Research in Western Iranian Languages and Dialects
Razi University
Linguistics Society of Iran
ISSN Print: 2345-2579 ISSN Online: 2676-573X

Revisiting Word-initial Glottal Stops in Persian: Underlying or Epenthetic?

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Article Info

Article type:
Research Article

Article history:
Received: 29 May 2024
Received in revised form: 22 Oct 2024
Accepted: 22 Oct 2024
Published online: 21 Dec 2024

Keywords:
glottal stop,
Persian,
syllable structure,
underlying representation.

ABSTRACT

The phonological status of word-initial glottal stops in Persian has been a subject of controversy. Particularly, researchers hold divergent views on whether the glottal stop functions as a phoneme in word-initial positions. These perspectives can be categorized into three main positions: (1) glottal stops are phonemes in all occurrences (Samareh, 1985; Windfuhr, 1979); (2) word-initial glottal stops are phonemes only in loanwords, especially from Arabic (Bijankhan, 2018; Haghshenas, 1991; Jam, 2019; Kord-Zaferanloo-Kambozia, 2003); and (3) word-initial glottal stops are not phonemes in Persian (Jahani, 2005; Majidi & Ternes, 1999; Sepanta, 1973). In this paper, a critical review of previous findings is provided along with new insights and neglected evidence relevant to the underlying representations of words with glottal stops. Based on these considerations, the paper leans towards the position that glottal stops function as phonemes in all positions regardless of occurrence in loanwords or native words. It also calls for a revision of previous research, emphasizing the importance of non-acoustic aspects in exploring the phonological functions of word-initial glottal stops.

Cite this article: Pirhayati, A. (2024). Revisiting Word-initial Glottal Stops in Persian: Underlying or Epenthetic?. *Research in Western Iranian Languages and Dialects*, 12 (4), 81-90. http//doi.org/10.22126/jlw.2024.10677.1765 (in Persian).

DOI: https://doi.org/10.22126/jlw.2024.10677.1765
Publisher: Razi University

1. Introduction

Glottal stop is a sound with unique, peculiar features. It is produced when the glottis is completely closed, preventing subglottal air pressure from opening it for a brief period. The production of a glottal stop typically lasts 50 to 60 milliseconds (Modarresi Ghavami, 2014, p. 49). Although this sound is present in nearly all languages worldwide, its phonological function varies across languages. It is used as a phoneme in many phonological systems, most notably in Semitic languages. Other languages may use the glottal stop as a mere phonetic element to prevent a vowel hiatus (Mitterer et al., 2019, p. 2). One main characteristic of this sound that makes it difficult to examine is the fact it can occur totally involuntarily or unconsciously, as its production is somewhat similar to a mild cough.

Contemporary phonological theories describe this sound as placeless, as its function cannot be explained by assigning a specific place to it. This idiosyncrasy in its phonetic and phonological description can also be seen in the ambiguity of the terms related to this sound, including the term 'glottalization,' which is widely used in the literature. The term has been described in various ways in different studies, allowing researchers to adopt definitions based on their specific research. This complexity has caused vagueness in phonetic and phonological analyses and has blurred the distinction between the two fields of phonetic and phonology in related studies.

It goes without saying that there is no agreement over the phonological status of glottal stops in Persian. In particular, researchers hold differing views regarding whether the sound is a phoneme in word-initial positions. Different perspectives on this issue can be described as: (1) glottal stops are phonemes in all occurrences (Samareh, 1985; Windfuhr 1979); (2) word-initial glottal stops are phonemes only in loanwords, particularly those borrowed from Arabic (Bijankhan, 2018; Haghshenas, 1991; Jam, 2019; Kord-Zaferanloo-Kambozia, 2003); and (3) word-initial glottal stops are not phonemes in Persian (Jahani, 2005; Majidi & Ternes, 1999; Sepanta, 1973).

Based on laboratory research, some scholars conclude that the glottal stop in Persian is most prominently produced at the beginning of a word after silence (compared to the middle and end of the word), as this position features a prominent closure that is visible in acoustic examinations and clearly audible in speech (Sadeghi, 2010).

In the present study, I aim to summarize and critically re-examine prior research and argue that the best account of the Persian data considers glottal stop to be a phoneme in all positions, irrespective of the etymological source of the words in which it occurs.

In the second section below, I provide a critical account of research on the production and perception of glottal stops in Persian and highlight their weaknesses. In the third section, I focus on morphophonological evidence relevant for determining the status of glottal stops in Persian.

The view I defend in this paper is based on the assumption that underlying representations are a useful tool for explaining the phonological systems of languages (Hyman, 2018).

2. Production and perception

The results of research on the production of glottal stops in Persian are quite diverse, if not contradictory. This inconsistency can be due to the inherent features of glottal stops and their unstable status in speech. However, three common confusions can be identified in previous acoustic studies about initial glottal stops in Persian. The first is the assumption that the problem of underlying representations of initial glottal stops can be resolved through analysis limited to phonetic data. In other words, the confusion between phonetics and phonology is a basic weakness of several inquiries on glottal stops in Persian. Second, the argument based on predictability of initial glottal stops -which I will show is fallacious- is the main argument advanced in numerous works. Third, some scholars have mistakenly drawn conclusions about

Persian syllable structure based on the analysis of initial glottal stops. This is a common confusion among both proponents and opponents of underlying glottal stops.

While inquiry into the occurrence of glottal stops in the speech of Persian speakers is the first step toward developing an analysis of the sound in Persian phonological system, some scholars treat this inquiry as the final analysis (Jahani, 2005; Navab Safavi et al., 2020; Sepanta, 1973 among others). In one of the earliest acoustic studies of glottal stop in Persian, Sepanta (1973) suggests that word-initial glottal stops in Persian are like German glottal stops and do not have any distinctive value. Given the fact that the duration of glottal stop is about 0.02s, he argues that Persian language does not have phonemic initial glottal stops.

As Jahani (2005) is a prototypical case of such approaches, I survey it in more detail. In the title of her paper, Jahani poses the question whether glottal stop is a phoneme in modern spoken Persian or not, but contrary to what the title implies, she provides a purely phonetic (but detailed) account of glottal stops in Persian speakers' speech. She explains that the glottal stops are often pronounced in colloquial modern Persian, but on most occasions, they are not stable and vary with Ø-pronunciation, compensatory lengthening of preceding vowels or consonants, or glide insertion (Jahani, 2005, p. 84). She points out that the glottal stop is 'always' pronounced in word-initial or utterance-initial positions after a pause (Jahani, 2005, p. 85), but it is not a phoneme in these positions as it is freely dropped within the utterance. Nevertheless, she does not discuss how to formalize the underlying representation of words in which the glottal stop is dropped in physical speech. For example, Jahani (2005) reports that the word /raʔj/[1] 'vote' is 'always' pronounced as [raj] (without compensatory lengthening). Although it is not clear how she would represent the underlying representation, it should be noted that no word in Persian ends with the sequence /-aj/, and this strongly suggests that the word should be analyzed as /raʔj/ phonologically. She also analyzes the glottal stop in monomorphemic words like /teʔɑtr/ (theatre) as hiatus-filling, but she does not explain how a hiatus context applies here, given that the word is monomorphemic.

Jahani (2005) also argues that the glottal stop is not 'phonemic' in the 'vocalic onset' because it is 'predictable' and does not contrast with Ø. The argument based on predictability can be found in various analyses by different researchers (Haghshenas, 1991; Jam, 2019; Navab Safavi et al., 2020). I believe this argument is fallacious and somehow circular, as its results rely on the very premise being posed. For example, in any language with obligatory onsets, one could omit a specific consonant from all words beginning with that consonant and argue that the consonant is predictable word-initially. Even if the glottal stops are considered predictable, not all non-contrastive glottal stops, as Lombardi (2002) notes, emerge later in the derivation; some must be accounted for within the phonology.

Samareh (1977) conducted an experiment on Persian speakers' perception of sound sequences consisting of Persian words where the initial glottal stop was deleted (e.g., [ɑb] instead of [ʔɑb]) (p. 17). He reports that over 95 percent of respondents were confused, while approximately 5 percent of them laughed at the production. Based on distributional phonology, he argues that initial glottal stops form minimal pairs with all other consonants.

Additionally, the claim that glottal stops are not contrastive word-initially is questionable, as it is evident that the initial glottal stop distinguishes meaning. For example, in the following sentence, meaning remains unambiguous when the second glottal stop is articulated.

1. ʔin	bɑr	ʔɑn	rɑ	be	jɑd	xɑham	dɑʃt
This	time	it	OBJ-marker	to	memory	will-1SG	have

'I will remember it this time.'

1. Jahani does not use slashes or brackets anywhere in her paper when transcribing words. Then there is no evidence of her distinguishing the phonetics and phonology of her descriptions of Persian words.

However, if the second glottal stop is not articulated, the meaning is ambiguous and the sentence can also be interpreted as 'I will remember this rain.' Thus, the argument based on predictability and distinctive meanings is flawed, since individual words without an initial consonant do not exist and the initial glottal stops in continuous speech influence meaning.

Another significant problem evident in previous research is the persistent confusion between different levels of representation. Most scholars working on different aspects of glottal stop in Persian have assumed that establishing non-phonemic word-initial glottal stops necessitates a change in the Persian syllable structure (Haghshenas, 1991; Jahani 2005; Navab-Safavi et al., 2020). Even the proponents of underlying glottal stops have accepted such an assumption (Dinmohammadi, 1997; Meshkatodini, 1995; Samareh, 1985). This is incorrect, as the syllable structure is not present in underlying representations (McCarthy, 2008, p. 208). As an exception, Bijankhan (2018) correctly defines the Persian syllable structure as CV(C)(C) (as opposed to (C)V(C)(C)) while rejecting the existence of underlying glottal stops in Arabic loanwords (p. 7).

Jahani (2005) asserts that the compulsory CV(C(C)) pattern probably originates from the Arabic grammatical tradition or the Arabic metric system, which is also the basis of classical Persian poetic rhythmic structures (p. 86). However, we know that the CV(C)(C) structure underpins colloquial poetry and nursery rhymes as well. Moreover, evidence from Persian nicknames with CVCV structure and studies on child language learning show that the Persian syllables have an obligatory onset. The words that Jahani (2005) claims to contain syllables without onsets clearly follow the CV(C)(C) structure when used in colloquial poetry.

One of Jahani (2005) examples of CV-V-V pattern is the word she transcribes as [miɑi] (you come/you are coming). She considers the word to consist of three syllables. However, the word cannot be understood as having three syllables in spoken language according to the linguistic intuition of Persian speakers. Here, I use the evidence from folk songs to show that this word is bisyllabic. There is a line from a very famous Persian children's song Hassani Nagoo Yeh Dasteh Gol (literally: Better Call Hassani a Bunch of Flowers) in which the father says to his son, Hassani.

2. hasani mijɑj berim hamum
Hassani come-2SG go-1PL-SBJV bath
'Hassani! Do you come to take a shower?

If we replace the word [mijɑj] with a three-syllable word (for example, its negative form, [nemijɑj]), the rhythmic structure will be distorted (Tabibzadeh, 2020). Jahani (2005) also argues that the glide in some words like [pɑjiz] ('autumn') is very reduced, but does not explain how vowel reduction in individual cases could have phonological significance.

Regarding the production and perception of glottal stops in Persian, it appears that there is overlooked evidence concerning the underlying representations that warrants further exploration.

First, there is some orthographic evidence for the phonemic status of initial glottal stops. Since writing normally reflects the phonology of words as opposed to their phonetics, the way the glottal stops are represented in Persian writing is of phonological importance. In the Persian orthography, the initial glottal stop is shown with *aleph* and *eyn*. For example, the orthography of /ʔɑb/ ('water') is like the word /Gorʔɑn/ ('Quran') in contrast to the word /sarɑb/ ('mirage'). In the first two words, the segment [ʔɑ] is written with *aleph* and a diacritic, while in the word /sarɑb/, it is written without the diacritic.

Second, there is a tendency among young people to write the first letter of words formally written with *aleph* using *eyn*, irrespective of the etymological source of the word. This shows that they (unconsciously) recognize that there is an initial glottal stop at the beginning of these

words.

Third, although allegedly there are no original Persian words with medial or final glottal stops (and this argument supports the 'foreign/external' status of this sound in Persian), the very fact that Persian speakers use the sound extensively in loanwords demonstrates that they recognize and perceive it as a phoneme. However, it should be noted that there are some words with medial/final glottal stops in contemporary Persian that are not loanwords. Frequent examples include /χuʔac/ (a street food), /babaʔi/ (written with *eyn*, the childish name for a sheep), and /zɑʔu/ ('parturient', historically a derived word, but a single morpheme in contemporary Persian).

Fourth, some cognitive evidence for phonemic status of glottal stops comes from research on child language learning. As Fikkert (2007) stresses, insight into the child language acquisition is of importance to understanding phonological knowledge. The glottal stop ranks among the first consonants a Persian-speaking child learns to produce (along with [b] and [m]).[1] Notably, the word /ʔɑb/ is among the first words learned, usually rendered as [ʔɑba] in early stages, presumably to break the CVC syllable into two CV syllables. It is worth noting that words with initial glottal stops are learned in isolation and often pronounced with emphasis by caregivers. Thus, some of the first words heard by children feature a prominent initial glottal stop. Also, Persian-speaking children always render a glottal stop at the beginning of these words (as opposed to Germen children, for example, described in Grijzenhout & Joppen-Hellwig, 2002), and the initial glottal stop is easily hearable. Interestingly, Persian-speaking children substitute some rather marked initial consonants with glottal stops

3. /je dune/ → [ʔe dune] 'one'

/χune/ → [ʔune] 'home'

In contrast, consonants are never substituted by a glottal stop in the utterances of German-speaking children. For example, the word "satt" [zat] ('satisfied') is not rendered as *[ʔat^{h}] but as [at^{h}] (Fikkert, 2007, p. 6).

Fifth, some other evidence comes from the recitation of Persian classical poetry by Persian speakers. The glottal stop is an important element in the correct reading of poetry, and Persian speakers easily drop and retain glottal stops where necessary to maintain the rhythm. This shows that they have an active knowledge of the occurrence of glottal stops in words. On the other hand, to my knowledge, all scholars working on Persian meters have described the alternation between word-initial glottal stops and Ø-pronunciation in the context of Persian rhythmic structure as glottal stop 'deletion' rather than 'epenthesis' (Najafi, 1973; Natel-Khanlari, 1966; Vahidian-Kamyar, 1988). Thus, it can be said that the prima facie forms of the words consist of glottal stops according to the scholars' intuition.

Sixth, as acoustic research on Persian glottal stops, including Jahani (2005) research, shows the glottal stops occur very frequently in formal as well as colloquial Persian speech. Shademan (2005) has examined glottal deletion and compensatory lengthening in colloquial Persian and concluded that glottal deletion is not a prevalent phenomenon in Persian. Even word-final glottal stops in CVCC syllables are easy to spot on the spectrogram (Shademan, 2005, p. 69).

Since Persian is usually compared to languages like German, Dutch and English in which the word-initial glottal stop is not considered a phoneme, it should be pointed out that, according to what has been discussed in this section, Persian differs in several important

1. All the child language data in this paper are based on voice recordings of two Persian-speaking children. One of them was studied between 10-14 months and the other between 23-26 months.

ways: (1) phonetically, glottal stops are always pronounced utterance-initially in Persian and their frequency in speech is significantly higher than in the other languages; (2) phonologically, Persian has obligatory onsets, and glottal stops are phonemic word-finally and medially; (3) child language data for Persian-speaking children show distinct differences.

3. Morphophonology

As the discussion on the production and perception of glottal stops shows, less attention has been paid to the non-acoustic data, despite the fact that stronger evidence for or against the phonemic status of the glottal stop in word-initial positions should come from the morphophonological data. These data, as the proponents of epenthesis assume, show that the glottal stops in original Persian words do not have a 'complete distribution,' and this is often presented as evidence in favor of their being non-phonemic.

Kord-Zaferanloo-Kambozia (2003) provides an autosegmental analysis of the glottal stop in Persian and concludes that the glottal stop is not distinctive word-initially in Arabic loanwords. She argues that glottal stops in original Persian words, as shown in (4), do not have a complete distribution since they are absent in cases of affixation and compounding, but in Arabic loanwords (written with *eyn*) (as shown in (5)), they are present in underlying representations:

4. /ham + ɑhang/→[hamɑhang] (literal "co+song", 'compatible')

/ham + ɑvard/→[hamɑvard] (literal "co+war", 'adversary')

/ham + ɑGuʃ/→[hamɑGuʃ] (literal "co+hug", 'companion')

/ham + in/→[hamin] (literal "co+this", "the very")

/ham + ɑn/→[hamɑn] (literal "co+that", "the very")

/bad + ɑvɑz/→[badɑvɑz] (literal "bad+song", 'discordant')

/del + ɑrɑm/→[delɑrɑm] (obsolete, literal "heart+rest", 'sweetheart')

/narm + afzɑr/→[narm + afzɑr] (literal "soft+tools", 'software')

/mard + afɑan/→[mardafɑan] (literal "man+to drop", 'strong')

5. /ham + ʔaGide/→[hamʔaGide/ (co+belief, 'co-believer')

/ham + ʔahd/→[hamʔahd] (co+time, 'contemporary')

/ham + ʔasr/→[hamʔasr] (co+period, 'contemporary')

In contrast to her suggestion, original Persian words are fundamentally different from Arabic loanwords, as some of them are obsolete while others have a much higher frequency and their meanings are not compositional. For example, /hamɑhang/ does not have a compositional meaning and is always written as a single morpheme.[1] Regarding words such as /hamin/ and /hamɑn/, Persian speakers do not perceive them as combinations of two morphemes; instead, they are treated as single morphemes in writing and speaking. Furthermore, the Arabic words above are drawn from a very formal or literary language, and thus they are not proper counterparts to the words in (4). There are numerous compounds consisting of Arabic loanwords in which the glottal stop is deleted at the border of morphemes.

1 gIt is interesting that there is an Iranian cellphone musical application named /hamʔɑhang/. This application is generally pronounced with a prominent glottal stop, written as two separate morphemes.

6. /ʔotɑG + ʔamal/→[ʔotɑGamal] (room+action, 'operating room')

/χoʃ + ʔacs/→[χoʃacs] (good+picture, 'photogenic')

/dʒenɑb + ʔɑli/→[dʒenɑbɑli] (excellency+high, 'Your Highness')

/ʔɑb + ʔali/→[ʔɑbali] (water+Ali, an Iranian city and also a very famous brand of carbonated yogurt drink popular in Iran)

/χoʃ + ʔaχlɑG/→[χoʃaχlɑG] (good+morality, 'good-tempered')

/mɑh + ʔasal/→[mɑhasal] (moon+honey, 'honeymoon')

/modir + ʔɑmel/→[modirɑmel] (manager+actor, 'Chief Executive Officer')

Thus, the distinction between Arabic loanwords and original Persian words as the basis of the phonemic status of the glottal stop is misleading. A closer look shows that the distinction lies instead between frequent words and non-frequent words.

Kord-Zaferanloo-Kambozia (2003) mentions some other cases of morphological alternation in Persian imperative verbs:

7. /be + andiʃ/→[biandiʃ] 'Think!'

Kord-Zaferanloo-Kambozia (2003) believes that the change at the border of the two morphemes shows that the glottal stop is lacking in the underlying representations of Persian verb stems. Two key observations can be mentioned regarding these alternations. First, the imperative verbs have a high frequency. Additionally, all these verbs have a long history in the Persian lang ɡ , which makes the chang highly probable. Second, forms like /be+ʔist/ ('stop!'), in which the change does not occur still indicate that the default form of the verbs might include the underlying glottal stop.

No new simple verb beginning with a glottal stop can be found in Persian (in order to be compared with other verbs) because the language has become more and more analytic and now relies on compound constructions for new verbs. However, some newly-constructed simple verbs are used in colloquial Persian through conversion from nouns. For example, the word /gɑz/ 'throttle pedal' can be used as the imperative verb /be-gɑz/ 'drive faster!' Thus, some nouns can be used as potential verb stems in Persian. For example, the noun /ʔɑrd/ 'flour' can be potentially used for conveying the meaning 'to flour.' An experiment was done with three Persian-speakers (ages 17-62) to test constructing imperative forms with verb stems beginning with a glottal stop. The task was to pronounce the imperative forms of the presented verb stems as quickly as possible. All of the speakers rendered the imperative of new verbs like /ʔɑrd/ as [beʔɑrd] not *[bijɑrd].

Furthermore, making a distinction between Arabic loanwords and other words for phonological analysis entails the assumption that Persian speakers distinguish between the two categories. However, I think such a cognitive distinction between native words and loanwords cannot be assumed to exist in human linguistic knowledge no matter which language is being surveyed. The loanwords always undergo the process of nativization, and the speakers do not distinguish them unless they are informed explicitly. Moreover, common orthographic mistakes among educated and uneducated Persian-speakers when writing Arabic loanwords show that they do not have such a distinction in their linguistic knowledge.

Another problem arises if we accept that the aforementioned Persian words begin with a vowel. With suffixes and enclitics, the hiatus is resolved through different sounds including [ʔ], [j] and [g] as the following examples show.

8. /χɑne/+/-i/ (indefinite clitic) → [χɑneʔi] or [χɑneji] 'a house'

/χɑne/-i/ (adjectival suffix) → [χɑnegi] 'homemade'

/parande/+/-ɑn/ (plural suffix) → [parandegɑn]'birds'

On the other hand, vowel hiatus for prefixes or compounds is never resolved through sounds other than the glottal stop. Thus, the derived word /nɑ+ʔomid/ ('hopeless') is not rendered as *[nɑjomid] or *[nɑgomid]. If we do not regard glottal stops as underlying, we need to explain the ungrammatical forms in detail, as Lombardi (2002) emphasizes. However, we can easily explain them based on faithfulness constraints when positing the underlying representation as /ʔomid/.

Bijankhan (2018) states that "[g]lottal stop is distinctive at the beginning of loan-words while not at the beginning of the original Persian words" (p. 1), but he does not discuss the arguments in favor of the position and later points out that there is no agreement over the phonemic status of glottal stops. In an earlier analysis, Bijankhan (2005) provides a summary of disagreements about the status of the glottal stop in Persian and tries to resolve them through an optimality analysis (pp. 156-182). Based on a set of data similar to examples (4) and (5), he first considers individual words with word-initial glottal stop and concludes that the phonological underlying representation in these words includes glottal stops because the proposed candidate does not violate the DEP constraint and has fewer violations (Bijankhan, 2005, p. 170). Thus, the 'phonological underlying representation' or 'lexical item' for [ʔɑhang] (an original Persian word) is /ʔɑhang/ not /ɑhang/ (Bijankhan, 2005, p. 181).

As to the affixation and compounding cases, Bijankhan provides a co-phonology analysis and concludes that there are two hierarchies of constraints for Arabic loanwords and original Persian words. He uses two constraints to explain the data: (1) "ALIGN-R": the right edge of stems should be aligned with the right edge of syllables, and (2) "*C.ʔ": the sequence "C.ʔ" is not allowed in syllabification. The optimality analysis for [ham.ʔa.Gi.de] is as follows (Bijankhan, 2005, p. 180, with amendments).

Tableau (1). Bijankhan's explanation of [ham.ʔa.Gi.de]

/ham+ʔaGide/	ALIGN-R	*C.ʔ
☞ham.ʔa.Gi.de		*
ha.ma.Gi.de	*!	

For [hamɑhang], Bijankhan (2005) argues that the underlying representation is /hamɑhang/ according to the following tableau (p. 181, with amendments).

Tableau (2). Bijankhan's explanation of [ha.mɑ.hang]

/ham+ɑhang/	*C.ʔ	ALIGN-R
☞ha.mɑ.hang		*
ha.m.ʔɑ.hang	*!	

According to the data I provided throughout this paper, glottal stops are obligatory in utterance-initial positions and optional elsewhere (with a higher probability of occurrence in emphatic and formal occasions); they are only prohibited at the border of morphemes in lexicalized words. The obligatory glottal stops can be explained through the obligatory onset constraint. Now the only phenomenon that should be accounted for in the theoretical explanations is the lack of glottal stops in lexicalized words. Based on OT accounts considering frequency effects (Sloos, 2013), it is possible to propose a more parsimonious account of initial glottal stops in Persian. A prevalent cross-linguistic phenomenon is that high word frequency leads to significant articulatory reductions, and since glottal stops do not have

active articulators in the vocal tract, the probability of their deletion or lenition is higher compared to other obstruents (Bergmann, 2014). Thus, the two constraints proposed by Bijankhan (2005) can be replaced by a single (more general) constraint

9. *ʔ$_{[Lex]}$: Glottal stops in the border of morphemes in lexicalized words are prohibited.

Tableau (3). An explanation of [ha.mɑ.hang] with *ʔ$_{[Lex]}$

/hamʔɑhang/	*ʔ$_{[Lex]}$	MAX-IO
☞hamɑhang		*
hamʔɑhang	*!	

4. Conclusion

To the best of my knowledge, no systematic, theoretical account of the word-initial glottal stop occurrence in Persian has been provided in the related research. I therefore sought to explore some characteristics of the production and distribution of the word-initial glottal stops in such a way that the results of the exploration can be of significance in the phonological analysis of the sound in Persian. I have aimed to show that some non-acoustic aspects of the word-initial glottal stops in Persian can have greater importance in determining their phonological function. These aspects include the sound's function in the Persian rhythmic structure (both colloquial/childish poetry and classic poetry), its occurrence in the process of child language learning, and its alternation at the boundaries of words and affixes.

I thus propose that the three main positions about the phonological functions of the word-initial glottal stops which I mentioned in the introduction cannot be substantiated. As Labrune (2012) and Kawahara (2016) put it, it is not easy to prove the absence of anything in linguistics or elsewhere as 'lack of positive evidence does not automatically provide negative evidence.' This perspective applies to underlying initial glottal stops in Persian. Although I have argued for an underlying glottal stop throughout this paper, my main purpose was to stress some phonetic, phonological, and psycholinguistic evidence which should be considered seriously when deciding whether or not to posit the word-initial glottal stop in underlying representations. I think the discussion can be continued with greater clarity by considering a wider range of relevant evidence including that presented in this paper.

Ethical Considerations
Not applicable

Funding
Not applicable

Conflict of interest
The authors declare no conflict of interest.

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