Relationship between Phonological and Geographical Distance: Persian, Sarawani Balochi and Sistani Dialect

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ABSTRACT

This article focuses on the study of geographical variations among the phonological systems of Standard Persian (SP) language, Central Sarawani Balochi (CSB), a dialect of Balochi language and the Sistani dialect (SD) of Persian, based on Optimality Theory (OT) and van Oostendorp's (2008) approach. SP and SD are linguistically closely related, but SP and CSB are very farther apart. While these language varieties share some similarities in their phonological system, they also have some peculiarities and are spoken in different geographical locations in Iran. Following OT and van Oostendorp's (2008) approach, the study of syllable structure of SP, CSB and SD supports the fact that the linguistic distance between two dialects is the minimal number of minimal reranking needed to get from one grammar to another. The findings of the present research show the fact that reranking DEP-IO and *COMPLEX^{ONS} constraints supports how the initial clusters are realized in the syllable structure of CSB and SD, but not in SP. In addition, the analysis of the status of [ʔ] in the onset position of the syllable structure of SP and SD based on the constraints: DEP-IO, ONSET and MAX-IO indicates that all these language varieties are among languages which typologically do not permit onset-less syllables. Moreover, the data suggests that the linguistic distance between two languages or dialects equals to the geographical distance between them. Further, as to syllable structure, historical considerations should be taken into account. Accordingly, the syllable structure of SD corresponds to the syllable structure of CSB rather than SP, although linguistically SD is closer to SP not CSB.

Keywords: linguistic variation; geographical variation; syllable structure; reranking; constraints

INTRODUCTION

'Thinking about the relation between generative grammar and language variation implies thinking about the value of empirical evidence. Most phonological theories dealing with the Chomskiyan notion of 'I-language[1]', phonology is seen as a part of the individual

knowledge of language. Yet most facts about language variation are facts about E-language[2], about the way language functions in the world' (van Oostendorp, 2008, p. 1). With a few exceptions, work on language variation within generative phonology has often been directed towards the macrovariation we find between languages. Yet nothing excludes in principle the possibility of applying the dominant theories of variation to microvariation within a given language, such as geographical variation between dialects, social variation and variation between different style levels (van Oostendorp, 2008). Indeed, studying such subtle differences may help us to refine and extend our theory.

Optimality theory (OT) can be seen as a theory of language variation; a grammatical framework of recent origin (Prince & Smolenskey, 1993). OT is the development of Generative Grammar and a general theory of grammar rather than that of phonology. The central idea of OT is that surface forms of language reflect resolutions of conflicts between competing demands or constraints. A surface form is 'optimal' in the sense that it incurs the least serious violations of a set of violable constraints, ranked in a language-specific hierarchy. Constraints are universal and violable, and directly encode markedness statements and principles enforcing the presentation of constraints. A language differs in the ranking of constraints, giving priorities of some constraints over others. In fact, the optimal output form arises from competition of markedness and faithfulness constraints. Faithfulness constraints require that output be the same as their lexical input, in other words, faithfulness constraints oppose changes, while markedness constraints trigger changes (Kager, 1999; McCarthy, 2002, 2004, 2008).

van Oostendorp (2008, p. 27) suggests 'three reasons to study geographical variations: (1) individual dialects are interesting in their own right, (2) comparison of closely related systems can shed light on how one system is organized and (3) the existence of geographical variation itself poses certain questions'.

'Within OT, a grammar is defined as ranking of a set of universal constraints. For this reason, the only systematic differences between languages or variations are ranking universal constraints differently' (Kager, 1999, p. 4). Therefore, as van Oostendorp (2008, p. 5) states, "different ranking of universal constraints gives a simple way to define the notion of 'linguistic distance between language systems' as below:

1. The linguistic distance between two dialects is the minimal number of minimal reranking needed to get from one grammar to the other.
2. The linguistic distance between two dialects of a language system equals the geographical distance between those dialects in a topological way.

van Oostendorp explains minimal reranking as the following:

'It is the reranking of two adjacent constraints; so ranking of these constraints a>>b>>c>> can be minimally reranked in two different ways (a >>c>>b or b>>a>>c); these have a distance of 1. Other rankings of these same constraints can only be attained by more than one minimal reranking. Thus the ranking b >>c >> a is at a linguistic distance of 2 from the original ranking and c>>b>>a is at a distance of 3' (van Oostendorp, 2008, p. 5). The purpose of this study is to determine the microvariation in the phoneme systems (vowels and consonants) and syllable structure of SP, CSB and SD based on minimal reranking of certain constrains in the framework of OT and also van Oostendorp (2008) approach. The corpus for the investigation was gathered through

elicitation procedure and interviews with several male and female native speakers of SP, CSB and SD.

The article consists of four sections. Apart from section (1) which presented the introduction, section (2) provides a description of phonological systems of SP, CSB and SD. In section (3), first, an explanation about microvariation found in the phoneme system of SP, CSB and SD is given, then, an analysis and a discussion of geographical variation in the syllable structure of language varieties under study will be provided based on OT. Finally, section (4) is dedicated to the conclusion.

FIGURE 1. The location of Tehran, Sistan and Sarawan in Iran

DESCRIPTION OF PHONOLOGICAL SYSTEMS OF SP, CSB AND SD[3]

This section describes the description of the phonological systems (vowel and consonants inventories, and syllable structure) of SP, CSB and SD. In addition, the microvaritions among the phonological systems of these three understudied languages and dialect will be illustrated.

SP PHONEME SYSTEM

SP CONSONANT INVENTORY

There are 23 consonants in the phoneme system of SP which is spoken in Tehran, the capital of Iran. Samareh (1992, pp. 80-102) shows the consonant and vowel inventories of SP as presented in table (1):

TABLE 1. SP consonants[4]

	bilabial	**labiodentals**	**Dental**	**Alveolar**	**alveopalatal**	**Palatal**	**Velar**	**Glottal**
Plosive	b p		t d			k g	q	ʔ
Affricate					tʃ dʒ		x	
Fricative	f v			s z	ʃ ʒ			h
Nasal	m			n				
Tap				r				
Approximate				l		J		

SP VOWEL INVENTORY

Samareh (1992, pp. 104-123) introduces six simple and six diphthong vowels in SP and describes their articulatory features. The simple vowels of SP are given in table (2):

TABLE 2. SP vowels

	Front	**Central**	**Back**
High	i		u
Mid	e		o
Low	æ		ɑ

As shown in the table, there is no central vowel in SP. Samareh considers six diphthong vowels in the vowel inventory of SP as well, including: /*a*j, uj, oj, æj, ej, and ou / (Samareh, pp. 100-102).

SP SYLLABLE STRUCTURE

'Syllable structure in SP is described as a unit of speech consisting of a vowel and one to three consonants' (Samareh, 1992, pp. 127). In SP, vowel is the peak of a syllable, preceded by one consonant and followed by one or two consonants.

The syllable structure in SP depends on how we interpret the glottal stop [ʔ]. When [ʔ] is in the coda position, it will be considered as a phoneme, (cf. [væzʔ]'position'), but in the words with an initial vowel, Samareh (1992, pp. 128-129) gives [ʔ] a phonemic status and thus establishes an obligatory syllable pattern of CV(C(C)).

If we do not consider [ʔ] as a phoneme in the onset position, the syllable structure in SP would be as follows:

(1). SP syllable structure without considering [ʔ] as a phoneme:

a. V	/uː/	'he, she'
b. CV	/bɑː/	'with'
c. VC	/ɑːb/	'water'
d. CVC	/pir/	'old'
e CVCC	/goft/	'said'

On the other hand, by considering [ʔ] as a phoneme in the onset position, the syllable structure in SP would be compatible with the economy of analysis, as shown in the followings:

(2). SP syllable structure which considers [ʔ] as a phoneme:

a. CV	/ʔuː/	'he, she'
b. CVC	/pir/	'old'
c. CVCC	/særd/	'cold'

CSB PHONEME SYSTEM

Balochi is spoken in south-western Pakistan, in the province of Baluchestan as well as by smaller populations in Punjab and Sindh, and by a large number of people in Karachi. It is also spoken in south-eastern Iran, in the province of Sistan and Baluchestan, and by the Baloch who have settled in the north-eastern province of Khorasan and Golestan. It is furthermore, spoken by small communities in Afghanistan in the Gulf States, in the Marw/Marie region of Turkmenistan, in India, East Africa and nowadays also by a considerable number of Baloch in North America, Europe and Australia (Jahani & Korn, 2009). 'The total number of speakers of Balochi has been estimated at between five and eight million, but it might also be somewhat higher than that' (Jahani, 2001, p. 59).

The position of Balochi among Western Iranian languages is controversial. Elfenbein (1989) introduces this language as Northwestern Iranian languages whose Middle Iranian ancestor is much closer to Parthian rather than Middle Persian. Paul (2003) claims that Balochi seems to be more of a Southwestern Iranian language. Korn (2003), from a historical perspective, regards it as a Northwestern Iranian language. Korn (2003, p. 50) shows the relationship between Balochi and other Iranian languages in the form of a family tree as shown in figure 2.

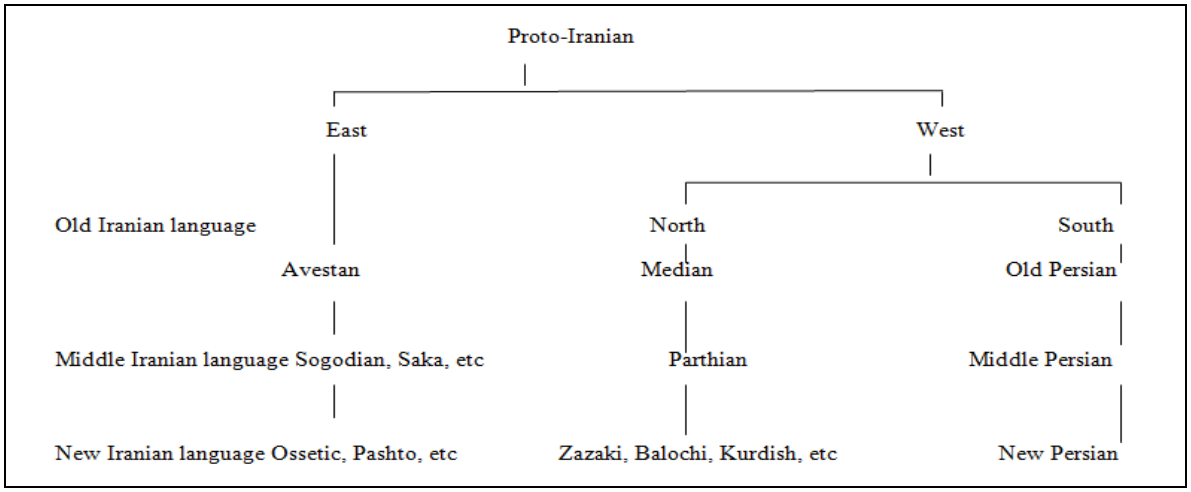

FIGURE 2. The relationship between Balochi and other Iranian languages

Jahani and Korn (2009, p. 636) divide the main dialects of Balochi into 'Western (WBal.), Southern (SBal.), and Eastern (EBal.). This is a very broad dialect division, within which further dialect demarcations can be made. Some dialects do not easily fit into any of these groups. This is true, for example, of the dialect spoken in Iranian Sarawan, which shows transitional features between Western and Southern Balochi.'

The dialect of Sarawani differs from the other Balochi dialects spoken in Iran. Sarawani is spoken in the area including the town of Sarawan. 'The district of Sarawan is about 24,000 km^2. It borders with Pakistan to the east and with Chabahar district, which is situated along the Arabian Sea, to the southwest and south. In the north it borders the towns of Khash and Zahedan and in the west Iranshahr. The distance from Sarawan to Tehran is about 2000 km^2.'(Baranzehi, 2003, p. 77).

CSB CONSONANT INVENTORY

The consonants in CSB are almost the same as other Balochi dialects consonants. 'The phonemes /f/, /x/, /q/ and / ġ/ which are found in Arabic, Persian and European loanwords are changed to /p/, /h/, /k/ and /g/ by most uneducated people whereas the educated mainly use the Persian pronunciation'(Baranzehi, 2003, p. 80).

Baranzehi introduces the consonant inventory[5] of CSB as displayed in table 3.

TABLE 3. Sarawani Balochi consonants

	Labial	**dental-alveolar**	**Retroflex**	**prepalatal-palatal**	**Velar**	**Glottal**
Plosive	P	t	ṭ		k	(')[6]
	b	d	ḍ		g	
Affricate				č		
				ǰ		
Fricative	(f)	s		š	(x)	h
		z		ž	(ġ)	
Nasal	m	n				
Lateral		l				
Flap		r	ṛ			
Glide	w			y		

Soohani (2003) investigates the phonology of CSB from the point of view of the ruling linear and non-linear models of modern generative phonology as developed in Chomsky and Halle (1968). She provides a list of consonants for this dialect which is the same as Baranzehi (2003), except for the fricative /ɣ/ rather than /q/ which she observes in the pronunciation of loanwords by educated speakers.

CSB VOWEL INVENTORY

The vowels of CSB have been introduced in Soohani (2003) and Baranzehi (2003). Baranzehi (ibid) considers the following vowel inventory for the dialect:

Long vowels: /ā, ī, ū, ē, ō/
Short vowels*: / a*, e, o/
Diphthongs: /ey, aw/

Sooahni (2003) considers the following vowels for CSB, where the number of short vowels is more than the number of long vowels:

Short vowels: /ɑ, e, o, æ, ə/
Long vowels: /ɑ:, i:, o:, u:/
Diphthong: /ei, ou/

On the other hand, Soohani (2010) introduces the inventory of CSB vowels, which are similar as Soohani (2003), except for these modifications: a) Soohani (2010) does not consider /ə/ as a vowel and b) she adds /i/ as a short vowel.

CSB SYLLABLE STRUCTURE

According to Soohani (2003, 2010), the syllable structure in Central Sarawani Balochi is formulated as (C) CV(C) (C). So different types of possible syllables in this dialect are as bellow:

(3)	a. CV	/doː/	'two'
	b. CVC	/ʔɑːb/	'water'
	c. CVCC	/ʔæsk/	'photo'
	d. CCV	/truː/	'aunt'
	e. CCVC	/srɑːh/	'home'
	f. CCVCC	/dræht/	'tree'

Vowels in all these positions can, as shown, be either short or long.

SD PHONEME SYSTEM

"Sistani dialect, a variety of Persian which belongs to the south western group of Iranian languages (Windfuhr, 1989, p. 248; Bearman et al., 2003, p. 427, cited in Ahangar, 2010, p. 1), is spoken in Sistan in northern of Sistan and Baluchestan province in the southeast of Iran, Farah and Nimruz provinces of Afghanistan, Sarakhs in Turkmenistan, and in some regions of Iran including Zahedan city, Mazandaran province, Golestan province, Mashhad and Sarakhs cities in Razavi Khorasan province, where a great number of migrant native speakers of Sistani dialect live." (Ahangar, 2010, p. 1)

SD CONSONANT INVENTORY

Ahanagr (2003, p. 12) introduces the consonant inventory of SD as displayed in table 4.

TABLE 4. SD Consonants

	Bilabial	**Labiodentals**	**alveolar**	**post alveolar**	**palatal**	**Velar**	**uvular**[7]	**Glottal**
Plosive	p b					k g		(ʔ)[8]
Affricate				tʃ dʒ				
Fricative		f v	s z	ʃ ʒ			x ɣ	(h[9])
Nasal	m		n					
Tap			r					
Approximate			l		j			

In addition, Barjasteh Delforooz (1996) introduces the same consonant inventory except for /ʒ/ found in Sistani dialect of Markazi region of Zabol.

SD VOWEL INVENTORY

The vowels of SD have been proposed by Ahangar (2003, p. 15; 2010, p. 6) as follows:

TABLE 5. SD vowels

	Front	**Central**	**Back**
High	iː		uː
	i		u[10]
Mid	eː		oː
	e		o
Low	æ		
	æː		ɑː

Furthermore, Barjasteh Delforooz (1996) also represents the same vowels except for /i/ in the vowel system of Sistani dialect of Markazi region of Zabol.

SD SYLLABLE STRUCTURE

The syllable pattern of SD depends on how the phonemic status of [ʔ] is interpreted in this dialect. Whereas Okati (2008, pp. 33-36) and Okati, Ahangar and Jahani's (2009, p. 80) study determine that [ʔ] has no phonemic status in the Sistani dialect of Miyankangi at present but more intense contact with Persian may change this status in the future, Ahangar (2003) considers [ʔ] as an independent phoneme in the consonant inventory of SD based on the linguistic data gathered from the speech of Sistani speakers living in Sekuhe (locally known as /sækvɑ/ or /sækvæ/) in Shibe Ab [11]region).

As for the SD syllable structure, Okati (2008) introduces nine syllable patterns of Sistani dialect of Miyankangi as follows:

(4)	a. V	/o/	'water'
	b. VC	/ol/	'push'
	c. VCC	/æsp/	'horse'
	d. CV	/ʃo/	'night'
	e. CVC	/nem/	'wet'
	f. CVCC	/keft/	'shoulder'
	g. CCV	/dvɑ/	'curse'
	h. CCVC	/ʃlɑːr/	'stitch'
	i. CCVCC	/plæft/	'faded'

However, Barjasteh Delforooz (1996) and Ahangar (2003) regard (C) CV (C) (C) as Sistani syllable structure and give the following possible syllable patterns for this dialect:

(5)	a. CV	/dʒoː/	'body'
	b. CVC	/ʃiːr/	'milk'
	c. CVCC	/dæːrz/	'seam'
	d. CCV	/præː/	'patch'
	e. CCVC	/klæp/	'beak'
	f. CCVCC	/spest/	'alfalfa'

DATA ANALYSIS AND DISCUSSION

As seen in the description of the vowel and consonant inventories as well as syllable structure of SP,CSB and SD spoken in various geographical areas, these language varieties show some microvariation in their phonemic inventories and syllable structure. It is only in the consonant inventory of CSB retroflex that consonants and the approximate /w/ are observed. Furthermore, the consonants /x/, /ɣ/ and /f/ are absent in the consonant inventory of uneducated speakers of CSB. These variations make CSB different from SP and SD. Moreover, in the consonant inventory of CSB and SD fricative /ɣ/ (also a phoneme in Old and Middle Persian) it is observed that its equivalent in SP consonant inventory is the stop/q/. On the other hand, the status of the glottal stop [ʔ] in SD varies in some regions of Sistan. While this consonant appears as a phoneme in the speech of SD speakers in Sekuhe village and Markazi region of Zabol, it does not serve as a phoneme in SD of Miyankang region. Instead, it occurs mainly in word-initial position and is in free variation with ø.On the other hand, SD lacks the consonant [h]. Nevertheless, it is observed in the speech of educated speakers of SD and Arabic as well as Persian loanwords. Thus the status of [ʔ] and [h] in SD differs from SP and CSB.

As for the vowels, the number of cardinal vowels in SD is more than SP and CSB. While vowel length is not a phonemic feature in SP and CSB (at least, based on the linguistic corpus under investigation), it functions as a phonemic feature in SD providing short/lax and long/tense vowels in its vowel inventory. Meanwhile, the status of short and long vowels of CSB is floating between SP and SD, that is, the number of short vowels in SP and CSB are mostly equal, whereas the number of long vowels in CSB and SD are almost the same.

The considerable difference in the syllable structure of SP, CSB and SD is the existence of the initial consonant cluster in the syllable structure of CSB and SD. But such a syllable structure violates the phonotactic constraints in SP.

Furthermore, the problem of disagreement in the status of [ʔ] in initial position of the syllable structure of SP as given in (2-1-3) and CSB as shown in (2-2-3), on one hand, and SD as represented in (2-3-3) on the other hand, can be explained in the framework of OT. In fact, the central idea of OT is that the optimal output form arises from competition of markedness constraints and faithfulness constraints. In this case, we have the structural well-formedness constraint ONSET (Prince & Smolensky, 1993):

ONSET

*[σ V (‘Syllables must have onsets.')

This constraint requires that syllables must not begin with vowels; it is satisfied only by syllables that have (at least) an initial consonant, or onset. Kager (1999) believes that “onset is ‘grounded’ in the articulatory and perceptual systems: the best starting point for the vowel is a preceding consonant (rather than another vowel)”.

In addition, filling the empty onset position by the glottal stop [ʔ] can be referred to as an example of epenthesis. Epenthesis involves a violation of faithfulness: the output diverges from the input by the presence of an epenthetic segment. The faithfulness

constrain which prevents epenthesis is DEPENDENCY-IO or DEP-IO (Kager, 1999, pp. 100-101; see also: Zaharani, 2004, pp. 6-7):

(6) DEP-IO
Output segments must have input correspondents. ('No epentheses')

Epenthesis in onsets shows that SP ranks DEP-IO below ONSET. Onset epenthesis involves the following ranking:

(7) Epenthesis in onset
ONSET>> DEP-IO

This ranking is demonstrated by tableu 1. It contains two candidates, which differ only in the presence versus the absence of an epenthetic consonant.

Tableau (1)

Input: /æbr/	ONSET	DEP-IO
a. ☞ ʔæbr		*
b. æbr	*!	

The evaluation of two candidate outputs for the input/æbr/ is presented as the following:
a. /ʔæbr/ satisfies ONSET, but violates DEP-IO constraint.
b. /æbr/ violates ONSET constraint, but satisfies DEP-IO constraint.

So, the optimal output is /ʔæbr/ not /æbr/.
Now consider the possibility of a second strategy, the deletion of the [ʔ] as an onset. Segment deletion is a violation of faithfulness, just as epenthesis is. The constraint that enforces the preservation of input segments in the output is MAXIMALITY-IO or MAX-IO (Kager, 1999, p. 102):

(8) MAX-IO
Input segments must have output correspondents. ('No deletion)

The fact that SP prefers consonant epenthesis in the onset position than onset-less syllables tells us that MAX-IO dominates DEP-IO. The former is not violable under the pressure of ONSET, while the latter is. As a result, we arrive at the following total ranking:

(9) ONSET, MAX-IO >> DEP-IO

This ranking is illustrated by the tableau 2.

Tableau (2)

Input: /ʔæbr/	ONSET	MAX-IO	DEP-IO
a.☞ʔæbr			
b. æbr	*!	*	

The evaluation of two candidate outputs for the input/ʔæbr/ is presented as the following:
a. /ʔæbr/ satisfies ONSET, MAX-IO and DEP-IO .
b. /æbr/ violates ONSET and MAX-IO, but satisfies DEP-IO .

Thus, the optimal output is /ʔæbr/.

Correspondingly, since in both cases the optimal output is the candidate with the glottal stop [ʔ] in its onset position, we should consider SP as a language that does not allow onset-less syllables (see also, Bijankhan, 2005, pp. 168-170). According to these explanations, it can be said that there are three types of syllable structure in SP as shown in Samareh (1992, p. 129).

The ranking of DEP-IO and ONSET constraints for the status of [ʔ] in CSB is illustrated in the tableau (3):

Tableau (3)

Input: /ɑːp/	ONSET	DEP-IO
a.☞ ʔɑːp		*
b. ɑːp	*!	

The verification of the two candidate outputs for the input /ɑːp/ is given below:
a. /ʔɑːp/ satisfies ONSET, but violates DEP-IO constraint.
b. /ɑːp/ violates ONSET constraint, but satisfies DEP-IO constraint.
Thus the optimal output will be /ʔɑːp/ rather than /ɑːp/.
The application of the second strategy, the input with [ʔ], for CSB is as follows:

Tableau (4)

Input: /ʔɑːp/	ONSET	MAX-IO	DEP-IO
a.☞ʔɑːp			
b. ɑːp	*!	*	

The evaluation of two candidate outputs for the input/ʔɑːp/ is shown as the following:
a. /ʔɑːp/ satisfies ONSET, MAX-IO and DEP-IO.
b. /ɑːp/ violates ONSET and MAX-IO, but satisfies DEP-IO.

Hence, the optimal output is /ʔɑːp/.
Consequently, as to the syllable structure in CSB, the optimal output is the candidate with the glottal stop [ʔ] in its initial position. This analysis supports the type of syllable

structure suggested for CSB by Soohani (2003) rather than the one observed in Baranzehi's (2003) data.

As it has been stated earlier, the status of [ʔ] in onset position of SD syllable structure is controversial. Syllable structures which are suggested by Ahangar (2003) have (at least) a consonant in their onset positions, while for the ones proposed by Okati (2008), there are some patterns which have no consonants in their onset positions. In fact, this disagreement can be solved in the framework of OT, which is what we discussed for SP syllable structure. Therefore, in order to satisfy the ONSET constraint all syllables must have a consonant in their onset position as suggested by Barjasteh (1996) and Ahangar's (2003) syllable structure because the suggestion for SD is supported by this constraint. In this regard, tableau (5) illustrates the example taken from Ahangar (2003):

The /ouri/ 'crazy' is considered as the input in tableau (5):

Tableau (5)

Input:/ouri/	ONSET	DEP-IO
a. ☞ ʔouri		*
b. ouri	*!	

The evaluation of the two candidate outputs for the input /ouri/ is presented below:
a. /ʔouri/ satisfies ONSET, but not DEP-IO.
b. /ouri/ violates ONSET constraint, but satisfies DEP-IO.

Therefore, the optimal output will be /ʔouri/ not /ouri/.
Next, by considering /ʔouri/ as an input, we will have what is presented in tableau (6):

Tableau (6)

Input: /ʔouri/	ONSET	MAX-IO	DEP-IO
a.☞ʔouri			
b. ouri	*!	*	

The evaluation of the two candidate outputs for the input /ouri/ is presented below:
a. /ʔouri/ satisfies ONSET, MAX-IO and DEP-IO
b. /ouri/ violates ONSET and MAX-IO, but satisfies DEP-IO.

So, the optimal output will be /ʔouri/.
Typological studies of syllable structure show that languages fall into two large classes: those allowing onset-less syllables, such as Japanese, Diola-Fogny, Ponapean and English, and those that do not allow onset-less syllables, such as Temiar, German, Dutch and Arabic(cf. Ewen & van der Hulst, 2001; Kager, 1999). In this regard, 'compare the English and Dutch forms for 'mayonnaise', viz /meɪəneɪz/ and /mɑːjoːneːzə/. In Dutch form the onset is filled by a glide, while English permits the onset to remain empty. Further, German is generally claimed to insert a glottal stop whenever the onset is phonologically empty, so that a word like *Ende*/ɛndə/ 'end' is realized as [ʔɛndə]' (Ewen & van der Hulst, 2001, p. 187).

As a result, all the evidence can be cited to support this fact that SP, CSB and SD, indeed, are among languages that do not permit onset-less syllables. They reject empty onset like German and fill it with the glottal stop [ʔ]. It is worth mentioning that, in CSB, the pronunciation of the onset-less syllables can also starts with a glottal fricative [h] as well as glottal stop[ʔ], like in [hæsp] ‘ horse’, [hoʃter] ‘camel’ and [hænɑːr] ‘pomegranate’.

Correspondingly, while there exists a geographical distance between SP and SD, phonologically, the case of inserting [ʔ] in the onset-less syllables provides a piece of evidence for the similarity between the syllable structure of these two language varieties. Nevertheless, whereas SD and CSB are close geographically, on one hand, and CSB and SP being distant on the other hand, onset-less syllables can be filled by [ʔ] and [h] in CSB, only [ʔ] fills the empty onset position in SP as well as SD.

So far, our syllable typology has only considered the presence or absence of onsets. But languages differ along the dimension of complexity of syllable margins as well. For example, a language may permit onset (like Japanese), but not a ‘complex’ one. In such a language, onset must be ‘simple’, i.e. it consists of one consonant. Indeed complex onsets are universally marked as compared to simple onsets which are unmarked’ (Kager, 1999, pp. 95- 97).

Concerning the complexity of onsets, in the framework of OT, we try to illustrate that the linguistic distance between SP, CSB and SD is the minimal number of minimal reranking to get from one grammar to another. Consider the following examples from these language varieties:

(10). Standard Persian onset structure:

a. /pesær/ ‘son’
b. /dʒævɑn/ ‘young’
c. / deræxt/ ‘tree’
d. / gerɑːn/ ‘expensive’
e. / kæmær/ ‘waist’

(11). Sistani dialect onset structure:

a. /pseː/ ‘son’
b. /dʒvoː/ ‘young’
c. / dræːxt/ ‘tree’
d. / groː/ ‘expensive’
e. /kmæːr/ ‘waist’

(12). Central Sarawani Balochi onset structure:

a. /tropʃ/ ‘sour’
b. /dʒwɑːn/ ‘young’
c. /dræht/ ‘tree’
d. /grɑːn/ ‘expensive’
e. /mtʃɑːtʃ/ ‘eyelash’

Based on the examples presented, we can claim that SP avoids complex onsets in its syllable structure by vowel epenthesis and just permits simple onsets, but in CSB and SD both simple onsets and complex onsets are allowed . Thus, this phonological process can be described in the frame work of OT based on the ranking of the following constraints:
DEP-IO
No epenthesis of segments

*COMPLEX^{ONS}

*[σ CC ('Codas are simple')

Ranking these two constraints for SP syllable structure will be as the following:

(11) *COMPLEX^{ONS} >>DEP-IO

This ranking is illustrated in tableau (7):

Tableau (7)

Input:/dʒvɑn/	*COMPLEX^{ONS}	DEP-IO
a. dʒvɑn	*!	
b.☞ dʒævɑn		*

The evaluation of the two candidate outputs for the input /dʒvɑn/ will be as follows:
a. /dʒvɑn / violates *COMPLEX^{ONS}, but satisfies DEP-IO.
b. / dʒævɑn / satisfies *COMPLEX^{ONS}, but violates DEP-IO.

As tableau (7) indicates, the optimal output is/dʒævɑn/, because it does not violate the strict dominate.

Reranking the same constraints will specify the syllable structures of Sistani dialect and Central Sarawani Balochi (tableau (8) and tableau (9), respectively):

(13). DEP-IO >> *COMPLEX^{ONS}

Tableau (8)

Input:/dʒvoː/	DEP-IO	*COMPLEX^{ONS}
a. dʒevoː	*!	
b.☞ dʒvoː		*

The evaluation of two candidate outputs for the input /dʒvoː/:
a . /dʒevoː/ violates DEP-IO, but satisfies *COMPLEX^{ONS}.
b ./dʒvoː/ satisfies DEP-IO, but violates *COMPLEX^{ONS}.

So the optimal output is /dʒvoː/ that does not violate the strict constraint.

Tableau (9)

Input:/dʒwɑːn/	DEP-IO	*COMPLEX^{ONS}
a. dʒæwɑːn	*!	
b. ☞ dʒwɑːn		*

The evaluation of two candidate outputs for the input /dʒwɑːn/:
a. / dʒæwɑːn / violates DEP-IO, but satisfies *COMPLEX^{ONS}.
b. /dʒwɑːn /satisfies DEP-IO, but violates *COMPLEX^{ONS} .

Since the second candidate '/dʒwɑːn/' does not violate the DEP-IO, it is considered as an optimal output.

Therefore, it can be claimed that the analysis of syllable structure of SP, CSB and SD based on the OT supports van Oostendorp (2008) approach: The linguistic distance between two dialects is the minimal number of minimal reranking needed to get from one grammar to another, so reranking of the same constraints shows the existence of initial consonant cluster in the syllable structure of CSB, SD and not in SP. In this regard, though SD is originally a dialect of Persian, its syllable structure is not identical with that of SP. So it seems that the geographical distance between the two language varieties leads to such a difference as a language variation, where SP has not had any effect on SD in this respect and SD behaves more similar to CSB, as a dialect of Balochi language, which are geographically closer to each other.

Similarly, historical considerations support the above claim. SD retains the initial consonant clusters like what we have in Old Persian e.g. /xʃɑj/ 'king' and Middle Persian /syɑ/ 'black'(for more examples see: Abolghasemi, 2010; Makenzi, 1990). On the other hand, CSB data shows that this dialect employs initial clusters as well (the matter whether such consonant clusters are traces of Old /Middle Persian requires a separate research).

CONCLUSION

This study has shown how it is, indeed, possible to define a notion of grammatical distance within OT, and how this notion can be successfully used to describe the geographical landscape of CSB and SD which have a different syllable structure from SP. The phoneme systems of SP, CSB and SD were studied and the results of comparing their phoneme systems were as follow:

- Presence of retroflex consonants/ɖ, ʈ, ɻ/ only in the consonant inventory of CSB. Absence of /x/, /ɣ/and /f/, in the consonant inventory of uneducated speakers of CSB.
- Absence of /h/ in the pronunciation of non-loanwords of SD.
- The controversiality of the [ʔ] status in Sistani dialect.
- The number of cardinal vowels in SD being more than SP and CSB, the central vowel /ʉ/ has been observed in SD as well.

- Presence of the bilabial approximate /w/ in the CSB consonant inventory.
- Observing the fricative /ɣ/ in CSB and SD instead of SP plosive /q/.
- The considerable difference in the syllable structures of SP, CSB and SD, whereas the consonant cluster in onset position of syllable structure in CSB and SD is current and grammatical, this structure is ungrammatical in SP.

Furthermore, the results also show that based on the framework of OT and based on van Oostendorp (2008) approach as well as historical considerations, the study of the syllable structure of SP, CSB and SD supports the fact that the linguistic distance between two dialects is the minimal number of minimal reranking which is needed in order to get from one grammar to another. As the status of glottal stop [ʔ] in the initial position of the syllable structures of SP, SD and CSB was analyzed based on ranking constraints, namely, DEP-IO, ONSET, and MAX-IO, typologically, it was claimed that these language varieties are among languages which disallow onset-less syllable. Correspondingly, reranking of the two constraints: DEP-IO and *COMPLEX^{ONS} supported the existence of the consonant cluster in onset position of syllable structures of CSB and SD but not that of SP.

Furthermore, our data demonstrated that the linguistic distance between two dialects equals to the geographical distance between the language varieties under investigation. Thus the syllable structure of SD is the same as the syllable structure of CSB, both different from SP syllable structure, though historically SD is closer to SP rather than CSB.

This research can pave the way for more future studies on the phonological microvariation among other Iranian languages and dialects using the frame work of Optimality Theory. In addition, it is also worth investigating the syntactic microvariation among SD, SP and CSB.

ENDNOTE

[1] Internal language
[2] External language
[3] In the present article, the IPA symbols have been used to transcribe the phonemes except for table3.
[4] The phonemic symbols and transcriptions, except for Baranzahi (2003), are based on IPA system.
[5] The consonants /f/, /x/,/q/ which are found in loanwords from Persian and Arabic are changed to /p/,/h/,/k/or/g/ by most language consultants whereas some educated uses the Persian pronunciation as well.
[6] The glottal stop [’] is occasionally pronounced in Arabic loanwords in Sarawani Balochi (Baranzehi, 2003, pp. 80-81).
[7] While Ahangar (2003) considers [x] and [ɣ] in Sistani as uvular fricatives, Okati (2008) introduces it as postvelar fricatives.
[8] The phonemic status of [ʔ] in SD is mainly in word-initial position, where it stands in free variation with ø
(Okati, Ahangar, Jahani, 2009, p. 80).
[9] The only place where [h] is heard is in Arabic and Persian loanwords, and only in the pronunciation of some SD speakers who are educated and /or live in urban areas (Okati, Ahangar, Jahni, 2009).
[10] Okati (2008) and Okati, Ahangar, Jahani (2009) introduce /ʉ/ as a central vowel in Sistani Dialect of Miyankangi.
[11] Shibe Ab is one of the five geographical regions of Sistan, namely: (1) Zabol or central region, (2) Miyankangi region, (3) Shahraki-Naruee region, (4) Poshte Ab region and (5) Shibe Ab region

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