Russian Loanword Adaptation in Persian; Optimal Approach

Aliyeh Kord Zafaranlu Kambuziya

Tarbiat Modares University, Iran

akord@modares.ac.ir

Eftekhar Sadat Hashemi

Tarbiat Modares University, Iran

sadat.hashemi@modares.ac.ir

Abstract

In this paper we analyzed some of the phonological rules of Russian loanword adaptation in Persian, on the view of Optimal Theory (OT) (Prince and Smolensky, 1993, 2003). It is the first study of phonological process on Russian loanwords adaptation in Persian. By gathering about 50 current Russian loanwords, we selected some of them to analyze. We found out that vowel insertion, vowel prothesis, no palatalized consonants are the phonological processes occur on Russian loanwords in Persian.

Keywords: Loanword, Russian Language, Persian Language, Phonology, OT

1. Introduction

This paper is a study of a set of Russian loanword adaptation in Persian, with focus on phoneme substitution patterns for consonants and vowels and processes used in resolving foreign syllable structures which are illicit in Persian. The data serving as the basis for analysis are loans borrowed into Persian from the Slavic language, Russian. Loanwords are words from one language which are incorporated into another, the borrowing language, and in the process are usually adapted to fit the sound system of the borrowing language. It is observed that the original foreign pronunciation of borrowed words tends to undergo systematic adaptation or nativization. "Adaptation" is a term that describes the assimilation into the recipient language of loan word while preserving their original form and pronunciation as per the donor languages. The study analyzes a corpus of about 50 Russian loan words gathering from Moein (2002), Sokhan (2006)- two Persian dictionaries- as well as Dictionary of European Loanwords in Persian[1]. We provide explicit accounts of several loanword phonological adaptation phenomena in Persian in terms of an Optimality-Theoretic model in phonology. Vowel Insertion, vowel prothesis, no palatalized consonants are the phonological processes occur on Russian loanwords in Persian.

2. Review of Literature

Loanword phonology has been studied extensively in recent years, and the process of loanword adaptation has been modeled in various ways, e.g. Silverman (1992), Paradis (1996), Kenstowicz (2001/2004) and Steriade (2002) that say different things about the stages of adaptation and relative importance

---

[1] Zomorodiyan, R. (1984)

of factors such as the borrower's proficiency in the source language and the veridicality of cross language speech perception. The Persian language's loanword however, has not been very heavily studied, and the few sources that do comment on Persian phonology are generally quite old or brief and only one article focus on Russian loan word, Sadeghi (2004) discussed the origin of more than 90 Russian loan words. He showed that when and why the loanwords entered Persian i.e he studied the history of the Russian loanwords on the time of borrowing. He neither talked about the loanwords adaptation in Persian nor any phonological process on Russian loanword adaptation in Persian.

3. Theoretical Frame Work

The theoretical framework of this survey is Optimality Theory, introduced by Prince and Smolensky (1993, 2003). The central idea of Optimality Theory (OT) is that surface forms of language reflect resolutions of conflicts between competing demands or *constraints*. A surface form is 'optimal' in the sense that it incurs the least serious violations of a set of violable constraints, ranked in a language-specific hierarchy. Constraints are universal, and directly encode markedness statements and principles enforcing the preservation of contrasts. Languages differ in the ranking of constraints, giving priorities to some constraints over others. Such rankings are based on 'strict' domination: if one constraint outranks another, the higher-ranked constraint has priority, regardless of violations of the lower-ranked one. However, such violation must be minimal, which predicts the *economy* property of grammatical processes (Kager, 1999: xi). Optimality Theory is a development of Generative Grammar, a theory sharing its focus on formal description and quest for universal principles, However, OT radically differs from earlier generative models in various ways. OT assumes that universal constraints are violable, while earlier

models assumed 'parametric' variation of inviolate principles. Moreover, OT is surface-based in the sense that well-formedness constraints evaluate surface forms only (ibid). At the heart of Optimality Theory lies the idea that language, and in fact every grammar, is a system of conflicting forces. These 'forces' are embodied by constraints, each of which makes a requirement about some aspect of grammatical output forms. Constraints are typically conflicting; in the sense that to satisfy one constraint implies the violation of another. Given the fact that no form can satisfy all constraints simultaneously, there must be some mechanism selecting forms that incur 'lesser' constraint violations from others that incur 'more serious' ones. This selectional mechanism involves hierarchical ranking of constraints, such that higher-ranked constraints have priority over lower-ranked ones. While constraints are universal, the rankings are not: differences in ranking are the source of cross-linguistic variation (Kager, 1999: 4). Two forces are engaged in a fundamental conflict in every grammar; markedness and faithfulness (ibid). In OT, constraints on output forms are called *markedness constraints* to distinguish them from constraints of a very different sort, *faithfulness constraints*. Faithfulness constraints prohibit differences between input and output (McCarthy, 2008: 13). Each input is associated with a candidate set of possible analyses by the function Gen (short for 'generator'), a fixed part of Universal Grammar (Kager, 1999: 5). Gen contains information about the representational primitives and their universally irrevocable relations. An optimal output is at the top of the harmonic order on the candidate set; by definition, it best satisfies the constraint system (McCarthy, 2004: 5). The job of a constraint is to assign *violation marks* to candidates. (Violation marks are conventionally written as asterisks.) Depending on how the constraint is defined and what the candidate is, a constraint can assign any number of marks from zero upwards; for

example: The anti-epenthesis faithfulness constraint assigns one violation mark for every epenthesized segment. This constraint is called Dep, because it requires the output to depend on the input as the source of all its segments. Each constraint's definition tells us how to determine the number of violation marks that it assigns to a given candidate (ibid, 2008: 13). The relations of Constraints and the candidates generated by Gen are shown in a tablue in which the candidates are represented in the first column and the constraints on the first row (McCarthy, 2004: 12-19).

4. Russian and Persian Sound System

Here we try to have a review on Russian and Persian sound systems.

4.1. Russian Sound System; Vowels and Consonants

The phonological system of Russian language is inherited from Common Slavonic. The language possesses five vowels, which are written with different letters depending on whether or not the preceding consonant is palatalized. It will be shown in chart (1);

	Front	Central	Back
Close	i	(ɨ)	ʊ
Mid	e	(ə)	ɔ
Open		ă	

Chart (1) Russian Vowels[2]

The standard language, based on the Moscow dialect, possesses heavy stress and moderate variation in pitch. Stressed vowels are somewhat

---

[2] Webster on line dictionary

lengthened, while unstressed vowels tend to be reduced to near-close vowels or an unclear schwa. The consonants typically come in plain vs. palatalized pairs, which are traditionally called *hard* and *soft.* (The *hard* consonants are often velarized, especially before back vowels, although in some dialects the velarization is limited to hard /l/).

		Bilabial	Labio-dental	Dental & Alveolar	Post-alveolar	Palatal	Velar
Nasal	hard	/m/		/n/			
	soft	/mʲ/		/nʲ/			
Plosive	hard	/p/ /b/		/t/ /d/			/k/ /g/
	soft	/pʲ//bʲ/		/tʲ/ /dʲ/			/kʲ/ [gʲ]
Affricate	hard			/ts/			
	soft				/tɕ/		
Fricative	hard		/f/ /v/	/s/ /z/	/ʂ/ /ʐ/		/x/
	soft		/fʲ/ /vʲ/	/sʲ//zʲ/	/ɕː/ /ʑː/		[xʲ]
Trill	hard			/r/			
	soft			/rʲ/			
Approximant	hard			/l/			
	soft			/lʲ/		/j/	

Chart (2) Russian consonants[3]

Russian is notable for its distinction based on palatalization of most of the consonants. While /k/, /g/, /x/ do have palatalized allophones [kʲ, gʲ, xʲ], only /kʲ/

---

[3] www.webster-online-dictionary

might be considered a phoneme, though it is marginal and generally not considered distinctive in the case of /tʲ/ and /dʲ/, the tongue is raised enough to produce slight frication (affricate sounds). These sounds: /t, d, ʦ, s, z, n and rʲ/ are dental, that is pronounced with the tip of the tongue against the teeth rather than against the alveolar ridge (Webster on line dictionary[4]).

The sound [f] and [v] of Russian are usually endolabio-dental (Catford, 1992: 84). In addition the Russian *"ʃ"* is rather typically of apico- postalveolar type (Catford, 1992: 89). In Russian all consonants are accompanied by a rising of the tongue body as a secondary articulator. Palatalization in the language is a distinctive feature (Kenstowicz, 1994: 41). The Russian syllable structure can be quite complex with both initial and final consonant clusters of up to 4 consecutive sounds. Using a formula with V standing for the nucleus (vowel) and C for each consonant, the structure can be described as follows: (C)(C)(C)(C)V(C)(C)(C)(C) Clusters of four consonants are not very common, however, especially within a morpheme.

4.2. Persian Sound System; Vowels and Consonants

Iranian Persian has six vowels and twenty-three consonants. Persian vowels divided into two natural classes; vowels [a, e, o] with the feature of [- long] and vowels [i, u, A] which are [+long] (Samareh, 2002: 83-96). There is no diphtongue vowel in morpheme boundary Iranian Persian (Kambuziya, et al, 2010). Vowels IPA symbols are shown in chart (3):

---

[4] www.webster-online-dictionary
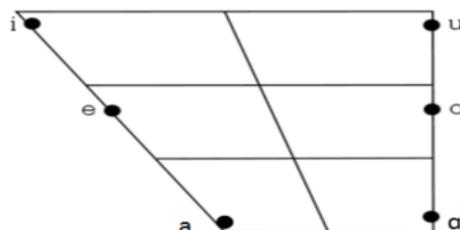
Chart (3) Persian Vowels

IPA symbols for the Persian consonants and their place and manner of articulation are available in chart (4).

	Bilabial	Labio-dental	Dental	Alveolar	Palate-alveolar	Palatal	Velar	Uvular	Glottal
Plosives	p b		t d			c ɟ		ɢ	ʔ
Nasals	m			n					
Fricatives		f v		s z	ɕ ʒ			χ	h
Affricates					tʃ dʒ				
Trill				r					
Approximant						j			
Lateral approximant				l					

Chart (4) Persian consonants [5]

As the chart shows there is no second articulation consonant in Iranian Persian.

Syllables in Persian may be structured as (C) V (C) (C) in underlying representation and CV (C) (C) in phonetic representation (Kambuziya, 2006). Onset consonant cluster is illicit in standard Iranian Persian.

---

[5] Kambuziya 2006: 116

5. Data Analysis

Now we are going to investigate the treatment of Persian phonological constraints in order to adapt Russian loanwords.

5.1. Vowel Prothesis and Epenthesis

By borrowing words from Russian, Persian faced with a number of sounds and sound combinations which are not present in the language. Persian phonological constraints with the responsibility of well-formedness must define the optimal choice to repair the illicit structure. Persian phonological system forbids more than one consonant in the onset of the syllable; it means that consonant cluster is illicit in Persian onset of syllables, while consonant cluster up to four consonants is licit in Russian phonological system. Persian phonological constraints, both markedness and faithfulness, compete to find the best candidate. Since complex onset consisting of a fricative and a plosive consonant is more frequent consonant cluster in Russian loanword, two main phonological processes, prothesis and epenthesis, occur to adapt the words in Persian phonological system.

5.1.1. Vowel Prothesis

Vowel prothesis is one of the phonological processes that can break consonant clusters. Persian get help the process to prevent the existence of complex onsets in Persian syllables. There are a number of Russian loanwords which has complex onsets. Persian phonological constraints compete to define the optimal candidate in the case of breaking the onset consonant cluster in the Russian word [stăkɑn], (English: cup) as /ʔes.te.kɑn /are as shown in the tablue 1:

Tablue (1)

Input:[stǎkɑn]	*COMPLEX ONS	ONS	DEP-[e] / S-C	*short [ǎ]	DEP IO
a) /stɑ̌.kɑn/	*i			*i	
b) /se.tɑ̌.kɑn/			*i	*i	*
c) /se.te.kɑn/			*i		**
d) /es.te.kɑn/		*i			**
e)☞/ʔes.te.kɑn/					***

The interaction of the constraints can be ordered as follow:

*COMPLEX ONS, ONS>>Dep- [e] / S-C>>*short [ɑ]>>DEP IO

As we see here, the *COMPLEX Ons is dominated the other constraints. Among the constraints two are faithful constraints; DEP- [e] / S-C and DEP-IO and the three others are marked ones. *Complex onset and onset are in the same rank and so their relation is consider by comma and in the tablue the non-continues line. Both of them dominate the three more constraints. Prothesis and epenthesis are both two phonological phenomena to break the consonant cluster, so, why in some cases the prothesis is allowed and in some other cases epenthesis? Jam (2009: 172) cited Flischhaker (2000) that the question can be answered by a general constraint formulated as DEP- V/ X-Y which can be specified and formulated as DEP- [e]/ S-C. The constraint is a context- sensitive faithful constraint. It participates in the competition to forbid vowel insertion between two consonants of [s] and [t]. The reason for the constraint is investigated by Broselow (1999). He says that When CVC languages borrow loanwords with complex onsets; they often treat s-obstruent clusters differently from all others. In s-obstruent clusters, a vowel is inserted at the edge. In rising sonority clusters, a vowel is inserted between the two consonants of the onset.

In falling sonority clusters, most notably s-obstruent clusters, the vowel is inserted before the cluster (Gouskova and Hall, 2001). Candidate (a) violates the high-ranked constraints; complex onset which is not permitted in Persian

phonatactics, and also *short vowel [ă]. Although it is faithful to Russian input, it has two fatal violations and so, never can be an optimal candidate. Candidate (b) and (c) violates the constraint of DEP- [e]/ S-C. According to Hierarchy of sonority, insertion of vowel in syllable with Complex onset with s-obstruent must be before the S-obstruent, as the sonority is decreased by the sequence of [st] inserting a vowel between two mentioned consonant is not permitted in Persian. Another constraint which is violated by candidate (b) and satisfied by candidate (c) is *short vowel [ă]. Short vowel [ă] is illicit in Persian since There is no short /ă/ in the language, unless in the context where a vowel followed by nasal consonant [n] in a tautosyllabic, as it remains in the last syllable of the word [kăn] (Khanlari, 1995: 146). Phonemic substitution occurs when a speaker borrows a Russian word containing a phonem without a correspondent in the native phonemic inventory. Thus, the vowel [ă] is substituted by [e] in order to harmonize with the first front mid vowel [e] prothesized. ONS, A universal constraint (Prince and Smolensky, 2004: 12; Kager, 1999: 9; McCarthy, 2002: 14), is violated by candidate (d). It violated the dominated and prior constraint in the tablue which forbid syllable without onset. Candidate (d) has a fatal violation and must be fined. The tablue indicates the optimal candidate is candidate (e) which it's input, only, violates the constraint of Dep IO. Dep IO is a faithfulness constraint which concerns that any insertion in syllable positions is forbidden. The candidate satisfies the constraints; by prothesis the mid-front vowel [e] satisfies the COMPLEX Ons. by inserting the plosive glottal consonant [ʔ] satisfies the ONS. Uffmann (2007: 451-476) expressed that the main reason of choosing glottal stop [ʔ] in onset of the first syllable, in order to satisfy the ONSET constraint, refers to sonority hierarchy principle. Hierarchy principle is as follow:

Vowels＞glides＞ liquids＞ nasals＞ obstruent＞ glottal

87

The sign (>) indicates the domination of the phonemes; i.e. left phonemes are more sonorous than the right ones. The principle is also called Prominence Hierarchy. Vowels are the most prominent (sonorous) and glottals are the least prominent. Prominence Alignment is a scale concerns prominence of structural positions within the syllable: Peak>Margin. The universal Margin and Peak Hierarchies ensure the following universal ordering of the Harmony of possible associations:

- Margin Hierarchy:

*Margin/v>>*Margin/r>>*Margin/l>>*Margin/nas>>*Margin/obs>>*Margin/lar

- Peak Hierarchy:

*Peak/lar>>*Peak/obs>>*Peak/nas>>*Peak/l>>*Peak/r>>*Peak/v

(Prince and Smolensky, 2004: 152-153)

These two marked constraints indicate that vowel in the Margin of syllable is a fatal violation; i.e. vowels are the most marked to fill the onset position of syllables and laryngeal (glottal) phonemes are the most unmarked ones to fill onset.

5.1.2. Vowel Insertion

Vowel insertion is the other phonological process which can repair the illicit consonant clusters in syllable structures in languages. As in Russian, Complex onset is allowed in syllable structures, there is a list of Russian loanwords with complex onset as the Data1 shows:

Data (1)[7]

Russian	Persian	English meaning
/brezent/	/berezent/	Canvas
/trɑmvɑj/	/terɑmvɑ/	Tramway
/ʃlang/	/ʃelang/	Hose
/Xleb/	/xelab/	Bread
/klʲoʃ/	/keloʃ/	a kind of skirt
/ʃkɑf/	/ʔeʃkɑf/[6]OR/ʃekɑf/	Gap

Persian phonological constraints compete to fine the candidates which violate the high rank constraints and define the optimal candidate. In order to break the consonant cluster of onset front mid vowel [e] inserted between two consonant and repair the ill-formed syllable structure. *COMPLEX Ons is the high ranked constraint and cause the vowel insertion. We should remember that the constraint is a dominated constraint in Russian. Why front mid vowel? Kambuziya (2006: 138-139) says that vowel insertion represents by inserting front mid vowel [e] on the boundaries of a Persian stem and a suffix. We can conclude that front mid vowel [e] is the most frequent vowel to insert between two consonants in loanwords with complex onset, provided that the consonant cluster is any combination of consonants but fricative [s] and a plosive. In the following tablue, we see the completion of the constraints to define the optimal candidate:

---

[6] The word is perceived and produced in two ways, the first in standard Persian and second one in some Persian dialects.

[7] Sadeghi 2004

Tablue (2)

Input:/ʃlang/	*COMPLEX ONS	*Prothesis #ʃl	DEP IO
a) /ʃlang/	*i		
b) /eʃlang/		*i	
c) ☞/ ʃelang/			*

The domination ranking of the constraints showing in tablue (2) is as follow:

*COMPLEX Ons>>*Prothesis #ʃl>>DEP IO

Candidate (a) violates the high ranked constraint,*COMPLEX Ons, which is a fatal violation and must be fined. The black parts of the table mean that these constraints play no role in selecting the optimal candidate. As Broselow (2000) shows, prothesis is not allowed for consonant clusters which benefit the rising sonority. *Prothesis≠ʃl constraint is the second constraint which is violated by candidate (b) fatally and must be fined. The optimal candidate is (c) violating the low ranked constraint, DEP IO which is a faithful constraint and forbid any insertion for the input.

5.2. No Palatalized Consonant

Russian is a language with a whole series of palatalized consonants contrasting with plain or non palatalized ones. Secondary articulations are normally at about the rank of approximant. Palatalization consists of raising the anterodorsum of the tongue towards the hard palate (Catford, 1992: 105-108). Silverman (2009: 63) defines it as so, front **resonance** caused by raising the **front** of the tongue. In Russian essentially all consonants are accompanied by the raising of the tongue body as a secondary articulator. If it is [-back], the consonant is palatalized. Palatalization and velarization freely combine with labials and most dentals in Russian (Kenstowicz, 1994: 41-42). According to what we mentioned so far consonants in Russian is divided into two groups;

plain and palatalized. Producing the palatalized consonants is not contrastive in Persian. Persian speakers produce such consonants in plain form. We know this phonological process is called phonemic substitution, for Russian palatalized consonants, Persian has no correspondent consonant; therefore, it substitutes the existed plain consonant with the palatalized ones. Data (2) is the list of the Russian loanwords containing palatalized consonants:

<h3 style="text-align:center">Data (2)[8]</h3>

Russian	Persian	English meaning
/bɑnʲɑ/	/bine/	dressing-room in a bath- house
/klʲoʃ/	/keloʃ/	a kind of skirt
/ʃinʲel/	/ʃenel/	Mantle
/otʲu/	/ʔotu/	Iron

Tablue (3) will show the completion of the constraints to select the optimal candidate in Russian loanwords with palatalized consonants:

<h3 style="text-align:center">Tablue (3)</h3>

Input:[otʲu]	*Palatalized consonant	ONSET	DEP IO
a) /otʲu/	*i	*i	
b) /otʲ/		*i	
c) /otu/		*i	
d) ☞ /ʔotu/			*

Candidate (a) would be faithful to the Russian input. It violates the high ranked constraint *No palatalized consonants and hence is ruled out. Candidate (b) repairs an offending palatalized through deletion the palatal segment, but violates ONSET, marked constraint banning no ONSET. Also candidate (c) violates the two marked constrains, ONSET and NO Cluster glide. Finally, the winning candidate (a), avoiding palatalized consonants and

---

[8] Zomorodiyan 1984

satisfying the ONSET and NO Cluster –glide through deletion palatalized consonant and insert a glottal stop [ʔ] in onset. It only violates lowest ranked DEP and thus turns out to be the winner. Generally, findings from various languages show that the output of loanword processes is a native form that demonstrates minimal changes from its foreign origin. On the segmental level, the principle of minimal modification functions through phoneme substitution, by which foreign sounds are replaced by their closest match available in the native inventory (Hock and Joseph, 1996). It is worthwhile mentioning that all the palatalized Russian phonemes perceived and produced in plain form by Persian speakers.

5.3. Russian Low Central Vowel [ă] and [ɑ] vs. Persian Vowel [a] and [ɑ]

 Since in Persian sound system there are a back low long vowel [ɑ] and also one front mid short vowel [a] all the Russian words having central low short vowel [ă] in non-final position substitute by the front low Persian vowel [a] and wherever long central Russian vowel [ɑ] appears, the back low Persian vowel [ɑ] is substituted, Since in Persian there is not lengthening vowel. Data (5) shows the Russian loanwords with central low short vowel [ă] and long central vowel [ɑ]:

<div align="center">

Data (3)[9]

</div>

Russian	Persian	English meaning
/kăzɑk/	/GazzɑG/	Cossack
/sămɑvɑr/	/samɑvar/	Samovar
/ʃlăng/	/ʃelang/	Hose

Tablue (4) shows the optimal candidate and the competition of Persian phonological constraints:

---

[9] Zomorodiyan 1984

Tablue (4)

Input:[ʃlăng]	*complex ons	ONS	*Prothesis≠ʃl	*short vowel [ă]	DEP-IO
a) /ʃlăng/	*i			*i	
b) /ʃelăng/				*	*
c) /eʃlang/		*i	*i		
d) ☞/ʃelang/					*

Candidate (a) is faithful to the Russian input and violates the high- ranked constraint *COMPLEX Ons and *short vowel [ă]. Candidate (b) violates the *short vowel [ă] constraint; it is a fatal violation and must be ruled out. Constraints ONS and *Prothesis≠ʃl have no place of attention about the optimal candidate about these two candidates, so the houses are hatch out. Onset and *Prothesis≠ʃl two high-ranked marked constraints which is violated by candidate (c). As we see in the tablue, the optimal candidate is (d) which satisfies all the high- ranked marked constraints, only, violates the lowest constraint of faithfulness.

5.4. Homorganic Sound Sequences

The sound sequence of [ts] in Russian word [tsɑr] by Catford is consider as a affricative sound; since there is no morpheme boundary, both [t] and [s] belonging to the same word and functioning in the structure of (Russian) language as a single affricate unit (Catford, 1992: 113). Silverman called affricatives as delayed released consonants and defined as the parting of the articulators relatively slowly following a stop causing a short phase of local audible friction (2009: 225). The optimal candidate of the word is as follow:

Tablue (5)

Input:[tsɑr]	*affricate [ts]	*PROTHESIS [ts]	* voiceless C between two vowels	*Mixed Persian word [tʃɑr]	DEP-IO
a) /tsɑr/	*¡				
b) /et.sɑr/		*¡			
c) /tesɑr/			*¡		
d) /tʃɑr/				*	
e) ☞ /tezɑr/					*

Tablue (5) shows Onset consonant cluster, prothesis [ts/tz] and affricative [ts] is the marked constraint in Persian. All of the constraints are prior to DEP IO. Therefore the optimal candidate is (e). As in Persian affricative [ts] is illicit and there is affricate sound of [tʃ] instead, the replacement is not acceptable since it would be mixed with Persian colloquial word [tʃahɑr => tʃɑr], (means "four"). Thus Persian speakers inevitably hear and produce the loan word as the candidate (e). Even though the candidate (c) does not violate the first three constrains, it violates one of the phonological rule; that is any voiceless consonant will be shift to voiced one if comes in between two vowels context. Thus the candidate (e) is the optimal one.

6. Conclusion

Whatever so far presented and discussed in the paper leads us to conclude that loan word adaptation in Persian facing the words origin in Russian on the basis of Persian syllabification and its constraints on onset consonant cluster can be performed by vowel insertion, either prothesis or epenthesis. According to the sonority hierarchy principle depends on the sonority rising or falling the insertion position will change; a vowel will be inserted at the edge of the syllable, before the cluster, if the sonority on the cluster is falling and if it is

rising a vowel will be inserted between consonant clusters. As no second articulation is permitted in Persian all the Russian palatalized loanwords in Persian perceive and produce in plain forms. Russian Affricatives [ts] and [dz] substitute by [tʃ] and [dʒ] in Persian. If the substitutions caused to produce words mixing with already existing Persian words, vowel prothesis or insertion play a role in order to change the compound consonants to simple ones, and makes the optimal output.

References

Anvari, H. (2006). *Sokhan Persian Dictionary*, Tehran: Sokhan.

Broselow, E. (1999). "Loanwords and learn ability", Handout of a talk given at the University of Maryland, 3 December 1999.

Catford, J. C. (1992). *A Practical Introduction to Phonetics*, UK: Oxford University Press.

Gouskova, M., and Hall, N. (2001). "Falling sonority onsets, loanwords, and syllable contact", *CLS*, 37 (1), pp.175-185.

Hock, H. H., and Joseph, B. D. (1996). *Language History, Language Change, & Language Relationship: An Introduction to Historical & Comparative Linguistics*, Berlin: Mouton de Gruyter.

Jam, B. (2009). Optimality Theory & its Application in Explaining Phonological Processes of Persian, unpublished PhD Thesis in Tarbiat Modares University, Tehran, Iran.

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

Kambuziya, A. K. Z. (2006). "Criticism and Correlation of Mohammad Reza Majidi and Elmar Terner's Paper", *Language and Linguistics*, vol.2, no.1, Iranian linguistics society, pp. 109-118.

Kambuziya, A. K. Z., and Hadian, B. (2010). "Natural classes in Persian vowels", *Persian Literature and Language Research*, Vol.15, pp. 117-144.

---------------------------. (2006). *Phonology Rule-Based Approaches & Their Applications in Persian*, Iran: Samt.

Kenstowicz, M. (1994). *Phonology in Generative Grammar*, UK: Blackwell.

------------------. (2001/4). "The Role of Perception in Loanword Phonology", to appear in Linguistique africaine 20 and Studies in African Linguistics 32, pp. 95-112.

McCarthy, J. J. (2008). *Doing Optimality Theory; Applying Theory to Data*, UK: Blackwell.

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

Moien, M. (2002). *Moien Persian Dictionary*, Tehran: Sahel.

Khanlari, N. (1995). *Persian Poem's Metric*, Iran: Toos.

Paradis, C. (1996). "The inadequacy of filters and faithfulness in loan word adaptation", in Durand, J. and Laks, B. (eds.), *Current Trends in Phonology: Models and Methods,* Vol. 2, Salford: European Studies Research Institute, available as ROA-157 from the Rutgers Optimality Archive, pp. 509-534.

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

Sadeghi, A. (2004). "Russian origin words in Persian and their history", *Linguistics Journal,* 40, Tehran, Iran: Iran University Press, pp. 3-46.

Samareh, Y. (2002). *Persian Phonetics*, Tehran, Iran: Nashre Daneshgahi. www.webster- online-dictionary

Steriade, D. (2002). The phonology of Perceptibility effects: The P-map & its concequences for constraint organization. Unpublished manuscript, UCLA. Retrieved September 6, 2005, from: http://www.linguistics.ucla.edu/people/ steraide/papers/p-map for phonology.doc

Uffmann, C. (2007). "Intrusive [r] & optimal epenthetic consonants", *Language Sciences*, 29, pp. 451-476, available at: www.sciencedirect.com.

Zomorodiyan, R. (1984). *Dictionaire des mots d'emprunt d'origine Europee nne en Persan,* Mashhad, Iran: Astan Qods Razavi.

Acknowledgment: