

# The Voiced Emphatic Coronal Stop [d̤] in the Ḥaḍrami Arabic: A Socio-phonetic Study

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**Index Terms:** emphatic, VOT, formant

## 1. Introduction

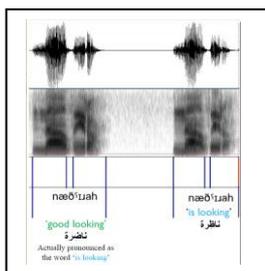
The current voiced emphatic coronal stop [d̤], which occurs in words [d̤ajf] 'guest', [jad̤f] 'get lost', and [bajd̤] 'eggs', in most of the Arabic varieties is not the archaic sound and it does not exist with its original realization as a voiced emphatic lateral fricative [1] and [2]. This study examined the socio-phonetic aspects of [d̤] in the Ḥaḍrami Arabic spoken in Yemen and concluded that there is variation in the articulation of this sound depending on social factors. For example, the sound is articulated as a voiced emphatic coronal fricative [z] in daily life conversation. However, it is articulated as [d̤] in religious and academic situation with longer voicing lead in the former situation. Although [d̤] and [z] are two distinctive phonemes and are distinguished orthographically: ض ض, Arabic dialects do not retain a distinction between them, and therefore are classified into two types regarding the substitution of the voiced emphatic stop with the emphatic dental fricative and vice versa [1]. In some dialects, there has been a merger on [d̤] as the realization for both. As for the other dialects, merger has favored the voiced fricative emphatic [z]. The Ḥaḍrami Arabic falls in the second category.

## 2. Methodology

Nine speakers from Ḥaḍramout participated in the study classified as 3 academic, 3 non-academic and 3 Quranic reciters. Academic subjects are defined as those who have finished their high school, university programs, or those who work in academic and educational fields. Non-academic subjects are those who finished their basic education and they can read and write. Reciters are those who follow the pronunciation rules of reciting the Quran. Praat, version 5.1.26 has been used for the acoustic analysis. In a carrier sentence, the participants were asked to read a list of words containing [d̤] and [z] preceded and followed by short and long vowels. In total, there were 25 tokens (13 for [d̤] and 12 for [z]) spoken by nine speaker, yielding 225 consonant tokens. The subjects also read a list of words three times with the seven Arabic stops [t, t, b, d, g, k, ʔ, ], yielding 219 tokens. Reciters are expected to have the most stable pronunciation of emphatic stops because they are trained and there is high frequency of [d̤] in their speech. Academics are expected to have variable pronunciation depending on their awareness of making this distinction and accuracy of their pronunciation. Non-academics are expected not to use [d̤], but articulate [z].

## 3. Results

In figure 2, the two words are articulated by a reciter; there is a sharp beginning and closure in [naḍirah] 'good looking' which indicates that the articulated sound is a stop. On the other hand, figure 1 shows that both sounds articulated as a fricative sound by non-academic subjects. The acoustic features of these two sounds are lowering the second formants for the adjacent vowel like other Arabic varieties [3], [4] and generally raising the first formant [5].



Figures 1: Non-academic

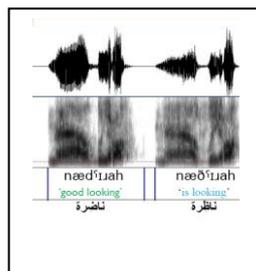


Figure 2: Reciter

As for the VOTs, VOT values for the voiced emphatic stop fall in the range (-14 to -125). Reciters have long voicing lead. Academics have short voicing lead.

Table 1: Averages of VOT values in ms of [d̤] for 3 reciters and 3 academic subjects

	Reciters			Academics		
dal	-74	-83	-80	-20	-16	-14
daal	-110	-125	-117	-91	-99	-98

## 4. Discussion

This study shows that this voiced emphatic stop has different articulatory features in standard Arabic and in regional dialects of Arabic. Although it is maintained in the language, it has varied phonetic properties due to social, cultural, and religious factors. For example, when spoken during religious events, it is very important to make the distinction between [d̤] and [z]. Otherwise, the intended meaning in the text will be misunderstood when performing religious rituals. The sound is also articulated in this manner in cultural settings. However, the voiced dental fricative emphatic consonant [z] is normally substituted for [d̤] in everyday conversations. For example, [d̤ajf] 'guest' is pronounced as [zajf].

Interestingly, while measuring the voice onset time (VOT) of this stop and the other seven in the dialect consonant system, widely varying results were found for speakers for [d̤], but not for the other stops. The varying results of [d̤] indicate the difficulty of maintaining stop voicing and this explains the shift to the voiced emphatic fricative exhibited by the non-academics. Even though the emphatic stop [d̤] is normally replaced by [z] in daily conversation in Arabic and is relatively less frequent in the language than the other stops, it is significant for cultural and religious considerations and will continue to be maintained in both the standard language and in regional dialects.

An articulatory study will be a further direction of this study to investigate the articulatory properties of both sounds in details.

## 5. References

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