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Extended Abstract

Phonological typology of obstruent consonants in Kurdish language in terms of laryngeal function

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Introduction

The underlying features of the phonemes in languages are very important for recognizing their behavior because they help identify the genetic characteristics and typology of languages. Among the phonetic characteristics, the basic features of voice and spread become important because changes in these features can lead to different perceptions among languages. Similar phonemes with different phonetic qualities are understood differently in different languages and can also influence different phonological behaviors. Sonorant consonants in languages are almost always voiced, and their voiceless type is rare. Therefore, they are not discussed in this paper. However, the obstruent consonants in languages behave differently due to having two types of voiceless and voiced consonants, which are determined by the basic features of voice and spread.

This paper aims to use an acoustic study of the obstruent consonants in Kurdish to determine their underlying phonological features as one of the Iranian languages. The data analysis is done within the framework of laryngeal phonology and will be compared with Persian.

The Kurdish language, specifically the Sanandaji variety, belongs to the group of northern western languages of Iranian languages. It is placed between early Balochi and [Middle] Persian according to Mackenzie. Dabir Moghaddam (2012: 599-601) considers Sanandji Kurdish to be part of the Western Northern Kurdish dialect group.

Materials & Methods

The methodology of this study involved recording the voices of four native middle-aged men speakers from the Sanandaj region of Iran in a completely silent room. The participants produced words with obstruents in different positions within carrier sentences. Beckman and Ringen's (2009) test was used to determine the underlying dimension of phonemes. The analysis focused on Kurdish stops, fricatives, and affricates at the beginning, between two

vowels, and at the end of words. The carrier sentence "isa bɛʒa …" meaning "Now say ....." was repeated twice.

Previous acoustic studies on the voice and aspiration features of obstruent consonants in the Sanandji variety of Kurdish language are limited. Garshasbi (2015) studied Sanandji Kurdish consonants acoustically, while Azadmanesh compared the consonants of Persian, Lori, and Kurdish dialects within the framework of laryngeal phonology theory. Other traditional research has also been conducted on Sanandji Kurdish, including studies by Rezaei (1999) and Karimi Dostan (2001).

The theoretical framework used in this article is laryngeal phonology. The main concepts in this theory include the existence of an additional phonological layer called Dimension, unary-valued features; markedness based on the presence or absence of a feature, and Gestures responsible for the pronunciation of phonetic representation. The laryngeal phonological theory based on the dimension and gestures is shown in Figure 1.

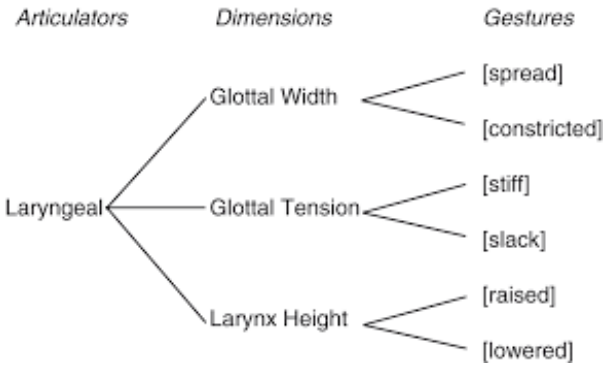

Figure 1. *Diagram of the laryngeal part of laryngeal phonology based on Avery and Idzardi (2001)*

The purpose of this paper is to investigate the acoustics of obstruent consonants in Sanandji Kurdish, one of the Iranian languages, and determine their underlying feature of voice or aspiration. This analysis will help specify the laryngeal typology of these consonants.

Results and Discussion

Traditionally, acoustic studies (based on Garshasbi, 2015) have shown that voiceless stops and affricates in Kurdish are aspirated with high delayed and positive average Voice Onset Time (VOT), while voiced stops and affricates are produced with low delayed and positive average VOT.

At the beginning of words, voiceless stops in Kurdish have the features of [voiceless aspirated], while voiced obstruents have the features [unvoiced and unaspirated], similar to

Persian languages. In the middle position, voiceless obstruents in Kurdish have the features [-voice] and [+aspirated], while voiced obstruents have the feature [+voice]. This similarity between Kurdish and Persian can be attributed to the spreading of the feature [voice] from vowels to stop consonants. In the final position, voiceless stops in Kurdish have the features [-voice] and [+aspirated], while voiced stops are semi-voiced. In Persian, voiced stops appear roughly voiceless in the final position.

The phonetic features of affricate consonants in Kurdish are the same as those of stop consonants, making them similar to the Persian language.

Based on figure (2), the basic characteristics of Kurdish and Persian obstruent consonants were compared in the framework of laryngeal theory.

B A

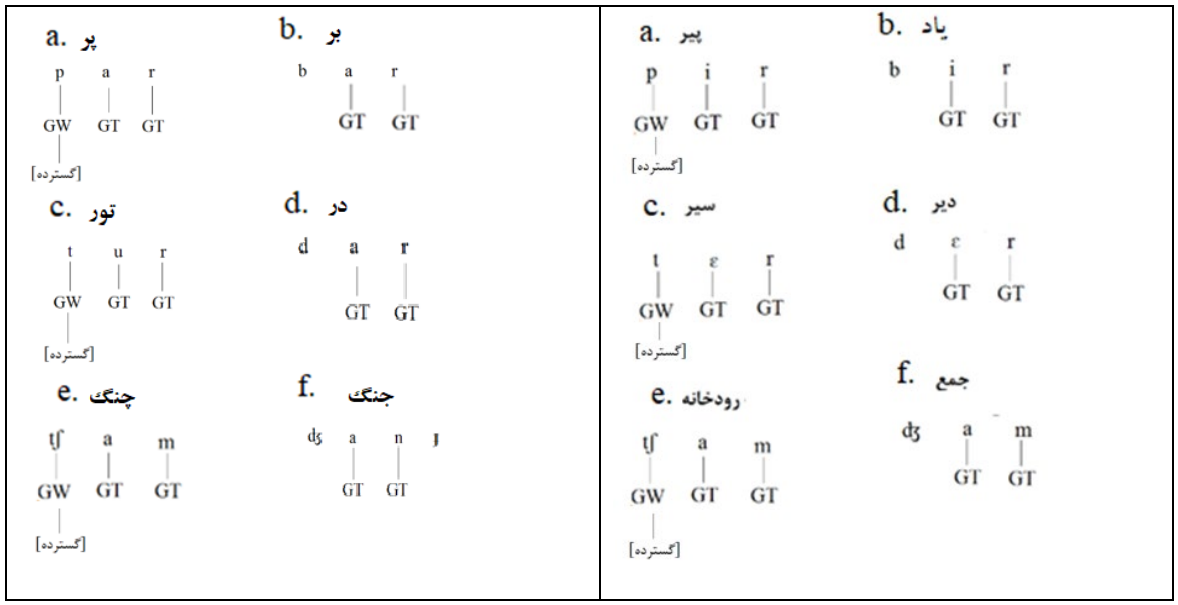

Figure 2.

A: Phonological representation of stops and affricates in Kurdish

B: Phonological representation of stops and affricates in Persian

Fricative consonants in Kurdish are produced differently compared to Persian. Voiced fricatives in Kurdish are produced with vibrating vocal cords in the initial and middle positions, while voiceless fricatives are pronounced voiceless. In the final position, voiced fricatives are pronounced half voiced. This is different from Persian, where voiced fricatives are produced without vibrating vocal cords. The phonological representations of fricatives in Kurdish and Persian are compared in Figure 3.

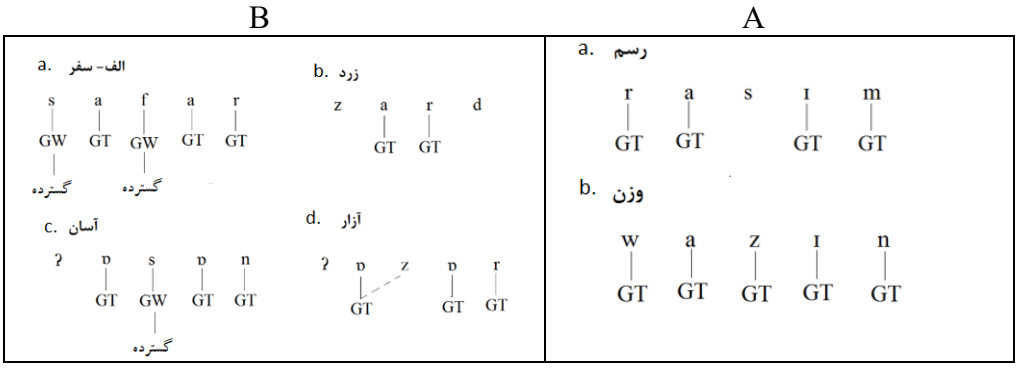

Figure 3:
A: Phonological representation of fricatives in Kurdish
B: Phonological representation of fricatives in Persian

An example of a spectrograph of phonological assimilation in Kurdish consonants in the word “device” /dasgah/ into [daska] is shown in Figure 4.

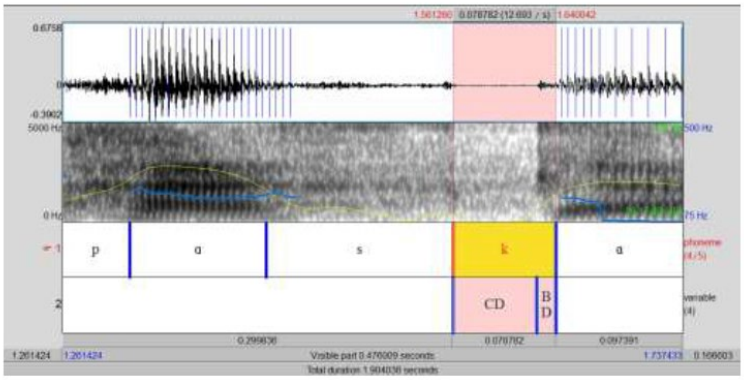

Figure 4. *Spectrograph of phonetic assimilation in Kurdish consonants*

The analysis of phonetic assimilation in Kurdish consonants in the word /dasgah/ → [daska], based on the laryngeal theory in figure (4), shows that [spread] gesture of the first phoneme [s] spreads from the GW dimension to the unmarked position, empty dimension of the /g/ phoneme, changing it into [k].

Conclusion

The answer to the question of whether the features [voice] or [aspiration], or more technically, the dimension of [glottal width] with the gesture [spread], are underlying in Kurdish obstruents, like Persian, can classify these two Iranian languages into one of the two categories of aspirated or voiced languages. The results of acoustic analysis were investigated within the framework of laryngeal theory to help us better understand Kurdish phonological

processes. It was shown that, based on the acoustic evidence and the phonological behavior of stops and affricative consonants, Kurdish and Persian are classified as aspirated languages and behave similarly to English and German. Therefore, their underlying dimension is GW, which is filled by the gesture [spread]. On the other hand, in terms of fricative consonants, Kurdish, unlike Persian, can be classified as a voiced language. In other words, the underlying dimension of voiceless fricatives is GW, but the underlying dimension of voiced fricatives is GT, not Ø. In this respect, Kurdish behaves similarly to French and Spanish.

Keywords: Obstruent Consonants; Voice; Spread; Laryngeal Phonology; Phonological Typology

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