

# **Speech Tempo and Speaker Age as a Factor of the Realisation Type of the Mora Nasal in Osaka Japanese**

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## **1. Introduction**

The description of the pronunciation of the mora nasal varies considerably in the literature. Such variation can be found not only between different researchers but also in dependence on the phonetic context, in which the mora nasal can be found. In some studies the mora nasal is described as having an underlying phonetic place and modus of pronunciation, which is close to a velar nasal and which gets modified according to phonetic context and speaking style, but often leaves a trace of the original pronunciation. Others assume more context dependent realisations, not giving any information about some original pronunciation.

In the following, a more detailed outline on the various descriptions of the pronunciation of the mora nasal in specific context will be given to illustrate the motivation of the present investigation, which is to show the existence of a consonantal realisation of the mora nasal in intervocalic context in Osaka Japanese.

### *1.1 At the End of a Word or Utterance*

In the case of its utterance final occurrence, some agreement exists, that the mora nasal should be produced with an unreleased oral closure. The description of the place of articulation varies from a velar nasal (Sakuma 1929) to a uvular nasal (Hattori 1930). Nakano (1969) presents us with two kinds of velar nasals in the phonetic description of the mora nasal, according to the immediate context. He gives an account for the occurrence of a velar nasal in case of a word final or intervocalic mora nasal, which is related in articulation to the utterance used to support the interlocutor to continue the performance. He shows an X-ray picture to demonstrate the articulatory settling of this nasal, which is a simultaneous closure at the rear part of the velum and the uvulum. Nakano expresses the possibility for this nasal to be produced simultaneously with lip-closure in that specific dialogue situation, which does not change the auditory impression due to the extensive closure at velum and uvulum.

Hattori (1930) and Arisaka (1940) describe the uvular closure as being weak, or lax. Contrasting results were shown in the following investigations: Aoki (1976) showed that oral airflow could be found during the production of the mora

nasal when kymograph recordings were made, whereas Sakuma (1929;1963) did not find any oral airflow with a much less elaborated experimental method. Bloch's description (1950) of the phonetic realisation of the mora nasal at the end of an utterance diverges from the descriptions above in that he claims the existence of a "voiced frictionless nasal ... spirant", which probably results - as Vance (1986) remarks quite convincingly - in an approximant articulation, in agreement with Catford (1977).

### *1.2 Preceding a Consonant*

Before obstruents and sonorants, the mora nasal is expected to be assimilated in place of articulation to that of that consonant. (Vance 1986, Nakano 1969). Here, Nakano (1969) introduces a second velar nasal, which is represented by the IPA-symbol [ŋ] and occurs before a velar stop, due to assimilation.

Kawakami (1977) claims three types of mora nasal in such a position, depending on the speaking style and speech tempo. In the case of careful pronunciation, the greater part of the mora nasal is realised as a nasal consonant having the same place of articulation as the supportive particle in conversation, which has been mentioned above. However, towards the end of the mora nasal, the articulation changes due to the place of articulation of the following consonant. Regressive assimilation takes place, but affects only a small portion of the mora nasal. In more casual speech this assimilation is much stronger meaning, that the portion of the original pronunciation of the mora nasal, which is the same as in the supportive particle, occurs only within a short time span of the whole nasal. In fast speech, the assimilation affects the whole time span of the mora nasal, and therefore the place of articulation for the whole nasal is homorganic with the following consonant.

Where there is a following fricative, the mora nasal tends to be a nasalised vowel, which corresponds in the quality to the place of articulation of the following fricative in the front-back dimension and is therefore a front or back vowel. (Hattori 1930).

### *1.3 Preceding a Vowel or a Glide*

Vowels and glides are also described as being preceded by the mora nasal, realised as a nasal vowel (Vance 1986, Arisaka 1940). These two authors agree in that there can never be a complete oral closure, which would result in a nasal consonant. Arisaka (1940) points out, that in case of a complete oral closure, a release would have to follow, to pronounce the following vowel. Such release would give a different auditory impression than it does in the way it is produced correctly. Nakano (1969) admits the occurrence of an oral closure of the type supportive type in dialogue in the case of careful pronunciation. However, in the

course towards a more colloquial speech style, the mora nasal is assimilated to its adjacent vowels and transforms into a vowel itself, spreading nasality onto the adjacent vowels at the same time.

#### *1.4 Purpose of the Present Investigation*

These descriptions of the realisation of the mora nasal represent the Tokyo and Standard variety of Japanese.

Having been exposed to Osaka Japanese for some time, the author felt the need to complement the illustrations above with the observation that complete oral closure in the realisation of the mora nasal can be found in the variety of Osaka Japanese in the case of intervocalic occurrence. One has to bear in mind that the phonological status of the mora nasal in Osaka Japanese differs from Tokyo Japanese, e.g. that it can bear accent. However, the consonantal version of the mora nasal, i.e. being articulated with complete oral closure, is not the only way of pronunciation, as a nasal vowel realisation can be found as well. The usage of either version varies according to the speaker being a member of a certain age group or generation. In addition, speech tempo is investigated as a factor on the choice of the variant of the mora nasal. As Kawakami (1977) observes from fast speech that the underlying quality of the mora nasal gets reduced and even deleted in consonantal context, this study will enquire such deletion in vocalic context. This study presents the results of a detailed acoustic analysis of the mora nasal in intervocalic position in Osaka Japanese with reference to variation in speaking rate and speakers' age group.

## **2. Investigation**

### *2.1 Material, Subjects and Recording*

The material for this investigation consists of read speech. It contains a list of 65 sentences of the type: "*A* yori wa, *B* to iu hoo ga ii"<sup>1</sup>, where *A* is a compound word, enclosing a mora nasal (N) at a morpheme boundary in intervocalic position (VNV). The rest of the phrase was designed not to contain any kind of phonological nasal, including the meaningful word *B*, which stands in semantic relation with *A*. The text was presented in Japanese characters, where the words *A* and *B* were often presented in Kanji plus Furigana. However, for some more familiar cases, Kanji only was presented. Due to the requirement that the target word *A* should contain a mora nasal in intervocalic context, and all 5x5 possible contexts should be presented, it was not easy to find well-known words, that could be understood by all the subjects when presented in Kanji only. However, it was not possible to find suitable words in all 25 vowel contexts. There is a distinct

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<sup>1</sup>This means "in comparison to *A*, *B* is better".

lack of target words containing the combinations /uNu/, /oNu/, /iNo/ in the material. Some examples of the list of sentences including the target words in Japanese style presented to the subjects are given in the Appendix. The subjects were asked to read the sentences fluently, avoiding any kind of pausing.

The group of subjects consists of eight native speakers of the Kansai variety of Japanese. They have all lived in the city of Osaka all their lives and their parents are natives of the city or the Kansai area as well. Four of the subjects belong to a younger generation, aged between 15 and 20 years (genA), the other four subjects belong to an age group between 40 and 45 years of age (genB). For each generation, two of the subjects are female and two of them are male. They have completed high-school or - for the younger subjects - are high-school students. The two male subjects of the older generation have completed undergraduate studies at college. The two female subjects of the younger generation have very good comprehension of English.

The recordings were made mostly in the subjects' homes. A portable two-channel DAT-recorder was used for that purpose. In addition to the oral signal, a nasal signal was recorded with the help of an accelerator microphone attached to the nose as described in Tronnier (1995).

## 2.2 Analysis

The recorded data were analysed in the ESPS/Waves+ environment. With the help of spectrograms, the waveform and the possibility of auditory output of fractions of the speech signal, traditional labelling was undertaken. The information in the nasal signal obtained with the accelerometer was merely used for support and orientation to detect the beginning and the end of the velar opening in the vowels adjacent to the mora nasal.

In the case of age group behaviour, the number of consonantal realisations of the mora nasal out of the whole number of correct realisations per subject was calculated in percentage (%). The definition of "correct realisations" refers to realisations, where the target word was read in the expected way or without misreading. In some cases, kanji-compounds in Japanese can be read in two different ways. However, only the realisation matching the intended pronunciation including a mora nasal was added to the list of "correct realisations". The data was grouped for the different age groups (genA for the younger generation and genB for the older generation) and an unpaired t-test, assuming equal variance was applied to compare the two groups statistically.

In addition, the length of the portion "yori wa" of the carrier sentence was measured to estimate the speech tempo. This procedure was chosen prior to measuring the length of the VNV-sequence to avoid the problem of a preceding vowel representing a whole mora in contrast to just one part of a mora (*eNo* vs. *seNoo*), or a following vowel-occurrence counting as one mora in one case and