

CHAPTER TWO

DESCRIPTION OF THE PHONETIC AND PHONOLOGICAL SYSTEMS OF PERSIAN

2.1 Introduction

There exist a number of descriptive studies on Persian; namely, Samareh (1968, 1977, 1992), Haghshenas (1990), Meshkatoddini (1998), Abumahbub (2002), Towhidi (1974), and Kalbassi (1992), which are used as sources for the description of Persian phonetics, phonology, syllabic structure and stress in this research.

2.2 The Persian Phonetic System

2.2.1 Persian Consonants

The Persian language has 72 main phonetic consonants, which can be divided into 8 groups based on their manner of articulation and 10 groups based on the place of articulation as illustrated in the following table.¹ The air stream mechanism used in the articulation of all Persian consonants is ‘pulmonic egressive’, in which the air stream is created by the lungs and exhaled through the mouth or nose.

¹These phonetic consonants are various realizations of 23 consonant phonemes in the Persian language.

The descriptions of the Persian consonants are based on the following:

(i) Air stream mechanism

It refers to the initiation of air flow required for articulating speech sounds, as in **pulmonic**, **glottalic**, **velar**, etc. This mechanism refers to the direction of the air flow as well, that can be **ingressive** or **egressive**.

(ii) Articulatory force

It is concerned with how much muscular energy is involved in producing speech sounds and the terms which are used to represent this feature are **fortis** (strong) and **lenis** (weak).

(iii) Phonation

It is involved in the existence, lack or the degree of vibration in the vocal folds; and is represented by the terms **voiced**, **voiceless**, etc.

(iv) Area of articulation

It refers to an area in the vocal tract where the obstruction of the air occurs and to the speech organs involved in articulating that consonant. For example, the area of articulation could be **bilabial** (both lips), **alveolar** (tongue against the alveolar ridge), **velar** (tongue against the soft palate), etc.

(v) Manner of articulation

It refers to the manner in which the consonant is articulated, for example **nasal** (through the nose), **plosive** (complete obstruction of air), **approximant** (vowel-like), etc.

(vi) Air passage

It is concerned with the passages of the air above the pharynx through which the air flow can escape into the atmosphere. These are the **oral cavity** and the **nasal cavity**.

Table 2.1
Persian consonants

		bilabial	labio-dental	dental-alveolar	alveolar	post-alveolar	palatal	velar	uvular	glottal
plosives	fortis	p ^h p p _h	ɸ	T ^h T T	t ^h t t _h		c ^h c c _h	k ^h k k _h		ʔ+ ʔ
	lenis	b b ^o b _o	ɸ	D D ^o D _o	d d		j j ^o j _o	g g ^o	q q ^o q _o	
fricatives	fortis		f	s		ʃ			χ	h
	lenis		v v ^o v _o	z z ^o z _o		ʒ			ʁ	ɦ
affricates	fortis					tʃ				
	lenis					dʒ , dʒ ^o				
nasals	lenis	m m ^o	ɱ	n>	n n ^o	ɳ	ɲ	ŋ	ɴ	
laterals	fortis									
	lenis	clear			l l ^o l _o					
		dark								
trills	lenis				r r ^o r _o					
flaps	lenis				ɾ					
approximants	lenis						j j ^o j _o			

2.2.1.1 Plosives:

The Persian plosive consonants are usually produced in four sequential phases: The first phase, which is called the **closing** phase is when one articulator is moved against another, or two articulators are moved against each other to form a total stricture. The second phase, **hold** or **compression**, is the time when the air is compressed behind the closure. The third phase, which is called **release** phase, refers to the time when the air behind the stricture is allowed to escape. The last phase is what occurs after the release phase. This is called the **post-release phase** and is different for different plosives in different positions.

All Persian plosives can occur in the initial, medial and final position; that is, they can appear at the beginning of a word, between other speech sounds and at the end of a word before pause.

In producing the plosives, the soft palate, or velum, is raised to keep the air back from escaping through the nasal cavity, except for the time when they are followed by nasal consonants. In such cases, the nasal cavity is open as well, and air can pass both through the mouth and nose, as in the example 'متن' [mætn] 'text'. In addition, when the plosives are followed by lateral consonants, the lateral release occurs, that is the air passes along the sides of the tongue, as in the example 'مطلوب' [mætlub] 'favourite'.

(i) **Bilabial fortis plosives** [p^h, p, p]_h

In the production of the bilabial fortis plosives, the lips are pressed together to make a complete closure. The soft palate, or velum, is raised to block the way to the nasal cavity, so the air is compressed behind the lips. The vocal folds are wide apart, so there is no

stricture for the air in the glottis and no vibration in the vocal folds. The other articulators are in the position of producing the next speech sound. Finally, the closure is removed and all the air behind the lips is suddenly released.

[p^h]

Since during the articulation of this plosive the glottis is open, some part of the air of the lungs escapes immediately after the air behind the lips, so the production of this plosive is accompanied with a puff of air which is called aspiration. This plosive occurs at the beginning of a stressed syllable, as in the examples ‘پر’ [p^hɔr] ‘full’ and ‘سپری’ [sep^hæri] ‘elapsed’.

Phonetic description of [p^h]:

fortis, voiceless, aspirated, oral, bilabial, plosive

[p_h]

In producing [p_h], the vocal folds are wide apart, so some part of the air of the lungs escapes out of the oral cavity immediately after the release of the air behind the lips, but the air escaped is not so much as that in an aspirated [p^h]. This plosive occurs at the beginning of an unstressed syllable (Samareh, 1992: 68) as in [p_h] in the example word

‘می پرید’ [‘mipærid]_h ‘He/She was jumping’ and ‘سم پاشید’ [‘sæmpɑʃid]_h ‘sprayed poison’.

Phonetic description of [p_h]:

fortis, voiceless, partly aspirated, oral, bilabial, plosive

[p]

This plosive is also produced with the open glottis, but there is no aspiration since no air from the lungs escapes along with the compressed air behind the lips. This consonant occurs in final position and when followed by another plosive, as in the words 'توپ' [tup] 'ball', 'توپ بازی' [tupbazi] 'a ball game' .

Phonetic description of [p]:

fortis, voiceless, unaspirated, oral, bilabial, plosive

(ii) Labio-dental fortis plosive [p̪]

When the bilabial plosive [p] precedes a labio-dental sound such as [f,v] the stop is often made by a labio-dental rather than a bilabial closure in anticipation of the following fricative articulation (Samareh, 1992: 71), as in 'سوپ فروش' [supfruʃ] 'a person who sells soup'.

Phonetic description of [p̪]:

fortis, voiceless, unaspirated, oral, labiodental, plosive

(iii) Bilabial lenis plosives [b, ɸ, ɸ̥]

In the production of the bilabial lenis plosives, the lips are pressed together to make a complete closure, the soft palate, is raised to block the way to the nasal cavity, so the air is compressed behind the lips. The compressed air and the articulatory force involved in the production of these plosives are not as much as that for bilabial fortis plosives. The other articulators are in the position of producing the next speech sound. Finally, the closure is removed and the air behind the lips is suddenly released.

[b]

In producing [b] the vocal folds are in vibration position to produce voice during the articulation of this speech sound. There is thorough vibration during the production of this plosive. The plosive [b] occurs between two voiced speech sounds such as 'أبی' [abi] 'blue' and 'جذبه' [dʒæz'be] 'charisma'.

Phonetic description of [b]:

lenis, voiced, plosive, oral, bilabial

[b̥]

When the plosive [b̥] occurs in initial position, the voice produced by the vocal folds accompanies only the second half of this consonant. So, there is no thorough vibration during the production of this consonant. This means that at the beginning of the word, it is partly devoiced (Samareh, 1992: 73). For example, in the word 'باد' [b̥ad] 'wind' the first part of [b̥] is devoiced.

Phonetic description of [b̥]:

lenis, partly devoiced, oral, bilabial, plosive

[b̤]

In the production of [b̤], the glottis is wide open, so that no voice is produced during the production of this sound. It occurs in final position, for example in the word 'نصب' [næsb̤] 'installation'.

Phonetic description of [b̤]:

lenis, devoiced, oral, bilabial, plosive

(iv) **Labio-dental lenis plosive [b]**

When the bilabial plosive [b] precedes a labio-dental sound such as [f, v] the stop is often made by a labio-dental rather than a bilabial closure in anticipation of the following fricative articulation, as in 'أبفروش' [abfruʃ] 'a person who sells water'.

Phonetic description of [b]:

lenis, voiced, oral, labio-dental, plosive

(v) **Dental-alveolar fortis plosives [T^h, ʈ, ʈ_h]**

In the production of the dental-alveolar fortis plosives, the tongue blade is in contact with alveolar ridge and the tip of the tongue is pressed against the upper front teeth to make a complete closure. The velum is raised to block the way to the nasal cavity, so the air is compressed behind the dental-alveolar closure. The vocal folds are wide apart, so there is no stricture for the air in the glottis. The other articulators are in the position of producing the next speech sound. Finally, the tongue abruptly leaves the alveolar ridge and teeth to let the air escape through the oral cavity.

[T^h]

In producing the plosive [T^h] the vocal folds are wide apart, and no voice is produced in the glottis. Following the release of the air behind the dental-alveolar closure, some of the air from the lungs escapes from the mouth. The production of this plosive is accompanied with aspiration. This plosive occurs at the beginning of stressed syllables, as in the examples 'تور' [T^hur] 'net' and 'پرسٹو' [pæræs'T^hu] 'swallow'.

Phonetic description of [T^h]:

fortis, voiceless, aspirated, oral, dental-alveolar, plosive

[T_h]

The plosive [T_h] is articulated with an open glottis, and there is partial aspiration.

This consonant occurs at the beginning of an unstressed syllable such as [T_h] in the word 'سه تا' [ˈseT_hɑ] 'three, three items'

Phonetic description of [T_h]:

fortis, voiceless, partly aspirated, oral, dental-alveolar, plosive

[T]

This consonant is articulated with the vocal folds wide apart. There is no escape of air through the glottis after the release phase, which results in the lack of aspiration for [T].

This plosive occurs in final position as well as before other consonants; as in the words 'پست' [pæst] 'inferior' and 'عطسه' [ʔætse] 'sneeze'.

Phonetic description of [T]:

fortis, voiceless, unaspirated, oral, dental-alveolar, plosive

(vi) Dental-alveolar lenis plosives [D, D^o, D_o]

In the production of the dental-alveolar lenis plosives, the tongue blade is in contact with the alveolar ridge and the tip of the tongue is pressed against upper front teeth to make a complete closure. The soft palate is raised to block the way to the nasal cavity, so the air is compressed behind the oral closure. The amount of compressed air and the articulatory force involved in the production of these consonants are less than that for the dental-alveolar fortis plosives. The other articulators are in the position of producing the next speech sound. Finally, the closure is removed and the air behind the lips is suddenly released.

[D]

The vocal folds are in vibration position to produce voice during the articulation of this speech sound. There is thorough vibration for this plosive. The plosive [D] occurs between two voiced speech sounds as in the words 'بدن' [bæɒæn] 'body' and 'گردن' [gæɒɒæn] 'neck'.

Phonetic description of [D]:

lenis, voiced, oral, dental-alveolar, plosive

[D°]

There is no thorough vibration during the production of this consonant. The speech sound [D°] occurs only in initial position. The voice produced by the vocal folds accompanies the second half of this consonant, that is to say, in the initial position, the first half of this speech sound is not voiced. For example, in the word 'دیر' [d°ir] 'late', the second part of the word is voiced.

Phonetic description of [D°]:

lenis, partly devoiced, oral, dental-alveolar, plosive

[D̥]

In the production of [D̥], the glottis is wide open, so that no voice is produced during the production of this sound. It occurs only in final position, as in the words 'رشد' [rʃD̥] 'growth' and 'قصد' [qæʃD̥] 'intention'.

Phonetic description of [D̥]:

lenis, devoiced, oral, dental-alveolar, plosive

(vii) **Alveolar fortis plosives** [t^h, t, t_h]

In the production of these plosives, the tongue blade is in contact with the alveolar ridge in a way that the tongue does not touch the teeth, this happens when these consonants follow [l], [n] and [r]. During the production of these alveolar plosives, the way to the nasal cavity is closed, and the air is compressed behind the alveolar closure. The vocal folds are wide apart, so no voice is produced. The other articulators are in the position of producing the next speech sound. Finally, the tongue abruptly leaves the alveolar ridge to let the air escape through the oral cavity.

[t^h]

In producing [t^h] the vocal folds are wide apart and no voice is produced. While the glottis is open, some of the air from the lungs escapes just after the release of the air behind the alveolar closure, which results in the production of an aspirated sound. This plosive occurs at the beginning of a stressed syllable within a word, as in the examples ‘سنتور’ [sæn't^hur] ‘dulcimer’, ‘سلطان’ [sɒl't^han] ‘king’ and ‘مرطوب’ [mær't^hub] ‘humid’.

Phonetic description of [t^h]:

fortis, voiceless, aspirated, oral, alveolar, plosive

[t_h]

The plosive [t_h] is articulated with an open glottis, and a partial aspiration which takes less time than when it is produced at the beginning of a word or at the beginning of a stressed syllable. This consonant occurs in initial position of an unstressed syllable within a word, for example, ‘التهابى’ [ʔelt eha'bi] ‘inflammatory’ and ‘ارتحال’ [ʔerte'hal]

[ʔerte'hal] ‘pass away’.

Phonetic description of [t]:
h

fortis, voiceless, partly aspirated, oral, alveolar, plosive

[t]

This consonant is articulated with the vocal folds wide apart and there is no escape of air through the glottis just after the release phase, which results in the lack of aspiration for [t]. This plosive occurs only in final position; as in the words ‘غلت’ [qælt] ‘trill, roll’, ‘كلت’ [kolt] ‘pistol’ and ‘شورت’ [ʃort] ‘short’.

Phonetic description of [t]:

fortis, voiceless, unaspirated, oral, alveolar, plosive

(viii) Alveolar lenis plosives [d, d̥]

In the production of the alveolar lenis plosives, the tongue blade is in contact with alveolar ridge in a way that the tongue does not touch the teeth. This happens when these consonants follow [l], [n] and [r]. During the production of these alveolar plosives, the passage to the nasal cavity is closed, and the air is compressed behind the alveolar closure. The compressed air and the articulatory force involved in the production of these consonants are less than that for the alveolar fortis plosives. The other articulators are in the position of producing the next speech sound. Finally, the closure is removed and the air behind the lips is suddenly released.

[d]

The vocal folds are in vibration position to produce voice during the articulation of this speech sound. There is thorough vibration for this plosive. The plosive [d] occurs

between two voiced speech sounds as in the words 'قندان' [qændan] 'sugar bowl' and 'گلدان' [goldan] 'flower vase'.

Phonetic description of [d]:

lenis, voiced, oral, alveolar, plosive

[d̥]

In the production of [d̥], the glottis is wide open, and no voice is produced during the production of this sound. It is in word final position, and fully devoiced, for example in the words 'قند' [qænd̥] 'lamp of sugar' and 'جلد' [d̥zeld̥] 'cover'.

Phonetic description of [d̥]:

lenis, devoiced, oral, alveolar, plosive

(ix) **Palatal fortis plosives** [c^h, c, c]_h

In the production of the palatal fortis plosives, the closure is formed in the center of hard palate, in a way that the center of the tongue is raised and pressed against the highest curved part of the hard palate. The velum is raised to block the way to the nasal cavity, and that the air is compressed behind the palatal closure. The vocal folds are wide apart, so there is no stricture in the glottis. The other articulators are in the position of producing the next speech sound. Finally, the tongue abruptly leaves the hard palate to let the air escape through the oral cavity. These consonants occur before front vowels [i, e, æ], before other consonants and also in final position, as in the examples 'چی' [ci] 'who', 'شکل' [ʃecɪ] 'form' and 'شک' [ʃæc] 'doubt'.

[c^h]

In producing the plosive [c^h] the vocal folds are wide apart, and the glottis is open. Following the release of the air behind the palatal closure, some part of the air from the lungs escapes from the mouth, resulting in an aspirated sound. This plosive occurs at the beginning of stressed syllables, as in the examples 'کیف' [c^hif] 'bag' and 'سرکه' [ser'c^he] 'vinegar'.

Phonetic description of [c^h]:

fortis, voiceless, aspirated, oral, palatal, plosive

[c_h]

The plosive [c_h] is articulated with an open glottis and a partial aspiration. The time it takes to produce this sound is less than the time taken to produce the sounds that occur at the beginning of a word or at the beginning of an stressed syllable. This consonant occurs at the beginning of an unstressed syllable as in the words 'شکیمی'

[ʃæc_h i'bi] 'patience' and 'ترکیبی' [tærc_h i'bi] 'compound'.

Phonetic description of [c_h]:

fortis, voiceless, partly aspirated, oral, palatal, plosive

[c]

This plosive is produced with an open glottis and no air from the lungs escapes just after the release of the compressed air behind the palatal closure. Therefore, there is no aspiration for [c]. This consonant occurs in final position or before another consonant, as in the words 'تک' [tæc] 'single' and 'اکثر' [ʔæc'sæɾ] 'majority'.

Phonetic description of [c]:

fortis, voiceless, unaspirated, oral, palatal, plosive

(x) **Palatal lenis plosives** [ɟ, ɟ̤, ɟ̥]

In the production of the palatal lenis plosives, the closure is formed in the center of the hard palate, in a way that the center of the tongue is raised and pressed against the highest curved part of the hard palate. During the articulation of these palatal plosives, the way to the nasal cavity is closed, and the air is compressed behind the palatal closure. The compressed air and the articulatory force involved in the production of these consonants are less than that for the palatal fortis plosives. The other articulators are in the position of producing the next speech sound. Finally, the closure is removed and the compressed air is suddenly released. These consonants occur before front vowels [i, e, æ], before other consonants and also in final position.

[ɟ]

The vocal folds vibrate to produce voice during the articulation of this consonant. There is a thorough vibration for this plosive. [ɟ] occurs between two voiced speech sounds as in the words 'اگر' [ʔæɟær] 'if' and 'ریگزار' [riɟzɑr] 'sandy region'.

Phonetic description of [ɟ]:

lenis, voiced, oral, palatal, plosive

[ʃ]

There is no extensive vibration during the production of this consonant. The voice produced by the vocal folds accompanies only the second half of this consonant. [ʃ] occurs only in initial position, as in the examples, 'گرم' [ʃærm] 'warm' and 'گرد' [ʃerd] 'round'.

Phonetic description of [ʃ]:

lenis, partly devoiced, oral, palatal, plosive

[ʒ]

In the production of this velar plosive, the glottis is wide open, so no voice is produced during the production of the plosive [ʒ]. It occurs word-finally, as in the words 'ریگ' [riʒ] 'pebble' and 'سنگ' [sæŋʒ] 'stone'.

Phonetic description of [ʒ]:

lenis, devoiced, oral, palatal, plosive

(xi) Velar fortis plosives [k^h, k, k_h]

For these plosives, the closure is formed in the center of the soft palate, in a way that the back of the tongue is raised to touch the center of the velum and prevent the air from escaping through the oral cavity. Simultaneously, the soft palate is raised to block the way to the nasal cavity. As soon as the tongue leaves the velum, the compressed air is suddenly released. The vocal folds are wide apart, and there is no voice during the production of these plosives. The other articulators are in the position of producing the next speech sound. Finally, the tongue abruptly leaves the hard palate to let the air escape through the oral cavity. These consonants occur before back vowels [ɑ, ɔ, u], and before velar consonants [k] and [g].

[k^h]

In producing the plosive [k^h] the vocal folds are wide apart, and no voice is produced in the glottis. Following the release of the air behind the velar closure, some part of the air of the lungs escapes out of the mouth. The production of this plosive is therefore accompanied with aspiration. This plosive occurs at the beginning of a stressed syllable, as in the examples 'کار' [k^hɑr] 'work' and 'شکار' [ʃe^hk^hɑr] 'hunting'

Phonetic description of [k^h]:

fortis, voiceless, aspirated, oral, velar, plosive

[k]_h

The plosive [k]_h is articulated with an open glottis, and is partially aspirated. This consonant precedes an unstressed syllable as in the examples 'مکاتب' [mækɑ'teb]_h 'schools' and 'شکوفه' [ʃeku'fe]_h 'blossom'.

Phonetic description of [k]_h:

fortis, voiceless, partly aspirated, oral, velar, plosive

[k]

This plosive is also produced with an open glottis. There is no aspiration as no air from the lungs escapes immediately after the release of the compressed air behind the velar closure. This consonant occurs before velar consonants [k] and [g] as in the examples 'دکان' [dɒkkan] 'shop' and 'رک گو' [rɒkɡu] 'frank'.

Phonetic description of [k]:

fortis, voiceless, unaspirated, oral, velar, plosive

(xii) **Velar lenis plosives [g, ɡ]**

In the production of the velar lenis plosives, the closure is formed in the center of the soft palate, in a way that the back of the tongue is raised to touch the center of the velum preventing the air from escaping through the oral cavity. During the production of these velar plosives, the way to the nasal cavity is closed, so the air is compressed behind the oral closure. The compressed air and the articulatory force involved in the production of these consonants are not as much as that for the velar fortis plosives. The other articulators are in the position of producing the next speech sound. Finally, the closure is opened and the compressed air is suddenly released.

[g]

The vocal folds vibrate to produce voice during the articulation of this speech sound. There is thorough vibration for this consonant. The plosive [g] occurs between two voiced speech sounds as in the words 'انگور' [ʔæŋɡur] 'grape' and 'سیگار' [sigar] 'cigar'.

Phonetic description of [g]:

lenis, voiced, oral, velar, plosive

[ɡ]

There is no thorough vibration during the production of this consonant. This plosive occurs in initial position before back vowels. It is partially devoiced, for example in the words 'گاری' [ɡari] 'cart' and 'گل' [ɡl] 'flower'.

Phonetic description of [ɡ]:

lenis, partly devoiced, oral, velar, plosive

(xiii) **Uvular lenis plosives [q, q̣, q̤]**

The back of the tongue and the uvula join to make this speech sound. For this to happen, the extreme back part of the tongue is raised to touch the extreme back part of the soft palate, which is called uvula, in order to block the way to the oral cavity. At the same time, the velum is raised to close the way to the nasal cavity. As soon as the back of the tongue drops down, the air compressed behind the uvular closure escapes out.

[q]

In producing [q] the vocal folds are in vibration position to produce voice during the articulation of this speech sound. There is thorough vibration for this plosive. [q] occurs between two voiced speech sounds such as 'عاقِل' [ʔaqel] 'wise' and 'برقى' [bærqi] 'electrical'.

Phonetic description of [q]:

lenis, voiced, oral, uvular, plosive

[q̣]

There is no thorough vibration during the production of this consonant. [q̣] occurs in initial position. The voice produced by the vocal folds accompanies the second half of this consonant, for example, in the word 'قند' [q̣ænd] 'lamp of sugar'.

Phonetic description of [q̣]:

lenis, partly devoiced, oral, uvular, plosive

[q̤]

In the production of this uvular plosive, the glottis is wide open, and no voice is produced. It occurs in final position, as in the example 'نطق' [nɔtq̤] 'speech'.

Phonetic description of [g]:

lenis, devoiced, oral, uvular, plosive

(xiv) **Glottal fortis plosives** [ʔ, ʔ]

+

The articulators involved in the production of these plosives are the vocal folds. To achieve this, the vocal folds are pressed against each other preventing the air from passing through the glottis. The air is trapped behind the closed glottis until this closure is opened and the compressed air is suddenly released.

During the production of these plosives, the position of the soft palate depends on the speech sound that follows them; that is, if an oral sound occurs after glottal fortis plosives, the soft palate is raised to obstruct the way to the nasal cavity; if a nasal consonant follows them, the soft palate drops down to keep the way to the nasal cavity open.

These plosives are voiceless, because when the vocal folds are in the position of producing a glottal plosive, they cannot produce vibration. In other words, the mechanism of producing voice is different from the mechanism of producing a glottal fortis plosive.

[ʔ]

+

This consonant occurs at the beginning of stressed syllables. It has a high degree of intensity as in the examples ‘اگر’ [ʔæjær] ‘if’, ‘آمد’ [ʔamæd] ‘came’, ‘فاعلى’ [faʔeli] ‘subjective’ and ‘بلعید’ [bælʔid] ‘swallowed’

Phonetic description of [ʔ]

fortis (high intensity), voiceless, oral, glottal, plosive

[ʔ]

This fortis plosive occurs in all positions other than at the beginning of stressed syllables, and it has a low degree of intensity (Samareh, 1992: 79), for example, ‘معصوم’ [mæʔ’sum] ‘innocent’ and ‘فرع’ [fæʔr] ‘branch’.

Phonetic description of [ʔ]:

fortis (low intensity), voiceless, oral, glottal, plosive

2.2.1.2 Fricatives

Fricatives are continuant consonants which are produced when one articulator moves against another or two articulators approach and make a narrow passage for the air; then by passing the air through this narrow passage a fricative sound is produced. Depending on the articulators making these narrow passages, various speech sounds are made, which are called fricative consonants. The Persian fricative consonants can be found in initial, medial and final position; that is, they appear at the beginning of a word, between other speech sounds and at the end of a word before pause.

In producing all the Persian fricatives, the soft palate, or velum, is raised to hold the air back from escaping through the nasal cavity. So, the only way for the air to pass is through the oral cavity.

(i) Labio-dental fortis fricative [f]

The articulators involved in the production of this fricative are the lower lip and the upper front teeth. To do this, the upper front teeth touch the inside part of the lower lip so that the air has the chance to escape through the openings between teeth and lip. During the production of [f], the glottis is open and there is no vibration in the vocal folds, so it is a

voiceless consonant. The examples are 'فرض' [færz] 'assumption', 'سرفه' [sɔrfe] 'cough' and 'برف' [bærf] 'snow'.

Phonetic description of [f]:

fortis, voiceless, fricative, oral, labiodental

(ii) **Labio-dental lenis fricative [v, v̥, v̥]**

The articulators involved in the production of these fricative consonants are the lower lip and the upper front teeth. For this to happen, the upper front teeth touch the inside part of the lower lip so that the air can escape through the openings between teeth and lip.

[v]

The vocal folds are in vibration position to produce voice during the articulation of this speech sound. There is thorough vibration for this consonant. The fricative [v] occurs between two voiced speech sounds, as in the words 'جزوه' [dʒɔzveh] 'pamphlet' and 'آوا' [ʔava] 'phone'.

Phonetic description of [v]:

lenis, voiced, oral, labio-dental, fricative

[v̥]

There is no extensive vibration during the production of this consonant. Voice is produced only during the articulation of the second half of this consonant. [v̥] occurs only in initial position, as in the examples, 'واضح' [v̥azeh] 'clear', 'واک' [v̥ak] 'voice'.

Phonetic description of [v̥]:

lenis, partly devoiced, oral, labio-dental, fricative

[v̥]

During the articulation of this labio-dental fricative, the glottis is wide open, so no voice is produced in the production of this consonant. It occurs in final position (Samareh, 1992: 81), as in the examples 'نشور' [næʃv̥] 'growth' and 'عفو' [ʔæfv̥] 'forgiveness'.

Phonetic description of [v̥]:

lenis, devoiced, oral, labio-denta, fricative

(iii) Dental-alveolar fortis fricative [s]

The articulators involved in the production of this consonant are the tongue, the alveolar ridge and the teeth. To articulate this consonant, the blade of the tongue touches the alveolar ridge so that there is only a narrow passage along the center of the tongue for the air to pass and the tip of the tongue is in contact with the lower front teeth.

During the production of [s], the vocal folds are wide apart and there is no vibration. The air coming up from the lungs escapes through the narrow passage formed along the center of the tongue (Samareh, 1992: 82). The examples are 'سرخ' [sɔrx] 'red', 'اثر' [ʔæsær] 'trace' and 'داس' [das] 'sickle'.

Phonetic description of [s]:

fortis, devoiced, oral, dental-alveolar, fricative

(iv) Dental-alveolar lenis fricatives [z, ẓ, ẓ̥]

The articulators involved in the production of these fricative consonants are the tongue, the alveolar ridge and the teeth. For this to happen, the blade of the tongue touches

the alveolar ridge so that there is only a narrow passage along the center of the tongue for the air to pass and the tip of the tongue is in contact with the lower front teeth. (Samareh, 1992: 82)

[z]

The vocal folds are in vibration position to produce voice during the articulation of this speech sound. Therefore, this consonant is fully voiced. The fricative [z] occurs between two voiced speech sounds (Samareh, 1992: 82), as in 'دزدی' [dɒzdi] 'theft' and 'مواظبت' [mɒvɒzɒbæt] 'supervision'.

Phonetic description of [z]:

lenis, voiced, oral, dental-alveolar, fricative

[z̤]

There is no extensive vibration during the production of this consonant. The voice produced by the vocal folds accompanies only the second half of this consonant. [z̤] occurs only in initial position (Samareh, 1992: 83), as in the examples, 'زود' [z̤ud] 'soon' and 'زرد' [z̤ærd] 'yellow'.

Phonetic description of [z̤]:

lenis, partly devoiced, oral, dental-alveolar, fricative

[z̥]

During the articulation of this dental-alveolar fricative, the glottis is wide open, and no voice is produced. Therefore, it is fully devoiced. It occurs in final position (Samareh, 1992: 83), as in the examples 'حفظ' [hefz̥] 'preservation' and 'مرز' [mærz̥] 'border'.

Phonetic description of [z]:

lenis, devoiced, oral, dental-alveolar, fricative

(v) **Post-alveolar fortis fricative [ʃ]**

For the production of this fricative, the tongue touches the roof of the mouth in a way that the blade of the tongue is pressed against an area between the alveolar ridge and the hard palate. The tip of the tongue is in contact with the lower front gums and the air escapes through the narrow passage formed along the center of the tongue. The width and depth of this passage is comparatively much bigger for [ʃ] than that for [S] and [Z]. In the production of this phoneme the vocal folds are wide apart and play no role in articulating this speech sound. Therefore, this consonant is voiceless. The examples are 'شاخ' [ʃax] 'horn', 'نبش' [næbʃ] 'corner' and 'عشق' [ʔeʃq] 'love'.

Phonetic description of [ʒ]:

fortis, voiceless, post-alveolar, oral, fricative

(v) **Post-alveolar lenis fricatives [ʒ]**

For the production of this post alveolar fricative, the tongue touches the roof of the mouth so that the blade of the tongue is pressed against an area between the alveolar ridge and the hard palate, and the tip of the tongue is in contact with the lower front gums and the air escapes through the narrow passage formed along the center of the tongue. The width and depth of this passage is comparatively much bigger for this fricative than that for [S] and [Z]. The vocal folds are in vibration position to produce voice during the articulation of this speech sound. Therefore, this consonant is fully voiced. The fricative [ʒ] occurs in initial position, between two voiced speech sounds, and in final position, as in 'ژولیده' [ʒulide] 'disheveled', 'مژه' [mʒe] 'eyelash' and 'دژ' [deʒ] 'fortress'.

Phonetic description of [ʒ]:

lenis, voiced, oral, post-alveolar, fricative

(vi) **Uvular fortis fricatives [x]**

For this fricative consonant to be produced, the back part of the tongue, or dorsum, gets close to the uvula to make a narrow passage. At the same time, the soft palate is raised to block the way to the nasal cavity. The air escapes through the passage formed at the back of the mouth, causing turbulence. Having passed through the passage, the air flows over the tongue and escapes out of the oral cavity. In the production of this consonant the vocal folds are wide apart and play no role in articulating this speech sound. Therefore, this consonant is voiceless. The examples are 'خواب' [xab] 'sleep', 'سخن' [sɔxæn] 'speech' and 'شاخ' [ʃax] 'horn'.

Phonetic description of [x]:

fortis, voiceless, oral, uvular, fricative

(viii) **Uvular lenis fricative [β]**

In articulating the fricative [β], the dorsum gets close to the uvula to make a narrow passage for the air. Simultaneously, the soft palate is raised to block the way to the nasal cavity. The airflow is constricted through the narrow passage between the back of the tongue and the uvula, causing turbulence. Having passed through the passage, the air flows over the tongue and escapes out of the oral cavity. The vocal folds are in vibration position to produce voice during the articulation of this speech sound; therefore, this consonant is fully voiced. The use of this consonant is very limited in the Persian language. It appears between voiced speech sounds. The examples are 'آقا' [ɑβɑ] 'Mister' and 'مغلوب' [mæβlub] 'defeated'.

Phonetic description of [ħ]:

lenis, voiced, oral, uvular, fricative

(ix) Glottal fortis fricative [h]

The articulators involved in the production of this consonant are the vocal folds. The edges of the vocal folds are brought together so that a narrowing is produced between the vocal folds. The way to the nasal cavity is closed by the soft palate. When the airflow rushes through this narrow passage a hissing sound is heard. This hissing sound is one of the Persian fricative consonants. During the production of this consonant, no voice is produced by the vocal folds. Therefore, [h] is a voiceless consonant.

This consonant has the quality of the vowel that follows it. For example, in the word 'همه' [hæme] 'all', [h] is followed by [æ]. The tongue, jaw, and lip positions for the vowel are all produced simultaneously with [h], so that this consonant has the quality of [æ]. When [h] is followed by the other vowels such as [e], [i], and [u], it has the quality of those vowels. With regard to this special quality of the consonant [h], it is generally said that it is phonetically a voiceless vowel. But, phonologically it is considered a consonant since in a syllable it occurs beside a vowel. The examples are 'حامی' [hami] 'supporter', 'ظاهر' [zaher] 'appearance' and 'واضح' [vazeh] 'clear'.

Phonetic description of [h]:

voiceless, oral, glottal, fricative

(x) **Glottal lenis fricative [ħ]**

This glottal fricative is articulated with the vocal folds. For this to happen, the edges of the vocal folds are brought together so that a narrowing is formed between them. When the airflow rushes through this narrow passage, a simultaneous weak hissing sound and voice is produced, so [ħ] is called a breathy voice. During the production of this speech sound, the way to the nasal cavity is closed by the soft palate. This consonant appears between two voiced speech sounds as in the examples ‘پرهیز’ [pærħiz] ‘abstaining’ and ‘زاهد’ [zæħed] ‘pious’.

Phonetic description of [ħ]:

voiced, oral, glottal, fricative

2.2.1.3 Affricates

Affricates are rather complex consonants. They begin as plosives and end as fricatives. Although each affricate consists of two separate speech sounds, it is regarded as a single consonant. For the articulation of these consonants the blade of the tongue is pressed against somewhere between the alveolar ridge and the hard palate to block the air flow, and then instead of a sudden release like what we have for the plosives, there is a plosion in the beginning which is continued with friction noise. For this to happen, the release takes place in two phases: first, the front part of the blade of the tongue is departed from its position and a plosion occurs; then the rest of the compressed air escapes, under pressure but gradually, through the passage along the center of the tongue to produce friction noise. So, none of the components of the two affricates in Persian are produced in the way that they are produced as single consonants. During the production of the affricates, the way to the nasal cavity is closed by the soft palate. The Persian affricates can appear at the beginning, within, and at the end of a word.

(i) Post-alveolar fortis affricate [tʃ]

During the articulation of this affricate, the glottis is wide open, and no voice is produced. Therefore, it is a voiceless consonant. [tʃ] is slightly aspirated at the beginning of stressed syllables. It occurs in initial, medial and final position, as in the examples 'چای' [tʃaj] 'tea', 'آچار' [ʔatʃar] 'wrench' and 'فاج' [qatʃ] 'slice'.

Phonetic description of [tʃ]:

fortis, voiceless, oral, post-alveolar, affricate

(ii) Post-alveolar lenis affricates [dʒ, dʒ̥]

For these consonants to be articulated, the blade of the tongue is pressed against somewhere at the border of the alveolar ridge and the hard palate to block the air flow, and then instead of a sudden release, there is a small plosion, which is continued with a slight friction noise. The plosion and the friction noise are weaker than that for the affricate [tʃ] since some part of the air is used for producing vibration.

[dʒ]

During the production of this consonant, the vocal folds are vibrating and producing voice. Therefore, it is fully voiced. It occurs between two voiced speech sounds, as in the examples 'مجاز' [mɔdʒaz] 'permitted' and 'گنجہ' [gændʒe] 'cupboard'.

Phonetic description of [dʒ]:

lenis, voiced, oral, post-alveolar, affricate

[dʒ̥]

This affricate consonant occurs in initial and final position as well as in medial position adjacent to a voiceless consonant. Voice is produced by the vocal folds during the

first or second half of the production of the sound, depending on the position in which it occurs. Therefore, there is no thorough vibration. The examples are ‘جوراب’ [dʒʊrɑb] ‘socks’, ‘گنجہ’ [gændʒ] ‘treasure’ and ‘مسجد’ [mæsdʒed] ‘mosque’.

Phonetic description of [dʒ]:

lenis, partly devoiced, oral, post-alveolar, affricate

2.2.1.4 Nasals

These nasals are produced when the velum is lowered, allowing air to escape freely through the nose. The oral cavity still acts as a resonance chamber for the sound, but the air does not escape through the mouth as it is blocked by the tongue touching some other articulators in the oral cavity. Thus it is not the nose itself that differentiates between the nasal consonants, but rather the tongue’s articulation, as in the oral plosives. Nasal consonants can be found in initial, medial and final position as in the examples ‘نم’ [næm] ‘wetness’, ‘امن’ [æmn] ‘safe’ and ‘نمد’ [næmæd] ‘felt carpet’.

(i) Bilabial lenis nasals [m, m̥]

For the articulation of the nasals, the upper and lower lips are pressed together to prevent the air from passing through the oral cavity. At the same time, the soft palate is lowered to allow the air to escape through the nasal cavity.

[m]

The vocal folds are in vibration position to produce voice during the articulation of this speech sound; therefore, this consonant is fully voiced. The nasal [m] occurs in initial position, between two voiced speech sounds and in final position after a voiced speech sound, as in ‘مرد’ [mærd] ‘man’, ‘زمان’ [zæmɑn] ‘time’ and ‘رمز’ [ræzm] ‘fight’.

Phonetic description of [m]:

lenis, voiced, bilabial, nasal

[m]

During the articulation of this bilabial nasal, the glottis is wide open, and no voice is produced. Therefore, it is fully devoiced. It occurs in final position, succeeding voiceless consonants, as in the examples 'حتم' [hæt̚m] 'certain', 'اسم' [ʔes̚m] 'name' and 'رسم' [ræs̚m] 'tradition'.

Phonetic description of [m̥]:

lenis, devoiced, bilabial, nasal

(ii) Labio-dental lenis nasal [ɱ]

In producing [ɱ] the lower lip is pressed against the upper teeth to block the way to prevent the air from escaping the oral cavity. During the production of this consonant, the vocal folds vibrate to produce voice. The air which is blocked by the labio-dental closure escapes through the nasal cavity. This consonant occurs before labio-dental consonants. The examples are 'انفصال' [ʔɛmfɛsɒl] 'dismissal' and 'اموال' [ʔæɱvɒl] 'property'.

Phonetic description of [ɱ]:

lenis, voiced, labio-dental, nasal

(iii) Dental-alveolar lenis nasal [n̪]

For this nasal to be produced, the blade of the tongue is pressed against the alveolar ridge and the tongue tip touches the upper front teeth to make a complete blockage. As a result of this blockage the air passes through the nose. This consonant occurs before [T] and [D] as in the examples 'صندلی' [sæ̪n̪dæ̪li] 'chair' and 'انتهای' [ʔen̪teha̪] 'end'.

Phonetic description of [n]:

lenis, voiced, dental-alveolar, nasal

(iv) Alveolar lenis nasals [n, ŋ]

For these nasals to be produced, the blade of the tongue touches the front part of the alveolar ridge and prevents the air from escaping through the nasal cavity. At the same time, the soft palate is lowered to allow the air to pass through the nasal cavity.

[n]

During the articulation of this alveolar nasal, the vocal folds are in vibration position. Therefore, it is fully voiced. It occurs in initial position between two voiced speech sounds, and in final position following a voiced speech sound as in the examples 'نام' [nam] 'name', 'آنان' [ʔanan] 'they', 'سنا' [sænɑ] 'light', 'ازنا' [æznɑ] 'a city' and 'وزن' [væzn] 'weight'.

Phonetic description of [ŋ]:

lenis, voiced, alveolar, nasal

[ŋ]

This nasal consonant occurs in final position following a voiceless speech sound. The examples are 'جشن' [dʒæʃŋ] 'festive' and 'متن' [mætn] 'text'.

Phonetic description of [ŋ]:

lenis, devoiced, alveolar, nasal

(v) Post-alveolar lenis nasals [ŋ]

For the production of this post alveolar nasal, the tongue touches the roof of the mouth in a way that the blade of the tongue is pressed against an area between the alveolar

ridge and the hard palate. The tip of the tongue is in contact with the lower front gum. It occurs before [ʃ], [ʒ], [tʃ] and [dʒ]. The examples are 'انشا' [ʔenʃa] 'composition', 'آنزین' [ʔaŋzɪn] 'sore throat', 'پنجر' [pæntʃæɾ] 'flat' and 'انجام' [ʔæŋdʒam] 'fulfillment'.

Phonetic description of [ŋ]:

lenis, voiced, post-alveolar, nasal

(vi) Palatal lenis nasal [ɲ]

For this nasal to be produced, the closure is formed in the center of the hard palate, in a way that the front of the tongue is raised and pressed against the highest curved part of the hard palate. During the production of this palatal nasal, the way to the nasal cavity is open, and the air escapes through the nose. This consonant occurs before [ç] and [ʝ]; for example, 'پنکه' [pæŋçe] 'fan' and 'سنگین' [sæŋʝɪn] 'heavy'.

Phonetic description of [ɲ]:

lenis, voiced, palatal, nasal

(vii) Velar lenis nasal [ŋ]

In the production of this nasal, the closure is formed between the back of the tongue and the soft palate, to prevent the air from escaping through the oral cavity. The point of closure will depend on the type of vowel it precedes, for example the contact is more back before back vowels. The soft palate keeps the way to the nasal cavity open, so that the air can escape through the nose. This consonant is produced when [ŋ] occurs before **k** and **g**; for example, 'انکار' [ʔeŋkar] 'denial' and 'انگور' [ʔæŋgur] 'grape'. This nasal consonant appears only in medial position.

Phonetic description of [ŋ]:

lenis, voiced, velar, nasal

(viii) Uvular lenis nasal [ŋ]

The back of the tongue and the uvula join in order to produce this speech sound. For this to happen, the extreme back part of the tongue is raised to touch the extreme back part of the soft palate in order to block the way to the oral cavity. At the same time, the velum is lowered to open the way to the nasal cavity. The air which is blocked in the oral cavity, escapes through the nose. This consonant occurs before [x] and [q] as in the examples 'تتخواه' [tæŋxɑh] 'funds', 'منقول' [mæŋqul] 'movable'.

Phonetic description of [ŋ]:

lenis, voiced, uvular, nasal

2.2.1.5 Laterals [l, l̥, ɭ]

The laterals are consonants produced with a closure made by the tip of the tongue and the alveolar ridge, while air from the lungs escapes at one side or both sides of the tongue. To produce these laterals, the front of the tongue is raised. They have a quality similar to the clear [l] in English. The way to the nasal cavity is blocked by the soft palate. The Persian laterals can be found in initial, medial and final position.

[l]

During the articulation of this alveolar lateral, the vocal folds are in vibration position. Therefore it is fully voiced. It occurs between two voiced speech sounds, as in the examples 'بله' [bæle] 'yes' and 'مظلوم' [mæzlum] 'oppressed'.

Phonetic description of [l]:

clear, lenis, voiced, oral, alveolar, lateral

[ʕ]

This lateral consonant occurs in initial as well as final position following a voiced speech sound. Voice is produced just for the first or second part of this speech sound. The examples are ‘لب’ [ʕæb] ‘lip’ and ‘عزل’ [ʕæzʕ] ‘dismiss’.

Phonetic description of [ʕ]:

clear, lenis, partly devoiced, oral, alveolar, lateral

[l]

During the articulation of this alveolar lateral, the vocal folds are wide apart and it is fully devoiced. It occurs in final position following voiceless consonants, as in the examples ‘سطل’ [sætl] ‘bucket’ and ‘مثل’ [mesl] ‘as, like’.

Phonetic description of [l]:

clear, lenis, devoiced, oral, alveolar, lateral

2.2.1.6 Trills [r, ʕ, r̥]

These consonants are produced by the tongue and the alveolar ridge. The tip of the tongue touches the alveolar ridge to create an intermittent closure. The touch is so soft that the air flow can pass through with a little pressure. In the articulation of these trills, the tongue is held constant against the alveolar ridge, where the air stream causes the tip of the tongue to vibrate in two or three periods. During the articulation of these consonants, the way to the nasal cavity is blocked by the soft palate. The Persian trills can be found in initial, medial and final position.

[r]

During the production of this speech sound, the vocal folds are in vibration position; therefore it is fully voiced. This consonant is fully voiced when occurring between voiced sounds, as the examples 'کارمند' [kɑrmænd] 'clerk' and 'مريد' [mɔrid] 'disciple'.

Phonetic description of [r]:

lenis, voiced, oral, alveolar, trill

[r°]

This trill consonant occurs in initial position as well as in final position after a voiced speech sound. As the voice produced by the vocal folds accompanies either the first or the last part of this speech sound, it is partly devoiced. The examples are 'راحت' [r°ɑhæt] 'comfortable' and 'بذر' [bæzr°] 'seed'.

Phonetic description of [r°]:

lenis, partly devoiced, oral, alveolar, trill

[r̥]

During the articulation of this alveolar trill, the vocal folds are wide apart, and no voice is produced. Therefore, it is fully devoiced. This consonant is also accompanied by a little friction noise. It occurs in final position, succeeding voiceless consonants, as in the examples 'كسر' [kæs̥r̥] 'fraction' and 'حفر' [hæf̥r̥] 'digging'.

Phonetic description of [r̥]:

lenis, devoiced, oral, alveolar, trill

2.2.1.7 Flap [ɾ]

This speech sound appears in intervocalic position and it is articulated with a single contraction of the muscles, so that the tip of the tongue briefly strikes the alveolar ridge. During the production of this consonant, the way to the nasal cavity is closed and the vocal folds are in vibration position. The examples are 'باران' [baran] 'rain' and 'عروس' [ʔærus] 'bride'.

Phonetic description of [ɾ]:

lenis, oral, alveolar, flap

2.2.1.8 Approximants [j , j̥ , j̧]

Approximants are speech sounds that could be regarded as intermediate between vowels and consonants. In the articulation of approximants, the articulatory organs produce a narrowing of the vocal tract, but leave enough space for air to flow without much audible turbulence. Approximants are more open than fricatives.

In the articulation of these approximants, the front part of the tongue and the hard palate produce a narrow passage, so that there is enough space for air to flow without much audible friction. From the phonetic point of view, the articulation of these consonants is the same as that of the front close vowel [i], but the length is shorter. During the articulation of these consonants, the soft palate blocks the way to the nasal cavity. These consonants can be found in initial, medial and final position.

[j]

During the production of this speech sound, the vocal folds are in vibration position, therefore it is fully voiced. This approximant occurs in initial position and after voiced sounds, as in the examples 'یاری' [jari] 'help' and 'مديون' [mædjun] 'debtor'.

Phonetic description of [j]:

lenis, voiced, oral, palatal, approximant

[j̥]

This approximant occurs after voiceless fricatives in medial position. The voice produced by the vocal folds accompanies just the last part of this speech sound; therefore it is partly devoiced. The examples are 'بسیار' [besj̥ɑr] 'a lot', and 'اشیاء'

[ʔæj̥ʃɑʔ] 'things'.

Phonetic description of [j̥]:

lenis, partly devoiced, oral, palatal, approximant

[j̥]

During the articulation of this palatal approximant, the glottis is wide open, and no voice is produced. It occurs after accented [p, t, k, h] and in final position succeeding voiceless consonants, as in the examples 'عطیان' [ʔæ'tj̥ɑn] 'bringing', 'نفی' [næfj̥] 'deny' and 'مشی' [mæʃj̥] 'policy'.

Phonetic description of [j̥]:

lenis, devoiced, oral, palatal, approximant

2.2.2 Persian vowel sounds

The description given for the Persian vowels are based on the following.

(i) Tongue height

Tongue height refers to the vertical position of the tongue relative to the roof of the mouth. In **closed vowels**, such as [i], the tongue is positioned high in the mouth whereas in

open vowels, such as [ɑ] the tongue is positioned low in the mouth, and in **mid vowels** such as [e], the tongue position is somewhere between these two.

(ii) Backness

Backness refers to the horizontal tongue position during the articulation of a vowel relative to the back of the mouth. In **front vowels**, such as [i], the tongue is positioned forward in the mouth, whereas in **back vowels**, such as [u], the tongue is positioned towards the back of the mouth, and in central vowels the tongue is positioned somewhere between these two.

(iii) Roundedness

Roundedness refers to whether the lips are rounded or not. In a **rounded vowel**, such as [ɔ], the corners of the lips are brought towards each other and the lips are pushed forward, whereas in **spread vowels**, such as [i], the corners of the lips are moved away from each other.

(iv) Nasalization

Nasalization refers to whether some of the air escapes through the nose. In nasal vowels, the velum is lowered, and some air travels through the nasal cavity as well as the mouth.

(v) Phonation

Phonation or voicing describes whether the vocal folds are vibrating during the articulation of a vowel.

(vi) Length

Length refers to the duration of a vowel sound. For instance, a vowel with less than normal duration is named **extra short**, whereas a vowel with more than normal duration is named **long**. Other terms such as **slightly long**, **short** and **reduced** are also used to define the Persian vowels.

2.2.2.1 Vowels

The Persian language phonetically has 32 pure vowels, which are divided into 6 groups according to their place of articulation, that is frontness and backness, as well as the tongue's height, which is close, mid and open.¹

The air stream mechanism used in the articulation of all Persian vowels is 'pulmonic egressive', in which the air stream is created by the lungs and exhaled through either the mouth or the mouth and nose at the same time.

The Persian pure vowels are illustrated in the following phonetic chart.

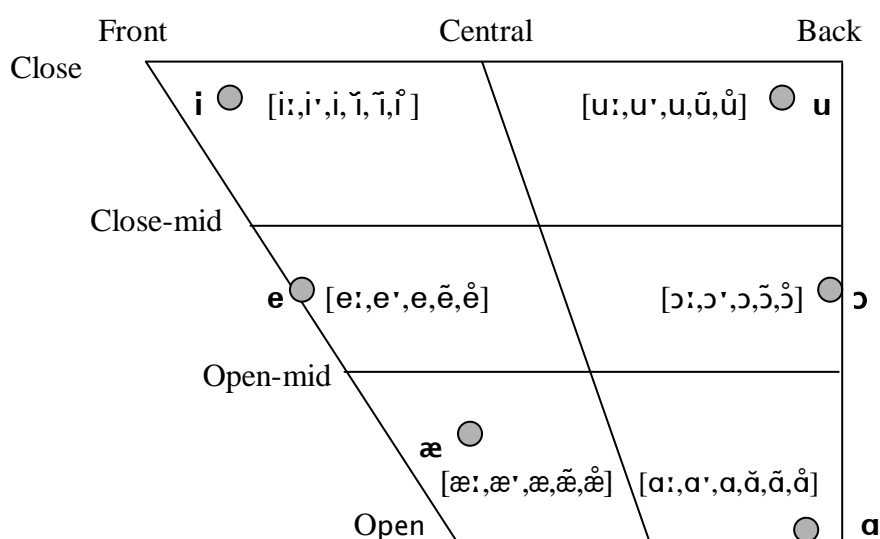


Figure 2.1
Persian Vowels

¹These phonetic vowels are different realizations of 6 vowel phonemes in the Persian language.

(i) **Front close vowels [i:, i·, i, ĩ, ĩ̃, ĩ̇]**

For the production of these vowels, the front part of the tongue is positioned high, close to the roof of the mouth, without creating a constriction that would be classified as a consonant. During the production of these vowels, the lips are spread and the tongue is tense.

[i:]

During the production of this long vowel the vocal folds are in vibration position and the way to the nasal cavity is blocked by the soft palate. This vowel occurs before final consonant clusters as the examples 'بیست' **[bi:st]** 'twenty' and 'بیخت' **[bi:xt]** 'sifted'.

Phonetic description of **[i:]**:

voiced, oral, long, spread, front, close, vowel

[i·]

This vowel, which is shorter than **[i:]**, occurs before final voiced consonants. The vocal folds are producing voice and the nasal cavity is closed by the velum during the production of this vowel. The examples are 'بید' **[bi·d]** 'willow' and 'خیز' **[xi·z]** 'leap'.

Phonetic description of **[i·]**:

voiced, oral, slightly long, spread, front, close, vowel

[i]

This vowel occurs in final position as well as before voiceless consonants. In the production of this vowel, the nasal cavity is closed and the vocal folds are in vibration position. For example, 'خیس' **[xis]** 'wet', 'نیش' **[nij]** 'sting' and 'سی' **[si]** 'thirty'.

Phonetic description of [i]:

voiced, oral, reduced, spread, front, close, vowel

[ĩ]

This vowel, which is shorter than [i], occurs before the consonant [j]. The way to the nasal cavity is blocked and the vocal folds are in vibration position. The examples are 'نیاز' [nījaz] 'need' and 'خیال' [xījal] 'fancy'.

Phonetic description of [i̇]:

voiced, oral, extra short, spread, front, close, vowel

[ĩ̇]

This vowel occurs before and after nasal consonants. During the production of [ĩ̇], the velum is lowered to open the way to the nasal cavity, and the air is allowed to escape simultaneously through oral and nasal cavities. The vocal folds vibrate to produce voice. The examples are 'زین' [ʔĩ̇n] 'this', 'میز' [mĩ̇z] 'table' and 'مین' [mĩ̇n] 'mine'.

Phonetic description of [ī]:

voiced, nasalized, spread, front, close, vowel

[ī]

This vowel occurs after aspirated consonants. The first part of the vowel is devoiced. The velum is raised to block the way to the nasal cavity. The examples are 'پیش' [pʰī] 'beside' and 'تیر' [tʰīr] 'bullet'.

Phonetic description of [ī̆]:

partly devoiced, oral, spread, front, close, vowel

(ii) **Front mid vowels [eː, e˞, e, ě, ě]**

For the production of these vowels, the front part of the tongue is positioned somewhere between close-mid and open-mid, but comparatively, it is nearer to close-mid. During the production of these vowels, the lips are slightly spread.

[eː]

During the production of this long vowel, the vocal folds are in vibration position and the way to the nasal cavity is blocked by the soft palate. This vowel occurs before final consonant clusters, as the examples 'جسم' [dʒeːsm] 'body' and 'شبه' [ʃeːbh] 'likeness'.

Phonetic description of [eː]:

voiced, oral, long, slightly spread, front, mid, vowel

[e˞]

This vowel, which is shorter than [eː], occurs before final voiced consonants. The vocal folds are producing voice and the nasal cavity is closed by the velum during the production of this vowel. The examples are 'قابض' [qabe˞z] 'astringent' and 'شامل' [ʃame˞l] 'inclusive'.

Phonetic description of [e˞]:

voiced, oral, slightly long, slightly spread, front, mid, vowel

[e]

This vowel occurs before voiceless consonants as well as in final position before pause. To produce this vowel, the nasal cavity is closed and the vocal folds are in vibration position as in the examples 'جيوه' [dʒive] 'mercury' and 'تابش' [tabeʃ] 'radiation'.

Phonetic description of [e]:

voiced, oral, reduced, slightly spread, front, mid, vowel

[ẽ]

This vowel occurs before and after nasal consonants. During the production of [ẽ], the velum is lowered to open the way to the nasal cavity, and the air is allowed to escape simultaneously through oral and nasal cavity. The vocal folds are producing voice as well. The examples are ‘شن’ [ʃẽn] ‘sand’ and ‘مهر’ [mẽhr] ‘kindness’.

Phonetic description of [ẽ]:

voiced, nasalized, slightly spread, front, mid, vowel

[ẽ̥]

This vowel occurs just after aspirated consonants, so that the first part of the vowel is devoiced. The velum is raised to block the way to the nasal cavity. The examples are [ʔært^hẽ̥ʃ] “army” and [t^hẽ̥krar] “repetition”.

Phonetic description of [ẽ̥]:

partly devoiced, oral, slightly spread, front, mid, vowel

(iii) Front open vowels [æ:, æ̣, æ, ǣ, ǣ̣]

For the production of these vowels the front part of the tongue is slightly raised to a position somewhere between open and open-mid. During the production of these vowels the lips are almost neutral.

[æ:]

During the production of this vowel, which is the longest in the group, the vocal folds are in vibration position and the way to the nasal cavity is blocked by the soft palate. This vowel occurs before final consonant clusters as in the examples ‘دست’ [dæ:st] ‘hand’ and ‘بخت’ [bæ:xt] ‘fortune’.

Phonetic description of [æ:]:

voiced, oral, long, almost neutral, front (nearer to the central), open, vowel

[æ̣]

This vowel, which is shorter than [æ:], occurs before final voiced consonants. The vocal folds are producing voice and the nasal cavity is closed by the velum during the production of this vowel. The examples are 'بد' [bæ̣d] 'bad' and 'خز' [xæ̣z] 'fur'.

Phonetic description of [æ̣]:

voiced, oral, slightly long, almost neutral, front (nearer to the central), open, vowel

[æ]

This vowel occurs before voiceless consonants as well as in final position before pause. To produce this vowel, the nasal cavity is blocked by the velum and the vocal folds are in vibration position as in the examples 'و' [væ] 'and' and 'نصب' [næsb] 'install'.

Phonetic description of [æ̥]:

voiced, oral, reduced, almost neutral, front(nearer to the central), open, vowel

[æ̃]

This vowel occurs before and after nasal consonants. During the production of [æ̃], the velum is lowered to open the way to the nasal cavity, and the air is allowed to escape through the oral and nasal cavities simultaneously. The vocal folds vibrate to produce voice. The examples are 'من' [mæ̃n] 'I, me' and 'نظم' [næ̃zm] 'discipline'.

Phonetic description of [æ̃]:

voiced, nasalized, almost neutral, front(nearer to the central), open, vowel

[æ̥]

This vowel occurs immediately after aspirated consonants. The aspiration devoices the first part of this vowel. The velum is pulled up to block the way to the nasal cavity. The examples are 'تعمير' [t^hæ̥ʔmir] 'repair' and 'پهن' [p^hæ̥hn] 'wide'.

Phonetic description of [æ̥]:

partly devoiced, oral, almost neutral, front(nearer to the central), open, vowel

(iv) **Back open vowels [ɑ:, ɑ̣, ɑ, ɑ̃, ɑ̌]**

These vowels are produced with the back part of the tongue slightly raised and positioned low, somewhere between open-mid and open but comparatively, they are much more open. During the production of these vowels, the lips are moderately rounded.

[ɑ:]

During the production of this vowel, the vocal folds are in vibration position and the way to the nasal cavity is closed by the soft palate. This vowel occurs before final consonant clusters, as the examples 'ماست' [ma:st] 'yogurt' and 'کارد' [ka:rd] 'knife'.

Phonetic description of [ɑ:]:

voiced, oral, long, moderately rounded, back, open, vowel

[ɑ̣]

This vowel, which is shorter than [ɑ:], occurs before final voiced consonants. The vocal folds are producing voice and the nasal cavity is closed by the velum during the production of this vowel. The examples are 'باد' [bạd] 'wind' and 'راز' [rạz] 'mystery'.

Phonetic description of [ɑ̣]:

voiced, oral, slightly long, moderately rounded, back, open, vowel

[a]

This vowel, which is shorter than the two aforementioned vowels, occurs before voiceless consonants as well as in final position. During the production of this vowel the nasal cavity is closed and the vocal folds are in vibration position, as in the examples 'مات' [mat] 'checkmate', 'تاس' [tas] 'bald' and 'رسا' [ræsa] 'audible'.

Phonetic description of [a]:

voiced, oral, reduced, moderately rounded, back, open, vowel

[ã]

This vowel occurs before and after nasal consonants. During the production of [ã], the velum is lowered to open the way to the nasal cavity, and the air is allowed to escape simultaneously through the oral and nasal cavities. The vocal folds vibrate to produce voice. The examples are 'نان' [nãn] 'bread', 'مار' [mãr] 'snake' and 'دهان' [dæhãn] 'mouth'.

Phonetic description of [ã]:

voiced, nasalized, moderately rounded, back, open, vowel

[ɑ̣]

The vowel [ɑ̣] occurs just after aspirated consonants, and the first part of the vowel is devoiced. The soft palate is raised to block the way to the nasal cavity. The examples are 'پاک' [pʰɑ̣k] 'clean' and 'تار' [tʰɑ̣r] 'cord'.

Phonetic description of [ɑ̣]:

partly devoiced, oral, moderately rounded, back, open, vowel

(v) Back mid vowels [ɔ:, ɔ, ɔ̣, ɔ̣̄]

For the articulation of these vowels, the back part of the tongue is raised and positioned somewhere between close-mid and open-mid, but comparatively they are much

nearer to close-mid. During the production of these vowels, the lips are fully rounded and they are pushed forward but not as much as it is for [u].

[ɔ:]

During the production of this vowel, the vocal folds are in vibration position and the way to the nasal cavity is blocked by the soft palate. The articulation of this speech sound has the longest duration in the group. This vowel occurs before final consonant clusters as in the examples 'دزد' [dɔ:zd] 'thief' and 'بهت' [bɔ:ht] 'consternation'.

Phonetic description of [ɔ:]:

voiced, oral, long, fully rounded, back, mid, vowel

[ɔ']

This vowel, which is shorter than [ɔ:], occurs before final voiced consonants. The vocal folds vibrate to produce voice and the nasal cavity is closed by the velum during the production of this vowel. The examples are 'شد' [ʃɔ'd] 'became' and 'بز' [bɔ'z] 'goat'.

Phonetic description of [ɔ']:

voiced, oral, slightly long, fully rounded, back, mid, vowel

[ɔ]

This vowel occurs before voiceless consonants as well as in final position. During the production of this speech sound, the nasal cavity is closed and the vocal folds are in vibration position, as in the examples 'تو' [tɔ] 'you' and 'پتک' [pɔtk] 'sledge'.

Phonetic description of [ɔ]:

voiced, oral, reduced, fully rounded, back, mid, vowel

[5]

This vowel occurs before or after nasal consonants. During the production of [5], the soft palate is lowered to open the way to the nasal cavity, and the air is allowed to escape simultaneously through oral and nasal cavity. At the same time, the vocal folds vibrate to produce voice. The examples are 'نه' [nɔ̃h] 'nine', 'تن' [tɔ̃n] 'tuna'.

Phonetic description of [5]:

voiced, nasalized, fully rounded, back, mid, vowel

[ɔ̃]

This vowel occurs after aspirated consonants; therefore, the first part of the vowel is devoiced. During the articulation of this speech sound, the soft palate keeps the way to the nasal cavity closed. The examples are 'پر' [pʰɔ̃r] 'full' and 'کند' [kʰɔ̃nd] 'dull'.

Phonetic description of [ɔ̃]:

partly devoiced, oral, fully rounded, back, mid, vowel

(vi) **Back close vowels [u:, u', u, ũ , ɔ̃]**

These vowels are produced with the back part of the tongue positioned high, close to the roof of the mouth. During the production of these vowels, the lips are rounded and pushed forward, and the tongue is tense.

[u:]

During the production of this vowel, the vocal folds are in vibration position and the way to the nasal cavity is closed. This vowel occurs before final consonant clusters, as in the examples 'دوخت' [du:xt] 'sewing' and 'گوشت' [gu:ft] 'meat'.

Phonetic description of [u:]:

voiced, oral, long, rounded, back, close, tense vowel

[u̇]

This vowel, which is shorter than [u:], occurs before final voiced consonants. The vocal folds are in vibration position and the nasal cavity is closed by the velum during the production of this vowel. The examples are 'کور' [ku̇r] 'blind' and 'روز' [ru̇z] 'day'.

Phonetic description of [u̇]:

voiced, oral, slightly long, rounded, back, close, tense vowel

[u]

This vowel occurs before voiceless consonants as well as in final position. During the production of this vowel, the nasal cavity is closed and the vocal folds are in vibration position, as in the examples 'گوش' [guʃ] 'ear' and 'بو' [bu] 'smell'.

Phonetic description of [u]:

voiced, oral, reduced, rounded, back, close, tense vowel

[ũ]

This vowel occurs before and after nasal consonants. During the production of [ũ], the velum is lowered to open the way to the nasal cavity, and the air is allowed to escape through the oral and nasal cavities at the same time. The vocal folds are in vibration position. The examples are 'خون' [xũn] 'blood' and 'موش' [mũʃ] 'mouse'.

Phonetic description of [ũ]:

voiced, nasalized, rounded, back, close, tense vowel

[ۇ]

This vowel occurs after aspirated consonants, and the first part of the vowel is devoiced. During the articulation of [ۇ], the velum keeps the way to the nasal cavity closed. The examples are ‘تور’ [tʰۇr] ‘net’ and ‘پول’ [pʰۇl] ‘money’.

Phonetic description of [ۇ]:

partly devoiced, oral, rounded, back, close, tense vowel

2.2.2.2 Diphthongs

The Persian language has six diphthongs, which are divided into two groups. The first group which consists of five members: [ei, æi, ai, ɔi, ui] and the second group which has only one member: [ɔu]. The first vowel of these diphthongs is longer and stronger than the second one. The common characteristic of Persian diphthongs is that they are all narrowing. The movement of the tongue is from a relatively more open vowel to a relatively closer one.

The Persian diphthongs are represented in the following diagram:

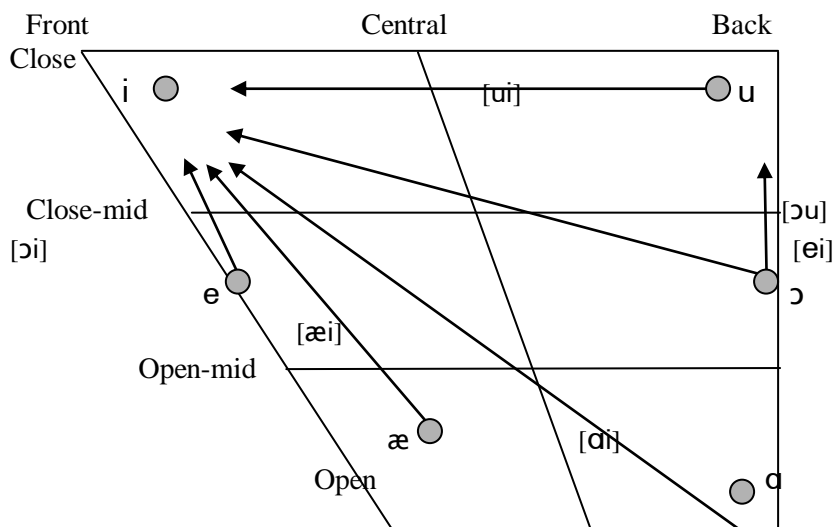
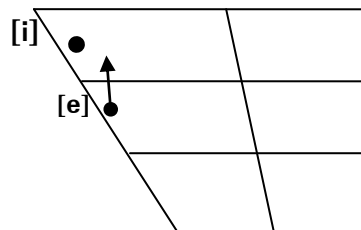


Figure 2.2
Persian diphthongs

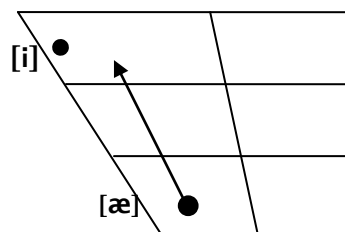
[ei]

This diphthong begins with the tongue and the other articulators in the position of producing [e], then the tongue moves upward to the position of producing [i], but the movement is not completed. The second vowel of this diphthong is weaker and shorter, and the lips are more spread at the end of the articulation. [ei] occur in medial and final position. The examples are 'نى' [neɪ] 'reed' and 'ميل' [meɪl] 'will'.



[æi]

At the beginning of the production of this diphthong, the tongue and the other articulators are in the position of producing [æ]. Then the tongue is raised to the position of producing [i], but the second vowel of this diphthong is shorter and weaker. The lips are more spread at the end of the articulation, in comparison with the starting point. The examples are 'صياد' [sæɪjɑd] 'hunter', 'قيم' [qæɪjem] 'guardian' and 'سعى' [sæɪ] 'effort'.

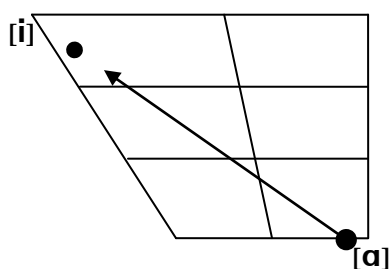


[aɪ]

This diphthong begins with the articulators in the position of producing [a], then the tongue moves up and forward to the position of producing [i], but this movement is not

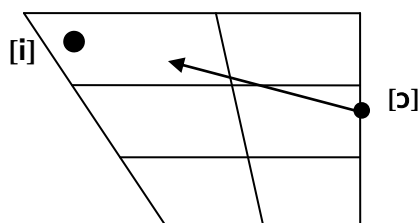
completed. Along with the glide of the tongue, there is a spreading movement of the lips. The second vowel of this diphthong is not as close and front as [i] and the lips are not as spread as [i] as a pure vowel. It occurs in medial and final positions. The examples are 'پای' [pai] 'leg' and 'رایگان' [raigan] 'free'.

This diphthong is shortened when it occurs before voiceless consonants as in the examples 'وایسا' [vaisa] 'stop' and 'چای ساز' [tʃaisaz] 'tea maker'.



[ɔi]

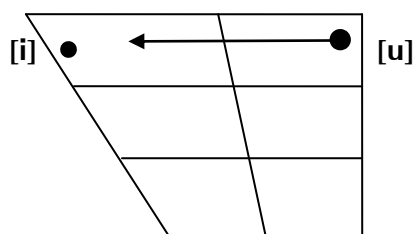
The diphthong [ɔi] begins with the articulators in the position of producing [ɔ], then the tongue moves up and forward to the position of producing [i], but this movement is not completed. Along with the glide of the tongue, there is a spreading movement of the lips. The second vowel of this diphthong is not as close and front as [i] and the lips are not as spread as [i] as a pure vowel. The use of this diphthong is very limited. The examples are 'خوی' [xɔi] 'a city' and 'هوی' [hɔi] 'hey'.



[ui]

This diphthong begins with the articulators in the position of producing [u], then the tongue moves to the position of producing [i], but the movement is not completed. The second vowel of this diphthong is not as close and front as [i], and the lips are not as spread as [i] as a pure vowel. The examples are 'موی' [mui] 'hair' and 'جوی' [dʒui] 'brook'.

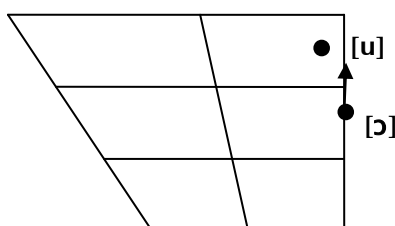
This diphthong is shortened when it occurs before voiceless consonants as the examples 'رویکرد' [ruikærd] 'procedure' and 'گویچه' [guitʃe] 'blood cell'.



[ɔu]

This diphthong begins with the articulators in the position of producing [ɔ], then the tongue moves upward to the position of producing [u], but this movement is not completed. Along with the glide of the tongue, the lips change from open rounded to close rounded. The second vowel of this diphthong is not as close and back as [u] and the lips are not as round as [u] as a pure vowel. The examples are 'نو' [nɔu] 'new' and 'هوله' [hɔule] 'towel'.

This diphthong is shortened when it occurs before voiceless consonants as the examples 'هوچی' [hɔutʃi] 'rumor monger' and 'روشن' [rɔʃæn] 'light'.



2.3 The Persian Phonological System

2.3.1 Persian Consonant Phonemes

The Persian language consists of 23 consonant phonemes. The Persian consonant phonemes are represented in the following table. Examples are given for each of the phonemes in the form of minimal pairs.

		bilabial	labio-dental	dental-alveolar	alveolar	post-alveolar	palatal	velar	uvular	glottal
plosives	fortis	p		t			k	q		ʔ
	lenis	b		d			g			
fricatives	fortis		f	s		ʃ		χ		h
	lenis		v	z		ʒ				
affricates	fortis					tʃ				
	lenis					dʒ				
nasals	lenis	m		n						
laterals	lenis			l						
trills	lenis				r					
approximants	lenis						j			

Examples

/p, b/ 'پاک' /pæk/ 'clean' - 'باک' /bak/ 'fear'
 /t, d/ 'ترک' /tærk/ 'leaving' - 'درک' /dærk/ 'understanding'
 /k, g/ 'کور' /kur/ 'blind' - 'گور' /gur/ 'tomb'

/k, q/	‘کار’	/kar/	‘work’	-	‘غار’	/qar/	‘cave’
/q, ʔ/	‘غار’	/qar/	‘cave’	-	‘عار’	/ʔar/	‘shame’
/q, g/	‘قیر’	/qir/	‘tar’	-	‘گیر’	/gir/	‘clip’
/f, v/	‘فصل’	/fæsl/	‘season’	-	‘وصل’	/væsl/	‘join’
/s, z/	‘سود’	/sud/	‘benefit’	-	‘زود’	/zud/	‘soon’
/ʃ, ʒ/	‘شن’	/ʃen/	‘gravel’	-	‘ژن’	/ʒen/	‘gene’
/χ, h/	‘خسته’	/χæste/	‘tired’	-	‘هسته’	/hæste/	‘core’
/h, ʔ/	‘هادی’	/hadi/	‘leader’	-	‘عادی’	/ʔadi/	‘ordinary’
/χ, q/	‘خالی’	/χali/	‘empty’	-	‘قالی’	/qali/	‘carpet’
/tʃ, dʒ/	‘چای’	/tʃaj/	‘tea’	-	‘جای’	/dʒaj/	‘place’
/m, n/	‘رام’	/ram/	‘tamed’	-	‘ران’	/ran/	‘thigh’
/l, n/	‘لاله’	/lale/	‘tulip’	-	‘لانه’	/lane/	‘nest’
/j, h/	‘یال’	/jal/	‘mane’	-	‘هال’	/hal/	‘hall’
/r, z/	‘راد’	/rad/	‘liberal’	-	‘یاد’	/jad/	‘memory’
/r, l/	‘مار’	/mar/	‘snake’	-	‘مال’	/mal/	‘property’
/n, r/	‘نان’	/nan/	‘bread’	-	‘ران’	/ran/	‘thigh’

2.3.2 Persian Vowel Phonemes

The Persian language has 6 pure vowel phonemes. The Persian vowels are represented in the following table, and examples are given for each of the vowels in the form of minimal pairs.

Table 2.3
Persian vowel phonemes

	front (unrounded)	back (rounded)
close	i	u
mid	e	ɔ
open	æ	ɑ

Examples

/e , æ/	‘فر’	/fer/	‘curl’	-	‘فر’	/fær/	‘magnificence’
/i , e/	‘سیر’	/sir/	‘garlic’	-	‘سر’	/ser/	‘insensible’
/ɔ , u/	‘پل’	/pɔ:l/	‘bridge’	-	‘پول’	/pu:l/	‘money’
/ɑ , e/	‘پای’	/pɑj/	‘leg’	-	‘پی’	/pej/	‘foundation’
/u , ɔ/	‘سور’	/sur/	‘feast’	-	‘سر’	/sɔr/	‘slide’
/ɔ , ɑ/	‘شد’	/ʃɔd/	‘became’	-	‘شاد’	/ʃɑd/	‘happy’
/ɑ , æ/	‘آستر’	/ɑstær/	‘lining’	-	‘استر’	/æstær/	‘mule’
/ɔ , æ/	‘مرد’	/mɔrd/	‘died’	-	‘مرد’	/mærd/	‘man’

2.4 The Persian Syllable

"The Persian syllable is a unit of sound composed of an obligatory syllable nucleus, a vowel, with one obligatory initial consonant and one or two optional final consonant(s)."

(Samareh, 1999: 113)

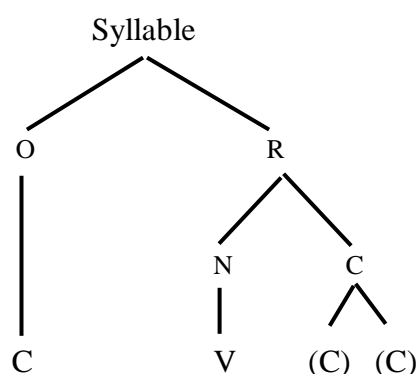


Figure2.3
The Persian syllable¹

2.4.1 Persian Syllabic Structure

The general structure of a syllable in the Persian language consists of the following segments which have been represented in the diagram above.

- Onset (obligatory)
- Rhyme
 - Nucleus (obligatory)

- Coda (optional)

The Persian language has three kinds of syllables as follows :

CV as in ‘ما’ [ma] ‘we’ and ‘مو’ [mu] ‘hair’

CVC as in ‘بار’ [bar] ‘load’ and ‘دور’ [dur] ‘far’

CVCC as in ‘درد’ [dærd] ‘pain’ and ‘آرد’ [ʔard] ‘flour’

The first type of syllable that is the minimum syllable in Persian consists of an onset which is obligatory and a rhyme that is composed of only a vowel. This is an open syllable.

The second kind of syllable consists of an onset that is one consonant and a rhyme which is composed of a vowel as the core of the syllable and a consonant in final position. This is a closed syllable.

The third kind of syllable consists of one consonant as the onset and one vowel and two consonants as the rhyme. The consonant cluster occurs at the end of the syllable after the core.

2.4.2 Syllabification

In the Persian language, the vowels form the nucleus of the syllable. There is only one vowel in each syllable. The number of syllables can be identified by counting the vowels. For example, in the word ‘سهل انگاری’ [sæh.len.ga.ri] ‘nonchalance’, four syllables can be identified because of the four vowels in the word. The division of syllables depends on the number of consonants that occur between two vowels. The minimum number of consonants that can occur between two vowels is one and the maximum is three. So, in a connected sequence of syllables, they can be divided into one of the following forms:

¹In this diagram ‘O’ stands for ‘onset’, ‘R’ for ‘rhyme’, ‘N’ for ‘nucleus’, ‘C’ for ‘coda’, ‘C’ for ‘consonant’ and ‘V’ for ‘vowel’. The parentheses represent the optional segments.

a) V.CV

In the first form, with one consonant occurring between two vowels, the division is between the first vowel and the consonant since no syllable begins with a vowel. The example is 'دوا' [dæ.va] 'medicine'. This kind of division results in two syllables, [cv.cv].

b) VC.CV

In the second form, with two consonants occurring between two vowels, the division is between the two consonants because vowels and consonant clusters do not occur at the beginning of a syllable. For example, 'دختر' [dɒx.tæɾ] 'girl'. This kind of division results in two syllables, [cvc.cvc].

c) VCC.CV

In the third form, with three consonants occurring between two vowels, the syllable division is between the third and the fourth consonant. This kind of syllable division results in two syllables, [cvcc.cv]. For example, 'صلحجو' [sɒlh.dʒu] 'peace-seeker'.

2.5 Stress in Persian

Stress, which is defined by phoneticians as "the relative emphasis given to certain syllables in a word, may be characterized by one of the characteristics such as variation of the 'pitch', 'loudness', 'quality' and 'quantity'". In connected speech, each of the syllables which is comparatively articulated with a higher degree of the above characteristics is called a stressed syllable. "The Persian language makes use of the 'pitch' much more than the 'loudness', 'quality' and 'quantity'. Therefore, the type of stress used in this language is called 'pitch stress' (Haghshenas, 1990: 124). Different languages make use of different

levels of stress such as ‘emphatic stress’, ‘primary stress’, ‘secondary stress’ and ‘tertiary stress’, but in some languages there is no stress at all. "In the Persian language, based on the grammatical category of the word only one syllable in each word is usually stressed" (Meshkatoddini, 1998: 118). Single-syllable words present no problems and are always stressed. The examples are ‘من’ [mæn] ‘I’, ‘توپ’ [tup] ‘ball’.

The stress pattern in Persian varies according to the word classes as well as the tenses of the verb. Below is a description of the stress patterns found.

2.5.1 Nouns and Adjectives

For most of the nouns and adjectives or other words playing the role of a noun or adjective, only the last syllable is stressed.

Examples :

‘خداوند’ [xɔ.da.vænd] ‘God’

‘بزرگ’ [bɔ.zɔrg] ‘great’

2.5.2 Adverbs

In each adverb, stress is put on a specific syllable. That is to say, in adverbs with the suffix ‘æn’, stress is put on the last syllable, and others get stress on the first syllable. There are still some adverbs with the suffix ‘æn’ which do not follow the rules so that they can be stressed on the first or last syllable.

Examples :

‘تقریباً’ [tæq.ri.’bæn] ‘approximately’

‘شاید’ [’ʃa.jæd] ‘perhaps’

‘کاملاً’ [’ka.me.læn] or [ka.me.’læn] ‘absolutely’

2.5.3 Verbs

2.5.3.1 The Present Tense of the Verbs

In the case of the present tense of the verb, stress is generally on the first syllable of the word.

Examples :

‘میخورم’ [’mi.xɔ.ræm] ‘I eat’

‘نمیخرم’ [’ne.mi.xæ.ræm] ‘I don’t buy’

2.5.3.2 The Past Tense of the Verbs

In the case of the past tense of the verb, if it is a two-syllable verb, stress is placed on the first syllable of the word; if the verb consists of more than two syllables, stress goes on the penultimate or last syllable.

Examples :

Two-syllable verbs:

‘بردم’ [’bɔr.dæm] ‘He/She could’

‘شستند’ [’ʃɔs.tænd] ‘They took’

‘رفتند’ [’ræf.tænd] ‘They went’

Verbs with more than two syllables:

‘توانست’ [tæ.va.’nest] ‘He/She could’

‘برداشتند’ [bær.’dɔʃ.tænd] ‘They took’

‘توانستند’ [tæ.va.’nes.tænd] ‘They could’

2.5.3.3 The Present Perfect Tense and Past Perfect Tense of the Verbs

In these two forms, stress is put on the last syllable of the past participle of the verb.

Examples :

‘گفته ام’ [gɒf.ˈte.ʔæm] ‘I have told’

‘خورده بودند’ [xɒr.ˈde.budænd] ‘They had eaten’

2.5.3.4 The Future Tense of the Verbs

In this kind of verb, the last syllable of the auxiliary verb is stressed.

Examples :

‘خواهند گفت’ [xɑ.ˈhænd.gɒft] ‘They will tell’

‘خواهم آمد’ [xɑ.ˈhæm.ʔɑ.mæd] ‘I will come’

2.5.3.5 The Imperative Verbs

In the imperative forms of verbs, stress is put on the first syllable of the word.

Examples :

‘بخوان’ [ˈbe.xɑn] ‘Read’

‘نیا’ [ˈnæ.jɑ] ‘Don’t come’

2.6 Summary

Persian language has 72 phonetic consonants. With regards to their place of articulation, they are divided into 10 groups, namely, bilabial, labio-dental, dental-alveolar, dental, alveolar, post-alveolar, palatal, velar, uvular and glottal, and based on manner of articulation they are classified as plosives, fricatives, affricates, nasals, laterals, trills, flaps and approximants. The air stream mechanism used in the articulation of all Persian consonants is ‘pulmonic egressive’, in which the air stream is created by the lungs and exhaled through the mouth or nose.

Persian has 32 phonetic vowels and 6 diphthongs, which are divided into two groups, one group consisting of five members ending in [i], the other, with only one member ending in [u]. The air stream mechanism used in the articulation of Persian pure vowels and diphthongs is also ‘pulmonic egressive’. There are no triphthongs in Persian. Persian consists of 23 consonant phonemes and 6 vowel phonemes.

Persian has three kinds of syllabic structures, namely CV, CVC, and CVCC, for example, ‘ما’ [ma] ‘we’, ‘تاب’ [tab] ‘swing’, and ‘بخت’ [bæxt] ‘fortune’. Syllabification, in this language, can be done, simply, through counting the pure vowels. Regarding the number of syllables in a word, Persian has five different types of words as in monosyllables, disyllables, trisyllables, tetrasyllable, and polysyllables. For example, ‘چای’ [ʃaj] ‘tea’, ‘بی درد’ [bi'dærd] ‘painless’, ‘سفالگری’ [sɒfalgæ'ri] ‘pottery’, ‘سفالگری’ [sɒfalgæ'ri] ‘pottery’.

Persian language makes use of only one level of stress, that is, in each word only one syllable is stressed. This language makes use of 'pitch' much more than the 'loudness', 'quality' and quantity; therefore, the stress used in this language is called 'pitch stress'. The distribution of stress is comparatively simple and rule-based, that is, in nouns and adjectives stress falls on the last syllable, in the present tense of the verbs stress is on the first syllable, in the past tense of the verb it is on the last syllable, and in imperative verbs stress falls on the first syllable. In the case of adverbs which are divided into three different groups, each one is stressed differently.