Phonological Adaptation of Arabic Loan Words in Persian: Consonants

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Abstract

The purpose of the research is to study the phonological adaptation of Arabic loanwords in Persian, on the focus of consonants which their articulators are inactive in Persian. Authors gathered 700 Arabic loan words from Persian Dictionary of Moienand then they extracted phonemic form of loan words from two Arabic dictionaries, Contemporary Arabic – Persian Dictionary and Assimil FranXais- Arabe Dictionary. The framework of the study is OT (Optimality Theory). The findings of the study is that interdental, pharyngeal, and bilabial glide places of articulation are inactive articulators in Persian and Persian language speakers replace loan words containing these consonants with the closest consonants in terms of place of articulation.

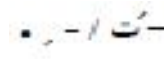**Keywords:** Loanword, Arabic, Persian, phonological Adaptation, Optimality Theory

1. *Introduction*

Speakers of each language loan words from the other languages in different reasons. Borrowing the words is a common and unavoidable phenomenon that is closely related with relation of different linguistic communities. Persian language is not an exception. After entering Islam in Iran and locating various Arab language groups in different regions, Persian language borrowed many words from Arabic language. According to Sadeghi (2007) Persian Arabic words made up 25-30 percent of the words in Persian language in the fourth century, while it reached to 50 percent in the sixth century. Generally speaking, the loan words are pronounced the same way in the borrower language after adjusting with the sound system of the language (Safavi, 2001). In relation with phonology of loan words, linguistic mechanisms governing on adaptation of loan words is important. Authors of this paper gathered 700 Arabic loan words from Moein Dictionary and then they extracted phonemic form of loan words from two Arabic dictionaries, Contemporary Arabic – Persian Dictionary and Assimil FranXais- Arabe Dictionary. They studied adaptation of Arabic consonants in these loan words using Optimality theory framework. About 60 loan words out of 700 data are presented in the paper body.

Two points were considered in their selection; first, the most common loan words are mentioned in data table, second, data related to each consonant are selected in such a way that consonant under study is present in all syllable situations. Transcription system of the words in this research is based on International Phonetic Alphabet (IPA).

2. *Review of Literature*

Many works have been written in Persian regarding Arabic language phonology. However, there are a few sources concerning change and evolution of Arabic loan words' adaptation in Persian language. One work in this

topic is *Semantic Difference between Two Types of Morpheme* مُـ ـ / ـتُـ ـ *in Persian* by A'lam (1991). The author attempted to introduce lexical – semantic difference of the Arabic loan words which are different in Persian and Arabic languages in terms of pronunciation and spelling. Here is an example: Arabic word "مراجعه" means "Return" in Persian if it is as "مراجعت" and it means "seeking something/someone aiming at demanding it" if it is as "مراجعه". He gathered almost 37 pairs of such words and gave some results including classification of the words in terms of writing in literary and colloquial Persians. Sadeghi (1991) in a paper entitled *About Arabic Words Ending to a, e, and at* studied findings obtained from A'lam's work. He supported some findings and presented counterexamples in some cases. In the other work entitled *Some Unknown Changes of Arabic Words in Persian Language*, Sadeghi (1994) investigated phonological and morphological changes of Arabic loan words in Persian language. According to Sadeghi, these changes were overlooking by some researchers and lexicographers. Sadeghi (2007) also examined effect of Arabic language on phones of Persian language. He investigated originality of consonants /ʁ //ʒ// ħ//G/ in Persian and Arabic languages.

3. *Theoretical Framework*

Optimality theory was presented in 1993 in the handwriting of the Prince and Smolensky as "Optimality Theory: Constraint Interaction in Generative Grammar". This work was published in 2004. Approach of this theory is the basis in all areas of constraint language and it had the most effect on generative phonology (Rasekh Mahand, 2004). Optimality theory deals with a collection of constraints instead of rules. Output in this theory results from interaction between a set of universal constraints which can be violated. Constraints interact with each other and in order to respect one constraint, the other one should be violated and there is no linguistic form that all constraints can satisfy with (Dabir Moghadam, 2004). Universal grammar in optimality theory contains a section entitled Constrains which includes all constraints of the languages. Constraints are universal and the only systematic differences in languages are in ranking of the constraints. Underlying representations and their surface realization in generative theory are used as input and output in optimality theory. Because of lack of assuming intermediary levels, adaptation of input and output is immediate and direct (Kager, 1999). McCarthy (2008) shows general pattern of optimality theory as follows. These parts in addition to a set of universal constraints (CON) make up grammatical formation of optimality theory.

Input → [Generator] → Candidates → [Evaluato-] → Output
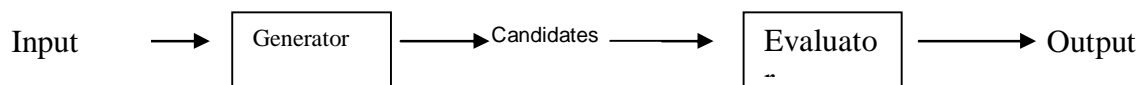
Pattern 1: General Pattern of Optimality Theory

Generator is a formal mathematical and universal mechanism, function of which is connecting input and output. It generates some competing output candidates from the input. The number of candidates can be infinite theoretically (McCarthy, 2002). Evaluator is also a formal mathematical mechanism which connects input and output in such a way that after generation of competing candidates, they are delegated to the evaluator so that it specifies the optimal candidate after imposing constrains (McCarthy, 2008; Kager, 1999). There are two sets of constraints in optimality theory; Faithfulness constraints and Markedness constraints. Markedness constraints evaluate the structural well-formedness of the output and have no access to output and it is blind to output. These constraints punish any mall-formedness. Faithfulness constraints monitor match between input and output and have access to levels, input and output. These constraints punish any difference between input and output candidates (McCarthy, 2004; Kager, 1999).

It should be noted all languages are common in universal constraints. The only difference in languages is in the way of ranking the constraints which cause higher rank for a specific constraint in one language and thus it is active, while it may have much lower rank in the other language and thus it is potentially active and has no important effect on determining output forms (Kager, 1999).

4. *Persian And Arabic Phonology Systems*

4.1. Arabic Language Phonology System

Arabic language has 28 consonants and three pairs of vowels. Some consonants in Arabic language have Secondary Articulation as distinctive feature. In Secondary Articulation, one frictionless feature is added to one of articulations of consonants. That is, another feature is added to the primary articulation (Catford, 1992; Ledfoge, 1982). Velarization or Pharyngealization is secondary articulation in Arabic language. Velarization is a term applied on the consonants articulated with the back of the tongue touching or near the soft palate. In fact, it is touching soft palate in consonant which its articulation place is not soft palate (HaghShenas, 1997). Catford (1992) considers Velarization as constriction of pharynx and rising of the tongue which occurs in laminal (coronal) consonants. Consonants of [tˤ sˤ ðˤ, ðˤ] (equivalent to ظ، ض، ص، ط) are among laminal consonants[1]. Arabic consonants can be observed in Table 1 (based on IPA) according to the manner and place of articulation.

Arabic vowel system contains three vowel pairs including two high vowels and one low vowel. The assumption that Arabic language includes three vowels means the real and distinctive number of vowels in this language is three vowels [u, i, a]. In fact, these vowels are the most frequent vowels in Arabic language (Khodabakhshi, 2007).

It should be noted short form of high vowels is also shown in this table. At phonemic representation level of Arabic language syllable, four forms of syllable patterns can be observed: CV:, CV, CV:C, CVC. If syllable value before silence is accepted in phonological representation of this language, two other syllable patterns can also be considered: CVCC, CV:CC (Khodabakhshi, 2007).

4.2. Persian Language Phonology System

Persian language includes 23 consonants and 6 vowels. Syllable is made as phonological underlying (C)V(C)(C) form or as (and in phonetic) phonological in articulatory as CV (C)(C) form in this language (Kamboziya and Hadiyan, 2009). Table 3 gives Persian language consonants according to the manner and place of articulation.

Persian language vowels are classified intro two natural classes: [a, e, o] vowels with [- long] feature and [i, u, A] vowels with [+ long] feature (Kambozia and Hadian, 2009). Persian language vowels are shown in Table 4 based on IPA.

5. *Data Analysis*

Phonological changes in adaptation of Arabic loan words in Persian language are investigated in this section.

5.1. *Replacing Arabic Interdental Consonants /θ/and /ð/ with alveolar Persian Consonants / s / and / z / ; θ → s and ð → z*

Persian language lacks Interdental consonants. In other words, this part of speech organ is inactive in this language and there is no such place of articulation. Thus, in confrontation with loan words with this class of consonants, the closest consonants in terms of the manner and place of articulation (S, Z) are replaced. Table (5) are examples of loan words with these consonants.

If it is to draw optimality picture in adaptation of loan word /ʔa:Ta:r/, some constraints are faced. Hierarchy of occurrence of the constraints is as follow[2]:

ONS>> Long front low V >>*Int- Dent Cons>> IDENT [place]>> MAX>>DEP

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[1] . Discussion on Velarization, Pharyngelized state or uvular state of these consonants is controversy among linguists which is not in the scope of this paper. Interested readers are referred to thesis by Khodabakhshi (2007) entitled Intonation: a Description in Generative Phonology Framework, Islamic Azad University, Central Tehran Branch.

[2] . Since the kernel of syllable is a vowel position, hierarchy of occurrence of constraints is set based on the constraints affecting vowels.

Tablue 1shows effect of above constraints in selection of optimal candidate:

Input: /ʔa:Ta:r/	*ONS	*Long central low vowel	*Int-Dent Cons.	IDENT[V Quantity]	IDENT[place	MAX
[ʔa:Ta:r]		**	*			
[a:TAr]	*!	*	*		*	*
☞ [ʔAsAr]					***	
[ʔasar]				**		**

Tablue 1

Generator generates 4 candidates from input /ʔa:θa:r/. The candidate violates a markedness constraint which is articulation of interdental consonant, because this part of speech organ is inactive in Persian language. On the other hand, presences of length feature in [a:] is the other markedness constraint in Persian language. Persian language has six vowel systems and each position of articulation is used only for articulation of one vowel. These six Persian vowels are classified to long and short vowels in terms of phonology. Shortness and longness of the vowels in Persian language does not reflect any contrast, since they are in contrast in terms of quality and this factor suffices for distinguishing so that difference in extension is considered as redundancy (Kambozia, 2006). Thus, this candidate is excluded. In Persian language, front low vowel is considered as short vowel, while in Arabic language, both short and long vowels are articulated in this position and it violates markedness constraint of *Long front low vowel. Since phonological system of Arabic and Persian language prohibits syllables without an onset, *ONS markedness constraint which prohibits syllables without a onset (Prince and Smolensky, 2004) is violated only by the second candidate and it is not effective about other candidates.

On the other hand, this candidate violates two other constraints and thus it is excluded from the competition. The third candidate suggests optimality of the candidate. Reason for optimality of this candidate is that it does not violate any high-rank constraints and overall violates faithfulness constraint of place of articulation for /θ/and /a:/ as three times. This constraint is not a high-rankconstraint. On the other hand, this candidate meets high-rankconstraints such as presence of onset in the syllable, interdental consonants and vowel lengthening. Thus, it is the optimal candidate or output. The other candidate which may be generated by the generator is one that meets two high-rankconstraints; i.e. presence of onset in the syllable and absence of interdental consonant. In addition, it should meet constraint of absence of vowel lengthening by eliminating the stretch. However, eliminating the vowel lengthening violates faithfulness constraint of preserving vowel quality (IDENT[V Quantity]). It is the constraint, violation of which leads to ambiguity of the term with its single form [asar]; in addition two other faithfulness constraints, place of articulation and Counter elimination, are also violated and possibility for its optimality is lost. Consonant /ð/ is the other Arabic language interdental consonant with voiced chracter.exapmles of this consonat in different positions of syllable in the loan words were observed in Data 1. Tablue 2 shows the word "ابتذال" in optimality tablue and the way of competition among generator canidates in obtaining optimality position. Order of effective constranits in this competition is as follows:

ONS>> Long central low V, *High short V>> *Int-Dent Cons>> IDENT [place]>> MAX

Three first constraints are markedness constraints and two last constraints are faithfulness constraints. Input /ɪbtɪða:l/ in generator leads to generation of five candidates shown in Table 2.

| Input: /ɪbtIΔa:l/	*ONS	*Long central low V.	*High short V	*Int-Dent cons	IDENT[place]	MAX
1. [ɪbtɪða:l]	*!	*	**	*		
2. [ʔɪbtɪða:l]		*	**	*		
3. [ʔɪbtɪðal]			**	*	*	
4. [ʔebteðal]				*	***	*
☞ [ʔebtezal]					****	

Tablue 2

As observed in the table, the generator generates five candidates which compete with six constraints. The first candidate violates first constraint with having syllable without onset and it deserves punishment. It should be noted title in this Arabic word is of connected tittle type, since consonant with glottal occlusion are not among three main letters of this word, this candidate violates three markedness constraints; presence of stretch in the vowel (*Long central low V.), prohibition of presence of high short vowel /I/ (*High short V.), and interdental (voiced) consonant (*Int-Dent cons). The second candidate with consonant with glottal occlusion meets the first constraint, but it violates constraints of interdental consonants and long central low vowel and high short vowel. As mentioned, Persian language with six vowels, three long vowels and three short vowels, does not allow presence of stretching in the vowels (Kambozia, 2005). The constraint (*High short V) suggests the same fact. All three constraints are of markedness constraints.

Thus, candidate 2 is prohibited due to two violations of the second constraint which is a high-rank constraint, and it cannot be selected as optimal candidate. It is noted that dotted line between two constraints *Long central low V and *High short V suggests both constraints are in the same rank. It can be observed also in linear order of the constraints. Considering constraint of onset is ineffective about other candidates, it is ignored. Candidate 3 meets second constraint, *Long central low V, with replacement of Persian long low vowel/ɑ/ with low stretched vowel /a:/ in Arabic language. But it violates constraint of presence of voiced interdental consonat /ð/ and this candidate is punished. This candidate also violates constrant of *High short V with vowel /I/. candidate 4 meets short high vowel constraint with changing place of articulation of high soft vowel /I/ and turninig it to vowel /e/ in persian language. Since as mentioned, in six-vowel system of persian language, only one vowel is articualted from each positino. However, this cadidtae should be punsihed due to violating interdnetal consonant constraint and it is excluded from the competititon. The other candidate generated by the generator is candidate 5. It meets*Int-Dent constraint by repalcing alveolar fricative consonant /z/ instead of Arabix interdental consonant /ð/. This candidate does not violate any markedness constraint and it only violates two faithfulness constraints which have low-order, thus, it is the winner of the competititon.

5.2. Replacement of Arabic Pharyngeal Fricative Consonant /∂/with Persian Glottal Plussive Consonant /ʔ/ ∂ →ʔ

Consonant /∂/in Arabic language is produced by drawing back the root of tongue toward pharynx and it is produced as fricative sound (Khodabakhshi, 2007). There are many Arabic loan words in Persian languages which contain /∂/consonant, some of which are given in Table 6.

The word "معين" is selected for investigating its adaptation in Persian language. Four candidates generated by the generator are discussed here.

Input: /muʕajjan/	* Hiatus	*Short high V	*Pharyngeal Cons.	MAX	IDENT [place]	IDENT [manner]
1. /muʕajjan/		*	*			
2. /muajjan/	*!	*		*		
3. /muʔajjan/		*			*	
4. ☞/moʔajjan/					*	*

Tablue 3

The first candidate not only violates short high vowel constraint, but also violates the other markedness constraint with having pharyngeal consonant /∂/. This candidate cannot be the optimal candidate. The second candidate meets pharyngeal consonant constraint with eliminating it. But it violates the other high-rank constraint known as (*Hiatus). Because onset of the second syllable becomes void by elimination of consonant /ʕ/and kernel of two syllables are put beside each other, which universal constraint of Hiatus is violated. On the other hand, anti-elimination faithfulness constraint is violated by elimination of pharyngeal consonant /ʕ/. Thus it is not optimal candidate. The third candidate meet constraint of pharyngeal consonant with replacing glottal consonant / ʔ/ which has the closest distance to the place of articulation of Arabic pharyngeal consonant /ʕ/, and it violates low-rank faithfulness constraint of articulation way. It also violates *Short high V constraint. Since this constraint from markedness constraints is higher than faithfulness constraints, it cannot be the optimal candidate compared to the last candidate.

The fourth candidate not only meets constraint of pharyngeal consonant/ʕ/ with repacing with glottal consonant /ʔ/, but also meets both constraints by changing place of articulation of short high vowel /ʊ/ to central vowel /0/ in Persian, and violates faithfulness constraint of place of articulation (IDENT [place]) and violates manner of articulation. These two constraints are low-rank and although fourth candidate violates them, it is most fitted to phonological system of Persian language; thus it is selected as the optimal candidate or output.

5.3. Replacement of Arabic Fricative Pharyngeal Consonant /ħ/with Persian Fricative Glottal Consonant /h/ ħ → h

Consonant /ħ/ is a fricative pharyngeal consonant in which the tongue root is drawn back in its articulation (Khodabakhshi, 2007). Place of articulation of this consonant is void in table of Persian consonants. It means that its place of articulation is not active in this language, thus, Persian language utilizes a mechanism for adaptation of Arabic loan words in Persian. Table 7 shows loan words with this consonant.

The word "صلح" is selected for investigation of its adaptation in Persian language within optimality framework. The generator creates a set of candidates, four of which are examined in the following table.

Input: / s ʊlħ/	*Short high V /Y/	*Pharyngeal Cons	* Velarized Cons	IDENT [place]	MAX
1. [s ʊlħ]	*!	*	*		
2. [sʊlħ]	*!	*			*
3. [solħ]		*		*	*
4. ☞[solħ]				*	*

Tablue 4

The first candidate is [s ʊlħ] which violates two first constraints with the same rank. It contains velarized consonant /S / and pharyngeal consonant /ħ/. While this candidate violates short high vowel constraint and it causes punishment of this candidate. The next candidate meets the constraint of consonant with velarization secondary articulation by eliminating velarization feature from consonant/S /. However it violates *Short high V /Y/ constraint and first high-rank constraint with consonant /ħ/. This candidate not only violates seriously, but also it violates two other constraints too and it cannot be the optimal candidate. The third candidate meets two constraints; velarized consonant and change in short high vowel place of articulation. But it violates two faithfulness constraints; anti-elimination and vowel articulation place preservation. Of course, this candidate violates markedness constraint and two faithfulness constraints with presence of pharyngeal consonant /ħ/. Thus, it is excluded. The last candidate, [solh] meets constriants of velarized consonant and short high vowel like the third candiate. In addtion, it meets also constriant of fricative pharyngeal consonant with replacing glottal fricative consonant /h/ which has the closets place of articulation with fricative pharyngeal consonant /ħ/. This candidate meets three markedness constraints and violates two faithfulness constraints; anti-elimination (MAX) and place of articulation (IDENT [place]), which are low-rank constraints. This candidate is the optimal candidate due to meeting high-rank constraints.

5.4. Replacement of Arabic Voiced Velar Fricative Consonant /ʁ/ with Persian Voiced Plosive Velar Consonant /G/ ʁ→ G

The other consonant which was studied is consonant /ʁ/which is a voiced velar fricative consonant. Its place of articulation is velum and since velum is the boundary between the oral cavity and pharyngeal (Catford, 1992), the sounds that their place of articulation is velum may belong to the oral cavity or pharyngeal cavity depending involvement of the tongue body or root. Consonant /ʁ/is articulated by root of tongue in Arabic language, while tongue root in velum is not an active place of articulation in Persian and Persian phonological system should adapt them in confrontation with Arabic words containing this consonant. Table 8 shows a set of Arabic words. The word "غلام" is selected for investigating its adaptation in Persian language and it is shown in Tablue 8.

Input: /ʁʊlaːm/	*ONS	* Short high V	*long front low V	*Pharyngeal Cons	MAX	*DEP	IDENT [place]	IDENT [manner]
1. [ʁʊlaːm]		*	*	*				
2. [ʊlaːm]	*!	*	*		*			
3. [Gʊlaːm]		*	*					*
4. [Golaːm]			*				*	*
5. [Gulam]						*	**	*
6. ☞[Golɑm]							**	*

Tablue 5

Generator generates some candidates using input /ʁYlaːm/, six of which are investigated here. The first candidate violates three markedness constraints; short high vowel, vowel lengthening, and pharyngeal consonant, since it contains short high vowel /Y/, long front low vowel /aː/, and pharyngeal consonant /ʁ/. This candidate deserves punishment because of violating higher-rank constraints. The second candidate meets pharyngeal consonant constraint by eliminating pharyngeal consonant/ʁ/. However, it violates high-rankconstraint of *ONS. It also violates two other constraints, long front low V and * Short high V. it should be noted faithfulness constraint of anti-elimination is after constraint of pharyngeal consonant in hierarchy of constraints for this adaptation, because adaptation of this loan word is not common in this way conceptually the second candidate is also excluded from the competition. The third candidate meets constraint of pharyngeal consonant by replacing Persian plosive velar consonant /G/ with pharyngeal consonant /ʁ/ which has the most fit and closest place of articulation with it. However, two other markedness constraints are violated, since it contains short high vowel /Y/ and long front low vowel /aː/. It violates faithfulness constraint of articulation manner with replacing /G/. Considering the scope of constraints which it violates, it cannot be the optima candidate. In the fourth candidate, change in place of articulation of short high vowel /Y/ is observed which is replaced with central back vowel /o/ and it meets * Short high V constraint. It violates markedness constraint with vowel lengthening /aː/. It violates*long front low V markedness constraint and violates two faithfulness constraints, i.e. place and manner of articulation and it is not suitable for being selected as the optimal candidate. The fifth candidate meets *long front low V constraint by replacing Persian long vowel /ɑ/, but it turns short high vowel /Y/ to log back high vowel /u/ by inserting length feature to the former and thus it violates anti-insertion constraint. Considering the number of constraints and the orders of constraints it violates, it is not the optimal candidate. [Golam] is the optimal candidate as shown in the tablue. It meets all higher-rank constraints and violates only two low-rank constraints, IDENT [place]and IDENT [manner].

5.5 Replacement of Arabic Bilabial Glide /w/ with Persian Labiodental Consonant /v/; w →v

Glide /w/ is a sound which is articulated with rounded lips and at the same time the tongue body is raised toward velum (Catford, 1992; Khodabakhshi, 2007). There are only three consonants with bilabial place of articulation in Persian language: /m/, /b/, and /p/, and articulation of glide consonant /w/ is not allowed in phonetic system of Persian language. In confrontation with loan words containing this consonant, Persian language imposes some constraints for their adaptation. Table 9 shows 10 loan words with consonant /w

The word "مواظب" /mʊwaːðɪb/ is put in optimality table and constraints imposed by Persian language for its adaptation are investigated.

Input: /moʊwa:ðIb/	*ONS	*Hiatus	*Short high V	*long front low V	DEP	*bilabial glide	*Velarized Cons.	*Int-Dent Cons.	MAX	IDENT [Place]
[moʊwa:ðIb]			**	*		*	*	*		
[mowa:ð̱eb]				*		*	*	*		**
[mova:ð̱eb]				*				*	*	**
[muvAzib]					**				*	**
☞[mo.vAzeb]									*	****
[mo.Azeb]	*!	*							**	***

Tablue 6

The first candidate violates two markedness constraints related to the vowels and three constraints related to the consonants and it deserves punishment. In other words, this candidate violates all markedness constraints except one. [mowa:ðeb] is the next candidate which meets *Short high V constraint twice by changing place of articulation of short high vowels to Persian central vowels. However, it still violates constraints of bilabial glide, velarization and interdental consonant and presence of long front low vowel /a:/. The third candidate meets short high vowels constraints. It also replaces bilabial glide /w/ with voiced fricative labiodental consonant so that it can meet one of consonant constraints. On the other hand, it also considers the other constraint by eliminating velarization feature from consonant /ð/. Of course, it violates faithfulness constraints of articulation place and anti-elimination by meeting the previous constraints. However, it cannot be the optimal candidate, because it violates interdental consonant markedness constraint and violates constraint of long front low vowel. The fourth candidate, [muvAzib], meets two constraints related to the consonant by replacing alveolar fricative consonant /z/ with velarized interdental consonant /ð/ On the other hand, it also meets *long front low V constraint by replacing long front low vowel /a:/ with Persian back low vowel /ɑ/. It meets short high vowel constraint by inserting stretch feature to two short high vowels; however, it violates faithfulness constraint of anti-insertion. Statistics obtained from this research study indicate all loan words containing two short high vowels /I/ and /Y/ change place to central vowels /e/ and /o/ which are identical in terms of back feature. Fifth candidate meets all high-rankmarkedness constraints and it only violates faithfulness constraints of anti-elimination and place of articulation by four times; both constraints are low-rank. Thus it is selected as the optimal candidate. The last candidate meets * bilabial glide constraint by eliminating bilabial glide, but it violates high-rank*ONS constraint which is serious violation. Thus, constraint of vowel combination is also violated. In addition, this candidate violates faithfulness constraints

5.6 Elimination of Arabic Final Glottal Consonant /ʔ/ in Persian

Consonant /ʔ/ has glottal place of articulation and it is articulated in plussive manner (Khodabakhshi, 2007). According to Khodabakhshi (2007, quoted in Ibrahim Ins and Kamal Bashar, 1420 and Daniel Jones, 1950), plussive glottal is neither voiced nor voiceless. Presence of this consonant at the end of some words in Arabic language, which were borrowed in Persian language, cause attempt for their adaptation in Persian. Followings are words with this consonant.

Table 10 is drawn for investigating adaptation of these words in Persian language within framework of the respective constraints.

Input: /ʔa:ra:ʔ/	* Long front low V	*final /ʔ/	MAX	IDENT[place]
[ʔa:ra:ʔ]	*!*!	*		
[ʔArAʔ]		*		**
☞[ʔArA]			*	**

Tablue 7

The word "آراء" /ʔa:ra:ʔ/ is selected for this process. The generator creates the first candidate which violates high ranked constraint of long front low vowel as twice, which is a fatal violation and deserves punishment. Of course, this candidate also violates constraint of final /ʔ/ (*final /ʔ/).
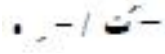
Constraint of final /ʔ/ was created since 100 words out of 700 loan words contain final /ʔ/, that their final ʔ is eliminated in today Persian language and it is emergent when affixes are added. The second candidate meets constraint *Long front low V by replacing Persian long back low vowel instead of vowel /a:/, but it violates high-rank constraint of *final /ʔ/ therefore, faithfulness constraint of place of articulation by meeting long front low vowel is violated, too. The third candidate does not violate any markedness constraints and it only violates two faithfulness constraints, anti-elimination and place of articulation. It is the optimal candidate and it is the winner of the competition.

6. Findings

It can be concluded that interdental, pharyngeal, and bilabial glide places of articulation are inactive articulators in Persian and Persian language speakers replace loan words containing these consonants with the closest consonant in terms of place of articulation. In addition, glottal plussive consonant /ʔ/ is eliminated from the end of words having it. Diagram (1) shows a summary of the rate of frequency of the phonological rules happen in adaptation of the studied loanwords diagrammatically.

7. References

A'lam, H. (1991): Semantic Difference between two types of morpheme   (-at, -e) in Persian, Journal of Linguistics, volum VII, No. 2, Autumn and Winter, pp. 21-31.

Haghshenas, A.M. (1997): Phonetics, Agah Publication: Tehran.

Khodabakhshi, M. (2007): Tajweed: a description within the framework of generative phonology, unpublished M.A Thesis, University of Tehran.

RasekhMahand, M. (2004): Introduction and reviews on optimality theory in Persian, Journal of Linguistics, Vol. 19, No. 1(34), pp. 42-66**.**

Sadeghi, A.A. (1991): About Arabic words ending to *-a, -e*, and *-at*, Journal of Linguistics, Vol.VII, No. 2, Autumn and Winter, pp. 32-43.

------------. (1994): Some unknown changes of Arabic words in Persian language, Journal of Linguistics, Vol XI, No. I, Spring and Summer, pp. 2-11.

-------------. (2006): Evolution of Arabic [P] (غ)in Persian, Arabic, Journal of Linguistics, Vol. 21, No. I and II, pp. 3-32.

------------. (2007): Influence of Arabic language on Persian-language Voices, Academy of Persian Language and Literature, Tehran.

Safavi, K. (2001): Semantics, Hermes Publication: Tehran.

Ghayem, A. (2011): Contemporary Arabic – Persian Dictionary, tenth Edition, Farhang-e-Moa'ser Publication: Tehran.

Kamboziya, A. (2005): Phonology of rule-based approaches, SAMT Publication: Tehran.

--------------------. (2006): Review and modification of the article by Mohammad Reza Majidi and Elmar Turner, Journal of Language and Linguistics, No. II, pp. 109-118.

--------------, Hadian, B. (2009): Natural classes of vowels in Persian, Persian Language and Literature Research, No. 15, Winter, pp. 117-144.

------------------, Hashemi, E.S.(2011):Russian Loanword Adaptation in Persian: Optimal Approach, Iranian Journal of Applied Language Studies, Vol.3, No.1, pp.77-96.

Moein, M. (1997): Moein Persian Dictionairy, six-volume, Eleventh Edition, Amir Kabir, Tehran.

Catford,J.C., (1992), A Practical Introduction to Phonetics, Oxford university press,UK.

Kassis, Nazih, JeriesKhoury, (2002), Assimil FranXais- Arabe, Arabe - FranXais,AssimilKernerman, France.

Kager, R.(1999), Optimality Theory, Cambridge: Cambridge University Press.

McCarthy, J.J.(2008), Doing Optimality;applying Theory to data,UK: Blackwell.

-----------------(2004), Optimality Theory in Phonology, A Reader, UK: Blackwell.

-----------------(2002), A Thematic Guide to Optimality, Cambridge: Cambridge University Press.

Ladefoged, peter,(2003), A course in phonetics, blackpool, UK.

Prince, A. and P.Smolensky,(2004), Optimality Theory: Constraint Interaction in Grammar, UK: Blackwell.

8. Tables

Table 1: List of Arabic Consonants According to Manner and Place of Articulation (Khodabakhshi, 2007)[3]

manner and place of articulation		Lip		Coronal (Tongue blade)				Dorsal (tongue body)			Radical (Tongue root)		Glottal
		Labio-dental	Bilabial	Interdental	denti-alveolar	Alveolar	Alveolo-palatal	Palatal	Velar	Uvular	Uvular	Pharyngeal	Laryngeal
obstruent consonants	Stop	b			t d				K	q			ʔ
	Velarized plusive				ṭ								
	Fricative		f	θð		s z	ʃ				χʁ	ħ ʕ	h
	Velarized fricative			ð̣	Ẓ	Ṣ							
	affricates						dʒ						
sonorant consonants	Nasal	m				n							
	Lateral					l							
	Trill					r							
	Glide	w						j					

Table 2: Arabic language vowels
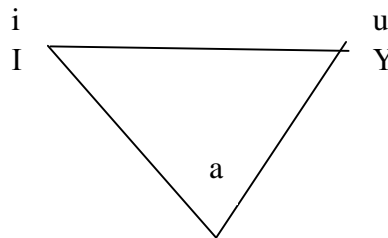
Table 3: Persian Language Consonants (Kambozia , 2007)

manner and place of articulation	Bilabial	Labiodental	Dental	Alveolar	Alveolo-palatal	Palatal	Uvular	Glottal
Stop	p b		t d			c ɟ	G	ʔ
Nasal	m			n				
Fricative		f v		s z	ʃʒ		χ	h
velar affricatives					tʃdʒ			
Trill				r				
Glide						j		
Lateral				l				

Table 4. Persian Language Vowels (Kambozia and Hashemi, 2011)

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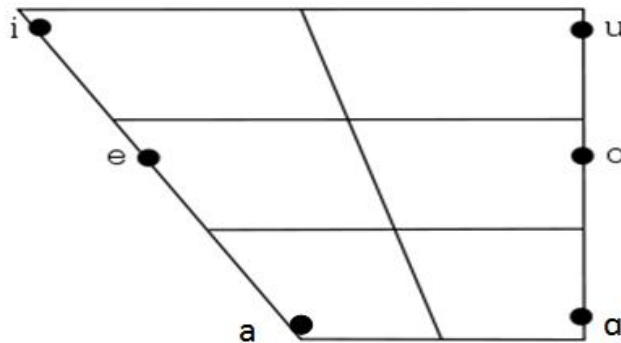
[3] . With some modification

Table 5. Arabic Loan Words with Consonants /Ɵ/and /Ð/

Meaning	Loanword	TL Phonetics	SL phonology
Works	آثار	[?AsAr]	/?a:Ta:r/
Vicious	آثم	[?Asem]	/?a:TIm/
Heir	وارث	[vAres]	/wa:rIT/
Trusting	وثوق	[vosuG]	/wYTuq/
Tarnish	لوث	[los]	/lYwT/
Affective	موثر	[mo?aser]	/mY?aTIr/
Effect	تاثیر	[ta?sir]	/ta?TIr/
help	غیاث	[GijAs]	/Pija:T/
Example	مثل	[masal]	/maTal/
Emitted	منبعث	[monba?es]	/mYnba?IT/
Delight	لذت	[lezzat]	/lIⳐⳐat/
seed	بذر	[bazr]	/baⳐr/
Iota	ذره	[zarre]	/Ⳑarra/
Remind	ذکر	[zecr]	/ⳐIkr/
Servile	ذلیل	[zalil]	/Ⳑalil/
Mind	ذهن	[zehn]	/ⳐIhn/
Taken	آخذ	[?a:Ξez]	/?a:ΞIⳐ/
Negotioation	مذاکره	[mozAcere]	/mYⳐa:kIra/
Take	اخذ	[?aΞz]	/?aΞⳐ/
Platitude	ابتذال	[?ebtezAl]	/?IbtIⳐa:l/

Table 6: Arabic Loan Words with Consonant /∂/

Meaning	Loanword	TL Phonetics	SL phonology
Preacher	واعظ	[vA?ez]	/wa:∂IⳐ/
Damn	لعن	[la?n]	/la∂n/
Toy	لعبت	[lo?bat]	/lY∂bat/
Dimension	بعد	[bo?d]	/bY∂d/
Known	معلوم	[ma?lum]	/ma∂lum/
Bestead	واقع	[vAGe?]	/wa:qI∂/
Innovation	ابتداع	[?ebteda:?]	/?IbtIda:∂/
Puzzle	معما	[mo?amA]	/mo∂ama:/
Creation	ابداع	[?ebdA?]	/?Ibda:∂/
after	بعد	[ba?d]	/ba∂d/

Table 7: Arabic Loan Words with Consonant /H/

Meaning	Loan Word	TL Phonetics	SL phonology
Sanctury	حرم	[haram]	/ ħaram/
Movement	حرکت	[harecat]	/ ħarIka/
Governor	حاکم	[hAcem]	/ ħa:kIm/
Need	حاجت	[hAʤat]	/ ħa:ʤa/
Incident	حادثه	[hAdese]	/ ħa:dIθa/
Rightous	صالح	[sAleh]	/salih/
Peace	صلح	[solh]	/sʊlh/
Imprisonment	حبس	[habs]	/ħabs/
Conditions	احوال	[?ahvAl]	/?aħwa:l/
Permissible	مباح	[mobAh]	/mʊba:ħ/

Table 8: Arabic Loan Words with Consonant /ʁ/

Meaning	Loan Word	TL Phonetics	SL phonology
Informing	ابلاغ	[ʔeblAG]	/ʔIbla:ʁ/
Fluent	بلیغ	[baleG]	/balIʁ/
Foreignness	غربت	[Gorbat]	/ʁYrba/
Stranger	غریب	[Garib]	/ʁarib/
Chap	غلام	[GolAm]	/ʁYla:m/
Anger	غضب	[Gazab]	/ʁazab/
Sunset/Morocco	مغرب	[maGreb]	/maʁrIb/
defeated	مغلوب	[maGlub]	/maʁlub/
Gland	غده	[Godde]	/ʁʊdda/
wish	رغبت	[raGbat]	/raPba/

Table 9: Arabic Loan Words with Consonant /W/

Meaning	Loan Word	TL Phonetics	SL phonology
Bestowal	وهب	[vahab]	/wahab/
Heir	وارث	[vAres]	/wa:rIθ/
Trusting	وثوق	[vosuG]	/wʊθuq/
Unit, single	واحد	[vAhed]	/wa:ħId/
Obligatory	واجب	[vAʤeb]	/wa:ʤIb/
Careful	مواظب	[movAzeb]	/mʊwa:ðIb/
Time	موعد	[mowʔed]	/mawçId/
Preacher	واعظ	[vAʔez]	/wa:çIð/
Devotion	وقف	[vaGf]	/waqf/
representation	وكالت	[vecAlat]	/wIka:la/

Table 10: Loan Words with Final Glottal Consonant

Meaning	Loan Word	TL Phonetics	SL phonology
Abba	آباء	[ʔAbA]	/ʔa:ba: ʔ/
Gifts	آلاء	[ʔAlA]	/ʔa:la:ʔ/
Openions	آراء	[ʔArA]	/ʔa:ra:ʔ/
Coercion	اباء	[ʔebA]	/ʔIba:ʔ/
Accustom	ابتهاء	[ʔebtehA]	/ʔIbtIha:ʔ/
Clearance	ابراء	[ʔebrA]	/ʔIbra:ʔ/
Modesty	حیاء	[hajA]	/haja:ʔ/
Beings	ابناء	[ʔabnA]	/ʔabna:ʔ/

Diagram 1. Frequency of Phonological Processes in Adaptation Arabic Loan Words in Persian