Phonetic characteristics of the Kochi dialect of Japanese: a comparison of the Yusuhara and Kochi-City dialects

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Abstract
The major phonetic characteristics of two sub-dialects of the Kochi dialect (the Yusuhara dialect and the Kochi-City dialect) of Japanese were compared by analyzing speech from an elderly speaker for both dialects. The fricative-affricate distinction (Yotsugana), was well attested in both dialects. Prenasalization before voiced stops was present more strongly for the Yusuhara speaker, and a number of new findings as to its distribution and its phonetic quality were obtained. For the manifestation of pitch accent, the F0 value of the H tone for the HH pattern was found to be higher than that of the HL pattern in Yusuhara, which is markedly different from that of the Kochi-City dialect and Standard Japanese.

1. Introduction ¹

This paper presents acoustic documentation and analyses of the major phonetic properties of the two sub-dialects of the Kochi dialect of Japanese. The two sub-dialects are the Yusuhara dialect and Kochi-City dialect that are shown in figure 1. The Yusuhara dialect was studied as part of the project Endangered Dialects, Folklores and Folk Cultures of Kochi that are on the Verge of Extinction which received financial support from the Ministry of Education, Culture, Sports, Science, and Technology in Japan. The ultimate goal of the project has been to document and preserve, in the form of a database, some linguistic and cultural properties of certain communities in Kochi where an extreme loss of population

¹ I would like to thank Naokazu Hashio, the project leader of Endangered Dialects, Folklores and Folk Cultures of Kochi that are on the Verge of Extinction for his kind help regarding the fieldtrip to Yusuhara and the arrangement of the speaker.
is being experienced. The majority of the population is over 65 years and social communal life can no longer be maintained. The above mentioned project is, in turn, a section project of *Endangered Languages in the Pacific Rim* (ELPR) for which the main aim is a fieldwork-based documentation of endangered languages of the Pacific Rim with particular emphasis on severely endangered ones.\(^2\)

1.1 Kochi prefecture

Kochi prefecture is located in the southern part of the Shikoku Island which is the fourth largest island in Japan. It shares its north-eastern border with the Tokushima prefecture and north-western border with the Ehime prefecture while its southern border is open to the Pacific Ocean. Along the northern borders runs the steep Shikoku Mountains which have long been an obstacle for transport and communication with the neighboring prefectures. The town of Yusuhara is situated in the northwest of the Kochi prefecture and is very close to the border to the Ehime prefecture (see figure 1).

![Fig. 1. Map of the Kochi prefecture where the locations of Kochi City and the Yusuhara town are indicated.](image)

1.2 Previous works

Kochi dialect has been known to retain many old linguistic features which have disappeared from other dialects of Japanese, including Standard Japanese, and which led Polivanov to call this dialect “Sanskrit Japanese” (Murayama 1976). Despite its historical value, a comprehensive phonetic analysis based on acoustic analyses has hitherto been largely missing for this dialect. The major phonetic

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\(^2\) For details, see [www.elpr.bun.kyoto-u.ac.jp](http://www.elpr.bun.kyoto-u.ac.jp).
characteristics of the Kochi dialect can be found in compiled studies of Japanese dialects. Presumably the most thorough description of the phonetic features of this dialect is found in Doi (1982) which the present study is based on. Other, more specific studies of the Kochi dialect include descriptive work on accent (cfr Nakai 2002 for the latest description), study of vowel devoicing rate (Sugito 1988), the instrumental analysis of so-called Yotsugana by Kuno et al. (1995), a phonological analysis of the prenasalization (Ioroi 1996), and some F0 analyses of the accent manifestations by Nagano-Madsen (2003).

1.3 Data collection and acoustic analysis

Data analyzed in the present paper were obtained during a field trip in the summer of 2003. Recordings were obtained from a 73 year-old male speaker who was judged to possess a typical Yusuhara dialect and an 80 year-old male speaker who represents a Kochi-City dialect. For the Kochi-City dialects, speakers from different generations were recorded during the same field trip, for which a separate paper is under preparation. The material used for recordings was specially compiled to test the main phonetic features of the Kochi dialect that have been previously reported in the literature. In addition, each speaker was asked to talk about themselves for a few minutes and a free conversation with the present investigator was recorded as well. Recordings were obtained in a quiet room using a DAT recorder and a noise-canceling close-talking microphone. The data recorded on DAT tapes were down-sampled to 20,000 Hz and acoustic analyses were carried out by SUGI Speech Analyzer installed on PC.

2. Vowel features

2.1 Vowel formant chart

The vowel formant charts for the Yusuhara and Kochi-City dialects were obtained by analyzing the utterances of /a, i, u, e, o/ in isolation form and plotted in figure 2 (a, b). The two dialects show very similar vowel quality except for /o/ for which the Kochi-City speaker has more back quality.

2.2 Vowel devoicing and consonant deletion

Vowel devoicing is a well-known feature for Standard Japanese, where the high vowels /i/ and /u/ are devoiced in a voiceless context without accent, though a more recent study questions the effect of accent (Nagano-Madsen 1994). It has also been known that the exact frequency of vowel devoicing varies considerably
among the dialects of Japanese. It is generally agreed that the Western dialect is vowel dominated and has less vowel devoicing whereas the Eastern dialect, including Standard Japanese, has more frequent vowel devoicing. The vowel dominated Western dialect is also more rich in tonal inventory indicating a linear correlation between the rate of vowel devoicing and tonality.

Kochi dialect, which forms a sub-dialect group of the Western dialect of Japanese, is known to have less degree of vowel devoicing. Sugito (1988), in comparing the rate of vowel devoicing for eight Japanese cities, found the lowest devoicing rate of 18% for Kochi, while Nagoya had the highest rate of 68%. Interestingly enough, Doi (1982) notes that in remote areas of the Kochi prefecture, one hears consonant deletion rather than vowel deletion or devoicing. He cites the cases where /s/ is deleted as in /arimasu/>[arimau] ‘there exists’ and /ikimasu/>[ikimau] ‘I shall go’. This was exactly the case for the present
study where the Yusuhara speaker had a very weakly articulated /s/ in phrases like /desu/ and /arimasu/ such that they sounded like [deu] and [arimau] respectively. It seems they are typically found in the sentence final fixed phrases and not in a content word. Vowel devoicing was very rare for the Yusuhara speaker, while for the Kochi-City speakers it was commonly found in sentence final phrases like /arimasu/ and /simasu/, where /u/ was devoiced. Both vowel devoicing and consonant deletion tend to occur in a sentence-final fixed phrase, presumably because such phrases are rather predictable and less important from the semantic view point. It should be noted, however, that the phenomenon of consonant deletion is far less common among the dialects of Japanese.

2.3 The vowel sequence /ei/

In most dialects of Japanese including Standard Japanese, the sequence /ei/ is pronounced as [e:]. Even in the Shikoku island, it is only the Kochi dialect that is known to have this pronunciation. Doi (1982) reports some exceptions such as /hei/ [he:] ‘fence’ and /mei/ [me:] ‘niece’, though he provides no explanation. In the present study, both the Yusuhara and Kochi-City speakers used the [ei] pronunciation, even for the words /hei/ and /mei/. This pronunciation was found even for the Kochi-City speakers of the younger generation (30s) and appears to be a persistent and strong phonetic characteristic of the Kochi dialect.

2.4 Lengthening of mono-moraic words

Another well known vowel feature for the Kochi dialect is the lengthening of the vowel in a mono-moraic word, so that words like /me/ ‘eye’ and /te/ ‘hand’ are pronounced as [me:] and [te:] respectively. In our report on the Monobe-Kochi dialect (Nagano-Madsen and Hashio 2003), the lengthening was found to occur in a less systematic way compared to that in the Kochi-City dialect. In Yusuhara, this mono-moraic lengthening was not found to occur in our test material and the speaker also confirmed that such a pronunciation is not typical in the area. The exact distribution of the lengthening of mono-moraic words within the Kochi prefecture as well as the difference among generations is yet to be clarified.

3. Consonant features

3.1 Realization of /ti, tu, di, du/

Until around 1500, the pronunciation of Standard Kyoto Japanese had realizations of /ti, tu, di, du/ as [ti, tu, di, du]. Since then, sound changes have
taken place and modern Standard (Tokyo) Japanese realized these sequences as affricates, e.g. /ti/ as [tɕi] and /tu/ as [tsu], etc. The Kochi dialect is known to be the only dialect where all four historical sounds are preserved. Doi (1982) notes that the pronunciation [ti] is more readily found in the remote areas of Kochi prefecture. In the present investigation, both the Yusuhara speaker and the Kochi-City speaker had [ti, tu, di, du], but they appeared to be in free variation with their affricate counterparts. The pronunciations [ti] and [tu] were found more frequently than [di] and [du]. However, even when the sounds are realized as affricates, the frication phase of the affricate is relatively weak and short. Other examples include [mi̯du] ‘water’, [titi] ‘father’, [tiisana] ‘small’, [sisetu] ‘facility’, [tukareru] ‘become tired’, among others. Earlier literature cites [φu̯di] for /hudi/ ‘wisteria’, but this word was realized as affricate [φudzi] by both speakers here. Figure 3 shows the spectrogram of [iɕidutɕijama] ‘the Ishizuchi mountain’ by the Yusuhara speaker. Observe that there is no frication phase after the [d] occlusion while [t] is released with a short phase of frication [ɕ] in this token.

3.2 Yotsugana

Until around the middle of fifteenth century, Standard Kyoto Japanese distinguished the pairs of syllables [ʑi] vs. [dʑi] and [zu] vs. [dzu] that were also written differently in the Kana writing system. This fricative/affricate distinction was gradually lost and today only [ʑi] and [zu] are found in most Japanese dialects. The Kochi dialect, as well as some dialects in Kyushu, is known to preserve this distinction at least among the older generation.
In the present investigation, this distinction was found to be well maintained both by the Yusuhara and Kochi-City speakers. The speakers were well aware of the distinction as difference in the use of the hiragana writing system. For the Yusuhara speaker, there was a tendency for the affricate to be prenasalized as in [ɸudzi] ‘wisteria’, but this was not the case for the Kochi-City speaker. In figure 4, [ɸuzi] ‘Mt. Fuji’ with a fricative and [ɸudzi] ‘wisteria’ with an affricate are shown. Note that in the second utterance, there is a clear occlusion for [d] before the frication phase, showing its affricate quality. Likewise, the Yusuhara speaker differentiates [ziro:] from [dziro:] ‘Jiroo’ (boy’s name), which are differentiated in the writing system (see figure 5). Other word pairs include;

### 3.3 Prenasalization

The distribution of the prenasalized consonants is limited to only a few dialects of Japanese, the Kochi dialect being one of them. Prenasalization in Japanese occurs most commonly before /b, d, z/ but the exact phonemic status differs among the dialects: in the Tohoku dialect, the prenasalized consonant is regarded as being phonemic, while in the Kochi dialect it is allophonic. The exact phonetic quality of prenasalization in Japanese has yet to be clarified, the only existing phonetic study of prenasalization being Inui (1992, 1995) who studied the production and perception of the prenasalized [ⁿd] in the Tohoku dialect.

With regard to the prenasalization in Kochi dialect, the general description is that /d/ and /g/ have their prenasalized allophones in word medial position, while the occurrence of a prenasalized /b/ is limited to the sub-dialects of the Kochi dialect (Doi 1982). In Hashio’s (2000) description of the Kochi-Otoyo dialect, /d/ and /g/ are realized as [ⁿd] and [ⁿg] in all positions. Previous studies agree, however, that prenasalization is not phonemic in this dialect, as it is in the Tohoku dialect. As prenasalization is rather limited among the world’s languages, it would be interesting to know exactly what kind of phonetic realizations are attested in this dialect. Earlier descriptions include a nasalized vowel, a mora nasal-like consonant, and a nasal stop that assimilates to the place of articulation of /b, d, g/.

In order to examine the distribution of prenasalization, phonetically balanced materials were composed, where position in word (initial vs. medial) and surrounding vowel environment were taken into consideration. These words were from different word categories, ie. native Japanese (wago), Sino-Japanese (Kango), western loan words, and onomatopoeia. All the words were recorded as word isolation forms.

### 3.3.1 Distribution of prenasalization

Generally speaking, the prenasalization was found to be much stronger and consistent for the Yusuhara speaker than the Kochi-City speaker, including such a textbook pronunciation as [miⁿdu]. As for the type of stops, it was shown that
/d/ was more readily prenasalized than other voiced stops unless it was a part of an affricate [dz] or [d̠z]. Besides the traditional description where /d/ and /g/ are prenasalized, some /b/ tokens were also prenasalized. In the case of /g/, it was often realized as a velar nasal while /b/ and /d/ were never realized as a pure nasal (for more detail see 3.3.2). As for the position in the word, prenasalization was found both word initially (or utterance initially) and medially without any
systematic differentiating factors. For the surrounding vowels, there appeared to be no systematic influence on the presence or absence of prenasalization neither. A more detailed study may, however, reveal quantitative differences due to vowel quality.

In considering linguistic factors, we note the relevance of word type and word class. Prenasalization was never found in a less common word or a word that is typical for written Japanese such as Sino-Japanese (Kango). However, prenasalization was found to occur more widely in various word types, not only native but also in a Sino-Japanese words, and in more recent western loan words, provided that they are familiar and used commonly in everyday life. In terms of the word class, prenasalization did not commonly occur before help verbs such as /-ga/ and /-da/. Whether their occurrence can be predicted on the ground of phonological or other linguistic factors, or is more or less in free variation, is an issue to be resolved in a future study. Since the present study aims primarily at covering the basic phonetic aspects of the Yusuhara dialect and the Kochi-City dialect, as extracted from a single speaker, no quantitative analysis of the prenasalization is presented. The observed data and analyses are to be regarded as a pilot investigation, following which more thorough examination with several speakers will be conducted.

3.3.2 Phonetic realization of prenasalization

When prenasalization is found word initially, the nasal phase tends to be longer than in word medial position. The duration of the nasal phase in word medial position was found to be about one third to one quarter of the mora nasal in the same position. An interesting observation could be made regarding voicing of the phonologically voiced stop for which prenasalization was observed. Figures 6 (a) shows the same words /gomi/ ‘garbage’, /doro/ ‘mud’, and /daita/ ‘(I) held it’ uttered by the Yusuhara speaker with prenasalization. Compare these utterances with the same words uttered by the Kochi-City speaker in figure 6 (b), who had no prenasalization for these words. It can be observed that the occlusion of the voiced stop /g/ and /d/ after the prenasalized phrase lacks voicing for the Yusuhara speaker.

3.3.2.1 Phonetic realization of prenasalized /b, d, g/

Exactly how /b, d, g/ are realized as prenasalized stops in word initial position can first be examined in figure 7, where the sound waves and spectrograms of words /gasu/ ‘gas’, /dassju/ ‘dash’, and /booi/ ‘boy’ are shown. The nasal phase
prior to the stop occlusion is clearly exhibited both in their sound waves and in the spectrograms. Further examples are shown in figures 8 (a-c) where the spectrograms of the onomatopoeia words /baNbaN/, /daNdaN/, /gaNgaN/ are shown. For the first two words, there is a nasal phase with low intensity prior to the stop occlusion which is weakly voiced. In /gaNgaN/, both word initial and word medial /g/s are realized as a nasal stop [ŋ].
The realization of prenasalization in word medial position is shown in figure 9 for the words /mado/ ‘window’ and /mizu/ ‘water’, for which a clear nasal phase is observable prior to the stop occlusion. From the formant movement to the following vowel, it would appear that the prenasalized phase in the word /maⁿdo/ has the quality of an alveolar nasal [n]. For the word /mizu/ [miⁿdu] ‘water’, the formant structure of the nasal phase is similar to that of the preceding [i] indicating that it is more or less a nasalized vowel. On the other hand, the prenasalized phases that appear before [d] in the words /doro/ ‘mud’ and /mado/ ‘window’ resemble the mora nasal in /baNbaN/. Thus, the exact
Fig. 9. Sound wave, F0 contour, and spectrogram of [maⁿdo] ‘window’ and [miⁿdu] ‘water’ by the Yusuhara speaker.

Fig. 10. Sound wave, spectrogram, and formant tracing of /hida/ [hiⁿda] ‘a fold’ versus /hiNda/ [hiNda] ‘it’s the dignity’ by the Yusuhara speaker.

The phonetic qualities of the prenasalized phases differ acoustically, but they are hard to distinguish aurally.

A question arises as to how such a pair as /hida/ ‘a fold’ versus /hiNda/ ‘it is the dignity’, or /nega/ ‘photo negative’ versus /neNga/ ‘a new year greeting’ are differentiated, if we expect the former to be realized as prenasalized voiced stops. Figure 10 shows the two words in question uttered by the Yusuhara speaker. It can be clearly observed that the major difference between the two
words is that of the duration of the nasal phase after the vowel [i], the latter being much longer. The exact formant structures of the two types of nasals are not identical but impressionistically, their quality is hard to distinguish.

Figure 11 shows the spectrograms of /nega/ ‘photo negative’ and /neNga/ ‘a new year greeting’. In the utterance /neNga/, two kinds of nasals are observable in succession - one is a mora nasal [N] and the other is a velar nasal [ŋ]. For the word /nega/, the /g/ is realized as [ŋ] without any noticeable [ŋ] occlusion. Further comparison of the /g/ in word initial and medial positions reveals that the prenasalized case (see figure 12 a) and a realization as a velar nasal (see figure 12 b) differ greatly in duration. In Standard Japanese, /g/ in word medial position is realized as [ŋ], while in the Kochi dialect, [ŋ] is said to occur even in word medial position except for a few western regions of Kochi prefecture (Yusuhara is not included though). Prenasalization and the realization of /g/ are said to reflect the state of Ancient Japanese and a more detailed study of a dialect where so much prenasalization is preserved will be of extreme interest from both a general phonetic and historical point of view.

4 Accent and intonation

The relationship between accent and intonation in the Yusuhara dialect and the Kochi-City dialect were first examined for the bi-moraic nouns. For the Kochi-City dialect, it is known that there exist four accent types for bi-moraic nouns. In the present study of the Yusuhara dialect, it was observed that the nouns
belonging to classes 2 to 5 in common accent classification of Japanese are all realized as HL(L) pattern, meaning that the total number of accent patterns in this dialect is only two, namely HH(H) and HL(L). In this section, the intonational patterns are examined for Yusuhara and Kochi-City dialects.

4.1 The HH pattern

Figures 13 (a, b) show the peak F0 values for the HH words read as a list consisting of one to five words in succession. The words were /momo/ ‘peach’, /ebi/ ‘shrimp’, /ame/ ‘candy’, /kani/ ‘crab’, and /sake/ ‘rice wine’. The most consistent intonation feature for both speakers is that they have the bottom pitch range for the end point which is unaffected by utterance length. For the
Fig. 13a. Maximum F0 value for the five words read as a list by the Yusuhara speaker, with an intervening particle /to/ ‘and’. P = particle.

Fig. 13b. Maximum F0 value for the five words read as a list by the Kochi-City speaker, with an intervening particle /to/ ‘and’. P = particle.

Yusuhara speaker, it is around 140 Hz and for the Kochi-City speaker it is around 115Hz. A notable difference between the two speakers is that for the Yusuhara speaker, the F0 value of the entire utterance is considerably higher for a long utterance while no such tendency exists for the Kochi-City speaker. The higher F0 range can be regarded as pre-planning by the speaker to adjust his pitch range in prediction of a longer utterance, so that the F0 value of the words with H tone will not decrease towards the end of the utterance. For the Yusuhara
Fig. 14a. The F0 value of the HL word in an utterance read as a list (up to 3 words) by the Yusuhara speaker (above) and the Kochi-City speaker (below), with intervening particle /to/ ‘and’.

speaker, there is a reset of F0 at the fourth word. Compare this utterance with that of the Kochi-City speaker. The Kochi-City speaker starts the utterance at the same pitch height as other utterances and has a F0 reset for the third word. The Kochi speaker had a manifestation which is local, ie. when he reaches the bottom of the F0 value for the H tone, he uses F0 reset. It cannot be concluded from the present material whether the difference observed for the two speakers regarding the preplanning is due to the dialectal difference or due to the speakers’ ideosyncracies.

4.2 The HL pattern

Figures 14 (a, b) show the peak and valley F0 values for the HL words /mame/ ‘beans’, /niku/ ‘meat’, /ami/ ‘net’, /kuri/ ‘chestnut’, and /nasi/ ‘nashi fruit’ read as a list of increasing length. The main difference between the Yusuhara speaker and Kochi-City speaker is that the HL pitch range is considerably compressed,
except for the last word in the list for the Yusuhara speaker. Furthermore, the HL relationship is not maintained for the first two words for this speaker. With regards to similarity, both speakers have a very stable F0 value for the L tone, that is around 130 Hz for the Yusuhara speaker and 100 Hz for the Kochi-speaker in utterance medial position.

Figure 15 shows the F0 values for the bi-moraic nouns which belong to class 4 (low initial, no kernel) and class 5 (low initial, with kernel). The words that belong to class 4, eg. /uri/ ‘melon’, /hune/ ‘boat’, /ito/ ‘thread’ have basically the same F0 pattern as the /mame/ ‘beans’ type. However, for the class 5 words such as /nabe/ ‘cooking pot’, /saru/ ‘monkey’, and /tururu/ ‘crane’, there is a slight tendency for the utterance to increase in pitch towards the end, although it is still the HL pattern (see figure 16).

### 4.3 The LH pattern

Since this pattern was not found for the Yusuhara speaker, only the F0 values
Fig. 15. Bi-moraic words of class four. The Yusuhara speaker. P=particle.

Fig. 16. Bi-moraic words of class five. The Yusuhara speaker. P=particle.
from the Kochi-City speaker are shown in figure 17. Even in this pattern, it can be seen that the pitch ranges for Ls and Hs are very stable; H is realized around 120 Hz while L is realized around 92 Hz. As expected, the H in the LH is lower than the H in the HL pattern.

4.4  F0 values of the Hs in the HH and HL patterns

One of the most interesting observations in the present investigation related to the F0 value of the H tone in the two accent patterns, namely HH and HL. In Standard Japanese, the F0 value of H in the HH (flat) accent type is known to be consistently lower than that in a HL word, which in turn has become one of the acoustic grounds to support the theory which regards the HH (flat) as ‘accentless’. In the present study, the Yusuhara speaker’s HH utterances had a higher F0 value than that of the HL pattern. Even for the Kochi-City speaker, the F0 value of the HH pattern is considerably higher than what we know from Standard Japanese (see figure 18). In accordance with more recent approaches, incorporating acoustic analyses into the theories of accent and intonation of Japanese, such as Pierrehumbert and Beckman (1988) and Kubozono (1993), it would be interesting to pursue a systematic study. Although a detailed
description of the accent system of the Kochi-City dialect already exists (cfr Nakai 2002), no acoustic analyses have been carried out for this dialect which is known to preserve many old features of the Japanese language.

4.5 Noun phrases

In this section, some noun phrases of varying accent types are examined for their F0 manifestation. Utterances are /ao'i i'e/ HHLHL ‘a blue house’, /anenoi'e/ HHHHL ‘my sister’s house’, and /anenoao'i i'e/ ‘my sister’s blue house’, and /aki'tano anenoi'e/ LHLLHHHHL (the house that belongs to my sister in Akita’). Figure 19 compares the two utterances /aneno aoi ie/ and /akitano aneno ie/. For the Yusuhara speaker, there is a F0 reset after /aneno/ and the consequent /aoi/ has a high F0 value, while for the Kochi-City speaker, the same pitch height continues all the way to /aoi/ with no notable declination. For both speakers, the H tone of /i'e/ HL has a lower F0 value than the preceding L tone.
of the word /ao'i/ HHL. Even in the utterance /aki'tano/, the Yusuhara speaker raises the pitch for /aneno/ HHH gradually and has the H of the /ie/ HL at a slightly lower level. In contrast, the Kochi-City speaker had the same F0 level until the H of /ie/ HL. Together with the data from the word list reading, where the Yusuhara speaker had considerably higher F0 values for longer utterances, it can be concluded that there is a clear difference between the Yusuhara speaker and the Kochi-City speaker. However, since we only had one speaker each for the present study, it cannot be concluded whether the observed difference is a dialectal or ideosyncratic one.
5. **Final remarks**

The most fruitful contribution of the present study may be the acoustic analyses of the prenasalization in the Yusuhara dialect, for which a strong textbook case of prenasalization was observed. For accent and intonation, the higher F0 value for the H tone than that for the HL is a notable characteristic. Since the present study was based on a single speaker from the two sub-dialects of the Kochi dialect, it would be appropriate to confirm and extend the main findings of the present study in future.

**REFERENCES**


APPENDIX

The formant values of the segment in Hz for the words with prenasalization. Yusuhara speaker, single token.

A) /baNbaN/ [ⁿbaNbaN] onomatopoeia

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### D) /gaikoku/ [ⁿɡaiకku] ‘foreign country’

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### E) /doro/ [ⁿdɔɔ] ‘mud’

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### F) /mado/ [maⁿdɔ] ‘window’

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### G) /mizu/ [miⁿdu] ‘water’

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