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Coalescence in Japanese Dialects is Diachronic[1]

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1. Introduction

In this paper, I examine the status of coalescence in the Owari dialect of Japanese and consider the following question: is coalescence in this dialect a synchronic hiatus resolution process? The Owari dialect exhibits the coalescence of the Middle Japanese vowel sequences /ai/ /oi/ and /ui/ to [æ:] [ø:] and [y:], exemplified in (1).

(1) **Examples of coalescence in Owari**

	Owari Japanese	Underlying form	Gloss
a)	[ræ:neN]	/raineN/	'next year'
b)	[osø:]	/oso-i/	'slow.NP'
c)	[fury:]	/furu-i/	'old.NP'

The synchronic status of coalescence is explicitly assumed in Terakawa (1985) and Yamada & Niwa (1989). This article critically examines data from the Owari dialect and offers a discussion and analysis of problematic facts. I extend the account of coalescence presented in Youngberg (2013) and argue that coalescence in Owari is no longer a synchronic process. Further evidence is drawn from dialectology works such as National Institute for Japanese Language and Linguistics (NINJAL 1968) and Ebata (2013) in addition to data recorded in the field[2].

Section 2 presents an introduction to Owari dialect of Japanese and coalescence. I examine the Owari data in further depth and point out problems forced by synchronic analysis of coalescence. I examine simple and compound nouns as well as adjectival and verbal conjugation. Exceptions are pointed out in both simple and compound nouns.

The article then discusses issues with a synchronic analysis in relation to exceptions and gives evidence that supports an analysis of Owari vowels in which they are fully specified in the lexicon due to the diachronic status of coalescence. Section 3 introduces Analytic and Non-Analytic domains (Kaye 1995, Yoshida Y. [1995] 1999) which is applied to compound exceptions. In section 4 I examine the facts regarding verbal conjugation which suggest that paradigms are listed in the lexicon with no active conjugation. Section 5 discusses pitch accent assignment and shift in nouns and verbs, focusing on the behaviour of the long vowels [æ:] [ø:] and [y:]. I conclude by claiming that all underlying representations are specified with the long vowel and that coalescence is no longer an active process in the phonology of speakers based on current data.

[1] I thank Monik Charette, Florian Breit, the editors and an anonymous reader for comments. All remaining errors are mine alone.
[2] Recordings were held in Ichinomiya City, April 2013.

2. The Owari dialect

The Owari dialect is spoken in Aichi Prefecture in central Japan. Coalescence is exhibited in the Nōbi plain between Nagoya City and Gifu City with locations to the south of Nagoya (e.g. the Chita peninsula) lacking coalescence. The Owari dialect is an Eastern dialect along with the Standard/Tokyo dialect (Katō 1977, Shibatani 1990:189) and has a Tokyo type accent pattern (Kindaichi 1977). The dialect does have some typically Western features, however, such as the usage of the negative suffix /-(a)N/ rather than Eastern /-(a)nai/ e.g. [kakaN] 'write-NEG.' (Keshikawa 1983, Yamada & Niwa 1989). See Hikosaka (2014) for recent discussion on the Western and Eastern aspects of Owari Japanese. Data below is drawn from NINJAL (1968), Terakawa (1985), Ebata (2013) and my own field notes. I assume for the moment that coalescence is synchronic, following Yamada & Niwa (1989). The vowel inventories for the two dialects are compared in (2). Assuming synchronic coalescence, underlying and surface representations of the vowel sequences are given for selected examples in (3), utilizing CV representations following Lowenstamm (1996) with Element Theory representations (Kaye, Lowenstamm & Vergnaud 1985, Backley 2011).[3]

(2) **Vowels in Tōkyō and Owari Japanese**

a. Tōkyō vowels

i i: ɯ ɯ:

e e: o o:

a a:

b. Owari vowels

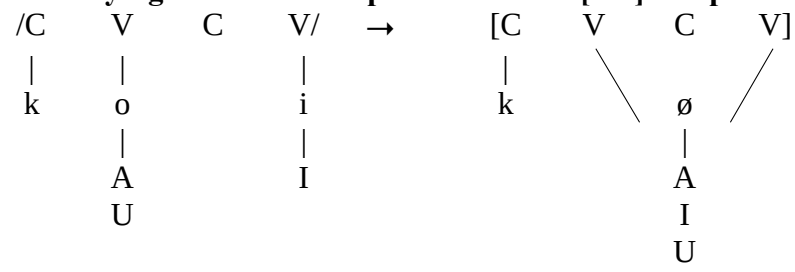
i i: y: u u:

e e: ø: o o:

æ:

a a:

(3) **Underlying and surface representation of [kø:] 'carp'**



[3] Previous arguments against branching constituents for Japanese are found in Yoshida S. (1996), Yoshida Y. (1999) and an extension of this argumentation can be found in the author's forthcoming thesis. See also Labrune (2012) for a similar mora based account.

The segmental phonology of the Owari dialect is identical to that found in Tokyo Japanese with the exception of the vowel inventory, exhibited in (2). Vowel coalescence has altered vowel sequences found in Middle Japanese, which are preserved in Tokyo and Kyoto Japanese. The vowel sequences /ai/ /oi/ and /ui/ are realized in Owari as [æ:] [ø:] and [y:] respectively through coalescence as exemplified in (3) with underlying vowel sequences.[4] I now examine coalescence as found in major word classes in Owari.

2.1. Nouns

I first examine nouns exhibiting coalescence. Consider the following data in (4).[5] Let us assume for now that coalescence is synchronic following Terakawa (1985) and Yamada & Niwa (1989). Data in (4) is drawn from fieldwork unless otherwise noted.

(4) **Owari Nouns**

	Owari	UR	Gloss
a.	[ræ:neN]	/raineN/	'next year'
b.	[ɕiharæ:]	/ɕiharai/	'payment'
c.	[æ:mæ:]	/aimai/	'unclear'
d.	[dæ:koN]	/daikon/	'daikon'
e.	[kawæ:so:]	/kawaiso:/	'poor thing'
f.	[æ:chi]	/aichi/	'Aichi (Pref.)'
g.	[æ:biki]	/aibiki/	'affair'
h.	[hæ:]	/hai/	'ashes'
i.	[kæ:]	/kai/	'clam'
j.	[ambæ:]	/ambai/	'seasoning'
k.	[sæ:ko:]	/saikoo/	'best'
l.	[hæ:]	/hai/	'fly'
m.	[ø:]	/oi/	'nephew'
n.	[kø:]	/koi/	'fish'
o.	[sy:ka]	/suika/	'watermelon' (Ebata 2013)
p.	[ky:]	/kui/	'post'(Ebata 2013)
q.	[ugy:su]	/uguisu/	'mockingbird' (Ebata 2013)
r.	[y:ro]	/uiro/	'steamed rice cake' (Yamada & Niwa 1989)

In simple nouns, coalescence occurs wherever there is a vowel sequence of the shape V_1V_2 where V_1 is {a, o, u} and V_2 is {i}. While it was hypothesized in Youngberg (2013) that /e/ seemed to be a trigger for coalescence, I now note evidence which suggests this assumption is incorrect. Direct comparison of Tokyo and Owari forms leads the observer to suppose that /e/ is a trigger for coalescence. I note that this correlation is likely due to reduction of /e/ to /i/ which then triggered coalescence, as in

[4] For more general introductions to coalescence and hiatus resolution, see de Haas (1988) and Casali (1996, 2011). I refer the reader to Youngberg (Forthcoming) for a formal treatment of hiatus resolution within GP.

[5] While field recordings (April 2013) attest to secondary palatalisation on the consonant preceding coalesced vowels, it seems to be variable and further investigation is necessary. For simplicity, I omit this from the transcriptions in this article.

the Owari word [hæ:] < *hai < Tokyo [hae] ‘fly’[6]. I note that vowel sequences with /e/ in the V_2 position are often reduced synchronically in modern Tokyo and Kyoto Japanese, such as the verb /kaer-u/ ‘to go home-NP’ which is often realized as [kairu]. This verb exhibits coalescence in Owari following a medial step of vowel reduction, with the Owari form [kæ:ru] corresponding to Tokyo [kaeru]. In addition to reduction evidence, exceptions to an /e/ trigger hypothesis are found in Ebata (2013) such as [ue] ‘above’. I therefore discard the hypothesis of /Ve/ as a context for coalescence and note that these words do not constitute exceptions.

2.1.1. Considering exceptions and other contexts

Loanwords do not exhibit coalescence for the speakers I have consulted as in the word [uisuki:] ‘whiskey’, nor do any coalesced loanwords appear in texts from NINJAL (1968), Terakawa (1985) or Ebata (2013). The evidence for coalescence in mimetic and reduplicated words is lacking, though some reduplicated words such as Tokyo [iroiro] ‘various’ derived historically from [iro] ‘color’ may exhibit coalescence upon further examination. Only one such word is found in Ebata (2013), with Tokyo [iroiro] ‘various’ being realized in Owari as [irø:ro].

A few simple nouns are found as exceptions which are problematic, such as the Sino-Japanese words [ai] ‘romantic love’ and [koi] ‘love’ which are identical in both Tokyo and Owari Japanese. These words could be considered non-dialect words, as [koi] and [ai] are rather literary, artistic or dramatic words for love. Another simplex word which also resists coalescence is [joip:ari] ‘nightowl’, drawn from Ebata (2013). This word, however, is rare in Tokyo Japanese and is not attested in the Owari materials from NINJAL (1968) or Terakawa (1985). [7]

Considering this, the above exceptions might simply be treated in the same way as loanword: there is no attestation of these words in the conversation transcribed in NINJAL (1968) or Terakawa (1985). I do note that though [ai] ‘love’ behaves exceptionally, the closely related Tokyo word [aikjo:] ‘emotions’ is attested in Ebata (2013) and realized as [æ:kjo:]. As simple exceptions are so few, they cannot truly be considered problematic for the positing of synchronic coalescence. We will see shortly, however, that these are not the only exceptions. I now move on to nouns with the locative suffix which exhibit coalescence.

2.1.2. Noun + locative

Nouns ending in the vowel {a, o, u} exhibit coalescence when suffixed with the locative particle /-i/ (Terakawa 1985:28). This is evidenced in texts from NINJAL (1976) and Terakawa (1985:28;34-49). Consider the citation forms [nagoja] ‘Nagoya’ and [furo] ‘bath’ and the locative forms /nagoja-i/ [nagojæ:] ‘Nagoya-LOC’ and /huro-i/ [furø:] ‘bath-LOC’. See the data in (5) and exceptional data in (6).

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[6] I assume the general understanding in Element Theory (Kaye, Lowenstamm & Vergnaud 1985) and the work of Harris (1990, 2005) that reduction is loss or simplification of an elemental expression.

[7] In the Tokyo Japanese based Balanced Corpus of Contemporary Written Japanese (NINJAL 2012), this word has only 16 occurrences. This equates to roughly 0.16 tokens per million words, which is an extremely low frequency. If this word is rare in Standard Japanese, it may simply be treated by Owari speakers as a loanword of sorts.

(5) **Locative coalescence in Owari**

	Nominal stem	Locative /-i/	Gloss
a.	[nagoja]	[nagojæ:]	Nagoya
b.	[furo]	[furø:]	bath
c.	[jakuba]	[yakubæ]	town hall
d.	[zæ:ɕo]	[zæɕø:]	one's own residence/town

(6) **Locative exceptions**

a.	[dokojara]	[dokojarai]	somewhere
b.	[asoko]	[asokoi]	over there

As can be seen in (5) and (6), the locative suffix does not consistently trigger coalescence. Terakawa (1985:28) states that while coalescence does occur with vowel final nouns in the locative, the suffix also surfaces as [i], as in [dokojarai] /dokojara-i/ 'somewhere-LOC' and [asokoi] /asoko-i/ 'over there-LOC'. No further discussion is given by Terakawa (1985)[8]. I presume that deictics are protected from coalescence. Further fieldwork is necessary to confirm whether the locative alternation is productive beyond the few tokens found in the texts above. I leave this question open, but assume for the moment that coalescence is synchronic for non-deictic nouns in the locative.

2.2. Owari verbal forms

I now examine verb alternations found in the non-past (NP) and past tense verbs where stem-final segmental loss in past tense forms feeds the process of coalescence in the Owari dialect. Verbs are divided into consonant-final and vowel-final stems (Bloch 1946). Verbs exist in which coalescence has altered vowel sequences found *within* stems, such as /hair-/ 'enter' e.g. [hæ:ru] 'enter-NP'. Coalescence also occurs at the stem-suffix boundary when certain consonant-final stems lose their stem final consonant. The changes which delete or assimilate stem-final segments are known collectively as *onbin*. We focus here on the deletion of stem-final {k, g} in Tokyo and {k, g, s} in Owari.

Coalescence has been analyzed as occurring synchronically in verbs (Terakawa 1985, Yamada & Niwa 1989), with vowel sequences created at the boundary between a stem terminating in {k, g, s} and a consonant-initial suffix. Certain suffixes, such as the past /-ta/, trigger consonant assimilation or elision when adjacent to a stem-final consonant. An example is the stem /kak-/ 'write'. Consider the non-past (NP) of this stem with the NP suffix /-(r)u/, realized as [kaku] 'write-NP' with the initial consonant unrealized. The stem-final consonant is elided when the stem terminates in {k, g} when consonant initial morphemes such as the past tense morpheme /-ta/ are suffixed, with underlying /kak.ta/ thus surfacing as [kaita] 'write-PAST' in Tokyo Japanese.[9] This then feeds coalescence in Owari Japanese under a synchronic analysis, giving the Owari form [kæ:ta] 'write-PAST'.

This altered verbal stem is traditionally called the *onbin* or 'euphonic' stem (cf. the chapters in Iitoyo, Hino & Satō 1982-1986; Frellesvig 1995, 2010). Stems may elide

[8] Ebata (2013) claims that the locative particle in Owari is [e] as in Standard Japanese, but this may be due to shift in the speakers consulted.

[9] This assumes that the loss of the stem-final consonant is synchronic as in Davis & Tsujimura (1991).

their final segment as shown above or they may exhibit assimilation to an NC cluster or geminate, as with the stem /ɕaber-/ 'chat' /ɕaber-ta/ [ɕabet:a] 'chat-PAST' or /yom-/ 'read' /jom-ta/ [jonda] 'read-PAST'. *Onbin* are a set of three lenition and assimilation processes that affect the final segment of the suffix: elision, nasal assimilation and gemination.[10] First, consider the following Owari verbs in the Non-Past, Negative and Past forms in (7) and (8). Note the past tense verbs bolded in (8b) where coalescence occurs.

(7) **Owari verbs with Vowel-Final stems** (Ebata 2013)

Non-Past	Negative	Past	Gloss
/Stem-(r)u/	/Stem-(a)N/	/Stem-ta/	
iki-ru	iki-N	iki-ta	'live'
jame-ru	jame-N	jame-ta	'quit

(8) **Owari verbs with Consonant-final stems** (Ebata (2013)

a. Stems exhibiting nasal and voicing assimilation

/Stem-(r)u/	/Stem-(a)N/	/Stem-ta/	
ajob-u	ajob-aN	ayonda	'toddle'
am-u	am-aN	anda	'knit'
sin-u	sin-aN	sinda	'die'

b. Exhibiting gemination

a(w)-u	awa-N	at:a	'meet'
tats-u	tata-N	tat:ta	'stand'
jor-u	jor-aN	jot:a	'stop'

c. Exhibiting consonant elision and coalescence

aruk-u	aruk-aN	**ary:ta**	'walk'
isog-u	isog-aN	**isø:da**	'hurry'
kobos-u	kobos-aN	**kobø:ta**	'spill
hirak-u	hirak-aN	**hiræ:ta**	'open, intr.'

In both Owari and Tokyo, *onbin* changes to the stem-final segment are 'triggered' by certain /t/-initial suffixes, such as the gerund /-te/, past /-ta/, conjunctive /-tara/, concessive /-temo/ and assortative /-tari/. I assume for the moment that *onbin* changes are derived synchronically, following Davis & Tsujimura (1991) and Yoshida S. (1996).[11] Out of the three possible stem alterations, elision occurs in {k, g} final stems in Tokyo or {k, g, s} final stems in Owari.

These changes have been captured by Davis & Tsujimura (1991) who approach the *onbin* changes in an Autosegmental rule-based account. I now discuss the application of

[10] For more on the diachrony of *onbin*, I refer the reader to Frellesvig (1995, 2010) for full discussion of its emergence in Old and Early Middle Japanese, see also Section 4. For an overview of the geolinguistic variation of *onbin* forms, see Uwano et al (1989), Iitoyo, Hino & Satō (1982-1986) and NINJAL (1989-2006)

[11] A synchronic process of vowel coalescence is assumed to be active by Terakawa (1985) and Yamada & Niwa (1989). Problems with such an analysis are discussed later in this article.

this proposal for Tokyo consonant stems compare Tokyo stems ending in {k, g} which exhibit lenition to the Owari stems where {k, g, s} elide. The account put forth by Davis & Tsujimura (1991) necessitates an ordered set of rules, as shown in (9). This rule ordering is applied to Tokyo and Owari {k, g, s} final stems in (10) and (11).

(9) **Tokyo process ordering proposed by Davis & Tsujimura** (1991)

a. Sonorant delinking (affects /r/, /w/ final stems)
b. Voicing assimilation (affects suffixes adjacent to [+voice] stems)
c. Nasal linking (affects /b/ final stems)
d. Labial delinking (affects /m/, /b/ final stems)
e. i-epenthesis (affects /s/, /k/, /g/ final stems)
f. Velar deletion (affects /k/, /g/ final stems)

(10) **Gerund form derivations in Tokyo Japanese**

Input	[+voice] spread	Epenthesis	Elision	Output	Gloss
/das.te/	-	/das.te/	-	[daɕite]	‘put-GER’
/kog.te/	/kog.de/	/kog.ide	/ko.ide/	[koide]	‘row-GER’
/kak.te/	-	/kak.ite/	/ka.ite/	[kaite]	‘write-GER’

(11) **Gerund form derivations in Owari Japanese**

Input	[+voice] spread	Epenthesis	Elision	Coalescence	Output	Gloss
/das.te/	-	/das.ite/	/da.ite/	/dæ:te/	[dæ:te]	‘put-GER’
/kog.te/	/kog.de/	/kog.ide	/ko.ide/	/kø:de/	[kø:de]	‘row-GER’
/kak.te/	-	/kak.ite/	/ka.ite/	/kæ:te/	[kæ:te]	‘write-GER’

Following (9) with alterations to Elision and the addition of a rule of Coalescence, we derive the Gerund forms found in (10) for {k, g, s} final stems in the following manner. Voicing assimilation first applies upon suffixation and then the vowel /i/ is epenthesised following Vowel Epenthesis as in (9e) to the consonant cluster formed by the stem and suffix. Velar deletion (9f), then takes place in this intervocalic cluster affecting {k, g} in Tokyo and {k, g, s} in Owari. For Owari, we expand the affected segments for consonant deletion and thus I consider this rule to be one of more general elision rather than velar deletion. This final process then results a vowel sequence as in Tokyo [kaite] from /kak+te/ ‘write-GER’ cf. Old/Middle Japanese *[kakite]. To derive the Owari forms in (11), we add and apply a rule of coalescence which applies last.

For reasons of space, I do not discuss a Government Phonology account of *onbin*, though see Yoshida S. (1996) for an analysis which utilizes similar processes without rule ordering. I note that the above account as well as that provided by Yoshida S.

(1996) utilizes arbitrary processes to give the derived verbal form.[12] The evidence for any synchronic *onbin* processes is somewhat thin on the ground. I return to this issue in Section 4.

Other consonant-final stems undergo either nasalization or gemination. Stems which terminate in /n/ or /t/ undergo no alterations. The stems terminating in {b, m} spread the feature [+voice] to the suffixes above as per voicing assimilation in (9b). These segments then undergo Nasal Linking in (9c) and Delabialization in (9d), with stems surfacing with the segment [n] e.g. /job-ta/ [jonda] 'read-PAST'. Stems terminating in the consonants {w, r} surface with a geminate consonant, in which the final segment delinks following the rule of Sonorant Delinking in (9a) with concomitant spread of the following consonant to the now empty consonantal position. This is seen in verbs such as /ɕaber-ta/ [ɕabet:a] 'talk-PAST'.

Returning to coalescence, I note that Yamada & Niwa (1989) assume that the vowel sequences exists in the underlying forms. Under a derivational rule-based analysis such as that pursued by Tsujimura & Davis (1991), this is plausible and I have provided an account above. The vowel sequence found in Tokyo Japanese simply feeds a process of coalescence e.g. /kak-/ 'write' /kak+ta/ > /kakita/ > /kaita/ > [kæ:ta] 'write-PAST'. A coalescence rule would apply to any vowel sequence of the shape /Vi/ in the grammar and would not be specific to verbal derivations. I later discuss evidence, however, which suggests that this account may not be correct.

2.3. Adjectival forms

I now examine coalescence in adjectives, where it is triggered by the adjectival non-past suffix /-i/. In line with the above analysis, a coalescence rule applies to underlying vowel sequences created by suffixation. Consider the data in (12), where forms exhibit coalescence in the Non-Past forms. The underlying stem vowel resurfaces in Transformative and Hypothetical forms

(12) **Adjectives** (Ebata 2013)

	Non-Past /Stem-i/	Transformative /Stem-naru/	Hypothetical /Stem-kerja/	Gloss
a.	ureɕi-i	ureɕi-naru	ureɕi-kerja	'happy'
b.	takæ:	taka-naru	taka-kerja	'tall'
c.	nukutø:	nukuto-naru	nukuto-kerja	'warm'
d.	akary:	akaru-naru	akaru-kerja	'bright
e.	atsy:	atsu-naru	atsu-kerja	'hot'
f.	samy:	samu-naru	samu-kerja	'cold'

All adjectives exhibit alternations where the coalesced vowel is not present. For example, the stems for 'hot' or /atsu-/ and 'cold' or /samu-/ are realized in the non-past form as [atsy:] 'hot-NP' and [samy:] 'cold-NP'. The stems are also realized without the coalesced vowel when other consonant-initial suffixes are added, such as the Past tense /kat:a/ e.g. [atsukat:a] 'hot-PAST' and [samukat:a] 'cold-PAST'.

[12] These processes are unattested elsewhere in the synchronic phonology of Japanese.

2.4. Compound Nouns

A number of exceptions to coalescence in compound nouns are found in Ebata (2013. If coalescence is a synchronic process, all compound nouns should have coalesced vowels. If compounds are somehow protected from coalescence, this may be due to their structure. See the example compounds from Owari in (13).

(13) **Compounds in Owari** (Ebata 2013)

a.	[koibi]	'little finger'	[ko]	'small'	+ [ibi] 'finger'
b.	[nakaibi]	'middle finger'	[naka]	'middle	+ [ibi] 'finger
c.	[yosoiki]	'going out'	[yoso]	'outside'	+ [iki] 'go'
d.	[wataire]	'cotton stuffed'	[wata]	'cotton'	+ [ire] 'stuff'
e.	[tsy:ri]	'rainy season'	[tsuju]	'monsoon'	+[iri] 'enter'

The above compounds are words where coalescence is absent with the exception of [tsy:ri]. The compound [tsy:ri] may be discounted as it is archaic and can be considered a simplex word originally derived from a compound. The other words above are protected from coalescence. I first hypothesize that the failure of coalescence to apply is due to the structure of compounds. In a Government Phonology analysis (Kaye, Lowenstamm & Vergnaud 1990) compound structure is captured with the use of analytic domains (Kaye 1995), which I discuss in Section 3.

2.5. Problems with a synchronic analysis of coalescence

At first glance, it seems that since there are clear morphological alternations, coalescence is a synchronic process which affects all Yamato and Sino-Japanese words where the context for coalescence is met. However, some exceptions to coalescence and a complicated process of derivation for verbs pose a challenge. An alternative analysis is also available: coalesced forms are lexically listed and coalescence is a diachronic sound change. In the remainder of this paper, I examine evidence which suggests that the latter view is correct.

In section 3, I refer to the structure of compound nouns with reference to analytic and non-analytic domains (Kaye 1995, Yoshida Y. 1999), discussed in the following section. Section 4 examines issues with the synchronic analysis of verbal derivation above. I examine the diachronic aspects of change, the behavior of new verbs, and experimental results which all suggest that verbal paradigms are no longer derived and are listed in the lexicon. Section 5 concludes the article by examining the interaction between pitch accent assignment and the vowels formed through coalescence.

3. Analytic and Non-Analytic Domains in English and Japanese

I now consider compounds and their structure utilizing the theory of analytic and non-analytic domains, proposed by Kaye (1995) to account for the interactions between morphological structure and phonological processes. The theory has been utilized previously for analysis of Tokyo Japanese by Yoshida Y. (1999). I first introduce the theory and then examine Owari compound nouns.

3.1. The visibility of morphology to phonological processes

It is uncontroversial that some morphological structure is visible to the phonology, but the question Kaye attempts to tackle is how much morphological structure is visible to

the phonology and what effect this structure has. The theory builds on the theories of morpho-phonology proposed by Kiparsky (1985) and Bromberger & Halle (1989).

Kaye (1995:302) states that "…Morphological structure has two effects on the phonology: little and none. These two interactions are called **Analytic** and **Non-analytic**." (Emphasis mine.) Analytic morphology has its own domain and thus analytic words have multiple domains to which phonology applies. Non-analytic words lack internal domains and non-analytic morphology brings no phonological domain to what may be understood neutrally to be a morphologically complex word. Analytic affixes are roughly equivalent to Level 2 affixes in Lexical Phonology (Kiparsky 1982, 1985) while non-analytic affixation is roughly equivalent to Level 1 affixation.

True compounds are composed of analytic domains. They are of the shape [[A][B]] or [[A]B] as in a word such as [[párent][hòod]] or [[dúst]mɨn] where each piece of morphological material has a domain in which phonology applies.[13] Non-analytic domains are words in which there are no visible domains with regards to phonology. They are of the shape [AB] as in [paréntal], which has penultimate stress assignment similar to the morphologically simpleword [agénda]. I unpack these notions in depth below.

Government Phonology (Kaye, Lowenstamm & Vergnaud (1990) eschews resyllabification and bans process ordering (Kaye 1992) as well as alteration to already computed structure. This is captured succinctly in the Projection Principle (Kaye, Lowenstamm & Vergnaud 1990), the Principle of Strict Cyclicity (Kean 1974, Kaye 1992) and the Minimality Hypothesis (Kaye 1992). The Principle of Strict Cyclicity (PSC) prevents alteration of previous phonological computation, such as stress assignment[14]. The Minimality Hypothesis bans any rule ordering or stratification and states that all processes may apply wherever the conditions are met. These statements are reproduced below.

(14) **The Projection Principle** (Kaye, Lowenstamm & Vergnaud 1990:221)
Governing relations are defined at the level of lexical representation and remain constant throughout a phonological derivation.

(15) **The Principle of Strict Cyclicity** (Kean 1974:179; Kaye 1992:142)
On any cycle A, no cyclic rule may apply to material within a previous cycle B without making crucial use of material uniquely in A.

(16) **The Minimalist Hypothesis** (Kaye 1992)
Phonological processes apply wherever their conditions are met.

[13] It is clear that 'dustman' is morphologically complex due to the preservation of the […st]m] cluster. In a simplex word, such a cluster would not be licensed as it is analysed within GP as a Rhyme-Onset-Onset cluster which is not possible in English. In this word, a domain-final nucleus is licensed in […st_] which provides Government Licensing (Charette 1990) to the preceding Coda-Onset cluster (Kaye 1990) with the following Onset being found in an independent domain. A lack of reduction of this cluster is a hallmark of a complex domain, yet no stress is found on *man* due to this portion of the compound being a dependent domain. See Kaye (1995) for more on licensing of positions in Analytic domains.
[14] See Scheer (2011) for critical discussion of Kaye (1992, 1995).

The Projection principle bans resyllabification operations. Following the PSC, alteration of an already processed domain is banned. The Minimality Hypothesis assumes that no strict ordering of processes is allowed, for the derivation of a well-formed phonological word. Processes apply without making reference to strata as in Lexical Phonology (Kiparsky 1985).

Given the above principles, exceptions to coalescence may then be explained as occurring within analytic domains. If coalescence is a process in the phonological grammar, it should occur wherever the context is met, unless the vowel sequences is in fact separated in the lexicon by a domain boundary e.g. [[ko][ibi]] 'little finger'.

The phonology portion of the morpho-phonology consists of two functions under Kaye's formalism: the Phonology function (φ) and the Concatenation function. The morphological domain in question is scanned by the phonology function with processes applying wherever their conditions are met. For us, this means a coalescence context where V1 is of the set {a, o, u} and V2 is /i/.

Once all possible processes have applied within a domain, this domain is concatenated with any neighboring domain and the process is repeated until all domains are processed and the word is ready for phonetic interpretation. More formally, we may consider a word ready for interpretation when all positions are licensed, following Kaye (1990) and Charette (1990).

3.2. [[A][B]]Analytic Domains

I now expand on the notion of analytic domains, which come in the shape [[A][B]] for a word composed of two independent domains or [[A]B] in a word with one independent domain and one dependent domain. The analytic domain shape of [[A][B]] is the structure of a compound noun. Consider the word 'blackboard' which is a compound consisting of two morphemes, [blák] and [bórd]. Kaye proposes a domain structure of [[blák][bórd]] for the resultant word [blákbòrd]. This word in fact has three domains: [blak], [bord] and [blakbord] or [A], [B] and [[A][B]], to which phonological processes apply. Note that the final result, [blákbòrd], has a primary and a secondary stress with no vowel reduction found in the unstressed vowel - this is caused by the assignment of stress to each domain [A] and [B] with the percolation of stress to the following concatenated domain, [AB]. The phonology then assigns one of the projected stresses as primary stress, namely the left domain in English.

3.2.1. Tokyo Japanese Analytic Compounds[15]

In Japanese analytic nominal compounds, Yoshida Y. (1999) proposes that the right-hand member of a compound determines the pitch accent of the resultant compound.[16] All words in Japanese come in both Accented and Unaccented variants. Following the GP analysis pursued by Yoshida Y. (1999), accented words have one accented nucleus, which is specified in the lexicon. Unaccented words are underlyingly unaccented with accent placed on the final nucleus during interpretation, wherever the

[15] I assume no distinction between Standard and Tokyo Japanese, though idiolectal variation does exist. I refer to the Standard as Tokyo Japanese, following Uwano (1977)

[16] I refer the reader to Yoshida Y. (1999) for more information on non-Yamato and longer compounds. See also Kubozono (2008), Nishiyama (2010) and Kawahara (2015) for other discussions of pitch accent.

end of the final domain occurs. Spread of the accent occurs until the initial nucleus in Tokyo Japanese. Consider the structure of Tokyo analytic compounds in (17). I follow Yoshida's notation below utilizing an asterisk for accented nuclei and an overline to represent high pitch.

(17) **Tokyo Analytic Compounds** (Yoshida Y. 1999:134-136)

a.	[ta ke]	+	[ha ɕi]	-> [ta ke ba ɕi][17]
	'bamboo'		'chopsticks'	'bamboo chop sticks'
b.	[a ta ma]	+	[ka zu]	-> [a ta ma ka zu]
	'head'		'number'	'head count'
c.	[sa sa]	+	[mi do ri]	-> [sa sa mi do ri]
	'bamboo grass'		'green'	'green of bamboo grass'
d.	[na ma]	+	[ta ma go]	-> [na ma ta ma go]
	'raw'		'egg'	'raw egg'
e.	[ka ni]	+	[ta ma go]	-> [ka ni ta ma go]
	'crab'		'egg'	'crab omelette'
f.	[u zu ra]	+	[ta ma go]	-> [u zu ra ta ma go]
	'quail'		'egg'	'quail omelette'

Above, the resultant compound retains the accent pattern of the righthand term. Yoshida Y. (1999) proposes that in analytic compounds the [B] domain determines the accent of the final [AB] domain and is the head of the compound [[A][B]]. Unlike stress languages, no secondary accents are possible in Tokyo Japanese pitch accent and thus no trace of the [A] domain accent remains[18]. If Owari compounds are analytic, we expect the [B] domain pitch accent to be preserved.

3.3. [[A]B] Analytic Domains

[[A]B] is also a proposed domain structure for compounds. Consider the words 'superman' and 'postman' in Southern British English discussed by Kaye (1995). The word [súpə̀màn] has a structure of [[super][man]] and thus has secondary stress on the ultimate nucleus. The stress is preserved in domain [B] in the final from but is realized as secondary stress. No vowel reduction occurs in [man].

[17] Some compounds exhibit *rendaku* or 'sequential voicing' where voiceless initial consonants {k, s, t, g} are realised as their voiced counterparts {g, z, d, b}. I refer the reader to works such as Itō & Mester (1986), Nasukawa (2005) and Labrune (2012) for further discussion of this phenomenon.

[18] An alternative interpretation is that pitch spread masks any realisation of the accent and that the projected nuclear structure in domain [A], posited by Yoshida Y. (1999), simply fails to be interpreted.

Compare this to the compound ‘postman’ which has the proposed structure of [[post]man]. The resultant form [póstmɨn] has no secondary stress on the ultimate nucleus and reduced vowel in the ultimate nucleus, which points to a domain shape of [[A]B]. Reduction processes and lack of secondary stress is a signal for a dependent domain in English.

This domain shape is also found in verbs and other constructions as with the past tense morpheme /-d/ or plural morpheme /-z/. Words with dependent morphemes are proposed to have the structure [[A]B]. Kaye (1995) notes that this structure is signaled by phonotactically odd words. This analytic structure creates otherwise unacceptable clusters within a language. Kaye (1995) notes that in a word such as [[dri:m]z], /m/ is not homorganic to /z/, while nasal homorganicity within a regular mono-morphemic word would be necessary for a nasal-obstruent cluster to hold. The [A] domain final empty nucleus is preserved and change to the domain final nasal /m/ is prevented through the PSC, where no alteration to domain [A] is permitted in an analytic word of the shape [[A][B]] or [[A]B] in the final concatenated [AB] domain and no vowel shortening is evidenced.

3.3.1. [[A]B] domains in Tokyo Japanese

This domain shape has only been proposed by Yoshida Y. (1999:146-151) for noun-particle combinations as in Accented [[namida]ga] ‘tear-NOM’ and Unaccented [[sakura]ga] ‘cherry-NOM’.

(18) **Representation of nominative derivations in [[A]B] domains**

a. [sa ku ra] + ga = [sa ku ra ga]

b. [na mi da] + ga = [na mi da ga]

I note that the same [[A]B] structure is possible for Japanese verbs and adjectives[19]. In Owari compounds, I expect compounds to exhibit preservation of the pitch of domain [B].

3.4. Non-Analytic morphology

Morphology which carries no domain information to the phonology, or in which no boundaries are visible to phonology, is **non-analytic morphology**, with a structure [A B] (Kaye 1995:308). An example of this cited by Kaye (1995) is the English suffix *-al* as in *parental*. *Paréntal* exhibits ‘stress shift’ which is in actuality the result of a non-analytic domain structure. If the word *parental* were analytic e.g. [[parent]al], stress would be assigned to the [A] domain e.g. [párɨnt] followed by computation of the full word giving *[párɨntɨl], as expected if the word were of the domain shape [[A]B]. Kaye notes that this stress pattern is the same as with a simplex word such as [agénda].

[19] Yoshida Y. (1999) proposes that verbs are Non-Analytic but this is dependent upon the assumption that accent is default antepenultimate for nouns as well as verbs. The current consensus, however, is that accent in verbs is different, with penultimate accent being the default. See Nishiyama (2010).

Non-analytic behavior in Japanese can also be seen in the following compounds drawn from Yoshida Y. (1999:98).

(19) **Non-analytic compounds in Tokyo Japanese**

a. [haná] ‘flower’ + [katá] ‘shape] = [hanágata] ‘star/popular person’

b. [uɛiro] ‘behind’ + [aɛí] ‘leg’ = [uɛiróaɛi] ‘hind legs’

c. [yamá] ‘mountain’ + [mitɛi] ‘street’ = [yamámitɛi] ‘mountain foot path’

d. [sakura] ‘cherry’ + [mitɛi] ‘street’ = [sakurámitɛi] ‘cherry road’

In the above compounds, preservation of the [B] domain accent as seen earlier is absent. Antepenultimate accent is found, identical to simple Japanese words which are longer than three nuclei such as Tokyo [murásaki] or [hototógisu] ‘cuckoo’.

Non-analytic forms are largely idiosyncratic or irregular forms. Kaye (1995) claims that any non-analytic form is listed separately in the lexicon, as these are not synchronically produced (Kaye 1995:311). He further states that *all irregular paradigms*, such as English strong verbs e.g. *wept*, ought to be listed in the lexicon separately and that the relation between irregular forms is diachronic and thus not relative to the phonology. This could easily be the case for Owari verb forms and would predict a lexicalist account of verbal paradigms.

3.5. Domain elision: from Analytic to Non-Analytic

Kaye (1995) further notes cases where analytic compounds may eventually become non-analytic as well as cases of speaker variation captured as variable domain structure. Domains may eventually fade, such as in the word *cupboard* [kʌ́bɨd] , which has elided its domains and undergone phonological change. The vowel [ɔ:] in ‘board’ is reduced to [bɨd] and no secondary stress is assigned as would be expected in an analytic domain. Also telling is the medial cluster not being realized as it might be in other compounds such as the nonsense word *capboard* [[kǽp][bɔ̀:d]].

Variation may also be explained through domain elision. This is noted by Kaye (1995) in compounds utilizing the word [metre]. Compare non-analytic [àltímətə̀] ‘altimeter’ to analytic [[áltĭ][mítər]] and analytic [[kílə̀][mítĕ]] versus non-analytic [kə̀lómətə̀].

3.6. Analytic to Non-Analytic domains in Japanese

Yoshida Y. (1999:144-146) also notes that there is domain elision found in the Tokyo Japanese interpretation of compound nouns. This is clear when a compound behaves as a simple word in its failure to retain the accent of an Accented [B] domain and exhibit antepenultimate accent.

(20) **Analytic variants of compounds** (Older speakers, Yoshida Y. 1999)

a.
*		*		(*) _____*
[na ma]	+	[ta ma go]	->	[na ma ta ma go]
‘raw’		‘egg’		‘raw egg’

b.
_		*		_____*
[ka ni]	+	[ta ma go]	->	[ka ni ta ma go]
‘crab’		‘egg’		‘crab omelette’

c.
___		*		_____*
[u zu ra]	+	[ta ma go]	->	[u zu ra ta ma go]
‘quail’		‘egg’		‘quail omelette’

(21) **Non-Analytic variants of compounds** (Younger speakers, Yoshida Y. 1999)

a.
*		*		____*
[na ma]	+	[ta ma go]	->	[na ma ta ma go]
‘raw’		‘egg’		‘raw egg’

b.
_		*		____*
[ka ni]	+	[ta ma go]	->	[ka ni ta ma go]
‘crab’		‘egg’		‘crab omelette’

c.
___		*		_____*
[u zu ra]	+	[ta ma go]	->	[u zu ra ta ma go]
‘quail’		‘egg’		‘quail omelette’

The above compounds in (21) show no preservation of the [B] domain pitch accent and instead pattern with simplex words with more than three nuclei such as [hototógisu] ‘cuckoo’ in exhibiting antepenultimate accent assignment. Elision is noted to exist in Japanese as well as in English, with Yoshida Y (1999:144-146) noting shift from analytic to non-analytic compounding found in some younger speakers. Compare the Japanese analytic [[uzura][tamágo]] to non-analytic [uzuratámago] with English analytic [[kílə][mítĕ]] versus non-analytic [kə̆lómətə̆]. This exemplifies the elision of domains in both Japanese and English.

3.7. Domains theory exceptionality and predictions

In sum, analytic compounds are protected from phonological processes by their structure as per the PSC: the domains have already been processed by phonology and thus are impermeable to alteration in following domains. This analysis has also been applied to harmony in Turkish (Ploch 1996) and Basque (Cobb 1996) compounds, with application of harmony failing to apply across the [B] domain of analytic nominal compounds [20]. What we expect to find is for the same facts regarding accent preservation in an analytic compound to hold for Owari Japanese.

[20] A fuller discussion of Analytic and Non-Analytic domains and exemplification for other languages can be found in Da Silva (1992), Gussmann & Kaye (1993), Charette (2000, 2004), Kula (2002) and Scheer (2011) among others. For a recent analysis of Japanese accent couched in Optimality Theory (Prince & Smolensky 2002) utilizing Domains, see Poppe (2012).

3.8. Owari Compound nouns revisited

Recall the data presented earlier in this article, presented again for convenience. I note that pitch accent assignment in Owari is nearly identical to that of Tokyo words (Uwano 1977, Keshikawa 1983, Terakawa 1985) and the same analytic patterning is expected in Owari Japanese. Consider the compounds in (22) with proposed domain structures.

(22) **Compounds in Owari** (Ebata 2013)

a.	[[koi][bi]] 'little finger'	[ko] 'small' + [ibi] 'finger'
b.	[[naka][ibi] 'middle finger'	[naka] 'middle +[ibi] 'finger
c.	[[yoso][iki]] 'going out'	[yoso] 'outside' + [iki] 'go'
d.	[[wata][ire]] 'cotton stuffed'	[wata] 'cotton' + [ire] 'stuff'
e.	[tsy:ri] 'rainy season'	[tsuju] 'monsoon'+ [iri] 'enter'

We can hypothesize that the above exceptions to coalescence are analytic compounds, while compounds exhibiting coalescence have become non-analytic as in [tsy:ri]. Compare [tsy:ri] to the English word 'cupboard'. The compound [tsy:ri] is likely a product of domain elision, with an original structure of *[[tsuyu][iri]], as with other non-analytic compounds discussed above. Ebata (2013) also notes that this word is slightly archaic. An analytic analysis would account for a lack of coalescence in a word such as [nakaibi] 'middle finger', with a structure of [[naka][ibi]].

Following Yoshida Y. (1999), an analytic domain analysis for the compounds above which resist coalescence also predicts that the accent of domain [B] in the compounds above takes precedence in analytic compounds of the shape [[A][B]], e.g. [[ko][ibi]]. While a full accent analysis of the dialect and all possible compounds is beyond the scope of this paper, we now examine the accent patterns found in the compounds containing [ibi] 'finger' for which comparable data is available. What is expected is that all finger names in (23) will have final accent as with the original constituent word [ibí], which appears in the [B] domain. The data shows that this is not the case. I represent the accented nucleus with an acute accent. Unaccented words represented with no acute accent. Spreading is not noted below.

(23) **Compound nouns for fingers** (Ebata 2013)

a.	[i bí]	'finger'
b.	[ó ja]	'parent'
c.	[o ja í bi]	'big finger, thumb'
d.	[ku su ri]	'medicine'
e.	[ku su ri í bi]	'ring finger'
f.	[ná ka]	'middle'
g.	[na ká i bi]	'middle finger'
h.	[hi to sa ɕi í bi]	'index finger'
i.	[ko í bi]	'little finger'

One can observe that the final accent of [ibí] is not preserved in any of the forms above. The resultant compounds either exhibit penultimate accent, as is found with verbs and adjectives in many Owari words (cf. Section 5) or antepenultimate accent, found in longer non-analytic compounds and simplex words as in Tokyo Japanese above and in Owari the words [ɕaembátake] 'vegetable garden' or [murásaki] 'purple' (Ebata 2013).

The patterns in (23) are not expected if these compounds are proposed to be analytic compounds with the domain shape of [[A][B]].

If we propose the alternate domain shape of [[A]B], this analysis also fails: accent would not be found on the [ibi] portion of the compound and the accent of domain [A] would be retained. I represent the relevant data in (24).

(24) **Owari compounds (Ebata 2013) with comparable [A] domains**

a.	[ó ja]	‘parent’	
b.	[o ja í bi]	‘big finger, thumb’	*[ó ja i bi]
c.	[ku su ri]	‘medicine’	
d.	[ku su ri í bi]	‘ring finger’	*[ku su ri i bi]
e.	[ná ka]	‘middle’	
f.	[na ká i bi]	‘middle finger’	*[ná ka i bi]

Note that for those compounds where the separate [A] domains own accent is attested in Ebata (2013), I note that the accent pattern of the [A] domain does not predict the final shape of the compound. The above compound forms are unpredictable in their accent assignment, which is a hallmark of a non-compound word. GP predicts that these compounds must be listed with their accent specified in the lexicon like morphologically simplex words.

What is crucial here is that the lack of coalescence in these forms is not predicted by their non-analytic structure. With respect to vowel coalescence these forms are clearly non-analytic. If these forms are non-analytic, they should be assessed by the phonology as one domain and coalescence should occur if synchronic. There is no prevention of coalescence predicted by the GP model. Two options are available at this point. We say the preceding domains analysis is incorrect to admit a few exceptions. Alternatively, we investigate the possible inactivity of coalescence as a synchronic phonological process and assume that all vowels which seem to be outputs of coalescence are in fact underlyingly specified as long vowels rather than vowel sequences. I now take the stance that coalescence is diachronic and long vowels ought to be specified underlyingly. I discuss issues with a synchronic analysis of elision and coalescence in verbs in Section 4 and the behavior of Owari pitch accent spread in Section 5 which points to the coalesced vowels in Owari as having a long vowel structure underlyingly.

4. Problems with verbal coalescence

I now re-examine the issue of synchronic verbal coalescence in verbal forms. A transparent analysis of synchronic coalescence in verbs is dependent upon the synchronic activity of consonant elision, which affects stems in segments {k, g, s}. I recall the relevant data in (25) below.

(25) **Consonant-final stems exhibiting coalescence**

	Non-Past	Negative	Past	Gloss
a.	aruk-u	aruk-aN	**ary:ta**	‘walk’
b.	isog-u	isog-aN	**isø:da**	‘hurry’
c.	das-u	das-aN	**dæ:ta**	‘put out’

To posit a synchronic case for coalescence in verb forms, it must be clear that the elision and assimilation processes are synchronic, with the above forms being formed through deletion of the stem-final segments {k, g, s}. This in turn gives rise to a vowel sequence, feeding coalescence. The alternatives are either a full listing of the paradigm in the lexicon or the listing of a suppletive *onbin* stem with a vowel sequence specified in the lexicon, such as /arui-/ 'walk-PAST'. The existence of a separate stem has been assumed in previous literature where synchronic *onbin* has been denied (as in Frellesvig 2010, Iitoyo, Hino and Satō 1982-1986). I note that this analysis in the Owari dialect would posit the existence of a stem with a vowel sequence, one which never surfaces and which cannot be independently verified. The existence of a lexically separate stem is possible for Owari, but the coalesced vowel would be specified underlyingly as part of the *onbin* stem e.g. /kak-/ 'write' would be associated with the *onbin* stem /kæ:-/. In the remainder of Section 4, I discuss evidence which supports lexical listing for verb forms.

4.1. The diachronic facts of *onbin*

We must first consider the age of *onbin* processes. By *onbin* I refer to the lenition and assimilation processes noted in 2.2, though other variants besides those found in Tokyo and Owari Japanese are found within the dialects. Frellesvig (2010:191-195) notes that words affected by *onbin* were widely attested by the Late Middle Japanese period (1200-1600 C.E.) and also gives evidence that *onbin* dates to the Old Japanese period, dating the birth of *onbin* to roughly before 800 C.E. *Onbin* forms begin to appear in texts through the Early Middle Japanese period (800 C.E.-1200 C.E.). The forms with *onbin* changes are widely attested in the Late Middle Japanese period (1200-1600 C.E.) in both native and foreign texts. This is especially transparent in accounts from foreign grammarians, such as those from the Portuguese missionary Rodrigues (1603-4, 1604-8). Both *onbin* variants and the original unaltered verbal stems were still in use during this period, but *onbin* forms were characteristic of speech and non-*onbin* forms characteristic of the written word. This evidenced in both prose texts and commentary by native philologists (Frellesvig 2010:194).

The *onbin* changes affected all categories of words, not just verbs. Frellesvig (2010:192) notes that the *onbin* processes were not entirely regular, unlike the automatic and regular lenition of consonants such as /p/ to /w/ or /f/ e.g. [kapu]>[kawu] 'buy-NP' and [kepu]>[kefu] 'today' found in the Early Middle Japanese. Frellesvig states that "…The *onbin* changes give rise to variant shapes of individual words or morphemes which coexisted for a considerable period…" (Frellesvig:2010:231). Importantly, I point out the fact than *onbin* were not regular. "They were non-automatic sound changes; that is to say, there were certain phonological conditions which had to be met for *onbin* to take place, but no identifiable phonological conditions under which the change **must** occur." (Frellesvig 2010:231, emphasis mine). Variation in modern dialects occurs largely due to the various forms of a Middle Japanese word which survived in certain areas and not others. Compare Eastern Japanese /kaw.ta/ [kat:a] 'buy-PAST' to Western Japanese [ko:ta] 'buy-PAST'. There is now no synchronic derivation at work, but rather variant *onbin* forms were adopted by different populations.

In addition to the age of the changes, Frellesvig (2010:230-2) claims that not all *onbin* sound changes affecting verb stems were equal. He notes a division between core *onbin* and analogical *onbin*. The core *onbin* were found in verbs, nouns and other words and affected the word medial segments {p, b, m, n, k, g}. The analogical *onbin* changes affected only verbal stems terminating in {t, r, s} as the result of analogy from the core changes preceding certain suffixes.

While I note that analogy and universality of *onbin* forms may have led speakers to generalise a verbal paradigm, there is also the issue of suffixes failing to create new *onbin* forms in more recent stages of the language. Frellesvig (2010:130-1) notes that later suffixes such as the LMJ desiderative /-(i)ta-/ did not trigger *onbin* though earlier suffixes of a similar shape such as the EMJ perfect suffix /-(i)te/ regularly trigger *onbin*.

Synchronically these changes are explained by analysing *onbin* triggering suffixes as consonant-initial. Other suffixes are analysed as vowel initial though it must be noted that consonant-initial suffixes such as /-(r)u/ for the Non-Past simply exhibit their initial consonant following Vowel-final stems and suppress this consonant when adjoined to a consonant-final stem. Why does the initial /t/ of the Gerund suffix /-te/ never exhibit such alternations? It must be stipulated that *onbin* are only triggered by a specific set of suffixes. While synchronically speakers know nothing of diachrony, this still seems to be a somewhat arbitrary analysis. I note that while a synchronic analysis of these forms is possible, the irregular *onbin* changes are not independently attested in Modern Japanese dialects and there seems to be little motivation for such a synchronic analysis.

I argue that a lack of recent *onbin* forms is due to *onbin* failing to be a synchronic process in the Late Middle Japanese (1200-1600 C.E.) period, with speakers lexicalising these forms in Modern Japanese. Once we take the step to posit full suppletion for *onbin* forms, arbitrary aspects of deriving a synchronic analysis vanish. Dialect variation found in modern Japanese dialects is not a result of synchronic *onbin* rule variation but rather simply variation in learned paradigms. Coalescence is simply another diachronic rule which applied following the Late Middle Japanese period.[21]

I support the lexical analysis in the following discussions of new verbs and experimental results which point towards a stored verbal paradigm with no productivity of *onbin* processes.

4.2. New verbs

I note that new verbs with stems from clipped loan words never form consonant-final stems affected by consonant elision. Verb stems terminating in the segments {s, k, g, b, m, n, t} are a closed class. Tsujimura & Davis (2011) offer an overview of new coinages which fall into two classes. New verbs are formed either by usage of the light verb construction /X-suru/ ‘to do X’, such as [memo-suru] ‘to make a memo’ or by addition of the same suffixes as the r-final stems to a novel stem formed from a clipped word with /r/ added. An example of the latter is the verb stem /sabor-/ ‘cut–class’ from

[21] I briefly note that evidence of /Vi/ coalescence is absent in the work of Rodrigues (1604) which roughly places coalescence occurring after the Middle Japanese period. Keshikawa (1971) and Hikosaka (1997) note that works from the early 1800’s show orthographical errors which are perhaps evidence of coalescence.

French ‘sabotage’ conjugated as /sabor-u/ ‘cut class.NP’ and /sabo-t:a/ ‘cut.class.PAST’. This occurs productively with commonly known concepts (e.g. ‘to google’ [guguru]) or coinages specific to certain groups but, Tsujimura & Davis (2011) note that the light verb construction is more common[22]. I know of no new verbs which utilise any other consonant-final stems productively. The class of consonant-final stems seems to be a closed class. Experimental evidence also shows that speakers are not able to recognize and derive novel consonant-final nonsense verb stems reliably.

4.3. Experimental evidence against synchronic derivation

Experiments by Vance (1991) utilise nonsense verbs to test Tokyo Japanese speakers on their ability to derive consonant-final verbs based on the existing paradigms. I discuss the results of Vance (1991) below. The results in fact fail to show that speakers are able to generate verb forms synchronically or even utilise analogy effectively, pointing towards lexical listing for verb paradigms.

Vance (1991) held a number of experiments (building on an earlier experiment with design flaws in Vance 1987) designed to test the ability of Tokyo Japanese speakers to conjugate novel consonant-final verb forms.

The task was a multiple choice pen-and-paper forced choice experiment with no time limit. The design disguised nonsense word stimuli in the introduction as slang words for standard verb forms (*hok-u* as a slang nonsense word for the *mi-ru* ‘see’). Subjects were given two examples of each nonsense verb with the non-past /-(r)u-/ and desiderative /-(i)tai/ suffixes. The nonsense verb stems given were /hom-/ /mur-/, /hok-/ and /kap-/ which were given associated real verbs as semantic counter parts e.g. [hoku] was given as a ‘real’ fashionable word for common verb [mir-u] ‘look-NP’ .[23] Each set of stimuli was followed by a multiple-choice task where a sentence with the verb blank was given, with the respondent choosing from three possible verb forms, one of which is analogically correct e.g. [hota], [hokutta] and [hoita] were all possible Past tense responses for the nonsense stem /hok-/ with [hoita] being the analogically correct response compared to other real verbs such as [kaita] ‘write-PAST]. The participants were tested on the conjugation of the stem in combination with the hypothetical /-(r)eba/, volitional /-(j)o:/, negative /-(a)nai/ and past tense /-(i)ta/ forms.

A separate task further analysed the ability of respondents to conjugate nonsense /r/ final stems. I do not discuss the results of the nonsense-word /kap-/ or the results of the second experiment and focus instead on the results relevant for *onbin* forms.

The results of 50 subjects, chosen at random, were selected for analysis. The results are poor for the three verbs with real counterpart paradigms (/hom-/ /hok-/ /mur-/). Only 68% of the total number responses, or 410/600, were correct among all responses.

[22] An example of the former is ‘Google’ forming the verbs /gugur-u/ ‘google.NP’ /gugu-t:a/ ‘google.PAST’. An example of the latter is specific to students at Kwansei Gakuin University , with students using the verbs [paparu] and [mamaru] to lightly refer to eating at the on-campus cafeterias Big Papa and Big Mama

[23] Consonant-final verb stems terminating in /p/ do not exist in Japanese. Vance (1991) utilised this novel verb to test the speakers’ ability to analogically create a paradigm from existing consonant-final stems. Speakers did not succeed in accurately performing this task, see Vance (1991) for details.

While the correct response percentage is above chance, it would be expected that speakers would perform more accurately if they had an active ability to conjugate consonant-final verb paradigms or if speakers actively used analogy to form new paradigms.

Respondents performed most poorly on responses to the verb stem /hok-/, with the mean correct per subject for /hok/ being 2.42/4 compared to 2.92 correct responses per subject for the stem /hom-/.The given forms for *hok*- were [hoku] 'hoku.NP' and [hokitai] 'hoku-DES' with analologically correct responses for the other forms being [hokeba] (Hypothetical), [hoko:] (Volitional), [hokanai] (Negative) and [hoita] (Past). The paradigm is clear given the non-past and desiderative priming sentences, so it is unclear why all speakers did not perform well given the lack of timing restrictions.

Vance (1991) claims that the subjects had difficulty recognising analogically correct verbal forms, and that the results tentatively support the hypothesis that regular inflectional forms are stored in the lexicon in addition to previous experiments reported in (Vance 1987). While the regular paradigm of consonant-final verb stems and a synchronic phonological analysis such as that by Davis & Tsujimura (1991) would predict the correct recognition and production of these verbs, subjects do not seem to accurately analyse nonsense stems as predicted nor do speakers conjugate them correctly and reliably in a forced choice task, even given adequate stimuli and time in which to respond. De Chene (1982), Batchelder & Ōta (2000), Klafehn (2003) and Sugaya (2011) present further evidence from nonsense word studies which support the lexical storage hypothesis for native Japanese speakers.

What the above results predict is that the paradigms of consonant-final stems are stored in the lexicon for Tokyo Japanese speakers. It is reasonable to assume that Owari speakers would show similar results. Having given evidence that forms might be lexically listed, I now discuss in the following section evidence from Owari pitch accent which supports the lexical listing of coalesced vowels. The evidence suggests that rather than vowel sequences being present underlyingly in nominal and verbal forms, long vowels are found in the lexical structures.

5. The behaviour of coalesced vowels and pitch accent

I now discuss the behaviour of coalesced vowels in relation to pitch accent spread. Accent patterns found in Tokyo and Owari are identical with the exception of the regressive spread of accent from the accented nucleus. Accent spreading is analysed by Yoshida Y. (1992, 1999) as operating regressively until the initial nucleus in Tokyo. I note that in Owari pitch spread operates until the pen-initial nucleus, yet this rule may be broken in certain contexts. This has been noted previously by Mizutani (1960) and Uwano (1977). I discuss the facts below.

5.1. The unique characteristics of Owari spreading

Mizutani (1960) observes that Tokyo accent and Owari accent are not quite identical when one considers the pitch patterns found. Consider the following data from Tokyo and Owari which focuses on nouns in plain and nominative form with three nuclei, drawing on data from Uwano (1977). Notation from Yoshida Y. (1999) is applied to differentiate Accented and Unaccented words.

(26) **Tokyo and Owari nominal accent**

a. **Tokyo nominal forms** (Uwano 1977:290)

Citation form	Noun.NOM	Gloss
ka bu to	ka bu to ga	‘helmet’
ko ko ro	ko ko ro ga	‘heart’
ka ga mi	ka ga mi ga	‘mirror’
sa ku ra	sa ku ra ga	‘cherry blossom’

b. **Owari forms** (Uwano 1977:290)

Citation form	Noun.NOM	Gloss
ka bu to	ka bu to ga	‘helmet’
ko ko ro	ko ko ro ga	‘heart’
ka ga mi	ka ga mi ga	‘mirror’
sa ku ra	sa ku ra ga	‘cherry blossom’

c. **Longer words** (Ebata 2013)

u ta ga u	‘doubt’
o ku ja mi	‘mourning’
sa ki o to to ɕi	‘three years ago’

In (26a), pitch spread occurs wherever possible until the initial nucleus in Tokyo Japanese. In (26b), we see identical Accented and Unaccented patterns represented in Owari but we find that spread does not affect the initial nor peninitial nucleus. Extending the analysis of Tokyo Japanese in Yoshida Y. (1999), I claim that there is inaccessibility for spreading of the two initial nuclei, rather than the sole initial nucleus as in Tokyo Japanese. This explains why spread is nonexistent in an Unaccented word with three nuclei such as /sakura/. Spread is exhibited only when the nominative particle /ga/ is added. Mizutani’s (1960) is correct in his intuition that Owari accent assignment is different. In a GP understanding of pitch accent utilized here, it is obvious that the difference between the dialects can be captured by a more restrictive spreading process. However, Mizutani (1960) also notes another difference: a pitch attraction rule in Owari Japanese exists which is sensitive to the occurrence of long vowels and nasal-obstruent clusters.

5.2. Pitch attraction in Owari Japanese

Mizutani (1960) then examines words with long vowel or a nasal-obstruent cluster in either the initial or pen-initial position. In these words, pitch attraction may operate and violate the ban on spreading to the initial and second nucleus. He notes this data from recordings and examines various contexts in which this process occurs. Data in Ebata (2013) supports this assertion. I discuss only long vowels below. I note that with regards to pitch attraction, both the five standard long vowels of the set {a, i, u, e, o} and the coalesced vowels {æ, ø, y} behave in an identical manner.

(27) **Data showing spread to pen-initial nucleus** (Ebata 2013)

a. o se: bo: ‘end of the year’

b. ɕi ø: ga ri ‘shell gathering/clamming’

c. e ræ: ga o ‘triumphant look’

d. o ɕo: ga ttsama ‘the new year’

(28) **Data showing spread to initial nucleus** (Ebata 2013)

a. to: mo ‘ricefield’

b. dæ: do ko ‘kitchen’

c. sy: ka ‘watermelon’

d. kø:tsu ‘this person’

e. tæ: fu: ‘typhoon’

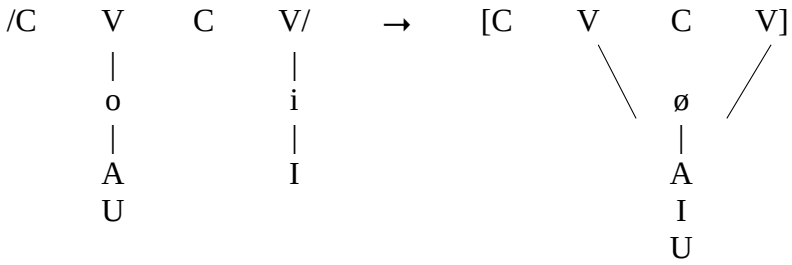
f. dʑo:dan ‘joke’

g. kʲo:kaɕo ‘textbook’

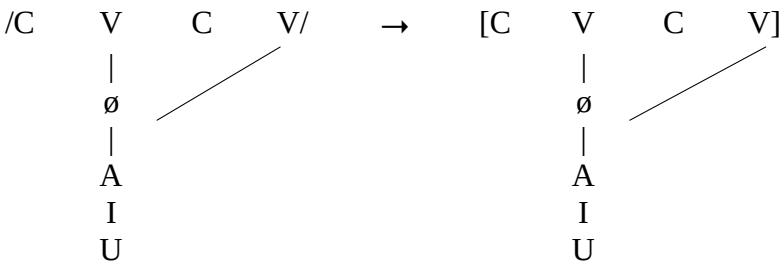
h. o: dæ: dʑi N ‘rich person’

Above, we see that the accent is attracted to the site of a long vowel.[24] Only the spread of high pitch is affected, with spread to either the initial or second nucleus. If a coalesced long vowel was underlying a nuclear sequence rather than an underlying long vowel, we would not expect coalesced vowels to behave in the same manner as the five standard long vowels. I exemplify the two possible underlying structures and their interpretation in (29).

(29) **Representation assuming underlying vowel sequence**



(30) **Representation assuming underlying long vowel with dependent V_2**



The unified behavior of standard and coalesced vowels points to the same underlying syllabic structure, whatever representational proposal is assumed. Long vowels must be specified underlyingly to explain this fact. I now examine the behavior of past tense verbal forms and pitch accent to see if this hypothesis is supported.

5.3. Verbal Accent in Owari

We now examine the pitch patterns found in Owari verbs, with particular attention given to the Past tense form. Description and data are drawn from Terakawa (1985) with further data and pitch accent drawn from Ebata (2013).

As with Tokyo verbs, Owari verbs have both Accented and Unaccented variants. Unaccented verbs are finally accented while Accented verbs receive penultimate accent in the Non-Past form as in Tokyo. I discuss only Accented verbs in this section, as Unaccented verbs have universal final accent and tell us nothing about the underlying structure of a word. Consider the data in (31) below.

[24] It should be noted that this can be paralleled with the attraction of stress in Latin or English, increasing the similarity of accent assignment in Japanese to that of the Latin stress rule, discussed by Kubozono (2008) and Kawahara (2015) in relation to Tokyo Japanese. Ebata (2013) does discuss informally that Owari is rather similar in terms of intonation to a stress language. However, unlike in Latin stress assignment, accent is not reassigned in Owari Japanese in the presence of a long vowel.

(31) **Accented Vowel final-Stems**

a. Accented verbs exhibiting penultimate accent in the Past

NP	Neg	Past	Gloss
i ki* ru	i ki* n	i ki* ta	‘live’
ya me* ru	ya me* n	ya me* ta	‘quit’
a zu ke* ru	a zu ke* n	a zu ke* ta	‘put away’

b. Accented verbs exhibiting penultimate accent in the Past

NP	Neg	Past	Gloss
a wa te* ru	a wa te* n	a wa te* ta	‘foam’
i ta me* ru	i ta me* n	i ta me* ta	‘cook/heat’
a ma e* ru	a ma e* n	a ma e* ta	‘coddle’

I note that in the above vowel-final stem data, accent is universally penultimate for Non-Past and Negative forms while Past forms show some variability, with some forms exhibiting a penultimate accent and others an antepenultimate accent. We expect to find the same pattern for Consonant-final stems where an underlying stem with a vowel sequence has previously been assumed. Consider the data in (32).

(32) **Accented C-stems**

NP	Neg	Past	Gloss
a jo* bu	a jo* ba N	a jo* n da	‘toddle’
sa so* (w)u	sa so* wa N	sa so* t ta	‘invite’
a ru* ku	a ru* ka N	a ry* : ta	‘walk’
i so* gu	i so* ga N	i sø* : da	‘hurry’
ko bo* su	ko bo* sa N	ko bø* : ta	‘spill’

In the non-past and negative forms, we find universal penultimate accent. In Past tense forms, we find universal accent on the antepenultimate nucleus with no penultimate

accent found in any of the verbal forms attested in Ebata (2013). While this is no surprise for those forms with a geminate or nasal consonant, it is unexpected for any synchronic analysis of coalescence.[25] If coalescence is a synchronic surface phenomenon, accent should theoretically also be found on the penultimate or antepenultimate nucleus as with verb-final stems, which is not attested. We must then claim that this nucleus is in the same position as those found in typical long vowel constructions: this nucleus is not an appropriate accent site. The same result is found whether one applies a GP analysis (Yoshida Y. 1999) or a Degenerate Mora analysis (Labrune 2012) of the above long vowels: it is clear that there is an underlying long vowel structure for coalesced vowels based on patterning with the standard long vowels in terms of pitch accent spread and a lack of ability to receive an accent on the second half of a long vowel (or the second nucleus in a sequence) in past tense verbal forms.

6. Conclusion

I note that further investigation is necessary to confirm the nature of coalesced vowels and their structure specified in Owari Japanese which is beyond the scope of this article. Forthcoming work will examine the dialect further and also examine the nature of coalescence in Niigata and Akita Japanese while discussing the typology and diachrony of coalescence further. Compounds and verbal pitch accent assignment also merits further investigation when field trips are feasible. For now, I note that the above discussion has given evidence to support the idea that coalescence is not a synchronically active process. In contrast to previous work, I propose that the dialect of Owari has diverged and the underlying as well as surface vowel inventory have been augmented in comparison to that found in Tokyo.

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[25] I lack space to discuss the proposals for representation of these words. From a GP point of view, Yoshida Y. (1999) proposes that the nucleus in a long vowel, nasal-obstruent cluster and geminate is governed and fails to project, thus unable to support accent assignment. A foot in GP is understood to be two nuclei in a licensing relation at the nuclear projection. Labrune (2012) alternatively analyses these structures as being composed of degenerate moras within a foot. See also Kawahara (2015) who assumes that the syllable plays a role in accent assignment shift to the antepenultimate mora.

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