

MOUTH SHAPE IN THE PRODUCTION OF [w] AND [ɸ] SOUNDS IN JAPANESE  
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The mouth of a speaker was illuminated by a stroboscopic light source every 10 milliseconds, and pictures of both frontal and lateral views of the mouth were taken utilizing a special camera in which a long film was driven continuously. Changes in the dimensions of various parts of the mouth were measured.

The up-and-down movements of the centers of the upper and lower lips, and the lateral movements of the corners of the lips, were also recorded by attaching small metal pellets to the lips at these points and by illuminating them with the stroboscopic lamp every 5 milliseconds. The frontal projections of the traces of these points were displayed three-dimensionally by adding the time axis. (This graph is called a "labiogram".)

The material used here comprised the traditional 100 Japanese monosyllables and some additional syllables occurring in loan words in modern Japanese. Some of the latter words consisted of two, three or four syllables. The words were spoken by a female adult.

On the basis of the stroboscopic observations and a spectrographic analysis of the speech sounds, characteristics of the mouth shape for each of the syllables and coarticulation effects were analyzed.

Among the results, this paper will focus on the characteristics of the sound [w] and the unvoiced bilabial fricative [ɸ], which are pronounced frequently in loan words, as well as in the traditional Japanese syllables /'wa/ and /hu/. (/'/ is the voiced counterpart of /h/.)

The use of visual information on the mouth shape for these sounds to improve lipreading of modern Japanese, will also be discussed.