

Syllabic Structure of Sistani Dialect (Rule-based Approach)

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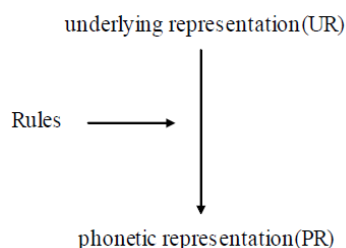
Abstract—Sistan is one of the eastern cities of Iran. It has local people with local dialect. The dialect has specific characteristics in phonology, phonetics, morphology and etc. The unique characteristic of Sistani dialect is its initially consonant cluster that makes this dialect different from the standard Persian, so vowels are placed in a different ordering. It is affected by two phonological processes and in a specific situation. Generative phonology will help us understand the underlying level of language in Sistani dialect and can discover the reason of the existent consonant clusters. This study is an attempt to discover the phonological processes which might occur in the beginning of words and make initially consonant clusters. The first one found is the centralization process, and the second one, the syncope process. These processes act as consecutives. Consequently, short vowels are converted to /ə/, then /ə/ is converted to /Ø/ and two consonant remain in line with each other and make different syllabic structures. The results revealed that in addition to CV(C)(C), C(C)V(C)(C) syllabic structure also exists in Sistani dialect. It is worth mentioning that C(C)V(C)(C) syllabic structure is just found in surface structure of Sistani dialect. Its deep structure is different: CV(C)(C), as it is in Persian dialect.

Index Terms—centralization, Sistani dialect, syllabic structure, syncope, vowel reduction

I. INTRODUCTION

Sistani is spoken in the Sistan region of Afghanistan, in southern Turkmenistan, and in southeast of Iran. The Iranian Sistani dialect is spoken by 90% of a total of about 350,000 inhabitants in the Sistan region of province of Sistan and Baluchistan. It is also spoken in other parts of Iran such as Sarakhs in Khorasan, Zahedan, the Golestan province and Pakistani Baluchistan (Dusti, 2001).

The study is concerned with generative phonology that is a subfield of general theory of language known as generative grammar. Different studies were performed in this field. Generative grammar was proposed from mid of 1950's and was formed from two different currents. These two different currents include Chomsky's and Halle's (1968) ideas. Chomsky gradually consolidated the base of the generative grammar in 1957 and he published his book named as "Syntactic Structures". Chomsky depicted the relationship between phonology and syntax in different essays (Clark and Yallop, 1995, Kenstowicz, 1994, Kord Zafaranlu kambuzia, 2006). Halle (1992) assumed that in generative grammar, the morphemes of a language are stored by the speaker in a special listlike device called a lexicon or dictionary, which contains all of truly unpredictable, idiosyncratic information about the behavior-syntactic, semantic, phonological of each morpheme known to the speaker. So, study of phonology is a branch of study of generative grammar. Here, it is necessary to define phonology in the method's point of view. Phonology is the study of the system underlying the selection and use of sounds in the languages of the world. Although a number of distinct approaches to the study of phonology have been developed during the present century, we will approach the study of sound systems from standpoint of one particular theory- generative phonology (Kenstowicz and Kisseberth, 1979). Kenstowicz (1994) believes that generative phonology is based on a comprehensive theory that Chomsky and Halle (1968) in "Sound Pattern English" (SPE) have illustrated it. Its typical point is having mathematical aspect of its operations. Phonological theory is about description of phonology and its classification in order to be able to explain a symbolic system of phonetic structures with mechanical forms. SPE has been defined as a linear pattern. It means that some phonological segments place on a tier and affect on each other. Both standard phonology and structural phonology obtain a linear pattern of language phonological structure. Phonotactics, in structural phonology and rules, in standard phonology are used for describing phonological processes. Therefore, SPE studies sounds and their rules which are affected on adjacent sounds. The rules occur on deep structure of sound and convert it to surface structure (Goldsmith, 1990, Durand, 1990 and Ladefoged, 2006). There is a paradigm regarding generative phonology which was describing underlying representation (UR, deep structure) and phonetic representation (PR, surface structure) and considering the place of the transformational rules between these two representations (Rocca and Johnson 1999).



Following above description for discovering underlying representation of the surface structure, three stages which are Corpus internal evidences, five criteria of discovering underlying representation, and Corpus external evidences must be survey to find underlying representations. (kenstowicz and kisseberth, 1979).

All utterances (and the morphemes composing them) have an underlying representation and a phonetic representation. These representations are linked by one or more rules that express the predictable features of pronunciation found in the phonetics representation of each morpheme. Given this general conception of phonology, the analysis of any language involves determining the UR for morphemes of a language and a statement of the rules linking this representation with the PR(kenstowicz and kisseberth, 1979). After determining deep structure, generative phonology rewrites operated transformational rules and explains it linearly (Kord Zafaranlu Kambuzia, 2006 and Durand, 1990). After linear explaining of structures, the rules are written as:

$A \rightarrow B / X - Y$

It means A convert to B if be in X—Y environment. All of rules can rewrite in this way (Clements and keyser, 1983).

Some phonological studies were done on the dialects of Persian. One of them is “Vowel Reduction in Kermani Dialect” by Parmoon(2006). Parmoon, In his article which has based on generative phonology approach, the process of vowel reduction has been analyzed and of course this process is different from that one occurring in the Sistani dialect, but shows frequency of vowel reduction process. In fact, Parmoon(2006) has studied centralization in Kermani dialect and determined deep structure of words with respect to the generative phonology approach. It is necessary to add that in Kermani dialect, omission of the middle vowel doesn’t always occur after centralization, but centralization can be often noticed. Okati (2008), also in “A phonological description of the Sistani dialect” deals with this subject, though she presents Sistani dialect as having initially consonant cluster in surface structures and believes that the Sistani has CCV(C) (C) syllabic structure in its deep structure. Okati, Ahangar and Jahani(2009), in “The Status of [h] and [?] in Sistani Dialect of Miyankangi” show that neither [?] nor [h] have phonemic status in Sistani dialect of Miyankangi at present. This study will illustrate the syllabic structure of Sistani dialect.

II. METHODOLOGY

A. Subjects

A group of 48 uneducated male and female subjects participated, in this, 24 men and 24 women. They are selected randomly from rural areas of Zabol city. They are about 50 to 60 years old. Table 1 below clearly indicates the subjects participating in the study.

TABLE 1
SUBJECTS FEATURE PARTICIPANTS

Number of sentences	Subjects	Sex	Age	Literacy	Zone
300	24	Male	50-60	Uneducated	Rural
300	24	Female	50-60	Uneducated	Rural

B. Instrumentation

The focus of this study is mainly on two processes of vowel reduction (centralization and Syncope) which results in the creation of initially consonant cluster in Sistani dialect. The approach upon which this study is based is generative phonology. Recent studies of phonology on generative approaches have been practiced more than before and one can’t find more literature related to this dialect, Sistani.

Collection of data was done by means of two instruments. First, bibliotic method in which all books related to the subject have been studied directly and essential information and notes have been taken. Some of these books are: *Generative phonology* (Kenstowicz and kisseberth, 1979), *phonology in generative grammar* (Kenstowicz, 1994), *A course in phonetics* (Lade forged, 2006), *A course in phonology* (Rocca & Johnson, 1999), and *The study of Language* (Yule, 1985), the Sound Pattern of English(Chomsky and Halle,1968), autosegmental and Metrical Phonology (Goldsmith,1990) and etc.

Second method is field study. In this method people were interviewed by a voice recorder. A questionnaire which developed by Parmoon (2012), was used which included 300 important sentences and base words of every dialect. Sentences were asked by an interviewer and every speaker repeated them 2 times and their voice was recorded. Both men and women were interviewed. After finishing the interview, sentences were transcribed using IPA. See appendix A.

C. Procedures

Initial consonant clusters are so prevailing in Sistani dialect that makes it significant. In this study, it was tried to discover the reasons of such clusters on the basis of generative phonology approach. To this end, the first procedure was to provide local speakers selected from rural areas and they are between 50 to 60 years old because rural and old speakers are affected by other languages less than urban speakers. Then, a questionnaire was given to these people to be completed. Every sentence should be repeated twice by every speaker and their sound was recorded and transcribed by IPA. IPA is an International Phonetic Alphabet. Then, it was tried to prove data on the basis of the Rule-based phonology and to study frequencies in the surface structure in order to determine their deep structure. Rules that were utilized in deep structures were discovered; and at last results were mentioned.

To show for which words or expression abbreviation are used, the following table is given.

TABLE 2
UTILIZED SIGNS AND SYMBOLS

1	Empty	∅	6	Phone sign(PR)	[]
2	Syllable border	\$	7	Omissible	()
3	Word border	#	8	Other phonological rules	...
4	Morpheme border	+	9	Consonant	C
5	Phoneme sign(UR)	//	10	Vowel	V

III. RESULTS

Based on the data analyses, the following results are found. According to the approach we utilized, one of two alternative forms in the surface structure must be deep structure. Generative phonology uses some methods to determine deep structure. As mentioned before, generative phonology introduces three stages which help to identify underlying level of language.

1. Corpus Internal Evidence

In linguistic corpus, two forms in parallel can be seen which phonetically aren't in correspondence. So, one can conclude that there are two forms in frequency. One of them is the underlying representation and another one is the surface structure (phonetic representation). In Sistani dialect, one of the forms is a group of /æ,e,o/ and the other one is /ə/. This alternation is demonstrated as:

$$\begin{array}{c}
 \text{(PR)} \left(\begin{array}{c} -\text{cons} \\ +\text{vowel} \\ -\text{long} \\ -\text{back} \\ -\text{short} \end{array} \right) \sim \left(\begin{array}{c} -\text{cons} \\ +\text{vowel} \\ -\text{long} \end{array} \right)
 \end{array}$$

2. Five criteria for discovering underlying representation

In this research three criteria of discovering underlying representation were studied.

1) Frequency of occurrence

/æ,e,o/ vowels can be seen in different places in Sistani dialect and without regarding any special conditions, and they are placed in any part of a word. In comparison /ə/ is restricted to some special conditions. So, frequency of occurrence of /æ,e,o/ is more than /ə/; subsequently, a form with more frequency of occurrence is the deep structure. For example in the word "psær", [æ] occur in the second syllable but ə just occur in the initial syllable.

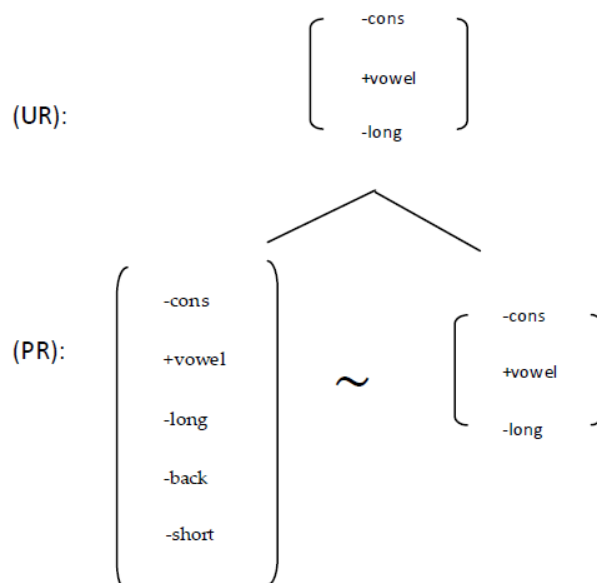
2) Phonetic plausibility

From two alternative forms, one is the underlying representation which its changing rule to another is more logical. This justifies the fact that vowel reduction process is a logical and explainable process. So, vowels / æ,e,o / are rooted in the deep structure. For example æ,e,o → ə /# — is plausible.

3) Phonological naturalness

As it is indicated in the following diagram, one can conclude that vowel reduction is not only a precedent process in this dialect but also in other languages. So /æ,e,o/ are rooted in the deep structures. For example æ,e,o → ə /# — is more natural than ə → æ,e,o /# —.

Based on the above-mentioned findings, underlying representation can be illustrated as the following:



3. Corpus external evidences

An external evidence was related to the students learning a foreign language. In their English classes, students having Sistani dialect could pronounce initially consonant clusters easier than the students of other dialects that don't have initially consonant cluster in their dialects. For example, the word "school" was hard to pronounce for student speaking the standard Persian. They pronounced it as "eskul". But sistani dialect students can pronounce "skul" as native English speakers. Based on the above findings, it can be concluded that Sistani dialect has two alternative forms. One of them has /æ, e, o/ and the other one is /ə/. For example, /pəsær/ and /pesær/ are pronounced in Sistani dialect. So, both of them are Sistani alternations.

As it was shown above, the underlying representation is /æ, e, o/. Generative phonology, after finding the underlying representation, will represent the existent rules of the Sistani dialect processes. As following data, Two Sistani phonology rules are written and the relation between them will be shown.

1). Centralization process

According to the internal evidence, five criteria of discovering underlying representation and external evidence examined above, /æ, e, o/ are underlying representation (UR) and [ə] is phonetic representation (PR). Now, the rule of above mentioned alternations in the frame of generative phonology can be depicted as so:

Rule1: [æ, e, o] → [ə] / # C — {CV, CVC}

2). Syncope process (ə-deletion)

Sistani speakers simplify their speech similar to other dialects. So, they tend to delete /ə/ too. Therefore, Another rule which occurs after the centralization is syncope (ə-deletion), as we see:

Rule2: [ə] → [Ø] / # C — {CV, CVC}

3). Linear derivation

Representation of the word [p^hsæɾ]. It means "boy" in English and "pesær" in Persian:

UR: ^o	/# pesær·#/ ^o	^o
^o	# pesæɾ ₁ ·# ^o	... ^o
^o	# pəsæɾ ₁ ·# ^o	Centralization ^o
^o	# p(ə)sæɾ ₁ ·# ^o	syncope ^o
PR: ^o	[# p ^h sæɾ ₁ ·#] ^o	^o

It is necessary to know that Rule1 and 2 will be performed in the specific phonetics conditions. The conditions are:

(1). Syllables must not have stress. It means that the vowels which were deleted must be unstressed.

(2). Vowels must be a short vowel. It means the centralized vowels must be short vowels /æ, e, o/.

(3). The rule of syncope must occur after ə. It means that first, short vowels must first centralize then centralized vowels must be deleted.

At the end, generative phonology shows a relation between two or more obtained rules. Talking about centralization and syncope (ə-deletion), it should be mentioned that centralization is performed first and then syncope (ə-deletion) will be performed. The above mentioned rules have interaction with each other, and this is a feeding interaction. That is,

centralization prepares the situation for the central vowel deletion. Hence, centralization is a prerequisite for the central vowel deletion. So, the interaction can be shown as:

Rule1: Centralization □ Rule2: Syncope

TABLE 3
EVIDENCE OF SISTANI DIALECT

Row ^o	Sistani ^o	English ^o	Row ^o	Sistani ^o	English ^o
1 ^o	psær ^o	boy ^o	10 ^o	n(ə)+p ^h æ ^o r+i ^o	Don't jump ^o
2 ^o	p ^h ja:dæ ^o	Ped ^o	11 ^o	n(ə)+k ^w h o ^o t ^h +æ ^o	They haven't killed ^o
3 ^o	t ^h mæ ^o	greed ^o	12 ^o	n(ə)+t ^h æ ^o t ^h +id+v ^o	I haven't clipped ^o
4 ^o	t ^h ræ ^o k ^h	Chink ^o	13 ^o	n(ə)+ʒæ ^o p ^h ðn+i ^o	Don't hit ^o
5 ^o	k ^h mæ ^o t ^o	Loin ^o	14 ^o	b(ə)+nɑ ^o l ^o	whimper ^o
6 ^o	dr ^w o ^o s ^o	Correct ^o	15 ^o	b(ə)+t ^h i ^o n ^o d ^o	He clipped ^o
7 ^o	drɑ ^o z ^o	long ^o	16 ^o	b(ə)+χɑ ^o r ^o	Eat ^o
8 ^o	χnæ ^o k ^h	Cool ^o	17 ^o	b(ə)+t ^h æ ^o	It became ^o
9 ^o	ʔd ^h æ ^o m ^o	Footstep ^o	18 ^o	b(ə)+ræ ^o r ^o	He went ^o

In table 3 above, words in sistani dialect with their corresponding counterparts in English are represented respectively. These words (verbs and nouns) are begun with consonant clusters in Sistani dialect that after performing two rules, they stayed in the initial part of the words. Consider to three vowels /æ, e, o/ that can be centralized and deleted. An example was [psær], as above mentioned. In this word /æ/ has been converted to ø. The other word is [χnæk] with its underlying representation /χonæk/ that shows the vowel /o/ which was deleted and converted to ø in phonetic representation. The next word is [ʔd^hæm] with its underlying representation /ʔæd^hæm/ that shows the vowel /æ/ in UR was deleted and converted to ø in PR. However, there are so many consonant clusters in this dialect that are beyond the scope of this paper for the sake of space. Some of them are ps, pj, tm, km, dr, χn, ʔd, np, nʒ, bχ, br and etc.

Kent (1953) was shown that some of the consonant clusters are not the result of centralization and syncope because they came from Old Persian in every Iranian dialects. Some of old consonant clusters in Sistani dialect are:

TABLE 4
EVIDENCE OF OLD PERSIAN

ROW ^o	PERSIAN ^o	SISTANI ^o	CONSONANT CLUSTER ^o
1 ^o	BARADAR ^o	brɑ:dæ ^o r ^o	br ^o
2 ^o	BOSHKE ^o	dræ ^o m ^o	dr ^o
3 ^o	FORUSH ^o	f ^h r ^o u ^o s ^o	fr ^o
4 ^o	YONJE ^o	sp ^h est ^h	sp ^o
5 ^o	ISTADE ^o	st ^h a:d+æ ^o	st ^o
6 ^o	SEFT ^o	sk ^h æ ^o t ^o	sk ^o
7 ^o	HARARAT ^o	zr ^w u ^o r ^o	zr ^o
8 ^o	XORUS ^o	χ ^w r ^o u ^o s ^o	χr ^o
9 ^o	SOHBAT-KARDAN ^o	χ ^w r ^o a ^o s ^o	χr ^o

According to table 4, all of initially consonant clusters aren't the result of vowel reduction process and omission. On the contrary, some of the Old Persian words are present in Sistani dialect and there is a unity between their deep structure and surface structure, it was mentioned above. Some in Old Persian are br, dr, fr, sp, st, sk, zr, χr and χr.

IV. DISCUSSION

The results clearly revealed the fact that the deep structure of [p^hsær] is /pesær/ and its syllabic deep structure is CV\$CVC. The transformational rules on the Sistani dialect, the centralization and later syncope, causes the omission of initial vowel of the words. The omitted vowel must be one of the short vowels /æ, e, o/. It must not have stress and and it must be centralized and deleted. So, in surface structure, the word is pronounced as [p^hsær] that in phonetic representation has the syllabic structure of CCVC. As it was concluded previously, initially consonant clusters can't exist in deep structure level. Therefore, in Sistani dialect only phonetic level has initially consonant cluster. Examples below clearly show the point, The syllabic structure of [b(ə)+nɑ^o l^o] in phonetic representation and underlying

representation is depicted. In PR, its syllabic structure is CCVC and in UR its syllabic structure is CV\$CVC. Consider their corresponding:

$$\begin{array}{rcl}
 \text{UR: } & \begin{array}{c} \text{be} \\ | \quad | \\ \text{CV} \end{array} & \$ \quad \begin{array}{c} \text{nol} \\ | \quad | \quad | \\ \text{CVC} \end{array} & \rightarrow & \begin{array}{r} \text{PR: } \begin{array}{c} \text{b+n} \quad \text{a} \quad \text{l} \\ | \quad | \quad | \\ \text{C+CVC} \end{array} \\
 \text{UR: } & \text{CV} & \$ & \text{CVC} & \text{PR: } & \text{C+CVC}
 \end{array}$$

We can find many initially consonant clusters in the Sistani dialect. Though there are many languages which have consonant cluster structure like English, but the clusters of those languages are not such diversified as the Sistani dialect. Of course the diversity in initially consonant clusters shows the non-existence of such clusters in deep structure of Sistani dialect. But English language has consonant cluster in both representations, underlying and phonetic, without any process. Such as st, sp, sk and etc

V. CONCLUSION

This study was written on the basis of generative phonology, a branch of Rule-base theory. The generative method helps to discover the deep level and mental specification of a language. It has been attempted to describe phonological system of Sistani dialect in it. Results of the study show that two rules occur as consecutives and change the syllabic structure of Sistani dialect. They are: centralization and syncope. According to generative phonology, it was found that two levels of alternations happen, one of them was short vowels /æ, e, o/ and the other one was /ə/. It was proved that the underlying representation or deep structure of the word has the short vowels and only phonetic representation or surface structure of word has initially consonant cluster. So, we can concluded that the Sistani dialect has CV(C)(C) syllabic structure in deep structure and when a word changes to surface structure, the vowel of initial syllable is omitted and the initially consonant cluster remains. Therefore, syllabic structure of the surface level is C(C)V(C)(C).

There are so many phonological processes in Sistani dialect that studying of them can discover new information about the Persian language and dialects. Via surveying other dialects and languages, the linguistics researchers can attain to universal result that it is the goal of the generative school.

The study revealed some results such as:

- 1- Two phonological processes in Systani dialect, centralization and syncope.
- 2- The arrangement of the two processes acting.
- 3- The affection of two processes on syllabic structure of Sistani dialect.
- 4- Finding initially consonant clusters of Sistani dialect.
- 5- Finding initially consonant cluster of Old Persian.

APPENDIX A. A SAMPLE OF THE QUESTIONNAIRE

Row	Persian sentences	Transcribed sentences
1	امشب مهتاب است.	ʔəmʃoː mæʔʰoː væ
2	دیروز آفتاب نبود.	dirʰuː z ʔæʔʰoː næː bʰu
3	به خانه نور خورشید نمی تابد.	væ fiː ʔʰʊnæː nʰuː rə ʔʰoːʃɪr dʰ n(ə)mæː tabæ
4	آن مرد شکار رفته است.	ʔʰuː mæː rd væʃ ʃ(ə)kəː rʰ ræʔʰæː
5	اینجا حیوان وحشی زیاد دارد.	ʔindʒæː dæʔʰoː dʊː mə (ʔeːvʊː nə væʃ+i) zijaː dʰ daræː
6	گلزار در باغ رفت.	gʰolˈnəː r b(ə)ræː dæːr bəː ʁ
7	چه گل هایی اینجا می روید.	tʃʰəː gʰolæː ʔinˈdʒæː soː z m(ə)næː
8	گنجشک زخمی شده است، نمی تواند پرواز کند.	tʃʰʊʃkʰ oː kʰ zæː ʔʰmɪː ʃ(ə)dæː ʔ(ə)mæː tnaː pʰæːrv aː z kʰʊnæː
9	یک گنجشک مرده اونجا افتاده است.	jækʰ tʃʰʊʃkʰ oː kʰ ə mæː ʔdə ʔʰʊndʒə ʔæʔʰidej æː
10	آن بوی بد می دهد.	ʔʰuː bʰuː fiə bæː dʰ mɪdæː
11	الان دیگه آفتاب بالا آمده است.	ʔaləː d(ə)gæː ʔæʔʰaː b tʰnuː kʰə ʃ(ə)dæː
12	هوا چطور است.	ʔæːvəː ʃ(ə)tʰʊː ræː
13	هوا خیلی بد بود، اون می خواست بیرون برود.	ʔavaː ʔʰeː lə bæd bʰuː ʔʰuː m(ə)ʔʰəː stʰ b(ə)rijaː b ʰuː rʰ
14	امروز هوا گرم بود.	ʔəmɪrʰuː z ʔæːvəː gæː ʔm bʰu
15	بیرون نرو.	bʰuː rʰ ʔʰ mæː rʰ o
16	از کجا می آیی.	ʔæː z ʔægdʒæː m(ə)jaː fi
17	من امشب خواب نمی شود.	məː fiəmʃʰoː ʔʰ oː n(ə)mɪː ʃə
18	آسمان صاف است.	ʔasmʰoː sɑː fæː
19	آسمان پر از ستاره است.	ʔasmʰoː pʰæː ræː + æ fiæː z ʃiɛː stəː ræː
20	وقتی آدم تشنه است، گلوش خشک می شود.	væʔʰtʰə ʃiədæː m tʰʊʃniː jæ glʰuː jo ʔʰ oʃk mɪː ʃ ʰo
21	اگر آب بود می خوردم.	ʔægæ ʃiəː w mɪrʰuː , m(ə)ʔʰardʰo
22	نمی دانم امشب باران می بارد.	n(ə)mɪː fæmʰu fiəmʃʰoː bəː rʰ ʃ mɪː r næ
23	سنگ ها خیس است.	sɛŋˈgəː ʔʰ iː sæː
24	کرم درد می کند.	kʰmæː r mɛː dæː ʔd mɛː næ
25	سر کوه برف باریده است.	sæː r kʰʊː bæː rʰf kʰæː ʔdæː
26	او یک شب و یک روز در راه بوده است.	ʔʰuː jækʰ ʃʰoː vʰ o , jækʰ ʔʰ uː z dæː rʰ ræː bʰud æː
27	ما یک روباه دیدیم.	məː jeː g rʰobə b(ə)dɪː de
28	او می گوید: سردش است.	ʔʰə mɛː gæ ʔnækʰɪː m(ə)ʔʰaræː
29	باد شروع به وزیدن کرده است.	bəː d pʰʊː ʃ(ə)dæː

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