A Phonological Contrastive Analysis of Persian and Serbian

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Abstract

One of the primary and crucial steps in teaching or learning a second language is the initial familiarization of adult learners with the major structures of the target language, i.e., its phonological, morphological, syntactic, and semantic features. To this end, contrastive analysis (CA) can help learners gain a good understanding of the linguistic similarities and differences between two languages. Persian and Serbian both belong to the Indo-European language family, and although some similarities can be found between the two languages, there are also significant differences in their structures. In this paper, the phonological system and syllable patterns of Persian and Serbian are reviewed and compared to determine which phonemes are present in Persian that are absent in Serbian and to investigate the challenges that Serbian learners of Persian face in producing the unique Persian phonemes. The paper also presents and discusses some examples of phonological errors made by Serbian learners that can be reflected and identified in orthography, using *the Salam Farsi Learner Corpus*. The results of the study can be used by researchers in theoretical linguistics and especially by instructors of Persian for Serbian learners. *(примљено: 2. априла 2023; прихваћено: 6. јуна 2023)*

1. Introduction

Contrastive Analysis (CA) has been widely employed since the mid-1950s across multiple linguistic domains, including syntax, semantics, and particularly phonetics and phonology. When considering the field of phonetics and phonology, the influence of the first language is evident in both the perception and production of sounds in a second language (Hansen Edwards/Zampini, 2008). This linguistic influence can result in errors not only in pronunciation, but also in orthography. Catford (1968) emphasized that the main function of contrastive analysis in language teaching should be to explain why errors occur rather than to predict errors. Accordingly, this paper conducts a contrastive analysis of Persian and Serbian, followed by a statistical examination of the orthographic errors made by Serbian learners of Persian.

Persian, a south-western Iranian language, is an Indo-European language used as an official language in Iran and Tajikistan and as one of the two official languages (along with Pashto) in Afghanistan. This language is officially called Farsi in Iran, Dari in Afghanistan, and Tajik in Tajikistan. In this paper, the term *Persian* refers to the contemporary Persian as spoken in Iran. The Persian language today is one of the Iranian languages that has gone through historical development that has includes phonological, syntactic, lexical, and semantic changes. The historical development of Persian can be divided into three historical periods. The first period is Old Persian (650–350 BC), which was the language of the Achaemenid Empire. The second period is Middle Persian, also called Pahlavi, which was spoken during the Parthian and Sassanid empires from the 3rd century BC to the 7th century AD. Finally, the third period is Modern Persian, which has been the predominant form of the language from the 9th century to the present day (Safari, 2015). According to Bagheri (2008: 127), the evolution of the phonetic system of Persian from Old Persian to Modern Persian has resulted in a simplified system characterized by various transformations and modifications. These changes and developments include: the omission of final syllables, the transformation of a diphthong into a long vowel, the omission of certain phonemes to facilitate pronunciation, the removal of one of the initial consonants in some phonetic groups, the omission of certain phonemes, and the transformation of some phonemes into other phonemes. During the development of the Persian language, the syllable structure was also simplified.

In this paper, the phonetic features and syllabic systems of Persian and Serbian languages are reviewed and compared. The aim is to identify the similarities and differences between these two linguistic systems. Additionally, the study investigates the relationship between Persian phonology and its orthographic representation, with a particular focus on analyzing the challenges encountered by Serbian learners of Persian in acquiring proficient writing skills.

2. Literature review

Phonological contrastive analysis is a field of study that generally attempts to review and compare the phonological features of languages. According to

Yarmohammadi (1955: 19), this is "the process of comparing and contrasting the phonological systems of languages in order to formulate their similarities and differences." The phonological CA is more applicable in studies of second language acquisition (SLA), and Richards (1974: 204) points out that "studies of SLA have tended to imply that CA may be most productive at the level of phonology." One application of CA research in the field of SLA is the topic of language transfer, although the debate about the influence of LI on L2 is still ongoing among applied linguists (Huthaily, 2003). Phonological transfer generally refers to the way in which a person's knowledge of the sound system of one language can influence the person's perception and production of speech sounds in another language (Jarvis/Pavlenko, 2008). Accordingly, a cross-linguistic comparison of sounds in two languages should include descriptions of both the phonetics and phonology of the NL and the TL (Brière, 1968).

Phonological or orthographic errors, both in reception and production, can result in challenges in decoding the intended message. L2 learners often categorize phonemes based on the phonemic inventory of their L1 or another language they have already acquired. This can cause a transfer of errors, subsequently leading to challenges and difficulties in acquiring the target language. Therefore, it is crucial for L2 learners to develop a clear understanding of the phonological system of the target language in order to communicate effectively. In this regard, Odlin (1989) noted that there is little doubt that L1 phonetics and phonology have a strong influence on L2 pronunciation. Furthermore, the importance of transfer is evident in studies of specific pronunciation contrasts, and also in studies comparing the overall pronunciation accuracy of speakers of different native languages. Therefore, phonological CA can be used in SLA research in two main ways: irst, by comparing the phonological systems of the learner's first language and the target language, researchers can identify possible difficulties the learner may have in acquiring the new language. Second, highlighting similarities and differences in the phonological systems of the two languages can also provide insights for language teaching and the development of appropriate learning materials and resources.

A contrastive study of Persian and Serbian phonology has been lacking in academic research, and to the best of the author's knowledge, no research has been carried out on this topic. However, several studies have examined the phonological CA of Persian and other languages, particularly English.[1] The literature review of previous research comparing the phonological system of Persian with that of

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1   Notable studies among these include the works by Yarmohammadi (2002), Mirhassani (2003), Hayati (2005), Soltani (2007), Eghlidi (2016), and Moradi (2018). They focused mainly on identifying pronunciation errors among language learners and providing recommendations and pedagogical solutions by comparing and contrasting the sound systems, phonetic differences, and suprasegmental features of Persian and English. Babaei (2013) used CA to study the phonetic systems of Persian and Russian. The study included a detailed description and comparison of the consonants, vowels, syllables, phoneme order, and stress patterns in each of the two languages. Kasgari Abediyan (2016) conducted a comparative study of the phonological systems of Persian and Danish. The study focused on identifying phonological similarities and differences between the two languages and assessing the level of difficulty associated with learning each respective phonological system.

other languages indicates that these studies aimed to do more than just conduct theoretical inquiries. In fact, the majority of them sought to identify the challenges and errors associated with the phonological systems of the two languages and to develop strategies that can facilitate language acquisition.

3. The consonant system of Persian

According to Samareh (2000) Persian has a total of twenty-nine phonemes, including twenty-three consonants and six vowels. The following section reviews the characteristics of Persian consonants, classified by their manner and place of articulation, and highlights their specific features. It should be noted that in this paper and for the sake of clarity, the North American Phonetic Alphabet (NAPA(as mentioned by Samareh (2000: 36–81) is used to indicate the Persian consonants; however, the final classification of Persian consonants in the International Phonetic Alphabet (IPA) format is shown in Table 1.

3.1. Plosives

Plosive consonant phonemes in Persian are /p, b, d, t, k, g, q, ʔ/. Of these eight plosives, four are voiced, namely /b, d, g, q/ and the remaining four, i.e., /p, t, k, ʔ/ are voiceless and are aspirated in different positions. In terms of place of articulation, /p/ and /b/ are bilabial, /t/ and /d/ dental, /k/ and /g/ palatal, /q/ post-velar (or uvular), and /ʔ/ glottal. The consonant /g/, as a voiced palatal sound, changes to a palatalized velar sound in final position (Zahedi/Fakharian, 2011). Among the consonant plosives in Persian, the phoneme /ʔ/ is considered to have a special role. This phoneme is closely related to the syllabic system of the language, as will be explained in a later section. Suffice it to note here that the syllable structure of Persian is characterized by the obligatory presence of an initial consonant in each syllable. While it is common in Persian for a word to begin with a vowel, that is, if a written word does not have an initial consonant, the glottal stop represented by the phoneme /ʔ/ is expected to be at the onset of the syllable. The phonemes are represented by the letters "ب", "پ", "د", "ب", "ت", "ک", "گ", "ق", "غ" and "ع" in the Persian script respectively.

3.2. Nasals

There are two nasal consonants in Persian, namely /m, n/ and both are voiced. /m/ is bilabial and /n/ is alveolar. They are represented in the Persian script by the letters "م" and "ن". The phoneme /n/ is subject to assimilation when it precedes bilabial plosives, represented by /b, p/, and labio-dental fricatives, represented by /f, v/. As a result, the /n/ turns into a bilabial nasal consonant, namely /m/. For example: /anbâšt/ > /ambâšt/ and /tanvir/ > /tamvir/ (Kord Zaferanlu Kambuziya, 2007). In contrast, bilabial plosives represented by /b, p/ are nasalized when they occur before nasals, for example: /âbnus/ > /âbnus/ (Samareh, 2000).

3.3. Fricatives

Persian language has eight fricative consonants, namely /f, v, s, z, š, ž, x, h/. Three of these consonants, /v, z, z/, are voiced, while the remaining five are voiceless. In terms of place of articulation, /f, v/ are labio-dental, / s, z / alveolar, /š, ž / post-alveolar, /x/ velar, and /h/ glottal. The phonemes are represented by the letters "ف", "و", "س", "ش", "ز", "ژ" , "خ" and "ه" in the Persian script respectively.

3.4. Affricates

Persian consonants include two affricates, namely /ċ/ and /ǧ/[2]. These affricates are characterized by post-alveolar articulation which involves bringing the tongue close to the roof of the mouth or palate, specifically in the region just behind the alveolar ridge. The distinction between these two sounds lies in their voicing; the former is voiceless and the latter is voiced. The phonemes are represented by the letters "چ" and "ج" in the Persian scrip respectively.

3.5. Trill

Persian has only one trill consonant, which is represented by the voiced alveolar /r/ and produced by vibrating the tip of the tongue against the alveolar ridge and is represented by the letter "ر" in the Persian script.

3.6. Lateral

The voiced alveolar /l/ is the only lateral consonant present. This sound is produced by touching the tip of the tongue against the alveolar ridge. The voiced alveolar /l/ is represented by the Persian letter «ل» in the written script.

3.7. Approximates

The voiced palatal /y/ in Persian is classified as an approximant sound, whereby the tongue approaches but does not touch the hard palate, allowing for a smooth flow of air. It is frequently used in Persian and is represented by the letter «ی» in the Persian script.

Place / Manner	Bilabial	Labiodental	Dental	Alveolar	Alveopalatal	Palatal	Uvular	Glottal
Plosives	p b		t d			c ɟ	ɢ	ʔ
Nasals	m			n				
Fricatives		f v	s z		ʃ ʒ		χ	h
Affricates					tɕ dʑ			
Trills				ɹ				
Laterals				l				
Approximates						j		

Table 1. The classification of Persian consonants
in IPA format (Modarresi Qavami, 2018)

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2   The NAPA format uses /č/ and /j/ to represent these sounds. However, for the purpose of clarity specially for members of the Serbian speaking area, they are intentionally marked as /ċ/ and /ǧ/ in this paper.

4. The consonant system of Serbian

The phonological system of Serbian consists of thirty phonemes: five vowels and twenty-five consonants (Stanojčić/Popović, 1999). As previously mentioned, *Latin orthography* is used to indicate phonemes in this paper for clarity and the classification of Serbian consonants in IPA format is subsequently shown in Table 2. The following is an overview of the characteristics of the consonants, based on the manner and place of articulation:

4.1. Plosives

The Serbian language has six plosive consonants, represented by the phonemes /p, b, t, d, k, g/. In terms of the place of articulation, /p, b/ are bilabial, i.e., produced with the lips; /t, d/ are dental, i.e., produced with the tip of the tongue against the upper front teeth; and /k, g/ are velar, i.e., produced with the back of the tongue against the soft palate. Three of these sounds are voiced, namely /b, d, g/, and three are voiceless, represented by /p, t, k/.

4.2. Nasals

The Serbian language has three nasal consonants, represented by the phonemes /m, n, nj/. These consonants are characterized by the flow of air through the nasal cavity but simultaneously through the oral cavity during their production, which gives them a unique sound. In terms of the place of articulation, /m/ is bilabial, i.e., produced with the lips; /n/ is alveolar, i.e., produced with the tip of the tongue against the alveolar ridge just behind the upper front teeth; and /nj/ is alveopalatal, i.e., produced with the body or laminal of the tongue against the hard palate near the front of the mouth. All nasal phonemes are voiced.

4.3 Fricatives

There are six fricative consonants in Serbian, including /f, s, z, š, ž, h(x)³/. These sounds have different places of articulation, which determine their manner of production. The articulation point for /f/ is labiodental, which means that the lower lip and upper teeth are involved. Both phonemes of /s/ and /z/ are articulated dental, with the laminal part of the tongue and the upper teeth. The palato-alveolar articulation places are used for the production of /š/ and /ž/. Finally, the phoneme /h/ is velar, articulated by the back of the tongue and the soft palate. In terms of voicing, /z, ž/ are voiced fricatives, i.e., the vocal cords vibrate during their production, while /f, s, š, h/ are voiceless fricatives.

4.4. Affricates

There are five affricate consonants in Serbian, including /c (ts)/, /č/, /dž/, /ć/, and /đ/. These sounds play a crucial role in distinguishing between words and ensuring

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3   To avoid confusion, it is important to note that /h/ in this context refers to the voiced fricative phoneme and not the voiceless glottal stop. To distinguish between the two, the symbol /x/ is placed in parentheses.

clear communication. The phoneme /c/ is characterized by its voiceless dental articulation, which occurs when the tip of the tongue touches the upper front teeth. It is a coronal phoneme, with a negative anteriority feature. The affricates /č/ and /dž/ are postalveolar sounds, produced with the tongue positioned near the ridge behind the upper front teeth. These sounds are also coronal phonemes, but with a negative anteriority feature. The phonemes /ć/ and /đ/ are characterized by their alveopalatal articulation, produced with the tongue positioned close to the hard palate. These sounds are also coronal phonemes, but with a positive anteriority feature.

4.5. Lateral

There are two lateral sounds in Serbian, namely, /l/ and /lj/. Despite this shared characteristic, the of articulation differs between the two sounds: The phoneme /l/ is an alveolar lateral consonant, pronounced by passing the airflow over the sides of the tongue; however, /lj/ is characterized by an alveopalatal articulation, with the anterior or laminal part of the tongue raised toward the hard palate while the airflow is directed over the sides of the tongue. Both are voiced consonants.

4.6. Trill

The phoneme /r/ is featured as the only alveolar trill consonant. In addition, the phoneme /r/ can function as a syllabic consonant when it is placed, for example, between two other consonants and forms the nucleus of a syllable. This is evident in words such as "srce" (heart), which is syllabified as "sr-ce" and forms two syllables. (Radojčić et al., 2019).

4.7. Approximants

There are two voiced approximant consonants, /v/ and /j/. The phoneme /v/ is a labiodental approximant, pronounced so that the lower lip touches the upper teeth. The phoneme /j/, on the other hand, is a palatal approximant that is raised with the back part of the tongue toward the hard palate.

Place Manner	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Alveolopalatal	Palatal	Velar
Plosives	p b		t d					k g
Nasals	m			n		ɲ		
Fricatives		f	s z		ʃ ʒ			x
Affricates			ts		tɕ dʑ	tʃ dʒ		
Laterals				l		ʎ		
Trills				r				
Approximates		v					j	

Table 2. The classification of Serbian consonants in IPA format (Sredojević, 2022)

5. The vowel system of Persian

There are six vowel sounds in Persian (Majidi/Ternes, 1999; Rees, 2008) as shown in Table 3 and Figure 1. Three of them are considered long vowels, including /i/, /u/, and /â/, and three are short vowels, including /a/, /e/, and /o/. There are also two diphthongs: [ei] and [ou]. According to Haghshenas (1997) and Bijankhan (2013), in the Persian vowel system, /i/, /e/, /a/ are considered front vowels and /u/, /o/, /a/ are considered back vowels. All Persian vowel sounds except /â/ are generally similar to Serbian vowels. However, it is important to note that the pronunciation of the short vowel /a/ in Persian is not consistently the same as the short vowel /a/ in Serbian. In certain positions, it tends to be more open and bears resemblance to the vowel /e/.

Persian Vowels		
	Front	Back
High/Closed	i	u
Mid/ Medium Open	e	o
Low/Open	a	â

Table 3. The position of the tongue in the articulation of Persian vowels
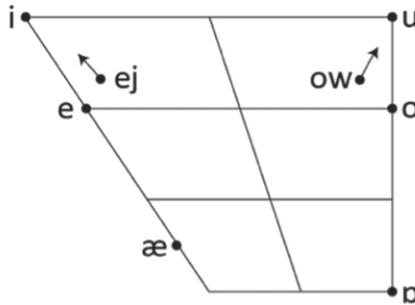

Figure 1. The contemporary Persian vowel system

6. The vowel system of Serbian

There are five vowels in the Serbian language: /i, o, u, e, a/ (Stanojčić/Popović, 1999). The diphthong /ie/ begins at the position of the monophthong /I/ and ends at the position of the monophthong /e/, as shown in Table 4 and Figure 2 subsequently (Landau et al., 1999: 67).

Serbian Vowels			
	Front	Middle	Back
High/Closed	i		u
Mid/ Medium Open	e		o
Low/Open		a	

Table 4. The position of the tongue in the articulation of Serbian vowels
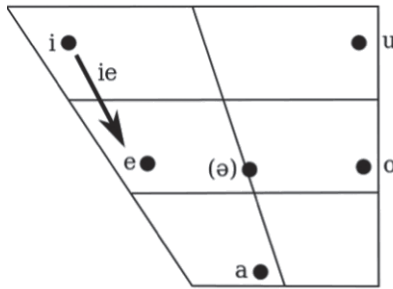
Figure 2. The contemporary Serbian vowel system

7. Syllable structure in Persian and Serbian

The Persian syllable system is controversial, but most linguists such as Bateni (1970) and Meshkotod Dini (1995) have accepted that it has the structure (C)V(C)(C). Therefore, modern Persian language allows only three syllable patterns, namely CV, CVC and CVCC (Kord Zaferanlu Kambuziya/Eslami, 2015). This means that Persian does not allow consonant clusters initially and the maximum possible consonants after coda are two consonants. In other words, Persian syllables cannot be initiated with vowels, and if a word begins with a vowel, it contains a glottal /ʔ/ as a syllable onset (e.g., "ʔâb" "water"), Table 5.

In Serbian, however, the syllable structure can be represented as (C)(C)(C)V(C) (C). This means that Serbian allows two consonant clusters, at the beginning and at the end. Moreover, a syllable in Serbian can consist of only one isolated vowel (Petrović/Gudurić, 2010), as illustrated in Table 6.

Type of Syllable	Persian syllable structure	Example
Type 1	CV	mâ, az
Type 2	CVC	dar, kif,
Type 3	CVCC	goft, dast

Table 5. The structure of syllables in Persian

Type of Syllable	Serbian syllable structure	Example
Type 1	V	i, u
Type 2	CV	da, ko
Type 3	CVC	zid, dan
Type 4	CCV	tri, pre
Type 5	CVCC	list, čast
Type 6	CCVC	ključ, broj
Type 7	CCCV	stvo.ri.ti
Type 8	CCCVC	stran.stvo.va.ti

Table 6. The structure of syllables in Serbian

8. Contrastive analysis of the Persian and Serbian phonological systems

In the previous section, an overview of the phonological features of the Persian and Serbian language was given. The phonological CA of these languages has led to the following findings, which provide further insight into SLA research.

1. In terms of *the number of phonemes*, the Persian language includes 23 consonants and 6 vowels, giving a total of 29 phonemes. On the other hand, the Serbian language includes 25 consonants and 5 vowels, for a total of 30 phonemes. The contrastive analysis indicates variations in the "place and manner of articulation" between the consonant systems of Persian and Serbian.

2. Regarding *the place of articulation for consonants*, both Serbian and Persian have eight places of articulation, with the last place of articulation for consonants in Serbian is limited to the "velar position" within the vocal tract. Persian, on the other hand, provides additional options for consonant articulation in the "uvular" and "glottal" positions. Therefore, the production and pronunciation of certain phonemes such as /q/, /ʔ/, and /h/ present challenges for Serbian Persian learners. As a result, learners tend to substitute these sounds with the closest phonemic equivalents, namely /g/ for /q/, /a/ for /ʔ/, and /x/ for /h/. In contrast, the Serbian phonemic system has three phonemes, namely /c/, /lj/, and /nj/ which have no equivalent in Persian. Therefore, Persian speakers or learners of Serbian tend to replace these sounds with the most similar or closest consonants of Persian when they try to pronounce them. In particular, the consonant /l/ is often used instead of /lj/, /s/ instead of /c/, and /n/ instead of /nj/. In addition, Persian speakers tend to perceive and produce the Serbian phonemes /č/, /ć/, /đ/, and /dž/ as interchangeable. Serbian learners of Persian also substitute the voiceless uvular fricative phoneme /x/ in Persian for the voiceless velar fricative phoneme /h/ in Serbian.

In terms of *the manner of consonant production*, Persian and Serbian have six common types: plosive, nasal, fricative, affricative, lateral, and approximate. However, Serbian features an additional manner of consonant production, known as trill consonants. The plosive consonants in Persian consist of two phonemes, /q/ and /ʔ/, which do not exist in Serbian, while Serbian contains the phoneme /nj/, which is produced in the nasal manner and does not exist in Persian. Fricative phonemes in Persian include /v/ and /x/ and differ from Serbian, where the phoneme /x/ is absent. The affricate manner of consonant production in Persian includes two phonemes of /ċ/ and /ǧ/. In Serbian, there are five affricates, namely, /č/, /đ/, /c/, /č/, and /dž/. Both languages produce approximate phonemes: in Persian, the phoneme /j/ is the only approximate, while in Serbian the approximate manner of consonant production is applied to the phonemes /j/ and /v/. The lateral manner of production is restricted in Persian to the phoneme /l/, while in Serbian there is also the phoneme /lj/, for which there is no Persian equivalent. Finally, the trilling manner of articulation associated with the phoneme /r/ is a consonant production

feature that exists only in Serbian, while the corresponding phoneme /r/ in Persian is characterized by the approximate manner of production.

3. Regarding *the comparison of vowel sounds*, it can generally be stated that Persian speakers are able to comprehend and pronounce all vowel phonemes of Serbian. In contrast, Serbian learners of Persian are able to understand and articulate all Persian vowels except for the vowel /â/. Therefore, to compensate for the lack of this vowel phoneme, Serbian learners of Persian tend to substitute it with either /a/ or /o/. Table 7 provides an overview of the phonemes that are unique to each language, and the substitute phonemes that speakers use to compensate for the absence of certain phonemes in their respective languages.

Persian Phoneme	Serbian Phoneme	Substitute phoneme	Example	Changed phoneme
/â/	-	/a/, /o/	salâm	salom/salam
/h/	-	/x/	harf	xarf
/q/	-	/g/	qavi	gavi
/ʔ/	-	/a/	ʔâdi	adi
-	/lj/	/l/	ljubav	lubav
-	/c/	/s/	car	sar
-	/nj/	/n/	njegov	negov

Table 7. A Comparison of unique and substitute phonemes between Persian and Serbian

4. Regarding *the structure of syllabus*, there is a difference in complexity between the two languages; in other words, Persian and Serbian have distinct syllabic structures. Persian has fixed three syllable types, while Serbian has eight frequently occurring syllable types. This means that the syllable structure in Persian is less complex compared to Serbian. The phonology of Persian dictates that the beginning of a syllable must consist of a consonant followed by a vowel, so it is not permissible to begin a syllable with a vowel. Moreover, there may be no more than two consonants in the same syllable after the vowel. On the other hand, Serbian syllables may begin with either a consonant or a vowel and contain up to two consonants before the vowel and two consonants after the vowel. In addition, there are cases where a sequence of consecutive consonants can form a single syllable in Serbian, with the semivowel /r/ acting as a vowel nucleus (Radojičić et al., 2019). Despite the differences in syllable structure, the three syllable patterns in Persian have their equivalents in Serbian. Therefore, it is unlikely that a Serbian learner of Persian will have difficulty understanding and producing the syllables in Persian. However, when Persian speakers try to learn Serbian, they tend to simplify the complex syllable structures to fit the Persian syllable pattern. Table 8 shows examples of syllable changes that Persian speakers make in the pronunciation of Serbian words.

Serbian word	pronunciation	Persian speaker pronunciation
vrata	/vrata/	ve.rata
trg	/trg/	terg
zdravo	/zdravo/	ʔez.de.ravo

Table 8. Examples of syllable changes in the pronunciation of Serbian

9. Persian phonology and orthography

In order to gain a comprehensive understanding of the challenges that Serbian learners of Persian face with respect to the phonological system of Persian, it is essential to examine the relationship between the phonemes and the orthographic representations of Persian. Unlike Serbian, which is characterised by a one-to-one correspondence between letters and phonemes, this correspondence is not consistently implemented in Persian, as phonemes in Persian are not always accurately represented by the letters of the Persian alphabet and this inconsistency between letters and phonemes poses a challenge for Serbian learners of Persian.

According to the official guide to the Persian Script and Writing System published by the Academy of Persian Language and Literature (2010)[4], the Persian alphabet consists of 33 letters. The way each letter is connected to the preceding or following letter in a word depends on whether that letter is at the beginning, middle, or end of a word, and not all letters are connected to the following letter. The most notable features of Persian writing also include the presence of punctuation marks, cursive writing, and the various consonant forms of consonants. However, the most striking feature of Persian writing is the omission of short vowels, i.e., /a/, /e/, /o/ in the script. In other words, the diacritical marks are not usually used in texts and are mainly used by beginners, as it is assumed that adult native speakers have already developed cognitive strategies for efficient speech performance. The lack of diacritical marks leads to errors, especially for learners of Persian, as words can be read in different ways. For example, the word "كرم" [K-R-M], without diacritical marks, i.e. short vowels, and when out of context, can be read differently, with different meanings such as: [KeRM: worm] , [KeReM: cream], [KaRaM: generosity].

In Persian, some consonant phonemes can be represented by different letters. This is because there are multiple forms of consonants that represent a phoneme. The reason for these multiple forms is due to the number of loan words from Arabic that have been adopted unchanged into Persian script. For example, although there is only one phoneme for /z/ in Persian, loanwords such as "لذيذ" [/laziz/ (adj). delicious], "ظلم" [/zolm/ (n). oppression], and "مريض" [/mariz/ (n). ill] retain the original Arabic phonemes, and represent three different phonemes (Safari, 2018).

In the present study, the "Salam Farsi Learner Corpus" was used to analyse the correlation between Persian phonemes and orthography. This learner corpus includes 300 text samples written by Serbian Persian learners, covering language levels A1 to C1, with a total word count of 26,987. The errors in the texts were

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4   دستور خط فارس (*dastur-e xatt-e farsi)*

classified and annotated in three different categories, i.e., *"Surface Structure Errors"*, *"Error Domains",* and *"Error Types"*. Based on the corpus data and associated reports, it can be concluded that the majority of the error tags are attributed to the domain of orthography, with an absolute frequency of 833 and a relative frequency of 31%. Moreover, it is noteworthy that the most common types of errors are associated with the precise representation of consonant and vowel phonemes, with an absolute frequency of 610 and a relative frequency of 23% (Safari, 2018).

In order to provide a concise and comprehensive overview of the phonological and orthographic errors of Serbian Persian learners, the results of the corpus findings can be summarised as follows:

The most frequent type of orthographic error is the substitution of the vowel phoneme /â/. This is due to the fact that the phoneme /â/ does not exist in Serbian, which makes it difficult for learners to accurately choose the correct vowel phoneme in Persian. As a result, they tend to replace it with the closest possible alternative, which is the phoneme /a/. The following is a sample extracted from the corpus data:

Error Form: [دنشکده] danesškade
Correct Form: [دانشکده] dârneškade
Error Tag: S_O_VL
Error in Surface Structure: Substitution (S)
Error in the Domain: Orthography (O)
Error type: Long Vowel Character (VL)

The orthographic errors related to consonants, especially the phonemes for which there is no Serbian equivalent, namely /ʔ/, /x/ and /q/, these consonants are corrected by either replacing them with the closest consonant in the Serbian language or omitting them altogether. The following are two samples extracted from the corpus data:

Error Form: [دکیکه] dakike
Correct Form: [دقیقه] daqiqe
Error Tag: S_O_CC
Error in Surface Structure: Substitution (S)
Error in the Domain: Orthography (O)
Error type: Consonant Character (CC)

Error Form: [سدی] sadi
Correct Form: [سعدی] saʔdi
Error Tag: O_O_CC
Error in Surface Structure: Omission (O)
Error in the Domain: Orthography (O)
Error type: Consonant Character (CC)

Based on the corpus findings and the subsequent analyses, it can be concluded that spelling is a major challenge for Serbian Persian learners, mainly due to the phonemic differences between the two languages.

10. Conclusion

The present study aimed to provide a contrastive analysis of the phonetic structure of Persian and Serbian, with a specific focus on identifying areas of difficulty for Serbian speakers learning Persian. The results showed that the absence of four phonemes in Serbian, including the consonants /q/, /ʔ/, /x/, and the vowel /â/, was a crucial factor in the errors that Serbian speakers made in learning, pronouncing, and writing Persian. The results were supported by the data collected from the Persian learner corpus, which showed that the orthographic errors made by Serbian learners of Persian were the most frequent types of errors in the entire corpus, which is primarily due to the phonemic differences between the two languages. The findings of this study contribute to a better understanding of the challenges faced by Serbian learners of Persian and highlight the need for more effective language learning strategies and resources. Overall, this study contributes to the field of contrastive phonological studies of Persian and Serbian. In addition, it has significant implications for language instructors of Persian, as it can support the development of customized teaching materials and the formulation of effective language learning strategies.

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Sažetak

FONOLOŠKA KONTRASTIVNA ANALIZA PERSIJSKOG I SRPSKOG

Početno upoznavanje odraslih učenika sa glavnim strukturama ciljnog jezika, tj. sa njegovim fonološkim, morfološkim, sintaktičkim i semantičkim odlikama, predstavlja jedan od primarnih i ključnih koraka u učenju i nastavi drugog jezika. Kontrastivna analiza može biti od koristi u tom procesu, budući da pomaže učenicima da steknu dobar uvid u lingvističke sličnosti i razlike između jezika. I persijski i srpski jezik pripadaju porodici indoevropskih jezika; međutim, premda je moguće pronaći izvesne sličnosti između ova dva jezika, postoje i značajne razlike u njihovim strukturama. U ovom radu dati su pregled i poređenje fonološkog sistema i obrazaca po kojima se formiraju slogovi u persijskom i srpskom, kako bi se utvrdilo koje su to foneme prisutne u persijskom, a ne postoje u srpskom jeziku, kao i da bi se istražili izazovi sa kojima se suočavaju srpski učenici pri izgovoru fonema specifičnih za persijski jezik. U radu se takođe izlažu i razmatraju neki primeri fonoloških grešaka koje prave srpski učenici, a koje se mogu ogledati i ustanoviti u ortografiji, pri čemu se koristi *Učenički korpus persijskog jezika (Salam Farsi Learner Corpus).* Rezultati istraživanja mogu biti upotrebljeni u istraživanjima iz oblasti teorijske lingvistike, a posebno su korisni u nastavi persijskog za govornike srpskog jezika.

Ključne reči:

kontrastivna analiza, fonološka struktura, greške pri učenju persijskog, persijski, srpski