On the whistle language of Gomera

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This is a brief report on work in progress, carried out in collaboration with Jens Allwood, University of Gothenburg.

Gomera is one of the Canary Islands. The primary language of the Canary Islands is Spanish. On Gomera, a secondary whistle language is used by some persons in some circumstances, viz. by men only, mainly outdoors for communication over distances. The whistle used is of high intensity and has a very simple acoustic structure, which is not exposed to distortion over considerable distances as is ordinary speech - the whistle signal either reaches the addressee unmodified or does not reach him at all.

In December, 1972, we visited Gomera and made tape recordings of three informants speaking and whistling lists of minimal pairs, phrases given by us, and spontaneous phrases. Profile X-ray pictures were also made of one of the informants when he whistled some of the vowels.

The whistle may be produced in different ways. Two main methods of production can be distinguished. First, the whistler may form a small longitudinal groove in his tongue blade while pressing it against his upper teeth. Second, the whistler may put one or two fingers into his mouth, pressing it/them against his tongue while forming a narrow passage with his tongue in approximately the palatal position. There are many variants of this second type. Our present X-ray pictures are not sharp enough to give adequate information about conditions further back in the vocal tract. In both types, the lips and the front part of the tongue are constantly fixed, while the posterior part of the tongue and the articulators further back are free to vary the size and shape of the vocal tract.

The whistle signal is essentially a sine tone. Its intensity is not varied for phonemic distinctions. The information-bearing variations of the signal are onset and offset of whistle tone, and duration and frequency variations. Frequency is changed by varying the size and shape of the vocal tract. Classe (1957), who described the Gomera whistle language in the fifties, claimed that the whistler modifies the signal by approximating the articulatory position of ordinary speech, the fixation of the lips and the front part of the tongue hampering the normal execution of the commands, however. We agree that there is a close and natural relation between the Gomera speech and whistling, but propose a more perception-oriented view of the relation. There are strong arguments for this standpoint. One of these is that labial consonants are generally realized by a negative transition of the whistle tone. This feature corresponds of course to the negative F2 transition in ordinary speech, typical of labial pronounciation. This F2 transition is caused by labial articulation, whereas the negative whistle transition must be caused by some quite different articulatory movement, as the lips are always fixed during whistling.

Acoustic analysis of the recorded material is now in progress. It is based mainly on F_0 curves of the whistles. (See Fig. 1.) The recordings have been lowered eight times in speed in order to match the whistle tone frequency to the Fonema analysing equipment of the Phonetics Department in Lund.

Some important features of the secondary whistle language as compared to the primary Spanish will be mentioned here:

1. The whistle language does not have a code relation to the primary language but stands in a <u>direct</u>, <u>natural</u> relation to the Gomera Spanish. By this is meant that the whistler with his simple whistling instrument produces acoustic signals that share some essential features with the corresponding speech signal. The whistle mechanism produces a one-dimensional signal, lacking the rich redundancy

of speech signals. It may be supposed that the choice of distinguishing features in the whistle signal - with due regard to the limits set by the instrument itself - will illuminate essential perceptual cues of Gomera Spanish and of languages in general. Our study may thus contribute to the elucidation of the general phonetic problem of speech perception cues.

2. The whistle signal gives an auditory impression well corresponding to the syllabic structure of the same message as spoken. Roughly speaking, this is attained by realizing vowels as frequency levels or relatively slow frequency variations, whereas consonants are characterized by rapid variations of the frequency combined, for plosives and fricatives, with silent intervals.

3. Word and sentence stress as well as sentence intonation are all at least to some extent realized in the whistle signal. Being a one-dimensional signal, the whistle tone thus manifests segmental as well as suprasegmental features in the some dimension. We think that the study of the weighting of these different factors in the whistle signal may be of interest also in a more general phonetic context.

4. In the whistle segmental paradigm there is a far-gone reduction of oppositions compared to the Gomera Spanish system. Five vowel phonemes of Spanish are reduced to three whistle categories. Insteed of 17 consonant phonemes the whistle language uses perhaps only four categories. It is interesting to note that we have heard and seen whistlers communicate complicated messages rich in new information under controlled circumstances. Thus, the Gomera whistle language is a rich domain for research also from the information theory point of view.

Reference

Classe A. 1957. Phonetics of the Silbo Gomero, Archivum lingvisticum, Vol. 9, I

References

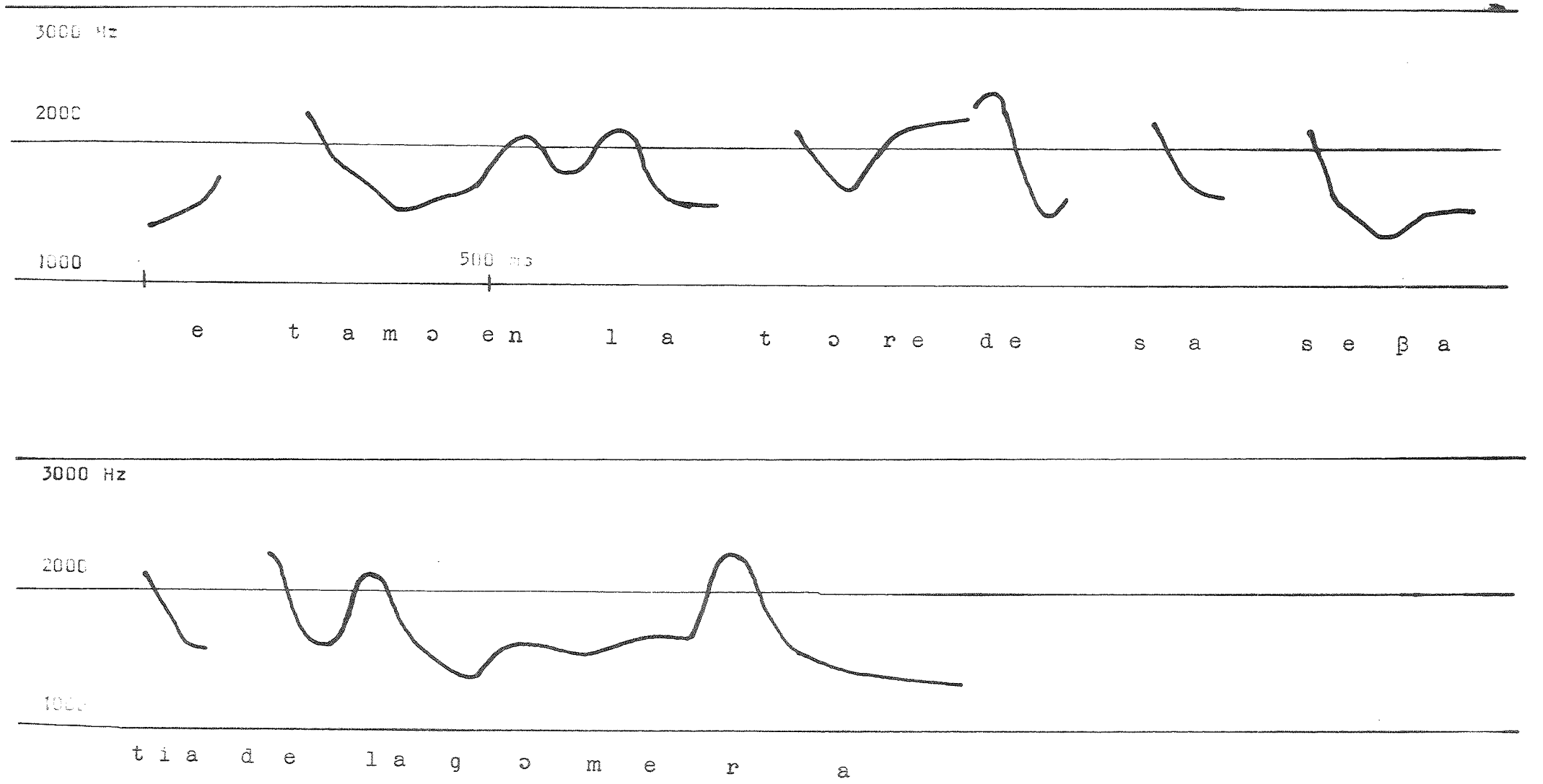

Figure 1. Tracing of the whistle tone from a sonagram. The informant whistled "Estamos en la torre de San Sebastian de la Gomera".