**!	

For Formal Persian, both IDENT features are ranked above the markedness constraints. This re-ordering causes the faithful candidate to come out the winner.

(F) IDENT-$V_{[+stress]}$, IDENT-IO >> *$V_{[+tense]}$

input: /ʃiˈrin /	IDENT $V_{[+stress]}$	IDENT-IO	*$V_{[+tense]}$
1. ʃɛˈrin		*!	*
2. ☞ ʃiˈrin			**

In this case, the input form is an underlying representation which is posited and defended by Henderson (1975:652). Also, the Formal and the Deliberate pattern together while the Colloquial goes its own way.

(F and D) *σ[CC >> DEP

input: /draxt/ 'tree'	*σ[CC	DEP
1. ☞ dɛˈræxt		*
2. ˈdræxt	*!	

In Henderson's analysis there is one rule (#2) in which the underlying form undergoes epenthesis, as seen in the surface forms of the Formal and the Deliberate. Then there is another rule (#2a) which uses the output of the first rule as its input. This second rule (#2a) then deletes the vowel inserted by the first rule (#2). But there may be a better way to analyze this data. If we allow the same underlying form, then the alternation is simply a matter of re-ordered constraints in the Colloquial so that DEP outranks *σ[CC. This is a much simpler explanation for the Colloquial speech variety's tolerance for complex onsets. Since the direction of language acquisition starts with the Colloquial and then moves to the Deliberate and Formal, it is plausible to see all three speech varieties accessing similar underlying forms. Thus, the differences come in the slight re-ranking of the phonological constraints.

(C) DEP >> *σ[CC

input: /draxt/	DEP	*σ[CC
1. dɛˈræxt	*!	
2. ☞ ˈdræxt		*

The identity of an epenthetic vowel is determined by markedness constraints and +/-RDSPREAD.

(F and D) -RDSPREAD >> *$V_{[-low]}$ >> *$V_{[+tense]}$

input: /draxt/	-RDSPREAD	*$V_{[-low]}$	*$V_{[+tense]}$
1. ☞ dɛˈræxt		*	*
2. deˈræxt		*	**!
3. diˈræxt		*	**!
4. dɔˈræxt	*!	*	

(F and D) +RDSPREAD >> *$V_{[-low]}$ >> *$V_{[+high]}$, *$V_{[+tense]}$

input: /froxt/ 'he sold'	+RDSPREAD	*$V_{[-low]}$	*$V_{[+tense]}$
1. ☞ fɔˈroxt		**	*
2. fɛˈroxt	*!	**	*
3. fuˈroxt		**	**!
4. foˈroxt		**	**!

The segments [h] and [ʔ] are not phonemes in the Deliberate and the Colloquial. Only the Formal allows consonants without an oral place node.

(D and C) $C_{[oral]}$ >> IDENT-IO

input: /dæˈhɔm / 'tenth'	$C_{[oral]}$	IDENT-IO
1. ☞ dæˈwɔm		*
2. dæˈhɔm	*!	

(F) IDENT-IO >> $C_{[oral]}$

input: /dæˈhɔm /	IDENT-IO	$C_{[oral]}$
1. dæˈwɔm	*!	
2. ☞ dæˈhɔm		*

Either [w] or [y] may take the place of either [h] or [ʔ]. The choice of glide is determined by the roundness quality of the adjacent vowels. It only takes one [+round] vowel to make the glide be a [w], but both consonants must be [-round] for the glide to be a [y].

(D and C) +RDSPREAD >> -RDSPREAD

input: /dæˈhɔm /	+RDSPREAD	-RDSPREAD
1. ☞ dæˈwɔm		*
2. dæˈyɔm	*!	

(D)+RDSPREAD >> -RDSPREAD

input: /nɛˈhæŋg/ 'whale'	+RDSPREAD	-RDSPREAD
1. ☞ nɛˈyæŋg		
2. nɛˈwæŋg		*!*

The motivation for the alternation of [h] and [ʔ] with [w] and [y] is not immediately transparent. The laryngeal consonants are notoriously slippery when it comes to phonological classifications. They are unique in the consonant world because they lack an oral place node. Sometimes they behave like sonorants but sometimes they do not. The facts of the Persian alternations are straightforward. Thus, *describing* this alternation is simple, but OT demands a typologically motivated constraint to *explain* this alternation. The classical notation easily allows *ad hoc* rules without expressing the true phonological motivation behind such alternations.

For the solution, I hereby invoke the constraint: LAZY. Ironically, LAZY is the product of a diligent dissertation by Robert Kirchner (1998). He says that there is "a phonetic imperative to *minimize articulatory effort:* lenition is characterized as substitution of a less effortful set of gestures" (Kirchner 1998:3). Basically, he says that all things being equal, glides and liquids take less effort to pronounce than other consonants. On a scale of lenition only vowels take less effort than glides. Cross linguistically, the intervocalic position proves to be fertile ground for the process of lenition. This is due to the common process of spreading or assimilation. And it is the intervocalic position where we find this alternation of [h] and [ʔ] with [w] and [y].

Consonant fortition is much less common in intervocalic positions than lenition. Thus, we find the speaker of Deliberate Persian confronted with two unacceptable phonemes in intervocalic positions: [h] and [ʔ]. His language's syllable structure and his intuition let him know that these segments are consonants, but now he is left with the responsibility of realizing them phonetically. The intervocalic position guides him toward lenition and voicing. The glides prove a useful option. They take the least amount of effort and remain perceptually closer to the laryngeals than other manners of articulation. He effortlessly produces the sounds with the +/-RDSPREAD constraints guiding him to the proper approximant.

(D and C) LAZY >> +RDSPREAD >> -RDSPREAD

input: /dæˈhɔm /	LAZY	+RDSPREAD	-RDSPREAD
1. ☞ dæˈwɔm			*
2. dæˈyɔm		*!	
3. dæˈxɔm	*!		
4. dæˈsɔm	*!		
5. dæˈtɔm	*!		

(D)LAZY >> +RDSPREAD >> -RDSPREAD

input: /nɛˈhæŋg/	LAZY	+RDSPREAD	-RDSPREAD
1. ☞ nɛˈyæŋg			
2. nɛˈwæŋg		*!*	
3. nɛˈkæŋg	*!		
4. nɛˈnæŋg	*!		
5. nɛˈdæŋg	*!		

The Colloquial speech variety does not allow unstressed, [-low] vowels next to glides. Max-IO is higher ranked in Deliberate than in Colloquial. Note the contrast in the order of MAX-IO:

(C) $C_{[oral]}$>> *$V_{[-low]}$ >> MAX-IO

input: /muˈhɛm/ 'important'	$C_{[oral]}$	*$V_{[-low]}$	MAX-IO
1. ☞ ˈmwɛm		*	*
2. muˈwɛm		**!	
3. muˈhɛm	*!	**	

(D) MAX-IO >> $C_{[oral]}$>> *$V_{[-low]}$

input: /muˈhɛm /	Max-IO	$C_{[oral]}$	*$V_{[-low]}$
1. ☞ muˈwɛm			*
2. muˈhɛm		*!	**
3. ˈmwɛm	*!		*

4.2 Ranking Summaries

The following table summarizes the constraint ranking hierarchy for Formal, Deliberate, and Colloquial Persian. The re-ordering of just three constraints accounts for the differences in these versions of Persian. These constraints (shown in bold) are MAX-IO, IDENT-IO, and *σ[CC.

Formal Persian	Deliberate Persian	Colloquial Persian
MAX-IO **IDENT-IO** $C_{[oral]}$ (IDENT-$V_{[+stress]}$) LAZY +RDSPREAD -RDSPREAD ***σ[CC** *$V_{[-low]}$ *$V_{[+tense]}$ DEP	**MAX-IO** $C_{[oral]}$ IDENT-$V_{[+stress]}$ LAZY +RDSPREAD -RDSPREAD ***σ[CC** *$V_{[-low]}$ *$V_{[+tense]}$ **IDENT-IO** DEP	$C_{[oral]}$ IDENT-$V_{[+stress]}$ LAZY +RDSPREAD -RDSPREAD *$V_{[-low]}$ *$V_{[+tense]}$ **MAX-IO** **IDENT-IO** DEP ***σ[CC**

4.3 Monster Tableaux

4.3.1 Deliberate Persian

input: /ʃiˈrin/	MAX-IO	$C_{[oral]}$	IDENT-$V_{[+stress]}$	LAZY	+RD SPRED	-RD SPRED	*σ[CC	*V [-low]	*V [+tense]	IDENT-IO	DEP
1.☞ʃɛˈrin								**	*	*	
2. ʃiˈrin								**	**!		

input: /dræxt/	MAX-IO	$C_{[oral]}$	IDENT-$V_{[+stress]}$	LAZY	+RD SPRED	-RD SPRED	*σ[CC	*V [-low]	*V [+tense]	IDENT-IO	DEP
1.☞ dɛˈræxt								*	*		*
2. ˈdræxt							*!		*		
3. deˈræxt								*	**!		*
4. dɔˈræxt						*!		*	*		*

input: /muˈhɛm/	MAX-IO	$C_{[oral]}$	IDENT-$V_{[+stress]}$	LAZY	+RD SPRED	-RD SPRED	*σ[CC	*V [-low]	*V [+tense]	IDENT-IO	DEP
1.☞ muˈwɛm						*		**	*	*	
2. muˈhɛm		*!						**	*		
3. ˈmwɛm	*!				*	*	*	*		*	
4. muˈyɛm					*!			**	*	*	
5. muˈtɛm				*!				**	*	*	

4.3.2 Colloquial Persian

input: /ʃiˈrin/	C[oral]	IDENT-V[+stress]	LAZY	+RD SPRED	-RD SPRED	*V [-low]	*V [+tense]	MAX-IO	IDENT-IO	DEP	*σ[CC
1.☞ʃɛˈrin						**	*		*		
2. ʃiˈrin						**	**!				

input: /dræxt/	C[oral]	IDENT-V[+stress]	LAZY	+RD SPRED	-RD SPRED	*V [-low]	*V [+tense]	MAX-IO	IDENT-IO	DEP	*σ[CC
1. dɛˈræxt						*!	*			*	
2. ☞ ˈdræxt							*				*
3. deˈræxt						*!	**			*	
4. dɔˈræxt					*!	*	*			*	

input: /muˈhɛm/	C[oral]	IDENT-V[+stress]	LAZY	+RD SPRED	-RD SPRED	*V [-low]	*V [+tense]	MAX-IO	IDENT-IO	DEP	*σ[CC
1. muˈwɛm					*	**!	*		*		
2. muˈhɛm	*!					**	*				
3. ☞ ˈmwɛm					*	*		*	*		*
4. muˈyɛm				*!		**	*		*		
5. muˈtɛm			*!			**	*		*		

5. Conclusion

The alternations in the various speech forms in Kabul, Afghanistan can be explained in terms of OT constraints. The Formal Afghan Persian ranks faithfulness constraints extremely high. Colloquial takes the most liberty in moving certain markedness constraints to be more prominent than certain faithfulness constraints. The Deliberate speech variety falls somewhere in between. The Deliberate follows the formal

and ranks MAX-IO as the top constraint. But the Deliberate is like the Colloquial in its low ranking of IDENT-IO.

The constraint against complex onsets is ranked very low in the Colloquial compared to the Formal and Deliberate. This seems to be motivated by the odd asymmetry of consonant clusters in Persian. In the Formal Persian, consonant clusters are prohibited in syllable onsets, but are very common in codas. The typological prediction would be for the other way around. The Colloquial speech form seems to move toward allowing consonant clusters in both codas and onsets.

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