



Representing the moraic nasal in Japanese: evidence from Tōkyō, Ōsaka and Kagoshima

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Abstract

This article reconsiders the nature and representation of the moraic nasal <N> in Japanese dialects, which is largely assumed to be a consonantal mora (Ito 1987, Vance 2008, Labrune 2008) or a variable segment (Yoshida S. 1996, 2003; Yoshida Y. 1999). I examine phonological processes and phonetic descriptions of the Tōkyō, Ōsaka and Kagoshima varieties of Japanese and show that previous representations do not capture all of the facts. I propose that N is best represented variously as a nasal consonant, a syllabic nasal or a nasal vowel depending on the dialect. I frame this account within the theory of Strict CV (Lowenstamm 1996) and I present new representations for N, taking into account segmental and prosodic behaviour of this segment. The overarching contribution is an analysis where the tonal status of N in Japanese dialects is directly derived from the status of nuclear positions that N is associated to or adjacent to, without reference to feature sensitive rules.

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KEYWORDS:

Japanese; mora; syllable; Strict CV; tone; nasal segments

TO CITE THIS ARTICLE:

Youngberg, Connor. 2021. Representing the moraic nasal in Japanese: evidence from Tōkyō, Ōsaka and Kagoshima. *Glossa: a journal of general linguistics* 6(1): 63. 1–36. DOI: <https://doi.org/10.5334/gjgl.1099>

In this paper, I revisit the phonological representation of the Japanese moraic nasal N based on data from the Tōkyō, Ōsaka and Kagoshima varieties. Generally speaking, I reconsider the essential nature of N, and I revisit the supposition that it is a unitary segment which happens to have differing phonological behaviour in varieties of Japanese.

In the Japanese literature, N is referred to as the *hatsuon*. In the western literature, it was first described as an archiphoneme by Bloch (1950). Following the birth of autosegmental phonology (Goldsmith 1976), N has generally been considered an underspecified segment specified only for nasality and subject to assimilation (Ito 1987). It is viewed as the only other permitted coda besides the first half of a geminate. In terms of its prosodic character, it is generally agreed that N is a segment associated to a mora (McCawley 1968, Vance 1987, 2008, Kawahara 2015 and many others). The data brought to bear in this article shows that alternative views are viable. The aim here is to first show that dialect accent diversity can be accounted for through varied representations for N and second, to derive tone assignment patterns without reference to rules which utilise features such as [\pm sonorant].

In general terms, N is realised phonetically as a nasal glide or a homorganic nasal consonant according to Vance (1987, 2008). Preceding a pause or intervocalically, N is realised with uvular or dorso-uvular place and variable closure, giving [hoũ~hoN] for /hoN/ ‘book’. N is homorganic to a following consonant. This can be exemplified with the word /hoN/ [hoN] ‘book’, and its nominative form [hoŋga] ‘book-NOM’. Consider in (1) representative data exemplifying N in final, pre-consonantal and intervocalic position.

- (1) Data with N using preliminary transcription
- a. Word-finally

| | | | |
|-------|---|-------|----------|
| [raN] | ~ | [raũ] | ‘orchid’ |
| [giN] | ~ | [giũ] | ‘silver’ |
| [hoN] | ~ | [hoũ] | ‘book’ |
 - b. Preceding an alveolar stop

| | | | |
|-----------|--|------------------|----------|
| [kantaN] | | ‘simple’ | |
| [kaunta:] | | ‘counter (loan)’ | |
| [honto] | | ‘book-with’ | /hoN-to/ |
 - c. Preceding a velar stop

| | | | |
|----------|--|-------------|----------|
| [giŋko:] | | ‘bank’ | |
| [kiŋgjo] | | ‘gold fish’ | |
| [hoŋka] | | ‘book-INT’ | /hoN-ka/ |
 - d. Preceding a bilabial stop

| | | | |
|--------------|--|-------------|---------------|
| [tombo] | | ‘dragonfly’ | |
| [tempura] | | ‘tempura’ | |
| [hombak:ari] | | ‘book-only’ | /hoN-bak:ari/ |
 - e. Intervocalically (formal and informal realisations)

| | | | |
|---------|---|--------|--------------------|
| [taN.i] | ~ | [taũi] | ‘credits, units’ |
| [oN.iN] | ~ | [oũiũ] | ‘phonology’ |
| [hoN.o] | ~ | [hoũo] | ‘book-ACC’ /hoN-o/ |

In this article, I fundamentally re-examine the phonological patterning of N beyond these assimilation facts. I focus on its interaction with tone assignment and tone spreading as well as other segmental processes, such as nasalisation in Tōkyō Japanese and syllable weakening in Kagoshima Japanese. I ultimately propose that in the place of a nasal consonantal coda, the Tōkyō variety has a nasal vowel, Ōsaka has a syllabic nasal and Kagoshima has a nasal coda. The varied character of N is supported by an examination of dialect data and phonological processes.

1.1 Outline of the article

In §2, I discuss the realisation of N in Tōkyō Japanese (TJ) in further detail. Following this, §3 examines the phonological facts of TJ relevant to the paper, namely the syllable template of Japanese, nasalisation, assimilation of N, and tone assignment. §4 then presents the facts of Ōsaka Japanese (OJ), while §5 examines Kagoshima Japanese (KJ).

Turning then to the revision of N, §6 focuses on the previous phonological representations of N in various frameworks, focusing on the syllable & mora representation of Vance (1987, 2008) and the variable representation proposed by Yoshida S. (1996, 2003). §7 introduces the Strict CV framework (Lowenstamm 1996), where the mora is equivalent to a CV unit. Here, N is reframed for each dialect in turn. §8 then discusses the way that the proposed representations can derive tone-bearing units (TBUs) in a straightforward manner by referring to the status of the V position in the representation of N, building on work from Yoshida Y. (1999). The paper concludes in §9 by outlining future avenues of research.

1.2 A note on the annotation of N and other special, deficient or dependent moras

I follow the tradition that annotates the second position within a heavy syllable with <R> or <H> for the second half of a long vowel, <N> for the moraic nasal, <Q> for the first portion of a geminate and <J> or <i> for the offglide of a diphthong. These labels are used in many structuralist and generative works including, but not limited to, McCawley (1968), Vance (1987, 2008), Labrune (2012a, b); Tanaka (2013), Kubozono (2015a, b); and Kawahara (2015).¹

As a set, these are called special, dependent or deficient moras. This is derived from their lack of free occurrence and their inability to support a lexical pitch accent or high tone (c.f. 3.2). I adopt the label ‘deficient moras’ following Labrune (2012a, b). In Japanese native terminology, R, N and Q are called respectively the *chō'on*, the *hatsuon* and the *sokuon*, while the set is called *tokushu haku* or ‘special beats’. See Labrune (2012b) and Otake (2015) for further discussion of Japanese terminology. While J or ‘i’ is not always included in the set of deficient moras, I include it in this set as {ai, oi, ui} behave as true diphthongs where /i/ fails to support an accent or tone on the high front off-glide (cf. Kubozono 2015b).² From here forward, I use R, N, J for the moras in isolation and CVN, CVR, CVJ and CVQ to denote heavy syllables.

2 The phonetic realisation of N in further detail

I now turn to the realisation of N and the various phonological and phonetic views represented in the literature. Bloch (1950), Vance (1987, 2008), Akamatsu (1997) and Yoshida S. (1996, 2003), among others, have noted that the realisation of N depends on the surrounding segmental context. First, I discuss the views generally presented in phonological works. I then touch upon some phonetic studies to clarify the status of N in pre-vocalic, pre-consonantal and pre-pausal positions.

Word-finally, N is realised phonetically as a uvular nasal consonant in some accounts, as in [hoN] ‘book’ or as a nasal glide (e.g. Vance 1987, 2008; Labrune 2012b) giving [ũ̃]. By others, N# is viewed as a back nasal vocoid [ũ̃] (Nakano 1969, Yoshida S. 1996, 2003, Yoshida Y. 1999). When considering informal speech, it is sometimes claimed that N is a nasal copy of the preceding vowel, giving [hoō] for the word <hoN> ‘book’ (Nakano 1969, Yoshida S. 2003). Focusing on the word-final representation of N, Yoshida S. (2003) argues persuasively that N# is not a uvular consonant, claiming that any oral closure is irrelevant. He notes that pre-pausal vowel-final words in Japanese are typically followed by an unreleased glottal stop e.g. [te]~[teʔ] ‘hand’. He extends this to <N>, claiming it is a nasal vowel with optional glottal closure, [ũ̃ʔ].

Word-medially, N is a homorganic nasal consonant when preceding another consonant. This was shown in (1), as in words like /hoN-tana/ ‘book + shelf’, [hondana] ‘bookshelf’.³ The exact nature of intervocalic N is debated. N is not an obstruent with full closure from a phonetic point of view. Early descriptions from McCawley (1965: 94–95) state that N is an approximant or glide, but no full discussion is given. Vance (1987, 2008) claims that intervocalic N is realised as a nasal glide, giving [saũ̃i] for /saN-i/ or ‘third rank’.⁴ Nakano (1969) and Yoshida S. (2003)

1 Bloch (1950: 94, fn 14) explicitly discussed the mora and Japanese phonology, but he did not treat the mora and syllable as separate entities as in the works referenced here.

2 As a reviewer points out, there are some exceptions to these sequences being treated as diphthongs, as in [egoisuto] ‘egoiste (Fr.)’. While I suggest that this could reflect donor language stress or accent or it could be a stratum effect, a systematic study of diphthong exceptions is beyond the scope of this paper.

3 I do not discuss *rendaku* or ‘sequential voicing’ present in this form – see Ito & Mester (1986), Vance (2015).

4 Vance (2008) also marks the nasal glide and other moraic nasals with a length marker, but I exclude this for clarity.

observe that N can also be realised as a nasal vowel, giving /hoN-o/ [hoũo] ‘book-ACC’ in careful speech, or a nasal vowel copy of the preceding vowel in informal speech, as in /hoN-o/ [hoõo] ‘book-ACC’.

I argue that ‘more careful’ pronunciations of N should be treated separately from TJ as spoken in daily speech (e.g. that of my consultants). It is clear that a pronunciation such as [taũi] for /taNi/ ‘credit’ is typical of emphatic pronunciation (orthography enunciation, poetic speech or sung speech).⁵ My consultants reject such a pronunciation as unnatural.⁶ Importantly, words produced with ‘formal’ N do not exhibit the other properties under discussion here (tone spreading, nasalisation of the preceding vowel). For this reason, I focus on the informal pronunciation in the following discussion.

2.1 Phonetic studies on N

Phonetic studies have clarified the production of N in further detail. The majority focus on the issue of oral closure. Vance (1987: 34–35, 2008: 96ff) provides review of instrumental and acoustic studies which show that uvulo-dorsal closure in intervocalic and pre-pausal position is variable (Nakano 1969: 220, Ushijima & Hirose 1974, Aoki 1976: 204, Kawakami 1977, Uemura & Takada 1990). More recently, closure of the oral tract is discussed by Hashi (2000), Yamane & Gick (2010), Yamane (2013), Mizoguchi & Whalen (2014), Nogita & Yamane (2015), Hashi et al. (2016) and Kochetov (2018). Work from Hashi and colleagues (Hashi et al. 1998, 2016) in particular shows that uvular closure during production of final N is in fact often absent, with other possible realisations including a labial nasal or a nasalised vocoid. Based on the variability of N finally and medially, it is clear that final and intervocalic N cannot be defined as sounds produced with reliable closure of the oral tract in Tōkyō Japanese. Maekawa (2019) has also shown that based on MRI evidence, there is no clear place of articulation for N following /a/ and he has also claimed that tongue movement is connected to the preceding vocoid.

With regards to the pre-consonantal position, it is mostly clear that N assimilates at some point in production to the following consonant. Recent studies include an electro-palatography study from Kochetov (2018) and ultrasound investigations from Mizoguchi (2019) examining N assimilation in L1 and L2 speakers.

In addition to these studies, it is also clear that N nasalises a preceding vowel (Bloch 1950, Vance 1987, 2008, Kawahara 2015). The accusative form /hoN-o/ ‘book-ACC’ has the surface form [hõũo] or [hõõo]. It must note that not all sources transcribe or discuss this phenomenon. Nasalisation preceding N is often ignored in descriptive overviews of Japanese phonetics (e.g. Shirota 1993, Akamatsu 1997), and in some phonological works (Yoshida S. 1996, 2003; Yoshida Y. 1999). With regards to instrumental phonetic studies, vowel nasalisation is empirically verified for the sequence <eN> by Ushijima & Hirose (1974), who note anticipatory velum lowering in an electromyography study. Nasalisation is also noted in descriptive phonetic studies by Nakano (1969) and Campbell (1999). In particular, Nakano (1969) proposes that acoustic spectrograms of Japanese show a transition of oral vowel to nasalised vocoid to nasal vocoid in the production of <aN> which is comparable to the production of French nasal vowels. Unfortunately, clear data is not provided beyond a figure showing the average nasalance curve for the production of the sequence <aN> in Japanese and the nasal vowel [ã] in French. While a reviewer notes that nasalisation could be interpreted as a regular low level phonetic effect, we will see that nasalisation is not regular in other dialects like Ōsaka Japanese.⁷

In sum, N is generally characterised as a homorganic consonant, but is best framed as a glide or vowel which assimilates only pre-consonantly. N then triggers nasalisation in the preceding vowel in all contexts. What remains unclear is whether to accept the supposition that N is a consonant, or to consider the rarer argument that N could be a nasal vowel. To consider this

⁵ While these modes are of course linguistically relevant, they require a separate analysis. See Yoshida S. (2003) and Youngberg (2018) for previous representational proposals.

⁶ I thank MM and RY for discussion on this point.

⁷ Another reviewer questions whether uniform or controlled nasalisation regularity (or lack thereof) might exist in bilingual speakers of Tōkyō and Ōsaka Japanese, or if one dialect might have different representations depending on speech context (e.g. formality). I hypothesize that as multilingual speakers can control their lexicon and morphosyntactic choices, so too can phonetic and phonological repertoires be controlled at both the conscious and/or subconscious levels, but this remains a question for further investigation and I make no strong claims here.

issue, I look at phonological behaviour and patterning of N in further depth in the following sections. When we consider all phonological facts together, it is clear that N patterning as a consonantal segment is not a universal truth.

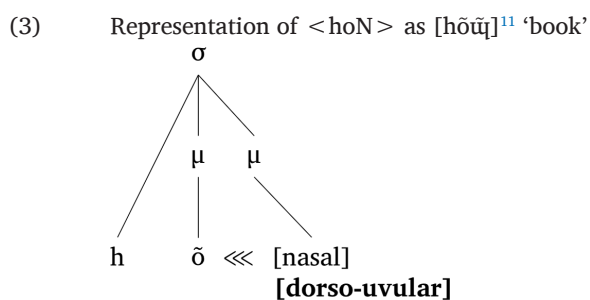
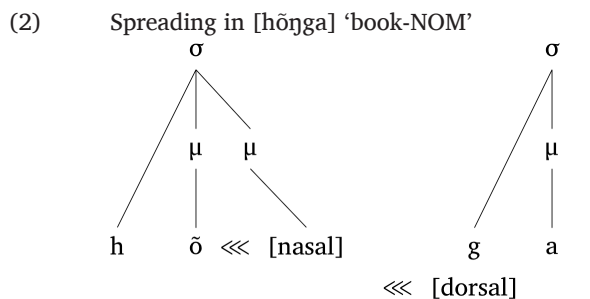
3 The phonological behaviour of N in Tōkyō Japanese

In this section, I discuss N focusing on Tōkyō Japanese (TJ)⁸ with relation to nasal assimilation and vowel nasalisation (3.1), tone assignment in light and heavy syllables (3.2), and tone spreading (3.3). The baseline assumption in the literature is that N is a consonant, with a few exceptions. When we consider the full set of phonological facts, it is clear that our view of N must be revisited. I base this upon the fact that N can support a high tone in certain circumstances and the additional patterning of CVN syllables in tone spreading, where N patterns with CVR and CVJ heavy syllables to the exclusion of CVQ.

3.1 Vowel nasalisation and nasal assimilation

Let us consider the analysis of nasalisation and assimilation. An example of vowel nasalisation has been demonstrated above; the orthographic word <ほん> or <hon> is realised as [hōũ] or [hōõ] ‘book’. The domain of nasalisation is defined as the syllable (Vance 2008, Kawahara 2016), and Vance (2008) proposes that the feature [nasal] spreads to the preceding vowel within a syllable.

In terms of assimilation, N assimilates to a following consonant and is realised as [n], [m], or [ŋ] preceding an alveolar, bilabial or velar consonant as in (1).⁹ As early as McCawley (1965: 95) and in autosegmental terms since Ito (1987, 1989), it has been assumed that N in Japanese is specified only for nasality.¹⁰ In the analysis of Vance (2008), manner and stricture features spread to N. A representation of nasalisation and assimilations for the nominative *hon-ga* is shown in (2), which draws on the analysis of Vance (2008). If no consonant follows, Vance (2008) claims that a default dorso-uvular place feature is added to the specification of N, giving a nasal glide [ũ] as in (3). A similar approach is taken by Labrune (2012a, b), though the representation of N is a mora with a C and V position, with the C specified only for [+nasal],



8 The literature often refers to Tōkyō Japanese or Standard Japanese interchangeably. I have confirmed the relevant facts with consultants from the central and western neighbourhoods of the Tōkyō metropolis (April–May 2019, Chiyoda, Shibuya, Kunitachi and others). I thank RY and MM in particular for discussion. Some facts may be different for speakers from informal downtown or *shitamachi* areas of Tōkyō, such as Asakusa, but I am unable to confirm this at the present moment. I thank Nobuko Kibe (p.c.) for raising this possibility.

9 See Yoshida S. (2003) and Vance (2008) for discussion of fricatives, affricates and liquids.

10 Discussing N and Q, McCawley (1965: 98) overtly describes an underspecified approach to segments. “A syllabic nasal or syllabic obstruent...can be represented in the dictionary simply as a nasal or non-nasal consonant respectively, with no further specification of point or manner of articulation.”

11 This representation relies on the discussion in Vance (2008) but as a reviewer points out, another possible phonetic realization can be found where this word is [hōn], which I argue below is a stylistic phonetic variant and not a phonological one.

Recall that N in final and medial position is a vowel for Nakano (1969), Yoshida Y. (1999) and Yoshida S. (2003). Here, /hoN/ ‘book’ is realised as [hoũ] ‘book’ in formal or careful pronunciation. Nakano and Yoshida S. further propose that in informal pronunciation, this word is realised as [hoō]. For Yoshida Y (1999) and Yoshida S. (2003), formal [ũ] is simply the realisation of a nasal feature with the quality of the epenthetic vowel [u]. This requires no use of a non-local place feature absent in the consonantal phonology. However, both Nakano (1969) and Yoshida S. (2003) point out that an informal and assimilated pronunciation is the one evidenced in general speech, and [ũ] is formal or hypercorrect with optional addition of glottal closure giving [N].¹² I revisit this analysis formally in §6.2. However, the authors purporting that N is a vowel in final and medial position do not note nasalisation in the preceding vowel. Yet if there is a nasalised vowel preceding N, and if it assimilates as suggested by Nakano and Yoshida S., could it instead be that a sequence VN is in fact a long nasal vowel? Let us turn to evidence from tone assignment and spreading which suggests this is indeed the case.

3.2 Pitch accent/tone assignment and syllable structure

I now consider the general patterns of accent or tone assignment in TJ and the deficiency of N as a tone-bearing unit (TBU). I begin by discussing the general facts of TJ tone in 3.2.1, followed by the discussion of deficient moras as poor TBUs in 3.2.2. I then focus on the paradoxical ability of N to carry marginal tone finally in 3.2.3 and in pre-accenting contexts in 3.2.4.

Here and throughout the rest of this article, I adopt the assumption that ‘pitch accent’ is better understood as autosegmental tone assignment, following Haraguchi (1977). This allows for linked and floating High (H) and Low (L) tones as well as for a straightforward account of tone spreading. In contrast to Haraguchi (1977) but following Yoshida Y. (1999), I presume that TJ does not encode L. L is not phonologically active or contrastively marked, so a low pitch here is understood to be the absence of tone specification. For alternative formulations of Japanese pitch accent, see Haraguchi (1977), Labrune (2012a, b) and Kawahara (2015), who use both a H and L. There is also the approach of Pierrehumbert & Beckman (1988), who approach Japanese tone and pitch accent utilising accentual and phrasal H tones and L boundary tones, focusing on intonation, with later work discussed by Igarashi (2015). Finally, there is also the work of Yoshida Y. (1999), who assumes that high tone is the manifestation of an accent with no use of low tone and no true H. I treat TJ henceforth as a privative H system, with floating and linked tones which may spread. See Hyman (2001) for discussion of privative and binary tone system in Bantu as well as Hyman (2009) for insightful criticism regarding the use of ‘pitch accent’, which I take on board.

3.2.1 Tone in TJ light syllables

In words with light syllables, one can identify clear generalisations regarding the typical tone patterns of TJ (Martin 1952, McCawley 1968, Haraguchi 1977, 1991; Poser 1984, Akinaga 1985, Yoshida Y. 1999, Kubozono 1999, Kawahara 2015). First, words are categorised into accented and unaccented categories. Accented nouns have a fixed lexical tone associated to a certain mora defined in the underlying representation. Unaccented words have no underlying high and receive a default high, which is mobile under suffixation. A final high tone is assigned by a default rule of high tone association (Haraguchi 1977), phrasal tone association (Pierrehumbert & Beckman 1988, Igarashi 2015) or final nucleus accent assignment (Yoshida Y. 1999). In the classical autosegmental analysis on which I will base my analysis (Haraguchi 1977, Yoshida 1999), tone spreads regressively until and excluding the initial mora, which I reserve for discussion until 3.4. I focus first on words of three moras or less. Consider examples in (4) drawn from Haraguchi (1999), exemplifying citation and Nominative case forms with unaccented /-ga/ ‘NOM’.

¹² A reviewer states that it makes sense that the more informal the speech, the larger the possibility that /N/ is only realised as nasalization. I place the realisation of N as [N] firmly within the Standard speech register. Informal and informal registers require different representations in my view, and I discuss the formal representation of formal N in Youngberg (2018). Other realisations like [hōm] do indeed occur as mentioned earlier, but I have only witnessed this in the formal register (e.g. the classroom) based on my elicitations and observations.

- (4) Pitch Accent Patterns for Tōkyō Japanese nouns (Haraguchi 1999: 6)
- a. Accented word patterns in citation form and with nominative suffix /-ga/
- | | <u>Noun</u> | <u>Noun + NOM</u> | <u>Gloss</u> | <u>UR</u> |
|------|-------------|-------------------|--------------|-----------|
| i. | [é] | [é ga] | ‘picture’ | /é/ |
| ii. | [há çi] | [há çi ga] | ‘chopstick’ | /háçi/ |
| iii. | [ha çi] | [ha çi ga] | ‘bridge’ | /haçi/ |
| iv. | [ká ra su] | [ká ra su ga] | ‘crow’ | /kárasu/ |
| v. | [ko kó ro] | [ko kó ro ga] | ‘heart’ | /kokóro/ |
| vi. | [o tó kó] | [o tó kó ga] | ‘man’ | /otokó/ |
- b. Unaccented words in citation form and with nominative suffix /-ga/
- | | <u>Noun</u> | <u>Noun + NOM</u> | <u>Gloss</u> | <u>UR</u> |
|------|-------------|-------------------|---------------|-----------|
| i. | [é] | [e gá] | ‘handle’ | /e/ |
| ii. | [ha çi] | [ha çi gá] | ‘edge’ | /haçi/ |
| iii. | [sa kú rá] | [sa kú rá gá] | ‘cherry tree’ | /sakura/ |

Accent in the accented words above is unpredictable and is a property of the word, but in unaccented words, surface high tone is always on the final mora.

There is an antepenultimate pattern commonly found in words of four or more moras (McCawley 1968, Poser 1984, Haraguchi 1991, Yoshida Y. 1999, Kubozono 1999, Kawahara 2015). This is exemplified in (5).

- (5) Antepenultimate accent
- | | | | |
|----|--------------|-----------------|----------|
| a. | [purógúramu] | ‘program’ | (loan) |
| b. | [razánia] | ‘lasagne’ | (loan) |
| c. | [hotótógisu] | ‘lesser cuckoo’ | (native) |
| d. | [murásaki] | ‘violet’ | (native) |

This pattern is applied regularly to loanwords and certain compounds (e.g. [namátámago] ‘raw egg’ from /nama + tamágo/) (Yoshida Y. 1999).¹³ Exceptions to this pattern do exist, as in the penultimate accented [inóçiçi] ‘boar’ and words with four moras being given an unaccented pattern as in /amerika/ [amériká] ‘America’ (Kawahara (2015: 457–459, Ito & Mester 2016). Focusing on the antepenultimate pattern, let us turn to deficient moras.

3.2.2 Deficient moras and tonal (mis)behaviour

Now let us consider the role of deficient moras, and I first focus on words where N cannot support a high tone. Deficient or special moras are defined as such because they cannot appear independently and they cannot support an underlying high tone.¹⁴ R, N, J and Q cannot support an underlying and lexically associated tone word-medially or finally, and so in TJ no accented word is found such as *[oŃna] ‘woman’, while such a form is admitted in Ōsaka Japanese.

The inability of these moras to serve as a full TBU is most clear when we look at loan words of four or more moras. Here, where the antepenultimate mora is one of the deficient moras, high tone is assigned to the pre-antepenultimate mora (McCawley 1968, Labrune 2012b, Kawahara 2015). See the loanword data in (6a–h), with each mora separated by a full stop.

- (6) Pre-antepenultimate accent in loanwords (adapted from Kawahara 2015)
- | | <u>Loan</u> | <u>Gloss</u> | <u>Antepenult syllable type</u> |
|----|-------------------|--------------|---------------------------------|
| a. | [pá.í.ná.p.pu.ru] | ‘pineapple’ | CVQ |
| b. | [tá.k.ku.ru] | ‘tackle’ | CVQ |
| c. | [gu.rá.m.pu.ri] | ‘Grand prix’ | CVN |
| d. | [ká.n.za.su] | ‘Kansas’ | CVN |
| e. | [su.nó.o.ke.ru] | ‘snorkel’ | CVR |
| f. | [pá.a.pu.ru] | ‘purple’ | CVR |

¹³ This form is used by younger speakers, where the input accent of the second term is not retained. Generational variation is noted in Yoshida Y. (1999), with the form [namatamágo] retaining the original accent of [tamágo] ‘egg’ and with both variants being found in dictionaries. Further discussion of compound accentuation is found in Kawahara (2015: 460–464) and references therein.

¹⁴ It is possible to formulate this statement as ‘deficient moras cannot be assigned a tone’, but this would be false in the view of unaccented words discussed in 3.2.3.

| | | | |
|----|-----------------|-----------|-----|
| g. | [ri.sá.i.ku.ru] | ‘recycle’ | CVJ |
| h. | [rá.i.fu.ru] | ‘rifle’ | CVJ |

Assignment on the pre-antepenultimate syllable has been formalised in a number of ways. McCawley (1968) proposed that accent (here, tone) is assigned to the syllable containing the antepenultimate mora. Kawahara (2015) further claims that this is because the initial mora in a heavy syllable is the head mora and a deficient mora is a non-head mora. Haraguchi (1977) proposed a rule-based account which either assigned a high tone to a diacritic marked vowel, or only referred to certain segment types in rules. More recently, Labrune (2012a, b) has provided a proposal where an OT-style constraint [NADM], or Non-Accentuation of Deficient Moras, prevents accentuation on a deficient mora, which is opposed to the ideal independent mora and TBU containing a consonant and a vowel.

In a similar vein, Yoshida Y. (1999) claims that N cannot be accented as it is a consonant followed by an empty nucleus word-medially, while a well-formed position is an Onset-Nucleus pair with two filled positions. Regardless of the exact formulation, it is clear that N and other special moras are not full TBUs. Now, however, I recall data in the literature where N is in fact a TBU.

3.2.3 Final N in unaccented words

While it is generally accepted that the deficient moras are never the bearer of a lexical tone, it is not true that the deficient moras R, N and J are never realised with a high tone. First, I turn to unaccented words. In unaccented words terminating in a special mora, N and other deficient moras exhibit a high tone contrary to expectation. Recall that typical unaccented words receive a final High tone in isolation. This applies to light syllable words as shown in (7) and also those that terminate in one of the deficient moras R, J or N as shown in (8).

- (7) Unaccented words (tone spreading unmarked)
- | | | | |
|----|----------|----------|---------------|
| a. | /sakura/ | [sakurá] | ‘cherry tree’ |
| b. | /kagami/ | [kagamí] | ‘mirror’ |
| c. | /kuruma/ | [kurumá] | ‘car’ |
- (8) Unaccented words with final ‘special’ mora
- | | | | |
|----|------------|------------|----------------|
| a. | /aidziN/ | [aidziN̩] | ‘lover’ |
| b. | /katsubo:/ | [katsuboó] | ‘longing’ |
| c. | /gaNtai/ | [gantaí] | ‘eyepatch’ |
| d. | /osui/ | [osuí] | ‘sewage’ |
| e. | /hatsukoi/ | [hatsukoí] | ‘first love’ |
| f. | /udoN/ | [udoN̩] | ‘udon noodles’ |

If we claim that deficient moras are not TBUs, then the data given in (8) are a problem. We must then claim that deficient moras are marginal or dispreferred TBUs for lexical accent, but that they are potential TBUs when no other option is available. Turning to another context, we find that indeed it is the case that R, N and J are potential TBUs.

3.2.4 High tone on final N and other deficient moras in pre-accenting contexts

Certain pre-accenting suffixes are noted to force a high tone onto deficient moras in TJ. McCawley (1965: 144) notes that suffixes such as /-çika/ ‘only’ force a final high onto a preceding unaccented word; see also Kizu & Tranter (2012: 272–279). Higurashi (1983: 35) further pointed out that /-çika/ ‘only’ does this also to words terminating in R, N or J; see also Labrune (2012a, b).¹⁵ I recall the relevant data from Higurashi (1983: 35) in (9), with tone spreading excluded for the moment.

- (9) Accentless words, citation form and suffix /-çika/ ‘only’ (Higurashi 1983: 35)
- | | | |
|----|-------------------|--------------------|
| a. | /mi ja ko/ | ‘capital’ |
| | [mi ja kó] | |
| | [mi ja kó ç̣i ka] | ‘only the capital’ |

¹⁵ A reviewer states that finding speakers who share Higurashi’s intuition regarding /-çika/ is very difficult. One consultant (MM) reliably produced pre-accenting effects on the suffixes discussed here while others did not. It is unclear to me at this point what role age and location of speakers play, or whether each suffix behaves differently for some speakers. I leave further consideration of this issue for the moment and rely on the published patterns, with any fieldwork for the current time period cancelled during the Covid-19 travel restrictions.

- b. /ko o e N/ ‘park’
 [ko o e Ń]
 [ko o e Ń ɕi ka] ‘only the park’
- c. /te k k’o o/ ‘iron bridge’
 [te k k’o ó]
 [te k k’o ó ɕi ka] ‘only the iron bridge’
- d. /ko o ba N/ ‘police box’
 [ko o ba Ń]
 [ko o ba Ń ɕi ka] ‘only the police box’
- e. /ɕi a i/ ‘match/game’
 [ɕi a í]
 [ɕi a í ɕi ka] ‘only the match/game’

Based on the marginal accentuation of R, N and J seen in the above data, Labrune (2012b) has proposed that these moras should be dispreferred tone bearing units, placing them low in a mora hierarchy. Going further than this, two analyses are possible. Pre-accentuation is either the spell-out of an unaccented word with a default H tone placement on the final mora of the noun, or it is association of a suffix floating tone to the mora directly preceding it. This occurs whether the final mora is independent or deficient.

If we attempt to retain the claim that the second mora within a syllable is never a TBU, it should not bear the main high tone. The particle /ɕika/ ‘only’ is inducing just such an effect, contrary to expectation. This behaviour is restricted to a few suffixes, with /-tatɕi/ ‘plural’ /-ra/ ‘plural, distributed’ being others, but the data must nevertheless be accommodated.¹⁶ The claim that the second mora within a syllable cannot bear a high tone or a pitch accent is not upheld. More importantly, N is included in a set with the vocalic moras R and J. Let us now turn to tone spreading, where the patterning of N triggers further questions regarding its true nature.

3.3 Tone spreading in Tōkyō Japanese

In addition to high tone assignment, TJ also exhibits regressive spreading. High tone spreads regressively up to and excluding the initial mora, as in the word /kagamí/ ‘mirror’, realised as [kagámí]. In informal TJ, it is clear that heavy syllables can disrupt this pattern and CVR, CVJ and CVN syllables attract tone to the initial mora (Haraguchi 1977). This has been noted by descriptive linguistics since at least Hattori (1951) and within generative quarters, has been treated by Haraguchi (1977), and Tanaka (2013).¹⁷ Consider the below data from Haraguchi (1977, marked with superscript a), Tanaka (2013, marked with superscript b), and from my informants (marked with superscript c). Data in (15a) exemplifies the case of initial light syllables, (15b–d) the case of CVR, CVN and CVJ syllables, and (15e) shows the case of initial CVQ syllable. Crucially, note that CVQ syllables do not trigger spreading to the initial mora.

- (15) TJ weight sensitive spreading
- a. Initial light
- i. [ko má gí ré] ‘(chopped into) small pieces’^a
 ii. [ko ná gó ná] ‘crushed to pieces’^a
- b. Initial heavy CVR syllables
- i. [kó ó bá Ń] ‘police station’^a
 ii. [só ó sé e ɕi] ‘sausage’^b
- c. Initial heavy CVJ syllables
- i. [sá í hó o so o] ‘rebroadcast’^b
 ii. [dá í há a do] ‘Die Hard (film)’^b

¹⁶ Other pre-accenting particles such as /ke/ ‘family of’ do not exhibit this behaviour. This can be seen in the alternation [kátó:] ‘Katō, family name’ and pre-accented [kató:ke] ‘The Katō family’ (Kawahara 2015: 455), though this case could be a case of antepenultimate accent. See the appendices in McCawley (1968) for a list of pre-accenting suffixes.

¹⁷ An additional pattern exists in prescriptive ‘standard’ materials, such as Akinaga (1985), where the initial mora is never affected by high tone spreading. Haraguchi (1977) claims that the pattern exemplified here is the more natural and common pattern and is the one exemplified in the speech of my TJ consultants.

- d. Initial heavy CVN syllables
 - i. [kó ń dá ń] ‘familiar talk’^a
 - ii. [há ń bá I ki] ‘vending machine’^b
- e. Initial heavy CVQ syllables
 - i. [ba t tá] ‘grasshopper’^c
 - ii. [pi t tá ri] ‘fit perfectly’^c

What is clear here is that CVN syllables pattern with CVR and CVJ syllables in initial position attract a high tone to the initial mora, while CVQ syllables do not exhibit this behaviour.

The behaviour of heavy syllables as tone attractors is also evidenced elsewhere such as the Owari dialect (see Ebata 2013, Youngberg 2017) and the Matsue dialect (Poppe 2015). Matsue Japanese exhibits a similar pattern to Tokyo Japanese. In Owari Japanese however, tone spreading ignores both the initial and pen-initial mora unless a CV: or CVN syllable intervenes. Here too, CVQ syllables do not trigger tone spreading to the initial mora. The pattern is exemplified in (16).¹⁸

- (16) Owari tone spreading, representative (drawn from Ebata 2013)
- a. [sakurá] ‘cherry tree’ (CV initial)
 - b. [tó:mó] ‘ricefield’ (CVR initial)
 - c. [réńkó] ‘lotus root’ (CVN initial)
 - d. [tep:ó] ‘pistol’ (CVQ initial)

I must make a brief aside to point out why I do not follow the ToBI analysis of these tone patterns, initiated by Pierrehumbert & Beckman (1988) and reviewed by Igarashi (2015). This framework does not use regressive tone spreading. Here, accented moras are marked with accentual H* and the pen-initial mora is marked with phrasal H-, with boundary %L associated to the initial mora unless it is a part of a heavy sonorant syllable (or here, CVR, CVJ or CVN). ‘Tone spreading’ is rather the interpolation of high pitch between the phrasal and accentual H. However, it is unclear how such an account could account for dialects of Japanese such as Owari, where the initial unaffected stretch of no high pitch is two moras, nor is it clear how to prevent the %L associating to the initial syllable in TJ. I believe that regressive High tone spreading with a protected window accounts more elegantly for the variation in weight-sensitive tone spreading systems, as in Tōkyō and Owari Japanese and others such as Matsue Japanese (Poppe 2015). I return to a full analysis later.

With regards to the above process, one first questions why CVN syllables pattern with CV: and not CVQ for tone spreading. Furthermore, why doesn’t a heavy CVQ syllable pattern with other heavy syllables? These are questions considered below in light of previously proposed representations.

3.4 N as a TBU and vocalic segment in Tōkyō Japanese?

In the above subsections, we have seen that N is not simply a coda consonant which fails to be a TBU. It is surely not a homorganic consonant in all contexts, and is a nasal vowel or glide pre-pausally and intervocalically. We have also seen that a CVN syllable contains a nasalised or nasal vowel. While it is true that N is not a lexical TBU, it can bear a tone word-finally in some contexts along with R and J (namely citation form unaccented words and pre-accentuation contexts). Finally, we have seen that at CVN syllables trigger high tone spreading along with CVR and CVJ syllables and not CVQ syllables. In all cases, CVN patterns with long vowels and diphthongs. If we take this behaviour seriously, it is possible that VN does not contain a nasalised vowel but rather is itself an underlying nasal vowel. I take this proposal forward from here. The essential facts thus far are summarised in [Table 1](#).

| Dialect | Nasalisation | Lexical TBU | Surface TBU | Suggested representation |
|---------|--------------|-------------|--------------|--------------------------|
| Tōkyō | Yes | No | Yes, finally | Nasal vowel |

Table 1 Interim summary of N.

Upon consideration of further dialect data, it is clear that N should have varying representations beyond what is appropriate for TJ.

¹⁸ Due to coalescence which affects /Vi/ sequences, no true diphthongs are found in this dialect. Instead, there are the long vowels {æ:, y:, ø:}.

We now consider the Ōsaka variety of Kansai Japanese. I draw on Kōri (1997) and Haraguchi (1999), and data has been confirmed with native speakers.¹⁹ First, N here is a full TBU rather than marginal as in TJ. Second, N does not have the same phonetic character with regards to obstruency and nasalisation (Tronnier 1996, 1999). I propose that N is an independent and syllabic segment in this dialect of Japanese.

4.1 Tone in Ōsaka

Let us first examine the facts regarding tone assignment. Ōsaka Japanese (OJ) exhibits two general tone patterns or tone melodies (Haraguchi 1999) in addition to the accented and unaccented division seen in TJ. OJ exhibits a similar tone system to the Kyōto and Kōbe variants of Kansai Japanese.²⁰ Haraguchi (1999) proposes that OJ has two possible tone melodies, HL and LHL. Descriptively, words come with one of two sparse tonal specifications: words with only a High tone specification, and words with an initial Low and a High specification. I discard the second L in Haraguchi's (2001) tonal melodies as it is best understood as a default fill-in L, which only ever follows the High-toned mora and which is not present lexically. I then divide the accent possibilities in OJ to four possible classes:

- i. accented words with only lexical H
- ii. accented words with a lexical H preceded by L
- iii. unaccented words with a default final H
- iv. unaccented words with default final H preceded by L.

In accented category (i) words, H is associated to the lexically accented nucleus, with H spreading regressively to the initial vowel within a word. The L is filled in following the site of an accent, as in /otóko/ [ótóko] 'man'. Turning to category (ii) words, these accented words exhibits a H assigned to a certain mora with the L tone assigned to the preceding vowel, as in /kàbúto/ [kàbúto] 'helmet'. This L may also spread regressively to the initial mora.²¹ In both cases, the final surface L is not marked in transcriptions as it is not a lexical tone, but the default realization of a toneless mora.

Unaccented words in categories (iii) and (iv) in OJ behave differently to those of TJ. I have proposed that in TJ, a default H tone is assigned to the final mora in a word. Such an analysis is not feasible in this dialect, as unaccented words are found with both H only and LH possibilities. I analyse these words as having floating tones with either H or LH present in the underlying morpheme. These tones are analysed as floating as they are a property of the morpheme, but mobile under suffixation. In HL melody words such as /sakura H/ 'cherry tree', they are realised in citation form with final H as in [sákúrá] 'cherry tree' and also in the nominative as in [sákúrágá] 'cherry tree-NOM'. For LH unaccented words like /suzume LH/, the L and H tones are assigned regressively from the final mora beginning with H, giving [sùzùmé] 'swallow' and [sùzùmégá] 'swallow-NOM'.

These patterns are exemplified in (17). Like TJ, tones spread regressively where possible. Unlike TJ, there is no initial protected monomoraic domain. Once again, I assume the surface Low tone realization following the site of lexical H is a default fill-in and thus I do not mark it.

- (17) Sample of accented patterns from Haraguchi (1999: 16–17)
- a. Three mora nouns, H tone pattern
 - i. /ínotçi/ [ínotçi] 'life' (Accented)
 - ii. /otóko/ [ótóko] 'man' (Accented)
 - iii. (no accented words with final high)
 - iv. /sakura – H/ [sákúrá] 'cherry tree' (Unaccented HL)

¹⁹ I thank MU, KM, MT and NT for discussion of the data and their co-operation.

²⁰ The lexicon and morphology of the Kansai varieties are not identical, with some areas of the grammar varying, e.g. honorification, tense/aspect morphology.

²¹ An alternative view recommended by a reviewer is that for LH words in categories (ii) and (iv), L is a tone placed on the initial mora which spreads progressively. L spreading is then prioritized over regressive H spreading. I believe that either approach is logically correct but this argument is not crucial to the point made here, focusing on potential sites for H.

- b. Three mora nouns, LH tone pattern
- i. (no accented words with initial high)
 - ii. /kàbúto/ [kàbúto] ‘helmet’ (Accented)
 - iii. /màttǽí/ [màttǽí] ‘match’ (Accented)
 - iv. /suzume – LH/ [sùzùmé] ‘swallow’ (Unaccented LHL)

Alternative analyses are found in Yoshida & Zamma (2001), where words have either a High tone which spreads or which does not spread and Labrune (2006), who applies a high register and a low register analysis.

The major difference I would like to focus on here is that in OJ, the H of the tonal melody can be placed on N, as well as R and J. This is a constant truth regardless of whether the underlying form is accented, unaccented or specified with a H or LH tone. Consider the data given in (13) from Haraguchi (2001). This data exemplifies high tone on N in (18a), R in (18b) and minimal pairs in (18c). In the (19), I give data from Kōri (1997) which exemplifies further contexts.

(18) Accented words exemplifying High on R or N within a syllable (Haraguchi 2001: 18)

- a. Medial H on N
 - i. [béŃtoo] ‘lunch box’ H, Acc
 - ii. [óŃna] ‘woman’ H, Acc
 - iii. [seŃdatǽi] ‘pioneer’ LH, Acc
 - iv. [saŃǽi] ‘three o’clock’ LH, Acc
- b. Medial H on R
 - i. [èéǽi] ‘the rich’ LH, Acc
 - ii. [ròóǽi] ‘alley’ LH, Acc
 - iii. [k’úúǽiba] ‘old drama’ HL, Acc
- c. Minimal pairs for High on R and N
 - i. [kóoko] ‘archaeology’ H, Acc
 - ii. [kòoko] ‘pickles’ LH, Acc
 - iii. [séŃdo] ‘degree of freshness’ H, Acc
 - iv. [sèŃdo] ‘last time’ LH, Acc

(19) Exemplification of surface forms with High on N, R, J (drawn from Kōri 1997)

- a. Final N High, H, Unacc.
 - i. [tákímóŃ] ‘firewood’
 - ii. [ákáŃ] ‘bad’
- b. Final N High, LH, Unacc.
 - i. [òtèràhàŃ] ‘temple’
 - ii. [tǽù:ɲèŃ] ‘summer gifts’
- c. Medial N High, H, Acc.
 - i. [héŃzi] ‘reply’
 - ii. [béŃtoo] ‘lunchbox’
- d. Medial N High, LH, Acc.
 - i. [kòŃko] ‘pickled daikon radish’²²
 - ii. [hàŃzoo] ‘prosperity’
- e. Final R or J High, LH, Unacc.
 - i. [tèé] ‘hand’
 - ii. [tǽòó] ‘intestines’
 - iii. [nàí] ‘to be absent’
 - iv. [sèŃzàí] ‘garden’
- f. Medial R or J High, LH, Acc.
 - i. [ùŃdòókai] ‘athletics meeting’
 - ii. [dòótai] ‘body’
 - iii. [tàígai] ‘maybe’
 - iv. [wàíra] ‘1.PL pronoun.’

²² The alternative form [koóko] is also listed by Kōri (1997).

Based on the data above, it is clear that N can bear a High tone with both attested tone patterns in medial and final position. It is also clear, based on a close examination of the data, that both R and J serve as TBUs for the principal H tone in this dialect. This lies in contrast to the facts of TJ, where deficient moras only serve as TBUs in limited contexts.

Let us now consider the case of longer words, namely either words of four or more moras and noun-noun compounds of more than four moras. Here too, R, N and J may support the principal high tone of the HL or LHL tonal melody to the antepenultimate mora. Some examples are given in (20). The exact assignment process of tone melodies in morphologically complex forms is discussed elsewhere by Haraguchi (1999).

- (20) Long words with antepenultimate high (drawn from Kōri 1997)
- | | | | |
|----|--------------|-----------------|----|
| a. | [mízũjúruma] | ‘water wheel’ | H |
| b. | [nànàzĩbaN] | ‘undershirt | LH |
| c. | [góháŃdoki] | ‘mealtime’ | H |
| d. | [mòmèŃito] | ‘cotton thread’ | LH |
| e. | [zũúbako] | ‘box’ | LH |
| f. | [tàĩgai] | ‘maybe’ | LH |

The crucial point here is that in both short words and longer words OJ, N is a *potential* and *independent* TBU, not that N is *always* a TBU.

Reviewers have suggested that unexpected exceptions to the above pattern exist, but I suppose these are connected to strata and category effects, with a possible shift to a TJ-type pattern of deficient mora avoidance. Examining adjectives, one reviewer has pointed out that while adjectives in Kansai Japanese typically display antepenultimate accent, this is not the case in the adjective [çiŃdói] ‘tired-NP’, *[çiŃdoi]. Another reviewer points out that loanwords exhibit avoidance of accent on special moras. However, it is the case that accent is permitted on N in nouns as we have seen above. Further consideration of gaps is worthy of investigation, but must be placed within a focused study on the OJ dialect itself.

In OJ, there is no universal word-medial avoidance of accent on N and it bears a tone in multiple environments in native words, suggesting that it is a fuller TBU than in TJ. To consider an appropriate representation in further detail, let us examine its phonetic realisation.

4.2 The phonetic realisation of N in OJ

Phonetic investigations of N in OJ are fewer in number, however Tronnier (1996, 1998, 1999) presents a number of studies looking at its realisation and assimilation. These studies shed light on N with regards to obstruency and nasalisation. A first study (Tronnier 1996) focused on the question of whether or not N was realised as an obstruent intervocalically, while a later study (Tronnier 1999) examined the nature of nasalisation and vowel formants preceding both the non-moraic nasal and the moraic nasal N.

The first investigation (Tronnier 1996) was driven by the author’s observations that in OJ, N was realised as an obstruent in intervocalic position, for examples as in <taN’i>, [taNi] ‘credit’. For his investigation, Tronnier recorded speakers using an oral microphone and a piezoelectric (accelerometer) microphone placed on the nasal cartilage. Eight Ōsaka natives were asked to read carrier sentences containing target tokens with intervocalic N, such as <daNatsu> ‘oppression’. In the results section, Tronnier (1996: 172–173) states that some speakers indeed produced N with a consonantal realisation. One speaker (Tooru) produced N with a consonantal realisation and not a vocalic realisation 33% of the time. However, some speakers never (n = 2) or rarely (n = 2, with N as consonant <10%) produced a consonantal realisation and three of these were younger speakers. All speakers did show a tendency to exhibit the vocalic realisation of N according to Tronnier, but crucially consonantal realisations of N are *possible* in this dialect of Japanese in intervocalic context. While the study is limited and consists only of a few tokens in elicited read speech from 8 speakers, it is essential to point out this difference from informal TJ where N is a glide or vowel.

In a later report, Tronnier (1999) focuses on the effect of nasals on preceding vowels, namely nasalisation and formant changes. Focusing on the nasalisation portion of the study, Tronnier examined the onset of nasalisation in the vowels preceding nasal onsets and the moraic

nasal in OJ. In question is whether the velum is lowered earlier preceding the moraic nasal (indicating nasalisation) than for the onset nasal, as evidenced in Ushijima & Hirose (1974) for TJ. This investigation consisted of oral microphone and nasal accelerometer recordings with six participants. The stimuli consisted of read speech, with target tokens containing both onset and intervocalic moraic nasals preceded by each of the five vowels of OJ, namely {a, i, u, e, o}, comparing words like <tani> ‘valley’ with words like <daNatsu> ‘oppression’. While the results showed inter-speaker variation in the exact patterns of nasalisation, no categorical distinction was evidenced for nasalisation patterns between the onset nasal and the moraic nasal, though speakers implement individual nasalisation initiation timings which treat each category in a similar manner. Tronnier (1999: 394) points out that nasalisation cannot serve as a predictor for the following nasal category and its phonological status. For our purposes, we can point out that nasalisation is not contrastive preceding the onset or moraic nasal. This lies in contrast to TJ once again, where nasalisation occurs prior to the moraic nasal N, e.g. [hōN] ‘book’ and is absent prior to a nasal onset, e.g. [tani] ‘valley’.

4.3 Concluding in Ōsaka

In conclusion, OJ exhibits different phonological characteristics for N as it is a full TBU and can bear a lexical high. N in OJ exhibits a different phonetic character where it is realised potentially as a consonant and does not reliably nasalise the preceding vowel. For this reason, I propose that OJ has a syllabic and independent nasal segment. The facts are summarised in [Table 2](#).

| Dialect | Nasalisation | Lexical TBU | Surface TBU | Suggested representation |
|---------|--------------|-------------|--------------|--------------------------|
| Tōkyō | Yes | No | Yes, finally | Nasal vowel |
| Ōsaka | No, variable | Yes | Yes | Syllabic nasal segment |

Table 2 Summary of N in TJ and OJ.

5 N in Kagoshima Japanese (KJ)

I now turn to the Kagoshima variety of Japanese (KJ), focusing on the dialect as spoken in Kagoshima city. I largely draw on description and data given in Kibe (1997a, b) and Uemura, Nobayashi & Hidaka (1997) for my discussion of syllable weakening²³ and tonal processes as well as more focused studies, discussed shortly. Data and facts were confirmed with speakers in Kagoshima City (April 17–20, 2019).²⁴ The tone and weakening patterns of this dialect suggest that it is not a vocalic or syllabic segment. No nasalisation studies have been published previously and Kibe (1997b) mentions no nasalisation in this dialect. N does not obviously trigger strong nasalisation, based on elicitations from 3 speakers in Kagoshima city in April 2019 and a cursory examination of spectrograms.

First, I show below that in the tone system of KJ, N never serves as the sole TBU for a High tone. Second, it is feasible that N here is a true coda consonant as it is accompanied by other medial and final coda consonants and is the product of syllable weakening, which degrades onsets.

5.1 Tone in Kagoshima Japanese

Tone assignment in Kagoshima Japanese allows for only two possibilities (Kibe 1997b, 2010): high tone placed on the penultimate syllable or the ultimate syllable.²⁵ The tone system of Kagoshima is discussed at length by Kibe (1997b, 2000, 2010), Kibe & Hashimoto (2003), Kubozono (2004, 2007, 2015b) and Ito & Mester (2019) among others. According to the notations given in Kibe (1997b), a high tone is realised over the entire syllable, whether heavy or light.²⁶ The patterns are exemplified in (10).

²³ I use this as the translation of *nishhōka* or ‘checking’, the term used in Kibe (1997b). I thank Prof. Yuji Kuwamoto for this suggestion.

²⁴ I thank MM, TS, SY, AR and KB for their patience and assistance during my time in Kagoshima.

²⁵ As with the other dialects discussed here, I analyse this dialect as having tone rather than pitch accent. I again focus on the assignment of the High, though a following Low can be assumed in Pattern A as contour tones in monosyllabic words are given in the work of Kibe (1997b, 2010); see also Kubozono (2012) and Ito & Mester (2019).

²⁶ In monosyllabic words, type A words exhibit a contour high-low pitch contour within the syllable, while type B words exhibit a level high pitch contour (Kibe 1997b; Ito & Mester 2019: 10, Kubozono 2012: 1399). These contours are only present in monosyllabic words and may imply that we are dealing with a HL and H tonal melody system, with tones assigned right to left. Whether or not this is a two-tone system is unclear, but I focus on the TBU bearing H regardless of the overall analysis.

- (10) Kagoshima Japanese accent in nouns (Kibe 2010: 28)
- | | | | |
|----|----------|---------------|-----------------------------|
| a. | [hána] | ‘nose’ | Pattern A, Penultimate high |
| b. | [haná] | ‘flower’ | Pattern B, Ultimate high |
| c. | [sakúra] | ‘cherry tree’ | Pattern A, Penultimate high |
| d. | [kokoró] | ‘soul, heart’ | Pattern B, Ultimate high |

Now let us consider the role of N as a TBU. According to Kibe (1997b), accent can never fall on the moras N, Q, R, or the second half of a diphthong. The author states explicitly:

The *hatsuon* [N], *sokuon* [Q] and *chō'on* [R] are one *bunsetsu* [segment] in length, however they are not independent and they cannot bear an accent. Furthermore, <i> in a vowel sequence is also not an independent mora. (Kibe 1997b: 10, translation mine).

For all words containing heavy syllables, only the syllable is counted in the assignment of penultimate or ultimate accent. This dialect is generally defined as a syllable-counting syllable dialect by McCawley (1978) and others, such as Kubozono (2012: 1403). Consider the data in (11) exemplifying words containing heavy syllables drawn from Kubozono (2012) and (2015b). These exemplify the fact that first, only the penultimate or ultimate *syllable* is referred to in accent assignment and second, that deficient moras do not bear the sole high tone in a word. Concretely, high tone is realised with a falling contour over the entire syllable in polysyllabic words, rather than an even high tone.

- (11) KJ words with CVJ syllable (Kubozono 2015b: 217–218)
- | | | | |
|------|-----------------------------|--------------------------|--|
| a. | Penultimate H, ultimate CVJ | | |
| i. | [akágai] | ‘arch shell’ | |
| ii. | [kazegúsui] | ‘cold medicine’ | |
| iii. | [kémui] | ‘smoky’ | |
| b. | Ultimate H, ultimate CVJ | | |
| i. | [nimaigái] | ‘bivalve, lamellibranch’ | |
| ii. | [magóí] | ‘black carp’ | |
| iii. | [hantái] | ‘opposition, objection’ | |
- (12) KJ words with CVN syllable (drawn from Uemura, Nobayashi & Hidaka 1997)
- | | | | |
|-----|--------------------------------|-----------------------------|--|
| a. | Ultimate H, Penultimate CVN | | |
| i. | [komeŋkó] | ‘rice flour’ | |
| ii. | [gomennáj] | ‘apologies’ | |
| b. | Ultimate H, Ultimate CVN | | |
| i. | [sakwáŋ] | ‘plasterer’ | |
| ii. | [dzaisáŋ] | ‘property’ | |
| c. | Penultimate H, Penultimate CVN | | |
| i. | [géŋmai] | ‘brown rice’ | |
| ii. | [dzuk:éŋsa?] | ‘treetop’ | |
| d. | Penultimate H, Ultimate CVN | | |
| i. | [kódoN] | ‘child’ | |
| ii. | [kedámoN] | ‘wild animal’ ²⁷ | |

In the data, H is only assigned with reference to the syllable. N never behaves independently as a TBU. The existence or absence of a deficient mora is not relevant, and a deficient mora is never the sole bearer of a high tone (Kibe 1997b; Kubozono 2012, Ito & Mester 2019).

N as a non-TBU lies in contrast to its status in TJ and OJ. In KJ, N only bears a semblance of a high pitch if the preceding vowel carries H. A syllabic or vocalic representation of N would not be appropriate as this would allow partial or full TBU status. KJ could instead have a true nasal coda consonant. To support this possibility, let us turn to evidence from syllable weakening.

5.2 KJ syllable weakening and coda consonants

KJ has a process of syllable weakening or *nissōka* (Kibe 1997b), where final high vowel apocope feeds consonant lenition. As a result, KJ exhibits a syllable template where N is one of

²⁷ According to Kubozono (2012: 1403), this also appears as [kedamono] for some speakers.

a fuller set of WM and WF consonants. Crucially, the moraic nasal is the output of nasal onset lenition in word-final and word-medial contexts.

In native words in this variety of Japanese, word-final high vowels undergo apocope and the preceding consonant lenites. Stops and affricates are reduced as glottal stops, fricatives lose their voicing, nasals reduce to N and the liquid [r] is reduced to the glide [j], as discussed by Kibe (1997b) and Kaneko & Kawahara (2002). I transcribe the final lenited obstruent as a glottal stop, following Kaneko & Kawahara (2002), though Kibe (1997b) notes stylistic variation between [ʔ] in typical speech and [ʔ̚]. Concretely, speakers I have consulted exhibit an unreleased glottal stop [ʔ̚] but I use the glottal stop for simplicity. This leads to cognates such as TJ [kaki] ‘persimmon’ and KJ [kaʔ] as well as TJ [kami] ‘paper’ and KJ [kaN]. Examples of the lenition patterns are given in (13).

(13) Final apocope and lenition KJ (Kaneko & Kawahara 2002)

- a. Stop, Affricates: {b, ts, tɕ, dʒ, dz, k, g} → [ʔ]
- | | <u>Tōkyō</u> | <u>Kagoshima</u> | <u>Gloss</u> |
|------|--------------|------------------|--------------|
| i. | [tobu] | [toʔ] | ‘fly-NP’ |
| ii. | [kutsu] | [kuʔ] | ‘shoes’ |
| iii. | [kutɕi] | [kuʔ] | ‘mouth’ |
| iv. | [midzu] | [miʔ] | ‘water’ |
| v. | [aɕi] | [aʔ] | ‘taste’ |
| vi. | [kaki] | [kaʔ] | ‘persimmon’ |
| vii. | [ojogu] | [ojoʔ] | ‘swim-NP’ |
- b. Fricatives: {s, z, ʃ, ʒ} → [ʃ, s]
- | | | | |
|------|---------|--------|----------|
| i. | [kwaʃi] | [kwaʃ] | ‘snack’ |
| ii. | [kaʒi] | [kwaʃ] | ‘fire’ |
| iii. | [usu] | [us] | ‘thin’ |
| iv. | [kazu] | [kas] | ‘number’ |
- c. Nasal: n, (ɲ,) m → [N]
- | | | | |
|------|--------|-------|----------|
| i. | [tɕɲi] | [taN] | ‘valley’ |
| ii. | [inu] | [iN] | ‘dog’ |
| iii. | [kami] | [kaN] | ‘spirit’ |
- d. Rhotic: r → [j]
- | | | | |
|-----|--------|-------|-------------|
| i. | [mari] | [maj] | ‘ball’ |
| ii. | [çiru] | [çij] | ‘afternoon’ |

The analysis of N is impacted by the surfacing of word-final and medial consonantal codas in this dialect. Possible WF codas are {ʔ, N, s, ʃ, j}.²⁸ While for nouns it is likely that this process is diachronic, it is active in verbal conjugations (Kibe 1997b, field notes). Consonant-final verb stems in the non-past such as /kak/ ‘write’ are realised with a lenited stem-final consonant, giving [kaʔ] ‘write-NP’.²⁹ Addition of the Negative suffix /-aN/ allows the underlying stem-final consonant to surface, giving [kakaN] ‘write-NEG’. This also occurs with m-final stems, as in /tanom/ ‘ask, request’, [tanoN] ‘ask-NP’, /tanom-aN/ [tanomaN] ‘ask-NEG’.

Word-medially, possible codas are Q, N, and ʔ (Kibe 1997). Examples are given in (14). (20a) provides examples of medial ʔ, while (20b) simply exemplifies that as with TJ, N and Q are found word medially in KJ. (20c) exemplifies medial nasal geminates and voiced geminates,

²⁸ Based on the transcription given in Kibe (1997b), this sound is [i]. Kaneko & Kawahara (2002) transcribe this sound as [j]. I retain the transcriptions from each source but remain agnostic regarding the status of J.

²⁹ It is worth noting that for verb stems which are consonant final and which terminate in [r], [r] in the non-past form is realised as [ʔ], e.g. /or/ [óʔ] ‘weave-NP’, /or-aN/ [óraN] ‘weave-NEG’ (cf. Kibe 1997: 94). Based on my elicitation sessions, this reduction too is synchronic, as in /ur/ [uʔ] ‘sell-NP’, /ur-aN/ [uraN] ‘sell-NEG’. Kibe (1997b: 10) explicitly states that the CV pair /ru/ undergoes weakening like other consonants, but also says ‘... ru may also change to i’ (translation mine). She also provides examples where Standard ru and ri are realised in Kagoshima as i, as in TJ [haru] ‘spring’ and KJ [hai]. In Kibe (2001: 43), the distribution of /r/ as [ʔ] is further restricted only to verbs, but Kibe points out that a realization here of /r/ as [i] is also possible, giving <aru> ‘to be’ as [ai~aʔ]. This issue is also discussed briefly in Haraguchi (1984) and Trigo-Ferre (1988).

with [N] and [ʔ] undergoing assimilation, noted by Kibe (1997b: 10). KJ thus has NC clusters, glottal-consonant clusters, voiceless geminates and voiced geminates.³⁰

- (14) Word-medial consonants
- a. Medial ʔ (Kaneko & Kawahara 2002)

| | <u>Tōkyō</u> | <u>Kagoshima</u> | <u>Gloss</u> |
|------|--------------|------------------|---------------|
| i. | [kitsune] | [kiʔne] | ‘fox’ |
| ii. | [sukunai] | [suʔnaka] | ‘little, few’ |
| iii. | [matsunoki] | [maʔnoʔ] | ‘pine tree’ |
 - b. Medial N & Q, as in TJ (Kaneko & Kawahara 2002)

| | | | |
|-----|----------|----------|---------|
| i. | [ʃinzo] | [ʃinzo] | ‘heart’ |
| ii. | [att̚çi] | [att̚çi] | ‘there’ |
 - c. Medial nasal and voiced geminates (Field notes, see also Kibe 1997)

| | | | |
|-----|------------|-------------|---------------------------------|
| i. | [kaminari] | [kannaisa:] | ‘thunder’ * <i>kaminarisama</i> |
| ii. | [butsudan] | [bud:an] | ‘home shrine’ |

I claim that in KJ N is a true consonant. First, we have no evidence to show that N is a vowel or a syllabic consonant, unlike the other dialects of Japanese we have seen. N is never the site of H tone assignment. Second, there is no clear nasalisation in the preceding vowel that can be discerned observationally. Third, it is clear that N can be derived as in verb stems. There is no argument to be made that final N is a vowel if it is derived from a consonant, and there are no arguments to be made that internal N is a vowel either.

5.3 Interim summary and the goals for a revised account

Having now considered the facts of N in three different dialects of Japanese, I return to the broader comparison of N. I summarise the facts given thus far in [Table 3](#).

| Dialect | Nasalisation | Lexical TBU | Surface TBU | Suggested representation |
|-----------|--------------|-------------|--------------|--------------------------|
| Tōkyō | Yes | No | Yes, finally | Nasal vowel |
| Ōsaka | No, variable | Yes | Yes | Syllabic nasal |
| Kagoshima | No (?) | No | No | Coda consonant |

Table 3 Summary of N in the three varieties.

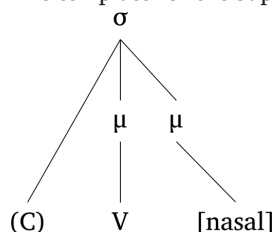
The goal in the remainder of this article is to revise the representation of N. I consider first the previous representations most relevant to the data discussed in the following section. I then propose a set of new representations within Strict CV (Lowenstamm 1996) in §7 and I account for the TBU status of N in §8.

6 Previous phonological representations of N

6.1 The syllable & mora account

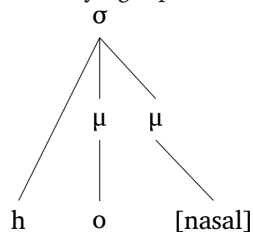
As discussed in §3, the moras N, Q, R, and J are usually analysed as the second mora within a syllable, affording them a deficient or dependent status. The shape of a CVN syllable as well as underlying and surface forms of <hoN> ‘book’ are recalled in (21–23).

- (21) The template for the Japanese syllable containing N in the spirit of Vance (2008)

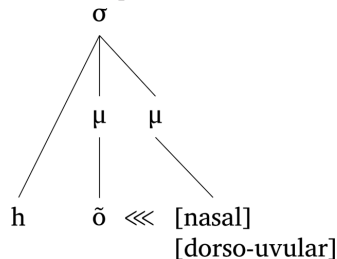


³⁰ I note that glottal-consonant clusters are not geminates, and that voiced geminates are not glottal stops followed by voiced consonants. Such productions were produced by the author, and were rejected as incorrect pronunciations. It is unclear at this point if all voiced consonants can be geminated.

(22) Underlying representation of <hoN> ‘book’



(23) Surface representation of <hoN> ‘book’



The representation of N as a moraic consonant in the aforementioned works is able to account for the realisation of /N/ as a homorganic nasal consonant through feature spreading, as well as nasalisation. The non-accentuation of a deficient mora can be defined with reference to avoidance of accent on a special or non-head mora, as discussed in Kawahara (2015).

6.1.1. A brief overview of issues in syllable and feature based approaches

The consonantal mora-based representation of N cannot explain all of the facts for TJ. Let us first consider tone spreading. First, structurally identical bimoraic syllables cannot divide CVN, CVR and CVJ syllables from CVQ syllables for tone spreading, and thus analyses must rely on featural or moraic specifications. Haraguchi (1977) has proposed that spreading only affects CVV and CVN syllables using autosegmental tone spreading rules. Tanaka (2008) points out that there is a distinction between heavy syllables ending in a sonorant mora and heavy syllables ending in a non-sonorant mora (i.e. Q), which is formalized later in Tanaka (2013) where the author states that spreading only affects CVX syllables, where X is the set {R, N, J}; see also Poppe (2015) for a formal analysis of these facts, where the constraint ALIGN(H, CVX[+son]) plays a crucial role in tone specification in output forms. Finally, Labrune (2012a, b) presents a syllable-free analysis where N is a consonantal mora specified only for nasality and lacking a following vowel which leads to deficiency. A mora hierarchy separates R, N and J from Q. Q can be separated as it is specified as [+consonantal].

Let us focus for a moment on the role of [\pm sonorant].³¹ Moras containing [-sonorant] are not the site of an accent in TJ and do not trigger spreading in TJ, as argued for in Tanaka (2008) and discussed by Poppe (2015).³² Taking this seriously, one can manipulate tonal rules based on the features of each mora in a non-head, or coda, position while the syllabic structure in each dialect of Japanese remains the same and the structure of N is identical. From this point of view, [+sonorant] codas trigger tone spreading in TJ and all codas are poor TBUs in TJ, though [+sonorant] consonants may be marginal TBUs in noun-final positions. In OJ, all [+sonorant] moras are TBUs, with tone spreading ignoring featural specifications entirely. In KJ, [+sonorant] codas are equivalent to [-sonorant] codas and a coda may not bear the principal tone in a word, regardless of feature specification. Indeed, such an analysis can capture the tonal facts adequately by utilising separate accent assignment and spreading rules or by reranking constraints referring either to [-sonorant] moras or deficient moras. However, we must then treat the segmental processes and different phonetic realisations as separate problems. There is also the question of why we must specify N universally in identical prosodic and featural terms. I argue that we can present a simpler account for the segmental and prosodic differences in each dialect, by replacing [\pm sonorant] with association to a consonantal or vocalic skeletal position. Dialects differ then not in their exact ranking or featural sensitivity but in the structure of N itself.

³¹ I thank two reviewers for their comments leading to the expansion of this section.

³² Another reviewer points out that in some other tone languages, only sonorant moras are relevant to accent assignment, as discussed by Gordon (2006). Indeed this is true, but a sonorant segment associating to a vocalic position can easily replace the role of [+sonorant] sensitive system as in Kwakala (Scheer & Szigetvári 2005).

Before moving on, let us consider some other problematic aspects of the syllable. Focusing on OJ, the status of N is rather independent. First, nasalisation is not systematic in this dialect and so the syllabic link between N and the preceding vowel is not necessary. In addition, N should not be a dependent mora as it is a full TBU. While this dialect has previously been captured as a ‘mora’ dialect by McCawley (1978). The syllable cannot be transposed to this dialect without adding the caveat that ‘the syllable is ignored’. It is preferable to say that the syllabification of N in each dialect differs, or indeed the representation of N itself.³³ Finally, we must account for the fact that this dialect has N realized optionally as a full syllabic consonant, as noted earlier.

Finally, let us consider KJ. A representation where N is not an independent mora is indeed appropriate here as it can never support an accent. However, one issue here is that N has two sources – one where it is a lexical coda as in [hoN] ‘book’, and another where N is derived from a lenited onset consonant, as in [kami~kaN] ‘spirit’ or /kam-/ ‘chew’, [kaN] ‘chew-NP’, /kam-aN/ [kamaN] ‘chew-NEG’. If weakening is synchronic in verbs, an issue arises: there are two types of N that exhibit an identical surface behaviour but N as the output of lenition is an onset consonant which is resyllabified, with re-association of the mora from the position undergoing apocope. An alternative representation is of course possible: one where N is not resyllabified and it is the onset in a dull syllable, argued to be appropriate for a number of languages by Harris & Gussmann (1998, 2002).

I now turn to another preceding representation of N that attempts to account for the variable character of N using variable structure, where Yoshida S. (1991, 1996, 2003) proposes that N is either a consonant or vowel depending on the surrounding syllabic context. This proposal captures some facets of N that we would like to capture, but not all.

6.2 N as a variable segment – the Government Phonology account

The first treatment of N as a variable segment is proposed by Yoshida S. (2003), where N is a floating nasal element (or privative feature) N associated to either an Onset or a Nucleus. Yoshida’s account is framed within Government Phonology (Kaye, Lowenstamm & Vergnaud 1990, Charette 1991, Harris 1994, Gussmann 2002) and Element Theory (Kaye, Lowenstamm & Vergnaud 1985, Charette & Göksel 1998, Backley 2011). For recent review, see Scheer & Cyran (2018a, b) and Scheer & Kula (2018). This proposal is developed by Yoshida S. (1991, 1996, 2003), with a slightly alternative representation given by Yoshida Y. (1995, 1999, 2003). See also Nasukawa (1998, 2005).

6.2.1 A brief introduction to GP

I now consider the tenets of Government Phonology (GP) relevant for Japanese, focusing on N (Yoshida S. 2003); the TBU is discussed in detail later in §8. The main proposal here is that N is a floating feature which is associated to either a nucleus or an onset. Crucially, it represents a preceding view of N where N is treated as a vowel.

GP utilises Onsets, Nuclei and Rhymes and rejects the syllable, while applying government and licensing in a parallel with Government & Binding (Chomsky 1981) as well as principles and parameters. In this theory, government is a force which silences an empty constituent, while licensing supports the realization of a segment or branching constituent. (Kaye, Lowenstamm & Vergnaud 1990, Charette 1991). Yoshida Y. (1995, 1999) and Yoshida S. (2003) propose that Japanese permits only non-branching Onsets and Nuclei.³⁴ The representation of a word such as [murásaki] ‘violet’ is given in (24).

(24) Structure of [murásaki] ‘violet’ (simplified from Yoshida Y. 1999: 79)

| O ₁ | N ₁ | O ₂ | N ₂ | O ₃ | N ₃ | O ₄ | N ₄ |
|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | | | | | | | |
| x | x | x | x | x | x | x | x |
| | | | | | | | |
| m | u | r | a | s | a | k | i |

³³ If forced to retain the syllable, adjusting syllabification rules would be appropriate in an analysis based on mora projection as in Hyman (1985). I approach a different view below without use of the syllable.

³⁴ Yoshida S. (1991, 1996) refers to the rhyme, but not in Yoshida S. (2003). Yoshida Y. (1995, 1999, 2003) utilises strictly non-branching constituents.

The mora in this framework is equivalent to an Onset-Nucleus pair, and the Nucleus is used as an accent site (or here, a TBU). In addition to the rejection of the syllable, a crucial difference to the syllable and mora framework (as used in Hyman 1985 and Hayes 1995) is that GP uses empty constituents.³⁵

Empty nuclei are used in the representation of NC clusters and geminates. They are captured as two Onsets surrounding an empty Nucleus. The onsets are partially assimilated (for NC clusters) or a segment is associated to both constituents (geminates). These Onsets surround an empty nucleus. I give the representation of N and Q in loanwords discussed earlier in (25) and (26), following the structures proposed by Yoshida Y. (1999).

(25) Representation of [káNzasu] ‘Kansas’

| | | | | | | | |
|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| O ₁ | N ₁ | O ₂ | N ₂ | O ₃ | N ₃ | O ₄ | N ₄ |
| | | | | | | | |
| x | x | x | <u>x</u> | x | x | x | x |
| | | └───┬───┘ | | | | | |
| k | á | N | | z | a | s | u |

(26) Representation of [ták:uru] ‘tackle’

| | | | | | | | |
|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| O ₁ | N ₁ | O ₂ | N ₂ | O ₃ | N ₃ | O ₄ | N ₄ |
| | | | | | | | |
| x | x | x | <u>x</u> | x | x | x | x |
| | | └───┬───┘ | | | | | |
| t | á | | | k | u | r | u |

For Japanese, the empty nucleus accounts for pre-antepenult accent in words with CVN and CVQ syllables, where only the filled nuclei can participate in accent assignment (cf. Yoshida Y. 1999, Youngberg 2017). Accent is placed on the antepenultimate **filled** nucleus, and accent ‘shift’ is not a true process of the grammar.³⁶ We return to this filled and empty distinction in further detail in §8.2, but first let us consider how empty positions are restricted.

6.2.2 Restricting empty constituents

Empty constituents remain uninterpreted only in specific circumstances. They are static and visible in the full course of a phonological derivation, and they are not subject to stray erasure (Ito 1987, 1989) or extrametricality (Hayes 1995).³⁷ The silence and non-interpretation of empty constituents is restricted by the phonological Empty Category Principle (Kaye, Lowenstamm & Vergnaud (1990; see also Kaye 1990, 1995), henceforth ECP. Empty nuclei are only permitted to remain silent (or p-licensed) if they are governed word medially by inter-constituent relations or if they are governed finally by parameter.

For Japanese, Yoshida Y. (1999) and Yoshida S. (2003) claim that empty Nuclei (EN) are only permitted word-medially. I present the ECP in (27) (Kaye 1995) and the settings for Japanese in (28).

- (27) The Empty Category Principle (Kaye 1995: 295)
 A p-licensed (empty) category receives no phonetic interpretation.
 P-licensing: 1. Domain-final (empty) categories are p-licensed. (Parameterized)
 2. Properly governed (empty) nuclei are p-licensed.
 3. A nucleus within an inter-onset domain.

- (28) Properties of the ECP with reference to Japanese (drawing on Yoshida Y. 1999)
 a. Domain-final parameter OFF (no final consonants, obligatory final vowel)
 b. No proper government (no vowel-zero alternations, as in Arabic or French)
 c. Inter-onset government active, silences empty nuclei in NC and Geminates

³⁵ This is not the only work to use emptiness in some form; see Harris & Gussmann (1998, 2002) and John (2014) for discussion of emptiness in various frameworks and see Polgárdi (2015), Cavirani & van Oostendorp (2017) & Zimmermann (2017) for three recent approaches to using emptiness in OT.

³⁶ A reviewer questions how antepenultimate accent is derived. Following Yoshida Y. (1999), accent is assigned to the head of the penultimate trochaic foot, with feet built from the right edge. Conditions on foot formation in GP and CV is discussed further in these sources. See also Scheer & Szigetvári (2005).

³⁷ By ‘visible’, I mean that their interpretation, or lack thereof, is sensitive to the status of surrounding constituents, and that they are involved in stress and tone assignment in various languages.

We focus here only on the facts relevant for Japanese. P-licensing, in short, refers to the silencing of an empty position through government. When EN occur within a geminate or an NC cluster, they are silenced through a relation between two onsets, or inter-onset government (Yoshida Y. 1999). If the ECP is not satisfied, the EN receives an interpretation or is the target of assimilation. In Japanese, a final EN in loanwords is phonetically interpreted as [ɯ], accounting for epenthesis in loanwords like English *kiss*, realised as [kisuɯ] (Yoshida S. 1996, Yoshida Y 1996). Having considered these issues, let us turn to an account of N as a variable segment.

6.2.3 N as a floating element

In Yoshida Y. (2003) proposes that the underlying representation (UR) of N, shown in (29), is a floating nasal element to capture its vocalic and consonantal realisations. Following Yoshida S. (2003), nasality is represented as the element |N| in combination with the oral resonance elements |A|, |I| and |U|, framed within Element Theory (Backley 2011, Scheer & Kula 2018).

(29) Representation of /N/ (Yoshida S. 2003)

| | |
|----------------|----------------|
| O ₁ | N ₁ |
| | |
| x | x |
| N | |

Yoshida S. (2003) is in agreement with the earlier literature that N assimilates to following consonants. On the other hand, we have seen in §2 that for Nakano (1969) and Yoshida S. (2003), word-final and intervocalic N is a nasal vowel, with /hoN/ ‘book’ realised as [hoũ] or [hoõ]. This variability drives the floating representation.

NC clusters are represented as adjacent onset consonants, as in /hoN-to/, [honto] ‘book-COM’ given in (30). The element |N| associates to O₂ as a governing relation can contract between O₃ and O₂. This satisfies the ECP, silencing N₂. Assimilation occurs as a result.

(30) Representation of /hon-to/ [honto] ‘book-COM’ (Yoshida S. 2003: 540)

| | | | | | |
|----------------|----------------|----------------|----------------------|----------------|----------------|
| O ₁ | N ₁ | O ₂ | <u>N₂</u> | O ₃ | N ₃ |
| | | | | | |
| x | x | x | <u>x</u> | x | x |
| | | | | | |
| h | o | n | | t | o |
| N | | | | | |
| | | | ʔ | <<< | ʔ |
| | | | A | <<< | A |

In other contexts, |N| associates to the nucleus, shown in (31–32). No following contentful Onset follows |N|, and inter-onset government cannot occur. |N| thus associates to the nucleus as the ECP cannot be satisfied. In formal pronunciation, N is given the place element |U|, the epenthetic element (e.g. *kiss* realised as [kisu], cf. Yoshida S. 1996, 2003). In informal representations, intervocalic and final N gain place elements from the preceding nucleus, shown in (31–32) for /hoN/ ‘book’ and /taNi/ ‘credit’.

(31) Representation of /hoN/ [hoõ] ‘book’, drawing on Yoshida S. (2003)

| | | | | |
|----------------|----------------|----------------------|----------------|---|
| O ₁ | N ₁ | <u>O₂</u> | N ₂ | |
| | | | | |
| x | x | | x | |
| | | | | |
| h | o | | õ | |
| N | | | | |
| | | U | >>> | U |
| | | A | >>> | A |

(32) Representation of /taNi/ [taäi] ‘credit’ (Yoshida S. 2003: 539)

| | | | | | |
|----------------|----------------|----------------|----------------|----------------|----------------|
| O ₁ | N ₁ | O ₂ | N ₂ | O ₃ | N ₃ |
| | | | | | |
| x | x | | x | | x |
| | | | | | |
| t | a | | ã | | i |
| | | | N | | |
| A | »» | | A | | |

6.2.4 Problems with the GP representation of N

These representations must be considered in light of §3. First, it is clear the vowel preceding N is nasalised in all contexts. Yoshida S. does not discuss nasalisation, but not all representations could capture the process. In the proposed representation of NC clusters, one cannot account for nasalisation as there is no relation between the Onset containing N and the preceding Nucleus. If we attempt to say this is a low-level phonetic process, it cannot explain why nasalisation is constant in TJ and not in OJ. For N in intervocalic and final positions, there is progressive spread of elements for informal VNV and VN#. A slight adjustment to include |N| spreading can capture nasalisation here, but this would not account for NC. Finally, N is realised as an assimilated nasal vowel in word-final positions, but it is also preceded by a nasalised vowel. The surface identity would be a long nasal vowel, or [hōō] ‘book’ for <hoN>. Why is this not the underlying representation?

Another issue is that the analysis of tone spreading remains problematic. Recall that CVN patterns with CVR and CVJ syllables. In (33), I provide the representation of CVQ from Yoshida Y. (1999) for <baQta> ‘grasshopper’, while the CVN word <keNka> ‘quarrel’ is shown in (34).

(33) Geminate in CVQ initial word as in [bat:a] ‘grasshopper’

| | | | | | |
|----------------|----------------|----------------|----------------|----------------|----------------|
| O ₁ | N ₁ | O ₂ | N ₂ | O ₃ | N ₃ |
| | | | | | |
| x | x | x | <u>x</u> | x | x |
| | | └──────────┘ | | | |
| b | a | | t | | a |

(34) Geminate in CVQ initial word as in [keŋka] ‘quarrel’

| | | | | | |
|----------------|----------------|----------------|----------------|----------------|----------------|
| O ₁ | N ₁ | O ₂ | N ₂ | O ₃ | N ₃ |
| | | | | | |
| x | x | x | <u>x</u> | x | x |
| | | └──────────┘ | | | |
| k | e | ŋ | k | | a |

N and Q have an identical constituent structure; the model incorrectly predicts that they should pattern together as their representation is identical. In this framework, the [±sonorant] feature cannot be invoked, nor the coda position. We could claim that that Onsets lacking |N| in the O₂ position block spreading, but this is a descriptive and unsatisfying solution.

A positive advance is made for N as a marginal TBU as final N is in the nuclear position, as in (31). If the TBU is a nucleus, Yoshida S.’s (2003) representation could explain how N supports a marginal high. The UR of N contains an empty nucleus and would not be a possible *lexical* TBU as it is empty, but could be a candidate post-lexically as the surface nucleus is filled.

This representation captures many, but not all, facets of TJ. While this variable representation of N could easily be adapted to the facts of OJ and KJ, variability is not clearly called for in these dialects. I turn to the possibility that the lexical representation of N in each dialect is entirely different, and not derived from one underlying form.

7 Revising the representations of N in Strict CV

I now consider representations within CV phonology (Lowenstamm 1996). This framework is a descendant of Standard GP (Kaye, Lowenstamm & Vergnaud 1990) and is built upon the hypothesis that no branching constituents exist. I build on the generalisations made in §3–5 and examine a varied representation of N, focusing on the nuclear position as the catalyst for TBU variation.

7.1 The basic foundations of Strict CV

Lowenstamm (1996) proposes that all words are composed of strictly repeating Consonant (C) and Vowel (V) positions and segments. Branching constituents are rejected, and the division between the constituent tier and the skeletal tier is collapsed (Scheer 2004). Segments are directly associated to the CV tier. Government is retained as the force which silences an empty nucleus (or V), while licensing supports the phonetic interpretation of a position (Scheer 2004). I do not provide a full overview of this framework, which is discussed in part by Scheer & Cyran (2018). For more on government and licensing in CV, see Scheer (1998, 2004, 2012), Dienes & Szigetvári (1999), Cyran (2010), Ségéral & Scheer (2008) & Ziková & Scheer (2010). CV units have also been used to investigate the relationship between morphosyntax and phonology; see Lowenstamm (1999) on the initial empty CV as a boundary marker, Bendjaballah & Haiden (2008) and Fathi & Lowenstamm (2016) on CV units as the spell-out of morphemes and syntactic terminals, and Scheer (2012) on CV markers at the interface.

The mora is redefined here as a CV pair (Scheer & Szigetvári 2005). This is in line with Yoshida Y. (1999), where an Onset-Nucleus pair is a ‘mora’. I return to the TBU in §8.2. In this section, I examine the structure of light and heavy syllables in Strict CV and I then turn to the structure of N.

7.1.1 Open syllables in a CV account of Japanese

First, compare the GP and CV representation of [murasaki] ‘violet’ in (35) and (36). In words with only open syllables, the difference is that the timing tier is no longer present – the timing tier and constituent tier are collapsed.

(35) Structure of [murasaki] ‘violet’ in Standard GP (Yoshida Y. 1999)

| | | | | | | | |
|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| O ₁ | N ₁ | O ₂ | N ₂ | O ₃ | N ₃ | O ₄ | N ₄ |
| | | | | | | | |
| x | x | x | x | x | x | x | x |
| | | | | | | | |
| m | u | r | a | s | a | k | i |

(36) Structure of [murasaki] ‘violet’ with a CV tier

| | | | | | | | |
|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| C ₁ | V ₁ | C ₂ | V ₂ | C ₃ | V ₃ | C ₄ | V ₄ |
| | | | | | | | |
| m | u | r | a | s | a | k | i |

7.1.2 Geminates, codas and long vowels in Strict CV

Long vowels and geminates are represented by the double association of a given segment to either two C or V positions. Revised representations for the Japanese words [ha] ‘tooth’, [to:] ‘tower’ and [bat:a] ‘grasshopper’ are given in (37a–c) Empty positions are underlined to represent a governed position.

(37) Representation of CV, CV: and CVC:V words in Japanese

a. [ha] ‘tooth’

| | |
|----------------|----------------|
| C ₁ | V ₁ |
| | |
| h | a |

b. [bat:a] ‘grasshopper’

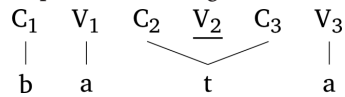
| | | | | | |
|----------------|----------------|----------------|----------------------|----------------|----------------|
| C ₁ | V ₁ | C ₂ | <u>V₂</u> | C ₃ | V ₃ |
| | | | | | |
| b | a | | t | | a |

c. [to:] ‘tower’

| | | | |
|----------------|----------------|----------------------|----------------|
| C ₁ | V ₁ | <u>C₂</u> | V ₂ |
| | | | |
| t | | o | |

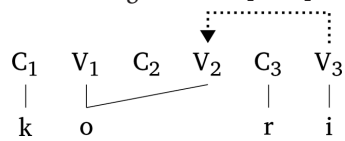
A few comments must be made about the structures given in (37b) and (37c). In the representation of [bat:a] given in (38), I assume for the moment that here too, an inter-onset relation contracts between C₂ and C₃, governing and silencing empty V₂.³⁸

(38) Representation of geminate in <baQta> ‘grasshopper’

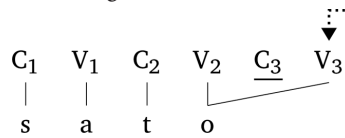


Long vowels are formed of a segment associated to both vowel positions. The second position is filled, but it is externally licensed by the following vowel position when found word-medially (Yoshida S. 1993, Kaye 1995, Lowenstamm 1996, Scheer 2004). Final long vowels meanwhile are licensed by parameter (Youngberg 2017).³⁹ In relation to Japanese, this can account for the lack of medial *V:C: sequences in mono-morphemic Japanese words and the free occurrence of final long vowels. See the representation of [ko:ri] ‘ice’ (39) and [sato:] ‘sugar’ (40), where a dotted line represents licensing.

(39) Medial long vowel in [ko:ri] ‘ice’



(40) Final long vowel as in [sato:] ‘sugar’



7.2 Revised representation for N in Tōkyō

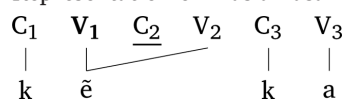
Now let us consider the structure of N in more detail. The suggested representations are recalled in [Table 4](#). I begin the redefinition of N here in §7.2, focusing on TJ, where a <VN> sequence is a long nasal vowel. I then consider §OJ in 7.3, where N is a syllabic nasal, and conclude with §KJ in 7.4, where N is a ‘coda’.

| Dialect | Nasalisation | Lexical TBU | Surface TBU | Suggested representation |
|-----------|--------------|-------------|--------------|--------------------------|
| Tōkyō | Yes | No | Yes, finally | Nasal vowel |
| Ōsaka | No, variable | Yes | Yes | Syllabic nasal |
| Kagoshima | Unknown | No | No | Coda consonant |

Table 4 A summary of TJ, OJ and KJ.

To account for nasalisation and the patterning of long vowels and so-called vowel nasal sequences in TJ, I claim that /VN/ sequences are in fact / \tilde{V} :/. This representation is shown in (41) for <keNka> ‘quarrel’, which is phonologically /kē:ka/. The velar nasal, which is typically transcribed preceding /k/, is absent as this is no longer part of the phonological representation but rather an effect of phonetic transition between a nasal vowel and a following consonant.

(41) Representation of N as a nasal vowel as in /kē:ka/ ‘quarrel’



³⁸ I believe that Inter-Onset relations are simply a condition on Government, while Scheer (2004) rejects inter-onset relations in CV.

³⁹ See Scheer (2004) and Cyran (2010) for extended discussion on the licensing and governing potential of final versus medial positions.

First, this representation characterises the regular nasalisation found in TJ as a full lexical part of the CVN syllable. Second, CVR and CVN syllables are unified when we consider tone spreading. Compare the representations for CV, CVR, CVN and CVQ syllables in (42–45). Tone spreading is marked with an H.

(42) [sakúrá] ‘cherry tree’

| | | | | | | |
|----------------|----------------|----------------------|----------------|----------------|----------------|--|
| | | | H | < | H | |
| C ₁ | V ₁ | <u>C₂</u> | V ₂ | C ₃ | V ₃ | |
| | | | | | | |
| s | a | k | u | r | a | |

(43) [kó:rí] ‘ice’

| | | | | | | | |
|----------------|----------------|----------------------|----------------|----------------|----------------|---|---|
| | | | H | < | H | < | H |
| C ₁ | V ₁ | <u>C₂</u> | V ₂ | C ₃ | V ₃ | | |
| | | | | | | | |
| k | o | | | r | i | | |

(44) [ké:ᵐká] ‘quarrel’

| | | | | | | | |
|----------------|----------------|----------------------|----------------|----------------|----------------|---|---|
| | | | H | < | H | < | H |
| C ₁ | V ₁ | <u>C₂</u> | V ₂ | C ₃ | V ₃ | | |
| | | | | | | | |
| k | ě | | | k | a | | |

(45) [bat:á] ‘grasshopper’

| | | | | | | |
|----------------|----------------|----------------|----------------------|----------------|----------------|---|
| | | | | | | H |
| C ₁ | V ₁ | C ₂ | <u>V₂</u> | C ₃ | V ₃ | |
| | | | | | | |
| b | a | | | t | a | |

Here, tone spreads regressively from the site of the default final H placed on the final vowel in these lexically unaccented words. The analysis of tone spreading is as follows. Following Yoshida Y. (1999), I assume that the initial CV is protected in Tokyo Japanese, though in other dialects this protection window may be 0 or 2 CV units, with the former represented by OJ and the latter represented by Owari Japanese (Youngberg 2017). Initial syllable protection is evidenced in other languages such as French (Charette 1991), Tonkawa (Yoshida Y. 1990) and Turkish (Charette 2004); see also Becker, Nevins & Levine (2012). In CV and CVQ words, V₁ is protected and not affected by spreading. However, this window only holds unless branching occurs between the initial V₁ position (within the protection window) and V₂ (within the tone spreading domain). The initial V position in CVR and CVN syllables have an identical status, with V₁ and V₂ being associated to the same segment, breaching the barrier between V₁ and V₂. It is not ‘weight’ alone which is relevant for spreading, but also the association between positions. No reference to features or a subset of syllables is necessary. CVQ, having no such relation, fails to trigger spreading to V₁. I revisit tonal behaviour of N in §8. Let us turn now to OJ.

7.3 Revised representation of N in OJ

I propose that in OJ, N should be represented as an independent syllabic nasal. Within Strict CV, this can be represented as the association of |N| to both the C and V positions, with the V position hosting the element. A similar representation for syllabic consonants in other languages can be found in Scheer (2004), with sonorant sensitive stress systems such as Kwak’wala (Northern Wakashan, Western Canada) finding a similar analysis in Scheer & Szigétvari (2005). See the representation of the word [oŋna] ‘woman’ in (46).

(46) CV representation of OJ [oŋna] ‘woman’

| | | | | | |
|----------------|----------------|----------------|----------------|----------------|----------------|
| C ₁ | V ₁ | C ₂ | V ₂ | C ₃ | V ₃ |
| | | | | | |
| | o | | N | n | a |

Here, |N| is associated to the V position and it is independent from the preceding and following V positions. The spreading to the C position also accommodates possible glide or obstruent-like interpretations of N and excludes regular nasalisation, following discussion of the phonetic realisation in OJ given previously in §4.

7.4 Revised representation of N in KJ

Finally, for KJ I propose that |N| is a ‘coda’, which in CV is a filled C position preceding an empty V position. This representation follows from cross-linguistic evidence that final consonants precede an empty nucleus (Kaye 1990, Harris & Gussmann 1998, 2002, Scheer 2004) and language internal evidence from syllable weakening (cf. §5). The structure is given in (47).

- (47) Kagoshima Japanese N as a ‘coda’, as in [kaN] ‘spirit’
- | | | | |
|-------|-------|-------|-------------------------|
| C_1 | V_1 | C_2 | <u>V_2</u> |
| | | | |
| k | a | N | |

Above, V_2 is empty. It is governed through the domain-final parameter of the ECP, which is set to [ON] and thus represented with underlining. This correctly predicts that C_2 may also contain other ‘final’ consonants, as in [ka?] ‘persimmon’. Unlike TJ where empty V positions are only permitted medially under strict conditions (now, only in geminates) and the WF parameter of the ECP is [OFF], in KJ we have WF empty V positions as the domain-final parameter of the ECP is [ON].

This representation also allows for a simple analysis of synchronic weakening where the non-past /kam-u/ ‘chew’ is realised as [kaN]. Descriptively, the final high vowel is suppressed, and the preceding consonant lenites. How does lenition function here? Elements in an onset are interpreted based on the filled or empty status of the following nucleus (Harris 1992, 1997, 2000, Cyran 2010). In GP, a ‘coda’ is a final onset or C followed by an empty nucleus or V. Following Harris (1992, 1997), lenition is derived from the diminished ability of an empty nuclear position to license its preceding onset, and the interpretation of subsegmental content is suppressed. Turning to KJ, C_2 is lenited in words affected by apocope which elides final high vowels, with the emptied V then unable to fully license the full segmental content in C_2 cannot be expressed. This gives rise to [kaN] ‘chew-NP’ from the UR /kam-u/. Stem final consonants are fully realised when the V position is filled by a suffixal mid or low vowel, as in the negative verbal form [kamaN] ‘chew-NEG’. Fuller analysis of weakening is presented in Youngberg (2020). Crucially, no resyllabification is necessary from the viewpoint taken here, and N is unified with other coda consonants.

8 Capturing the variation of TBU status for N

I now turn to the TBU in Strict CV and I present a proposal where the TBU status of N is directly linked to the status of the V position. Regardless of theoretical viewpoint, dialects differ with respect with their ability to accent ‘deficient moras’ word-medially and word-finally. In TJ, the ‘deficient moras’ R, J and N may receive post-lexical high-tone word-finally, but never word-medially and never lexically. In OJ, any of the ‘deficient moras’ may bear an accent, both medially and finally and in lexical forms (cf. /oŋna/ ‘woman’). In KJ, deficient moras are never the site of a high tone either domain-finally or domain-medially. This section briefly reviews how this variation has been captured in the past and then provides a Strict CV analysis.

8.1 Previous approaches to dialect typology in Generative Phonology

Since McCawley (1978), Japanese varieties are often divided into syllable dialects (Kagoshima), syllable-and-mora dialects (Tōkyō) and mora dialects (Kansai) based on what unit is relied on for accent assignment.⁴⁰ These divisions are used also in recent typologies and analyses (e.g. Kubozono 2012, Ito & Mester 2019). Optimality Theory (Prince & Smolensky 1993) analyses refer to the

⁴⁰ Here, I discuss *only* the Generative tradition, but the division between syllable and mora dialects is possibly first attributed to Shibata (1962); see Shibatani (1990) and Labrune (2012a) for discussion of the dialectology literature.

syllable and mora directly in constraints, capturing typology through ranking. Labrune (2012a, b) proposes that certain moras are incomplete in their featural makeup, with the ideal mora having both a consonant and a vowel. Deficient moras are penalised by the markedness constraint NADM (non-accentuation of deficient moras) and the TBU is also ranked against a mora hierarchy, where R, J and N are ranked low and Q is ranked at the bottom. Dialects which permit accent on deficient moras have NADM ranked low (e.g. as in OJ), while TJ would have NADM ranked high to prevent output forms with H on deficient moras. Ito & Mester (2019) also utilise markedness constraints such as NOCONTOUR-SYLL, NOCONTOUR-MORA and H-TO-HEAD (among others) to derive the tone patterns of various dialects in Kagoshima prefecture, including that of KJ, and separates syllable dialects like KJ from others by high ranking of H-TO-HEAD and NOCONTOUR-SYLL. Such analyses indeed derive the correct typology, but they rely on a universal syllabic structure and a universal structure of N with constraints deriving the desired output. Additional constraints and a hierarchy are not necessary when the input involves adjusted representations.

As we have seen earlier, features can be used to derive variation as well. Haraguchi (1975: 138,441ff; 1977) is an early example, altering the target features in tone assignment and spreading rules to derive accent differences. The definition of a TBU, for example, relies on features such as [\pm syl], with N being [+syl] in OJ and thus being a TBU. N is [-syl] in TJ and cannot support a tone. These features are assigned only to derive the possible tone patterns. The author does not appeal to further evidence beyond tone to justify such an assignment, but it must be noted that he also focuses only on tonal typology and ignores segmental processes or discussions of phonetic regularity. I replace both constraints and feature sensitivities here with simple reference to the V position.

8.2 A Strict CV view of the TBU

Turning to Strict CV, I claim that the consideration of the V position status leads to a clear division of well-formed, marginal and malformed TBUs. I build on the analysis of Yoshida Y. (1999) for defining an accentable site, and I develop this model by including dialects besides TJ and by incorporating Strict CV structures. Previous work on stress and parameters in CV began in Scheer & Szigetvári (2005), who examine stress assignment in Latin, Kwak'wala, Malayalam and other languages. The proposal here complements the parameter approach developed by Ulfsbjorninn (2014) and Faust & Ulfsbjorninn (2018), who focus on the role of empty nuclei in stress systems.⁴¹ The crucial ingredient introduced here is that full, marginal and impossible TBU status above the CV tier is derived from the status of the V position below the CV tier.

8.2.1 The well-formed lexical TBU as a projected position

In this section, I claim that a full TBU in the lexicon is a filled and independent V position (N in OJ), while a marginal TBU on the surface is a filled V position which is not independent but externally licensed (N in TJ), and a malformed TBU is an empty and governed position (N in KJ).

Yoshida Y. (1999) has defined an accentable position as a filled nuclear position which is unlicensed and ungoverned (or here, V position). Empty nuclei are governed where possible, or they are phonetically interpreted. At this point, filled nuclei remain unlicensed; they project in order to find a licenser at a higher level (Charette 1991, Harris 1994, Kaye 1995).⁴² Empty nuclei are governed at the constituent tier; to go a little further than we have, licensing is an inter-constituent force which *supports a segment* while government is understood to be a subtype of licensing which *supports a constituent's silence* (Charette 1991).⁴³ As empty nuclei are governed at the constituent tier, they do not project.⁴⁴ A possible TBU can be initially defined as the filled nucleus, while an impossible TBU is one which is empty and governed.

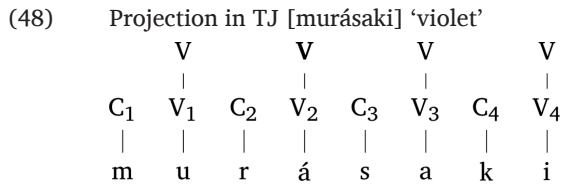
⁴¹ The main difference in the approach taken here is that I do not rely on the use of an additional device called 'Incorporation' to explain the failure of long vowels to be a TBU, which Ulfsbjorninn (2014) proposes to explain the behaviour of long vowels in stress systems and their projection to a metrical grid. I do not follow this proposal, and projection here is related to the status of the V at the skeletal tier.

⁴² Further projections are discussed in Yoshida Y. (1999).

⁴³ The idea that government is a subtype of licensing is not followed in all CV work, with Scheer (2004, 2012) and others treating government and licensing as two equal and opposing forces. However, I follow only Lowenstamm (1996) in redefining the skeleton and constituency.

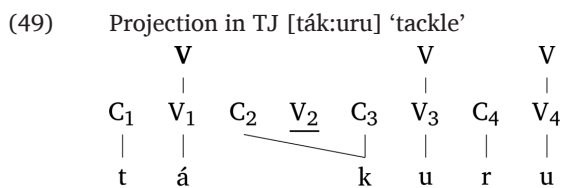
⁴⁴ According to Charette (1991), a *final* empty nucleus can project and receive a stress in French, and in this case it is interpreted as [ɛ], while it is normally interpreted as [œ].

Translating this into Strict CV, any CV which is independent and which is filled projects. Governed V positions do not. Consider the structure of the words [murásaki] ‘violet’ demonstrated in (48). A high tone is assigned to the antepenultimate *projected* nucleus, as in the earlier work of Yoshida Y. (1999).⁴⁵ A similar analysis of Latin stress is given by Scheer & Szigetvári (2005).

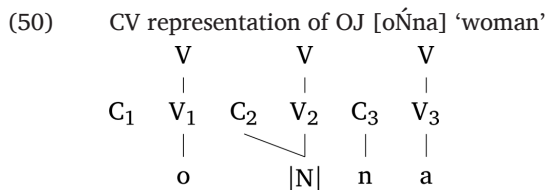


8.2.2 Defining an unaccentable site – government of empty V

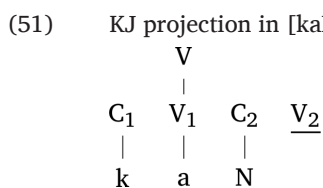
Yoshida Y. (1999) proposes that unaccentable positions are empty nuclei. In Japanese, these are found in geminates as in /bat:a/ ‘grasshopper’. Empty nuclei are not projected as they are already governed at the constituent tier. Adapted to CV, geminates and ‘coda’ consonants contain a governed empty V which fails to project, and in Japanese these positions are governed in the formation of a geminate. This is shown in (49).



The definition of an accentable and unaccentable site can be directly transposed to OJ and KJ. Firstly, the representation I have proposed for N in OJ is a full TBU as the V position is filled. The representation of [oŃna] ‘woman’ is given (50). The V₂ position is filled with the element |N|, which then projects to serve as a potential lexical TBU as it is unlicensed and independent.⁴⁶



In KJ, N is never a TBU. Here, |N| is associated to a C position which precedes an empty V position. The final V is governed by the WF parameter of the ECP and does not project.⁴⁷ The structure of [kaN] ‘spirit’ is recalled in (51).



In each of these dialects, N as a lexical TBU or an impossible TBU is easily captured with little adjustment: N cannot serve as a TBU in KJ as it has no contentful nucleus, while in OJ it is

⁴⁵ I abstract away here from the crucial role of internuclear licensing at the nuclear projection, typically analyzed as foot formation; see Yoshida Y. (1999) and Youngberg (2017) for a fuller formulation of how antepenultimate accent is derived through the formation of two trochaic feet, with accent assigned to the head of the penultimate foot.

⁴⁶ A reviewer rightly points out that N is not always a TBU in OJ. While this has been previously discussed in fn 17, I note that N is a *potential* lexical TBU, but that it has no special properties in comparison to a light CV mora, for example. I leave further investigation of morphologically complex and loan exceptions where N is not a TBU for future work, but it is possible that this is a special property of N in in Yamato and Sino-Japanese words. Speakers lacking accent on N in loanwords may have a hybrid phonology where N may be syllabic in Yamato words while being a coda in other strata.

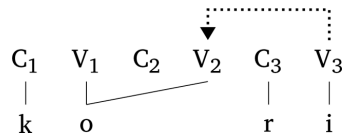
⁴⁷ N would have an identical structure in the middle of a word, namely a C preceding an empty V position. The only difference here is that empty V is governed by the following contentful V position.

independent and has a contentful nucleus through being ‘syllabic’.⁴⁸ An issue remains for TJ – the V position is filled but still fails to serve as a TBU.

8.2.3 Refining an unaccentable site –long vowels and external licensing

For TJ long vowels, we must consider the status of the second V position. We have seen earlier in §7 that the second position is licensed externally at the CV tier. We must exclude the possible of lexical accent on V₂ in a long vowel. The representation of [ko:ri] ‘ice’ is given again in (52).

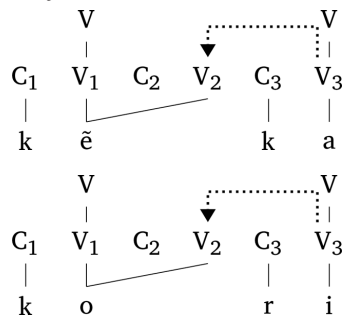
(52) Licensing in V: as in [ko:ri] ‘ice’



Deficiency based on the filled or empty status of a V position alone does not suffice. Yoshida Y. (1999) relies on the post-lexical formation of branching nuclei to deal with the unaccentability of the second half of a long vowel, but this is an ad hoc solution and not possible in Strict CV.

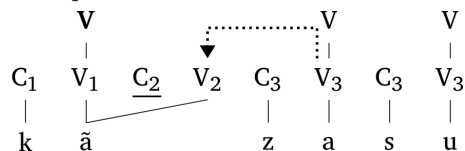
I claim that the deficient nature of a long vowel (and N) falls out from the original proposal from Yoshida Y. (1999) in combination with the CV structure of long vowels: only those positions which are unlicensed at the constituent tier project and serve as accentable units. In the configuration in (53) showing the representations of [ko:ri] ‘ice’ and [kē:ʔka] ‘quarrel’, V₂ is externally licensed by V₃, V₂ does not project as it licensed at the CV tier and is unable to serve as a TBU. This is the same for CVV and CVN syllables, identical in structure but not in segmental content.

(53) Projections in [ko:ri] ‘ice’ and [kē:ʔka] ‘quarrel’



This proposal easily accounts for cases of accent shift in long words and compounds where antepenult H is expected, but found on the pre-antepenult. Consider the structure for the word <kaNzasu> ‘Kansas’. The representation is given in (54). High tone is assigned to the pre-antepenult V position, which does project. V₁ is the antepenultimate *projected* nucleus.⁴⁹

(54) CV representation of [kã:ʔzasu] ‘Kansas’



8.2.4 Marginal accentuation in TJ revisited

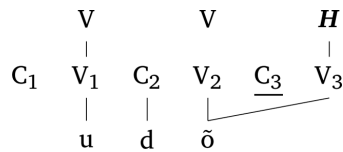
Now what of marginal accentuation in TJ? In final position, the second V position for long vowels is filled. As discussed in §7, they are licensed by virtue of being domain-final. However, note that we are not discussing lexical highs but rather tones placed in a post-lexical context. R, J and N are never good lexical TBUs and there is no underlyingly accented word such as */tokoó/ in TJ. This is because the second V position in a long vowel does not project. I propose, however, that final N, R and J are *marginal* TBUs due to their filled nature. Upon spell-out of an unaccented form or

⁴⁸ A reviewer rightly asks how a high tone might be interpreted over an entire syllable in KJ, as discussed by Kibe (1997b) and Kubozono (2012). If a High tone is associated to the principal V position, I assume that the high F0 is sustained over whatever segment follows if there is voicing to convey the high F0. I do not assume that H spreads to the following empty V position.

⁴⁹ This is the same result as in Yoshida Y.’ (1999) original proposal, but in her formulation of N, the antepenultimate vowel would be an empty and governed nucleus and N is associated to the preceding onset.

under pressure from a pre-accenting suffix, a default H or suffixal floating H can be placed and interpreted on the final *filled* V position (55). It does not matter whether this is projected or not as this is not a *lexical* tone, which relies on projected nuclei.

(55) Surface representation of <udoN>, [udõ:] ‘udoN noodles’ in TJ



Why are CVQ syllables never TBUs in TJ, even marginally? While no final consonants means the structure forming Q can never take a marginal tone, it is also clear that Q lacks the correct configuration to become a marginal TBU – it has no filled vowel position.

8.2.5 Revising accent typology and the deficient mora

The dialects are divided into three types based on the structure of the CV pair forming N – those with independent and filled V positions (OJ), those with filled but dependent V positions (TJ), and those with empty and dependent V positions (KJ). Deficiency is redefined: a CV pair which contains a compromised V position (licensing or government) is deficient as it does not project. In an unexpected outcome, this is a formalised version of Labrune’s definition of deficiency, where a mora is deficient if it is missing a fully specified consonant or vowel. The difference from Labrune’s account is that here, we need refer only to the V position. The moras R, J, N and Q are also further divided: a deficient mora such as R is different from Q as the former has a filled V position and the latter does not, and this has impacts on high tone spreading and marginal TBU behaviour.

9 Conclusions, implications and further questions

In this paper, I have redefined the moraic nasal N based on dialect data and suggested that the segmental processes and prosodic variation can be captured using revised representations. A singular view has been discarded in favour of one where N is simply an orthographic notation with no guaranteed counterpart in phonology. Using the Strict CV framework, I claimed that TJ has a long nasal vowel, OJ has a syllabic nasal and KJ has a proper nasal ‘coda’ which is a final consonant preceding an empty vowel position. To understand the varying behaviour of deficient moras (and especially N), a full TBU is defined as a CV pair with a filled vowel position which is independent and takes both lexical and marginal tone. A marginal TBU in TJ was defined as a CV pair with a vowel position that is externally licensed, which only receives a post-lexical tone from a suffix or from a default H in unaccented contexts. An ill-formed TBU is one with an empty and governed vowel position, which cannot support a High tone by itself. The distinction between syllable, syllable-and-mora, and mora dialects of Japanese is derived, for N, simply by considering whether the relevant V position is empty, filled but compromised, or independent.

Turning to further syllabic processes, tone spreading was re-analysed with regards to the status of the initial vowel. Deficiency of a mora was directly obtained by referring to the structure of a CV pair, and no universal structure of N or reference to the ‘non-head’ mora is required. A radical outcome is that nasal ‘assimilation’ between two syllables is not a phonological process. Following the proposed representations, the ‘assimilation’ of N must be reanalysed as an effect of co-articulation and the transition between articulatory phonetic targets. Assimilation is an empirical reality attested in phonetic examinations, but it is not necessarily a phonological reality. This model predicts that in TJ, there is no phonological relation between N and a following C, while the vowel inventory is expanded.

We have partially achieved a redefinition of the syllable/mora-based typology of tone systems in Japanese. However, it remains to be seen to what extent this model can capture other systems of tone assignment and spreading, such as those in Kagoshima Prefecture dialects discussed by Ito & Mester (2019). It is clear that other constraints or parameters cannot be dispensed with, such as NOCONTOUR-MORA which regulates output of contour tones. The above proposal serves to *improve* the analysis of tone assignment and account for the evidenced behaviour of N at the same time, rather than to replace other parameters or constraints wholesale. Not all

aspects of variation can be captured by re-examining representations, but I submit that many can. Systems involving accent on syllabic consonants or obstruents must also be considered in further depth, including the claims that OJ may have accent on geminate consonants, though Haraguchi (1977) claims accent is on the preceding vowel.⁵⁰

Some issues are borne from this proposal with regards to morphosyntax, and I will outline some topics that I must investigate elsewhere due to space limitations.⁵¹ First, let us consider the role of N in infixational and mimetic morphology, where gemination often alternates with N insertion. In intensive adverb formation from mimetic stems (Ito & Mester 1989: 275), medial gemination and the suffixation of *ri* is found in the adverbial of the stem *niko* ‘smiling’, giving *nikkori* ‘while smiling’, though N insertion is found in non-gemination contexts giving *fuwa* ‘fluffy’ ~ *fuNwari* ‘fluffily’ and *shina* ‘supple’ ~ *shinnari* ‘in a supple way’. Additionally, intensive forms prefixed with *ma-* exhibit a similar pattern, with *kuro* ‘black’ giving *maQkuro* ‘completely black’ and *naka* ‘middle’ giving *maNnaka* ‘right in the middle’. This is also found in emphatic forms such as *mina*~*miNna* ‘everyone’ and *sugoi* ~ *suNgoi* ‘amazing’. I believe that all cases can be analysed through the insertion of an emphatic CV infix, which is void of associated segmental content but which contains a floating |N| element. The emphatic CV is inserted in the position immediately following the first CV pair, and if the consonant following this position cannot geminate, the preceding vowel spreads and the |N| element is associated to V in order to satisfy the ECP.

Questions can be also be raised regarding the formation of NC clusters formed in past tense verbs, with consonant-final stems terminating in /m/ and /b/ mutating to a nasal, e.g. /tob-/ ‘fly, [tobu] ‘fly-NP’ [tonda] ‘fly-PAST’. Compare with /tabe-/ ‘eat’ [taberu] ‘eat-NP’ [tabeta] ‘eat-PAST’. This unexpected alternation is the product of the *onbin* or euphonic sound changes initiated in the Middle Japanese period (Frellesvig 1995, 2010) which is no longer productive. The *onbin* stem is restricted to the plain past and gerund forms and their derivatives. Verbal *onbin* can be analysed as synchronic (Davis & Tsujimura 1991), and this assumption is made in a large portion of the literature on generative Japanese phonology (e.g. Yoshida S. 1996, Nasukawa 2000). I do not believe that a synchronic analysis of *onbin* is tenable, based on the experimental work which shows that *onbin* is not reliably productive in novel verb conjugation tasks (Klafehn 2003, Sugaya 2011 and references therein). Neurolinguistic research also suggests that verb production co-occurs with neurological events related to lexical access, implying that *onbin* is lexical retrieval rather than synchronic phonology (Kobayashi, Sugioka and Itō 2012). I assume that a VP in the plain past or the gerund selects the *onbin* stem, with /tob-/ ‘fly’ having a variant with a nasal vowel /tō:d-/ ‘fly, *onbin*’ in the lexicon. The exact diachronic development of the variation proposed here is worth investigation, but I believe it is entirely plausible that Early Middle and Late Japanese nasalisation patterns triggered by both onsets and nasal codas (see Frellesvig 2010) gave rise to various representational outcomes.

The crucial claim, which one might carry home or throw at the wall, is the proposal that mora-based accounts are not fine-grained enough to account for both accent typology and segmental processes in a cohesive manner. I suggest that we examine the composition and completeness of a mora itself, shattered into a C and V position, followed by a close consideration of segmental associations and their syntagmatic effects in order to provide a full account of phonological variation. Further exploration of this general CV approach, and other issues raised in this conclusion, will continue to be explored in future work.

Abbreviations

- ACC – Accusative
- COM – Comitative
- CV – Consonant Vowel
- ECP – Empty Category Principle

⁵⁰ According to Yuko Yoshida (P.C.) and Hiroshi Aoyagi (P.C.), this is indeed the intuition for speakers from Kyōto and Ōsaka respectively and should be considered further.

⁵¹ I thank the third reviewer for raising these concluding issues, though space issues prevent me from expanding on all points here.

- FN – Footnote
- GEN – Genitive
- GP – Government Phonology
- INT – Interrogative
- KJ – Kagoshima (City) Japanese
- LOC – Locative
- NOM – Nominative
- NC – Nasal-Consonant (cluster)
- OJ – Ōsaka Japanese
- ON – Onset – Nucleus
- TJ – Tōkyō Japanese
- UR – Underlying representation
- VP – Verb phrase
- WM – Word-medial
- WF – Word-final

Acknowledgements

I must first thank audiences at the London Phonology Seminar, Séminaire P3, L'Atelier de Phonologie, the Phonological Association In Kansai and the Nanzan University Department of Linguistics for crucial feedback on presentations of this work. I also thank my consultants in Kantō, Kansai and Kagoshima for kindly providing their knowledge, time and kindness. I thank Monik Charette and Yuko Yoshida for many informative theoretical discussions, and Bjarke Frellesvig and Nancy Kula for encouraging further investigation into the moraic nasal at my defense. I greatly thank Sabrina Bendjaballah for supporting this research and my wellbeing, et merci à tous les phonologues et les linguistes nantais-e-s. For this manuscript, I thank Ebany Dohle for assistance with copyediting and András Bárány for a diagram makeover. A final thank you is due to the patient editors, staff and reviewers of *Glossa*, who have greatly improved the ideas found within. A global pandemic is never a good time to review a submitted manuscript, and I send my gratitude for their professionalism. All remaining errors and inconsistencies are mine alone.

This research was funded through a post-doctoral fellowship from l'Université Bretagne-Loire, hosted by LLING (UMR-6310) and the Université de Nantes. Any and all primary data attached to this work were obtained with informed and revocable consent. The recordings are held in compliance with the EU GDPR directive (2016/679) at the Université de Nantes.

Competing interests

The author has no competing interests to declare.

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TO CITE THIS ARTICLE:

Youngberg, Connor. 2021. Representing the moraic nasal in Japanese: evidence from Tōkyō, Ōsaka and Kagoshima. *Glossa: a journal of general linguistics* 6(1): 63. 1–36. DOI: <https://doi.org/10.5334/gjgl.1099>

Submitted: 23 September 2019

Accepted: 25 November 2020

Published: 10 May 2021

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