A Phonetic Study of Vowel Epenthesis in the Dialect of Misurata: Preliminary Results

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Abstract

A pilot phonetic study on vowel epenthesis in the dialect of Misurata was conducted. The aim of the experiment was to gain insight into the identity and behavior of the epenthetic vowel. The acoustic profile showed that the epenthetic vowel is /i/. It was also found that the epenthetic vowel occurs within CC coda clusters. In addition, the duration of the epenthetic vowel is determined by its prosodic position. For example, in single word lists the epenthetic vowel is longer than when it is embedded within a carrier phrase. This suggests that the single word behaves like a full intonational phrase where the final syllable is lengthened. The durational variation observed here is similar to that of lexical vowels when they vary in duration as a function of their prosodic position. These results suggest that CC clusters are not favorable within coda positions in this dialect. This is so despite the fact that underlying sequences do not violate the sonority sequencing principle.

1. Introduction

Vowel epenthesis refers to the process of inserting a vowel in spoken utterance. More specifically, an epenthetic vowel is added within consonant clusters in onset or coda positions (Abu-Mansour, 1990).Vowel epenthesis is a common linguistic phenomenon observed across many Arabic dialects, i.e., Levantine Arabic (Hall, 2013), Makkan Arabic (Abu-Mansour, 1990), Moroccan Arabic (Azra et al, 2009), Egyptian Arabic (Broselow, 1976) and Libyan Arabic (Elgadi,1986).

There has been disagreement on the phonetic characteristics of the epenthetic vowel. For example, the quality of the epenthetic vowel varies across Arabic dialects from [ə] in Damascus (Cowell, 2005) to [e] in Palestine (Elihay, 2004, as cited in Hall, 2013: 133) to [i] in Lebanon (Haddad, 1984). For example, (Haddad, 1984) introduced a phonological account based on impressionistic descriptions by native Lebanese speakers. Haddad used the phonetic symbol [i] in the transcription of both epenthetic and lexical high front vowels in words like [libis] “cloths” and [libis] “he wore”. In Haddad’s transcriptions both words were transcribed as if having identical pronunciation. Furthermore, (Haddad, 1984: 37) discussed Beiruti dialect in that the epenthetic vowel is often represented as /i/. According to Haddad, this was done primarily for typographical purposes. Haddad raised the inadequacy of her transcriptions in that the epenthetic vowel [i] is often shorter than its lexical counterpart.

(Gouskova and Hall, 2007) studied vowel epenthesis in Lebanese and Palestinian Arabic. They examined 30 minimal/near minimal pairs and found that the epenthetic vowel is inserted within word final consonant clusters, i.e., /bikr/ [bikər] and /rikb/ [rikəb]. They also reported that the epenthetic vowel varied in duration across items and speakers. Importantly, their results showed that the epenthetic vowel is phonetically further back than its lexical counterpart. They also noted that epenthetic vowels and lexical vowels are not significantly different in terms of duration.

Crucial to the present study, the identity of the epenthetic vowel is often confused and researchers often disagree about whether it is an [i], [ə] or an [u] (Hall, 2013; Azra et al. 2009; Broselow; 1976). It is, thus, aimed in this preliminary investigation to define the

quality of the epenthetic vowel. In addition, the duration factor is taken as a key measure to distinguish epenthetic and lexical vowels.

2. A sketch of the study

This study investigates vowel epenthesis in single and sentenced words in the dialect spoken in the city of Misurata, Libya. In this dialect, epenthesis seems possible in coda CC clusters. In section (3), A brief description of syllable structure in Misurata dialect is reviewed. In section (4), the method of the present experiment is described. Section (5) presents the findings which are followed by discussion and conclusion in section (6).

3. Syllable structure in Misurata dialect

Elramli (2012, 23) describes the syllable structure in the dialect of Misurata as having the following types: [CV, CVV, CVC, CVCC, CCVV, CVVC, CCV, CCVVC, CCVCC, CCVC]. Interestingly, the [CVCC] syllable seems optional to speakers of this dialect. For example, the data discussed in Elramli for this type of syllable includes the word [gird] "monkey". It seems grammatical to have the word pronounced as [girid]. It is possible that these two types are interchangeably produced and consequently both patterns are permissibly allowed in the dialect. This patter has been reported in Levantine dialects as stated by (Hall, 2013: 133), "For many clusters, epenthesis is optional, and it is common for a speaker to produce the same word sometimes with epenthesis and sometimes without". In Misurata Arabic, an epenthetic vowel is often inserted between underlying CC clusters in coda positions as illustrated in (1) below.

(1)

	a. 'girl'	b. 'I wrote'
	/bint/	/katabt/
	[bi.nit]	[ki.ta.bit]
	noun	**verb**

Generally, the dialect spoken in the city of Misurata has received little attention. Thus, the present experiment seeks to be a preliminary investigation to uncover any information regarding the quality of vowel epenthesis in this dialect. This may motivate further investigations.

4. Method

One speaker has been recorded producing the tokens shown in (Table 1). These data tokens have been carefully chosen to control for syllable structure and stress assignment. More clearly, in the noun tokens the syllable structure is underlyingly CVCC. The verb tokens incorporate two syllable words of the CV.CV + (1^{st} sing. subject) morpheme [t]) in underlying forms. The second syllable is always stressed. These tokens are produced two times as single word lists. They are also produced two times within the carrier phrase [iktib ……. Bas] "write …… only".

Table 1. Data tokens recorded in the present experiment showing underlying forms and their surface counterparts.

noun	Noun	Verb
/bint/ /binit/ "girl"	/nabʕ/ /nabiʕ/ "water spring"	Kitab-t ki.ta.bit "I wrote"
/ʔism/ /ʔisim/ "name"	/farʕ/ /faraʕ "branch"/	Darab-t derabit "I hit"
/ħiml/ /ħimil/ "load"	/ward/ /warid/ "flowers"	Sharab-t shirabit "I drank"
/qird/ /girid/ "monkey"	/fardˤ/ /faridˤ/ "tile"	Thahab-t thahabit "I went"
/qism/ /qisim/ "department"	/rafdˤ/ /rafidˤ/ "support"	Ghalab-t ghalabit "I defeated"
/Sifr/ /sifir/ "zero"	/ħarf/ /ħarəf/ "letter"	Qalab-t galabit "I turned over"

Acoustic measurements of vowel duration were carried out using PRAAT software (Boersma & Weenink, 1992-2003). As shown in (Figure 1), test sequences were segmented where segment boundaries were acoustically defined according to standard phonetic theory. Whenever a data item was not clearly readable on the speech signal, the item was discarded. A script was manipulated in extracting the duration values of the examined vowels in milliseconds (ms). Another script was manipulated to extract F2 and F1 values in Hz. The duration values, and F2-F1 values were automatically transferred to an excel sheet for analysis. Statistical analysis was run in (R version 3.6.0, 2019).

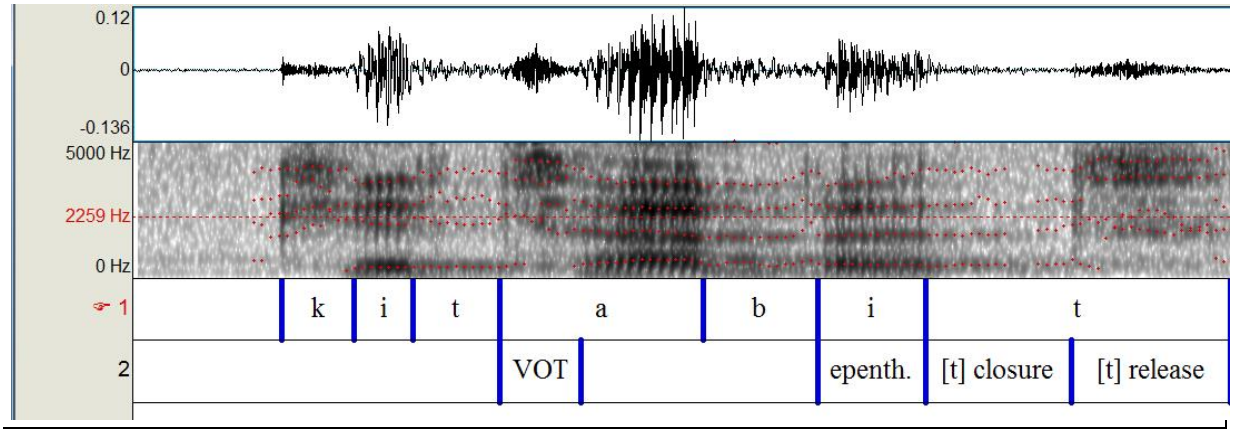

Figure 1. a spectrogram window of the word [kitabit] "I wrote" produced as a single utterance (without a carrier phrase). Segment boundaries are marked on the first tier. The second tier displays the VOT interval, the epenthetic vowel (epenth.), and the closure and release phases of the word-final /t/.

5. Results

As shown in (Figure 2), the duration of the epenthetic vowel [i] seems longer in the single word list than when the target word is embedded in a carrier phrase ($p<0.0031$), see (Table 2) below.

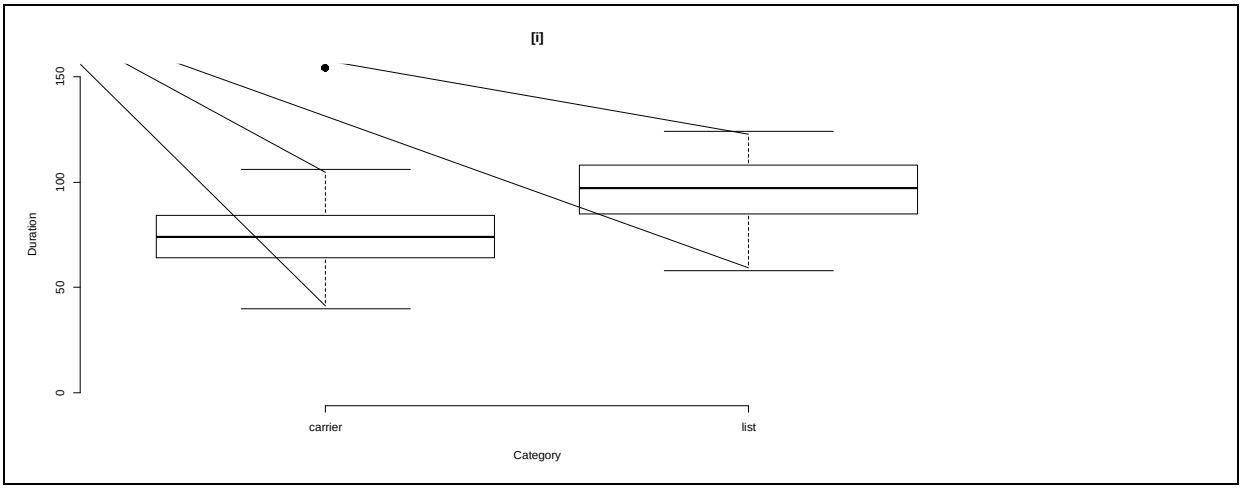

Figure 2. Epenthetic vowel [i] duration in both utterance conditions (within the carrier phrase and in single word lists).

The mean value of the epenthetic vowel duration in the carrier phrase is about 79 ms. However, in single word lists it increases by about 18 ms possibly because of the full intonational phrase pattern. This might be interpreted as the epenthetic vowel is behaving like a full lexical vowel in terms of it durational variation as a factor of prosodic context.

Table 2. T-test results showing a p-value (<.001) supporting the alternative hypothesis that true difference in means in carrier and list durations is not equal to "0".

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        Welch Two Sample t-test

Data:  duration by type

t = -3.0883, df = 54.579, p-value = 0.003163

Alternative hypothesis: True difference in means is not equal to 0

95 percent confidence interval:

 -30.127347  -6.412047

Sample estimates:

Mean in group carrier    mean in group list

              78.7000                96.9697
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Acoustic measurements of the epenthetic vowel [i] show that the formant structure of the epenthetic vowel is typical of a lexical vowel /i/. As illustrated in (Figure 3), the epenthetic vowel plot shows that the mean F2 value is about 1500 Hz, and the mean F1 value is about 450 Hz. It is worth mentioning here that these values are affected by neighbouring segments

and, therefore, do not represent typical values for [i]. These results are similar to the findings reported in (Hall, 2013: 138), where F2 mean values are 1590 Hz, and F1 mean values are 408 Hz.

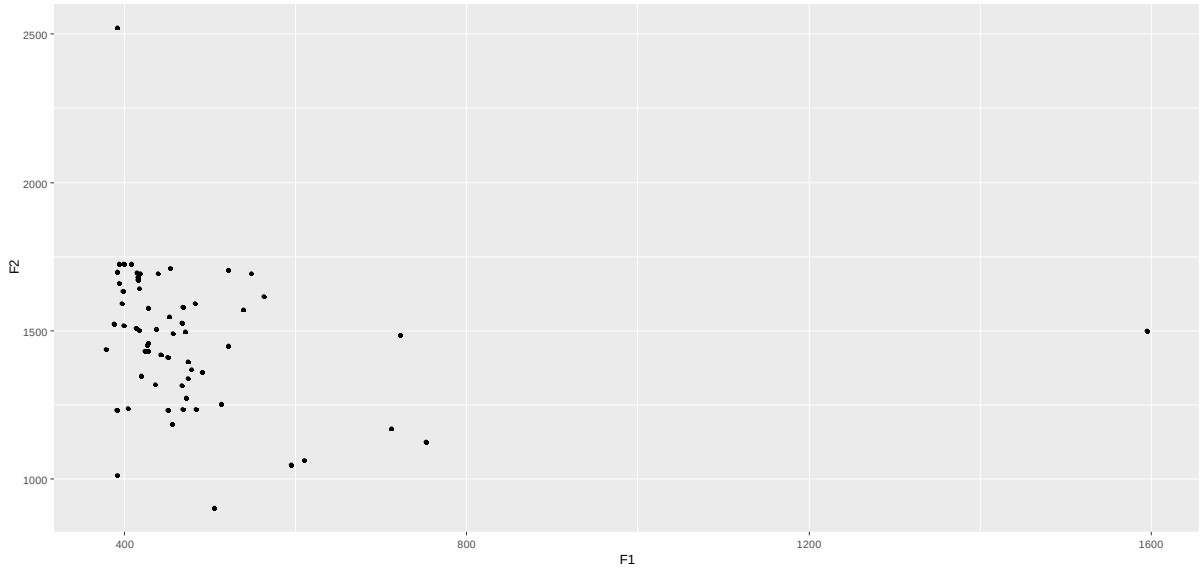

Figure 3. Plot of F1 and F2 values of the epenthetic vowel [i].

These results show that the epenthetic vowel is [i]. In addition, the duration of the epenthetic vowel seems to vary as a function of utterance type.

Conclusion and discussion

These preliminary results show the acoustic characteristics and duration of the epenthetic vowel [i]. First, the data in the present paper show the existence of the epenthetic vowel within CC clusters in coda positions. Secondly, the acoustic characteristics in the present data suggest that the epenthetic vowel is an /i/. Thirdly, the duration of the epenthetic vowel varies as a function of utterance type. More clearly, in single word lists the epenthetic vowel is longer than when embedded within a carrier phrase. This suggests that the single word exhibits a full intonational phrase where the final syllable is lengthened. The durational variation observed here is similar to that of lexical vowels when they vary in duration as a function of prosodic position.

The general trend shown in the present data suggests that CC clusters are not favorable within coda positions in this dialect. This is so despite the fact that underlying sequences do not violate the sonority sequencing principle. For example, in a word like [bint], the coda CC incorporates a [+sonorant] /n/, followed by a [-sonorant] /t/. This sequence is permissibly allowed in this dialect as well as other Libyan dialects. When an epenthetic vowel is inserted, a re-syllabification rule seems to operate. More clearly, instead of a branching CC cluster from the coda, the final C re-syllabifies to a newly formed syllable having the epenthetic vowel in its nucleus position.

Further investigation of epenthesis with more subjects and larger data is needed to uncover finer details regarding the epenthetic vowel identity and how it behaves in the phonology of the dialect spoken in Misurata.

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