

QUANTITY IN ICELANDIC¹

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1. INTRODUCTION

The role of quantity in Icelandic phonology has been discussed frequently in the literature (cf. Benediktsson 1963 and further references listed there). Benediktsson (1963) summarizes the phonological situation as follows: in stressed syllables vowels are long when followed by one consonant and short when followed by two consonants, with minor exceptions. Vowel length is thus predictable from the presence and number of post-vocalic consonants. Four different solutions have been proposed to account for the distribution of quantity in Icelandic: (1) Kemp Malone assigns distinctive quantity both to vowels and to consonants, (2) Einar Haugen combines stress and quantity into accent and assigns it both to vowels and to consonants, (3) Sveinn Bergsveinsson assigns quantity to vowels alone, while (4) Hreinn Benediktsson assigns quantity to consonants.

But which analysis is supported by phonetic facts? In this study² I investigated the following properties in three structural types: (1) the quantity and quality of vowels in monosyllabic words with CVC:-CV:C structures, e.g., *húss-hús*, (2) the quantity of vowels, consonants, and pre-aspiration in monosyllables of the type CVhC:-CV:Ch, e.g., *takk-tak*, and (3) the segmental durations in disyllabics with the structure CVhC:V-CV:ChV, e.g., *kakka-kaka*. The long tense voiceless plosives, /pp/, /tt/, /kk/, are traditionally phonetically transcribed by pre-aspiration plus long plosive, followed by no post-aspiration: [hC:]. The short, tense plosives, /p/, /t/, /k/, lack pre-aspiration but have post-aspiration: [Ch].

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² The data presented here are based on the speech of my principal informant, Thráinn Eggertsson, age 30, who is a native of Reykjavík. Quantitative differences apply to diphthongs as well as to monophthongs, although in this study I have investigated only the monophthongs. None of the long consonants consisted of consonant clusters. No measurements were made of initial consonants (cf. Lehiste 1970a:27). Formant measurements were made from Voiceprint spectrograms. Quantity measurements were made from oscillographic displays of approximately 300 tokens/utterance type. See Einarsson (1927) for an earlier instrumental analysis.

2. RESULTS

In CVC:-CV:C type monosyllables the ratio of the short:long allophones of 6 monophthongs, /i/, /i/, /u/, /a/, /o/, /ú/, is approximately 3:5. For two of the pairs the ratio of short:long allophones is smaller: 7:10 for /e/ and almost 3:4 for /ö/. The largest ratio is for the allophones of /ú/, ca. 4:7. The mean average of short (13.2 cs.): long (20.1 cs.) is 63%. The formant structures of the short:long allophones of /e/ and /ö/ show that they are relatively widely separated in quality. It might be assumed that there is a connection between the facts that short and long /e/ and /ö/ differ relatively less in quantity and relatively more in quality, i.e., that the opposition is maintained on the basis of quality in the case of these vowels; but the argument loses some of its strength, since, e.g., the allophones of /ú/ are likewise widely separated, and it is this same pair that has the greatest difference in duration between the short and long allophones.

In CVhC:-CV:Ch type words, the short vowel duration (10.7 cs.) is 53% of the long vowel duration (20.2 cs.), i.e., 10% less than in syllables without pre-aspiration. The short vowel plus pre-aspiration (6.2 cs.) is 84% of the long vowel. The short consonant (14.0 cs.) is 85% of the length of the long consonant (16.5 cs.). The total word durations are very similar: the short vowel type is 1.1 cs. shorter than the long vowel type.

These same general relationships are maintained in the disyllabics: CVhC:V-CV:ChV. The mean short vowel duration (7.4 cs.) is 50% of the long vowel duration (14.6 cs.) in the disyllabics, similar to the 53% found for the monosyllabics. The duration of pre-aspiration is 1.3 cs. less in the disyllabics (4.8 cs.) than in the monosyllabics (6.1 cs.). This difference combined with the difference in vowel length preserves the same percentage of short vowel plus pre-aspiration to long vowel that was found in the monosyllabics above, i.e., 84%. Perhaps the most striking relationship is that of the consonants themselves: the long consonant has an average duration of 10.7 cs. while the short consonant is 10.4 cs. The durations of aspiration are also similar: 4.8 cs. for pre-aspiration and 4.5 cs. for post-aspiration. The total average duration of CV:ChV words is 5.8 cs. longer than the CVhC:V type, i.e. 43.9 cs. vs. 38.1 cs.; the difference in the duration of the pairs is mainly due to the greater duration of the long vowel. The segments in the disyllabic words indicate a systematic reduction in quantity from their counterparts in the monosyllabic words.

3. CONCLUSION

The phonetic evidence indicates that vowel length, not consonant length, is the crucial factor in quantity distinctions. The findings therefore support Bergsveinsson (1941: 83-4) who assigned the distinctive function to vowel quantity. Thus, e.g., the data here indicate a phonetic transcription of the investigated disyllabics with length

assigned to the vowel only: CVhCV and CV:ChV. Since pre-aspirated consonants have the same duration as post-aspirated consonants, there seems to be no point in transcribing them as long.

The data also provide evidence supporting Lehiste's (1970b) theory which includes the claim that there is temporal organization of speech at levels above the segment. The results here show that at the word level the relationships among the segments remain systematic within the different structural types; thus it may be concluded that the domain of the temporal pattern is the whole word, and at some level, the word itself constitutes a unit of programming.

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DISCUSSION

ELERT (Umeå)

When the words are inserted in sentences or, still more, when they occur in spontaneous speech, the duration values will show greater dispersion. However, consistent relations of the duration of long and short vowels will probably be found when various influencing factors are accounted for, e.g., in the relation of the duration in each speaker's pronunciation of pairs of words with long and short vowels with the same quality ($V_1 : /V_1$). In Swedish, the relation $\frac{V_1}{C_1} : \frac{V_1}{C_1}$ was found to be consistent also in fast readings.

GARNES

In reply to your comment that the phrase, not the word, may be the unit of temporal compensation, I refer you to the work of two of my co-students, Linda Shockey and Dick Gregorski, *Word-Unit Temporal Compensation* (*Working Papers in Lin-*

guistics No. 9) (Columbus, Ohio, Ohio State University Department of Linguistics). They have used sentences in their study and have found that temporal compensation was evident throughout the sentence. This indicates that the sentence is programmed as a whole.

In my study the words were uttered in isolation, thus obviously I have no data regarding the phrase, though it does appear that the word is programmed as a unit at some level.

KLOSTER-JENSEN (Bergen)

It is interesting to note the great similarity between the results shown here and those of C.C. Elert for Swedish as spoken in Stockholm, though I wish Mrs. Garnes had had Elert's facilities for utilizing a computer so as to enable her to work with several informants.

GARNES

Thank you very much for your comments. Although it is well known, as you say, that quantity oppositions show certain similarities in the Scandinavian languages, I believe that no recent instrumental studies have dealt with Icelandic. I hope that the data presented in this paper will be useful in comparing durational relationships among the Scandinavian languages.

As you observe, I included no final aspiration measurements for the monosyllables ending in short tense voiceless plosives. From the oscillographic tracings obtained, the measurements of these segments appeared to be very irregular and in most cases difficult to obtain with consistent accuracy. Therefore, I did not include any of the measurements in the report. I did not include any of the measurements of the release of the long, tense voiceless plosives in monosyllables for the same reasons.