

Arabic vowel durations and how focus affects them.

<person 1>, <person 2>, and <person 3>

Introduction

We propose to examine how voicing and quantity are expressed in the vowel duration of speakers of Arabic. In addition, we will examine how these two are affected by the presence or absence of explicit focus on them. With respect to voicing and quantity, both phonemic differences have been shown in previous work to systematically affect vowel durations. Long vowels are systematically longer in Arabic than short vowels (Port et al. 1981). Vowels in many languages have been shown to be longer before voiced obstruents than voiceless ones (Chen, 1971). These results have sometimes been found in Arabic (e.g. Munro, 1993), but not always (e.g. Mitleb, 1984). This study, then will ask the question, does Arabic have both quantity and voicing effects in vowels, and are they of the same magnitude?

In addition, to get at a potential difference in the status of such effects, should we find them, we will manipulate explicit focus on the quantity and voicing contrasts. Van Heuven (1994) showed that if one has speakers explicitly correct a misperception of a particular contrast, hearers can tell that the speaker is doing so. Thus, speakers can tailor their speech around the expression of particular contrasts. Hence, a second question related to that above is whether speakers will explicitly make vowel duration differences larger in conditions which focus their attention on the quantity and voicing contrasts.

Hypotheses

Given previous results, we expect that vowel durations will be longer in phonemically long vowels, and perhaps also before voiced consonants. In addition, we expect that, if speakers can indeed focus attention on particular contrasts, the difference between long and short vowels will be greater in conditions where they are correcting a misperception by a listener. We are unsure about whether the differences in vowels before voiced and voiceless consonants will also become larger or not. If they do, this would indicate that the vowel duration difference is an active component of the voicing contrast. If not, this would suggest that vowel duration differences, if we do get them, are not an active part of the voicing contrast.

Subjects

To answer these questions, we will examine speakers of Arabic. To add some generality to the results, we will examine the speech of 3 speakers of a dialect spoken in Amman. Since <person 2> is from Jordan, and will be there on thursday, she will be able to record various of her age cohort over the weekend. Each of them are multi-lingual, but since <person 2> is known to them primarily as a speaker of Arabic, they should converse in a form generally indicative of the dialect shared by them and <person 2>. Since this study concerns structures internal to Arabic, all comparisons will be made within the productions of Arabic speakers, and so no control speakers will be recorded.

Proposed Method

A. Linguistic corpus.

Forms have been chosen from Arabic which minimally contrast quantity and voicing. These forms all have the vowel /a/ placed in a /b/ ___ /t/ context, and are given in Table 1. Each word has the target vowel in a stressed position, since the stress rules in this dialect place stress in the penultimate position.

Table 1.

Target segments	Word	Gloss
<u>baat</u>	baata	he stayed overnight
<u>baad</u>	baada	he extinguished
<u>bad</u>	bada	he started

B. Elicitation technique.

Speakers will be asked to produce multiple repetitions of the three target words in the two different focus conditions. In the first condition, they will be asked to produce them in a condition in which the speaker is responding to someone asking the question, 'who said it?', and so will appear in a post-focal sentential condition such as in (1)

(1) ?ana ?ult baada mij huwwe.

I said 'he extinguished', not him

After the entire group of post-focal tokens is produced, we will then ask them to read a corpus which answers the question, 'what did you say?' In this corpus, half of the tokens are to be in response to someone mis-hearing the voicing contrast, and the other half to someone mishearing the quantity contrast. Hence to focus on the quantity contrast, subjects were asked to read sentences such as in (2):

(2) ?ana ?ult baada mij bada

I said 'he extinguished' not 'he started

However, to focus on voicing, subjects were asked to read sentences as in (3).

(3) ?ana ?ult baada mij baata

I said 'he extinguished' not 'he stayed overnight.'

To obtain these, the speakers will be presented with a randomized list of sentences in Arabic script with the question to which they are responding at the top of the sheet. Note that Arabic script does not have diacritics such as underlining to indicate focus.

C. Recordings

Recordings will be done in a quiet room with a portable cassette recorder obtained from the linguistics department.

D. Corpus size

In all, there are three word types in three conditions (post-focal, focus on quantity, and focus on voicing), for a total of nine target types. Each item will be repeated three times by three speakers for a total of 81 tokens.

Analysis

The target words from the recordings will be digitized for analysis using Sound Scope. Using broad-band spectrograms and waveforms, vowel and stop closure durations will be extracted from each target. In addition we will extract formant estimates from the middle of the target vowels, and will measure the degree to which there is voicing in the consonant closure. The vowel durations are the primary targets of analysis. The other three measures, vowel formant, consonant closure duration and proportion of voicing in closure are to help us see whether the focus condition is doing anything.

We expect vowel durations to be longer before voiced stops and for long vowels. In addition, we expect vowel duration differences between long and short vowels to be greater with focus on quantity contrasts, but not greater with focus on voicing contrasts. If the consonant voicing effects are not specified as part of the voicing contrast, we do not expect any increase in the difference between voiced and voiceless consonant locations due to focus of any kind.

Finally, vowel formants will be compared for short and long vowels to see if there is any difference between the quality of long and short vowels, and if there is, we might expect an increased difference in the focus on quantity condition. Similarly, we would expect the consonant duration to be longer and proportion of voicing measures to be less for voiceless consonants. These differences should be greater in the focus on voicing condition, but not in the focus on quantity condition.

Division of Labor

The members of our group are <person 1>, <person 2>, and <person 3>. <p2> has constructed the corpus and will administer the recordings. <p1> has written this prospectus. <p3> will digitize all the data and perform the analyses on one of the speakers. <p1> and <p2> will each analyze one of the other two speakers. Each person will compile the final data into a spreadsheet. Analyses will be done by committee.

References

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