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<td>Author 1</td>
<td>Uguru Joy O.</td>
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Dear Dr. Uguru

I am writing to inform you that your paper *Durational Effects of Intonation Variation in Ika* has been accepted for publication in The Phonetician. We will try to fit it in at the earliest opportunity.

Yours sincerely,

Angelika Braun
The Phonetician
An official journal of the International Society for the Phonetics Sciences

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Silent pauses in speech are not only pauses in the breaking of the speech stream, but pauses in the syntax, in the prosody, and in the phonetics.
Durational Effects of Intonation Variation in Ika

By

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ABSTRACT

Ika is a dialect of Igbo, a major Nigerian language belonging to the New Bense-Congo sub-group of the Niger-Congo family. This paper is targeted at identifying the effect of three Ika rising intonation patterns on durations of syllables. Three utterances were used for the study. It was discovered that some intonation patterns have elongating effect on the durations of syllables and utterances while others tend to effect shorter durations.

Keywords: Duration, intonation, acoustic, variation

Introduction

Duration as used in this study is purely an acoustic cue. It refers to the length of time it takes to produce a sound or syllable (Crystal, 1991: 114). Acoustic analysis involves the calculation of acoustic features and in this study we focus on duration. Other acoustic cues include fundamental frequency and amplitude. Although Lieberman (1967:65) in his research, discovered that speakers can manipulate duration so as to be able to say so much at a short duration, it must be noted that speech takes a time lag just as quiet breathing. Expiration in normal (quiet breathing) takes about two to three seconds (Lieberman, 1967:23). Lieberman and Blumstein (1988:201) show that in producing a particular sentence several times the fundamental frequency (Fo) keeps changing while the duration remains constant. This was seen from the production of five tokens of the utterance, Bev loves Bob. In all five tokens, the syllables had the same duration. They point out that many perceptual
interpretations of prosody are as a result of variation in duration of segments though they are wrongly attributed to Fo variations. Lieberman (1967) indicate that Fo and duration are the strong correlates of intonation. The effect of variation on duration can be seen from this work. Thus it appears that variation in intonation results in variation in durations of segments and syllables.

Remez et al (1986) in Lieberman and Blumstein (1988:223) portray that duration tends to vary in spontaneous speech more than in natural speech. Although the speech used for our research is not read, the subject was already pre-informed on what to speak. Hence it is expected that the durations should be less variable. Collier (1983) reveals that the major phonetic difference that correlates with intonational contrasts is the timing of otherwise identical changes. Hence a timing of not more than 25 ms is enough to make the difference between intonation patterns. It is therefore a two-way traffic where duration effects intonation variation and intonation variation is reflected in differing durations. Nakatani, O'Connor and Aston (1981) from their study of American English, reveal that syllable duration is greatly influenced by stress. Also, word-final and phrase-final syllables tend to be elongated more than those in non-final positions. It appears, from their findings, that syllable position plays a greater role in syllable elongation than stress. They measured the spectrograms of one-stress syllable in final, penultimate and antepenultimate positions in phrase-medial adjectives, and those of phrase-final nouns. They came up with the following measurements.

<table>
<thead>
<tr>
<th>Phrase-medial one-stress syllable adjectives</th>
<th>Antepenultimate</th>
<th>Penultimate</th>
<th>Final</th>
</tr>
</thead>
<tbody>
<tr>
<td>190ms</td>
<td>210ms</td>
<td>280ms</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Phrase-final one-stress syllable nouns</th>
<th>Antepenultimate</th>
<th>Penultimate</th>
<th>Final</th>
</tr>
</thead>
<tbody>
<tr>
<td>215ms</td>
<td>220ms</td>
<td>470ms</td>
<td></td>
</tr>
</tbody>
</table>
Ho (1977) also reiterates that that the duration of syllable nuclei in a sentence is influenced by word position rather than intonation except in sentence-final position. The test utterances used in this study are isolated hence word position is not considered in our analysis.

Ho (1975) conducted an acoustic experiment on the duration of four Mandarin tones in isolated words. The tones were level tone (tone 1), rising tone (tone 2), falling-rising tone (tone 3) and falling tone (tone 4). He found that tone 3 had the longest duration (above three seconds), followed by tone 2 (0.29 seconds) the level tone (tone 1) ranked third (0.26 seconds) while tone 4 took the shortest duration (0.20 seconds)

**Materials and Methods**

Four test utterances were used for the study. Each of the utterances was pronounced in the four intonations studied in this work – Low Rise, High Rise, Fall Rise and Rise Fall. The test utterances appear below:

<table>
<thead>
<tr>
<th>Word</th>
<th>Intonation</th>
<th>Attitudinal meaning/translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>wé</td>
<td>LR</td>
<td>they (emphasis)</td>
</tr>
<tr>
<td>yá</td>
<td></td>
<td></td>
</tr>
<tr>
<td>nû</td>
<td></td>
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</tbody>
</table>

A male informant pronounced the utterances in the four different intonation patterns. His speech was tape-recorded and fed into the computer. Three tokens of each utterance were taken. The durations of the utterances were calculated in seconds, using the *praat* speech analysis software. Below are the test utterances with the intonation patterns and their attitudinal meanings.
Results and findings

The following mean duration values were calculated for the test utterances:

**Wé**

- Low Rise – 0.45 seconds
- High Rise – 0.30 seconds
- Fall Rise – 0.55 seconds

It can be observed above that the FR intonation pattern has the longest duration – 0.55 seconds. The LR has 0.45 seconds while the HR has duration of 0.30 seconds. This can be seen from fig. 1 below.
Fig. 1 Mean duration for *we* using LR, HR and FR intonation patterns.

**yá**

Low Rise – 0.35 seconds
High Rise – 0.33 seconds
Fall Rise – 0.42 seconds
Fig 2 Mean duration of ɣ using LR, HR and FR intonation patterns.

N gallons

Low Rise – 0.53
High Rise – 0.51
Fall Rise – 0.59
Summary and Conclusion

Our findings indicate that the Fall Rise intonation has the longest duration, followed by Low Rise, with the High Rise having the shortest duration. This also authenticates the findings of Ho (1976:335) which showed the Fall – Rising tone as having the longest duration. Though it may not be said that Fall Rise tone and the Fall – Rising tone are the same, their nomenclature must surely depict some semblance in direction of pitch movement. Thus it can be concluded that Fall Rise intonation tends to take longer duration to pronounce than the other two - High Rise and Low Rise. The difference in duration could be as a result of the direction of pitch movement. The FR involves the pitch going down firstly and secondly rising up. This process apparently would take longer than what occurs in the production of the Low Rise where the pitch does not have to undergo a fall since it is already low. Rather, it undergoes a slightly gradual rise from low to high. The pitch movement involved in Low rise however should obviously take longer than what takes place in HR. In the latter, all that is involved is making an already high tune to go higher. It should be expected that this should take the shortest duration of all the processes described above. Though Collier (1983) shows that the major phonetic difference that correlates with intonational
contrasts is in the timing of otherwise identical changes, we determine that manner of
production plays a major role in establishing classification of intonation patterns.
Manner of production influences duration which is a major factor in the shaping of the
various types of tunes. A timing difference of not more than 25ms is enough to make
the difference between intonation patterns (Collier, 1983). We therefore conclude that
the duration of tunes is determined by the manner of production and the positions and
processes through which the tongue and the vocal cords have to go.

References


Ho, A.T. (1977): Intonation Variation in a Mandarin Sentence for Three Expressions:
Interrogative, Exclamatory and Declarative. *Phonetica* 34, 446-457.


Press.

Lieberman, P. and Blumstein, S.E. (1988): *Speech Physiology, Speech Perception and


American English Speech Rhythm. *Phonetica* 38, 84-106.

Remez, R.E., Rubin, P.E. and Nygaard, L. C. (1986): On Spontaneous Speech and
Fluently Spoken Text: Production Differences and Perceptual Distinctions.

Languages and Culture* 6(2), 75-80.