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SYNCOPE IN THE *TE*-FORM WITH AUXILIARY VERBS

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In Modern Japanese, deletion of a segment inside a word, or "syncope", is frequently observed in informal or casual speech or in fast speech, especially when the *te*-form of a verb, which roughly corresponds to the present participle in English, is followed by vowel-initial auxiliary verbs. Unlike other environments where only a limited number of words and phrases undergo syncope, the *te*-form with vowel-initial auxiliary verbs shows a very systematic process of syncope. In this paper I will attempt to account for this systematic syncope as well as another case of syncope observed in the *te*-form followed by a consonant-initial auxiliary verb, within the framework of Optimality Theory (Prince & Smolensky 1993).

Optimality Theory

First, I would like to briefly explain Optimality Theory (henceforth, OT), in case the reader is not familiar with it.[2] OT is a theory in which grammar is considered to be composed of a set of universal constraints. These constraints are violable and are ranked in a language-specific hierarchy, which determines the characteristics of each language.

In OT, based on an underlying representation, or the "input", a number of candidates are generated as its potential surface forms, and the candidate that incurs the least serious violations of constraints is selected as the optimal candidate, which becomes the surface form, or the "output", of the underlying representation. For instance:

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[2] I refer the reader to Archangeli & Langendoen (1997) and Kager (1999) for an introduction to OT, and to McCarthy (2002) for an advanced knowledge of OT.

(1) a. Underlying representation (or *input*):
/ɪn+pɒsəbl/[3] 'in+possible'
b. Potential surface forms (or *candidates*):
(a) [ɪnpɒsəbl] 'inpossible'
(b) [ɪmpɒsəbl] 'impossible'
(c) [ɪpɒsəbl] 'ippossible'
c. Constraints:
(a) /n/ of the prefix /ɪn/ must directly precede /p/ of the word /pɒsəbl/.
(b) /n/ must share the place of articulation[4] with the following consonant /p/.
(c) The place of articulation of any sound, or "segment", must not be changed.
Ranking: a >> b >> c ('>>' denotes "dominate".)
d. Optimal candidate (or *output*):
[ɪmpɒsəbl] 'impossible'

(1) is diagrammed in a tableau as follows:

(2)

Input: /ɪn+pɒsəbl/	Constraint (a)	Constraint (b)	Constraint (c)
a. ɪnpɒsəbl		*!	
b. ☞ ɪmpɒsəbl			*
c. ɪpɒsəbl[5]	*!		

NB: In a tableau, constraints are set in descending order from left to right. A violation of a constraint is indicated with '*', a "fatal" violation which eliminates a candidate completely, with '!', and the optimal candidate with '☞'. The constraints that do not require further consideration are shaded.

There are basically three types of constraints in OT, and they are:

(3) a. **Faithfulness constraints**, which enforce identity between the input and the output and militate against any deviation, such as deletion or insertion of segments or change of features, from the underlying representation.
e.g. IDENT(ITY)-IO(place): The place of articulation of an output segment must be the same as that of the input correspondent (Kager 1999). This is Constraint (c).
b. **Markedness constraints**, which require the output to meet some criterion of structural well-formedness and militate against cross-linguistically marked structures in the output.

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[3] The International Phonetic Alphabet is employed to transcribe the phonetic spelling of the input (indicated with / /) and the output (indicated with [ ]).
[4] The place of articulation refers to where in the vocal apparatus a sound is produced.
[5] [ɪpɒsəbl] also violates **MAX(IMALITY)-IO** (i.e. no deletion of segments; McCarthy & Prince 1994, 1995).

e.g. CODACOND(ITION): A coda[6] consonant must not have a place of its own (Itō 1986, 1989, McCarthy & Prince 1986). This is Constraint (b).

c. **Alignment constraints**, which require an edge of one constituent to coincide with an edge of another.

e.g. ALIGN(PrWd, L, Prefix, R): The left edge of a prosodic word must meet with the right edge of a prefix.[7] This is Constraint (a).

In modern Japanese the following constraints are undominated, except when words and/or phrases are expressed emphatically or very roughly:[8]

(4) a. DEP(ENDENCE)-IO: Output segments must have input correspondents (McCarthy & Prince 1994, 1995). Insertion of segments is disallowed at the surface level.

b. NUCLEUS: Syllables must have a vowel (Prince & Smolensky 1993). Syllabic consonants are disallowed.

c. *COMPLEX: Syllables have at most one consonant at an edge (Prince & Smolensky 1993). No complex onset or coda is allowed.[9]

d. CODACOND: A syllable-final consonant is placeless (Itō 1986, 1989, McCarthy & Prince 1986).

e. CVLINKAGE: Every consonant-vowel sequence forms a linked domain headed by the vowel (Itō & Mester 1995b). Alveolar obstruents (i.e. [t], [d], [s] and [z]) followed by a high front vowel (i.e. [i]) are disallowed.[10]

f. *wV[-low]: No labio-velar glide (i.e. [w]) is allowed before non-low vowels (i.e. [i], [ɯ], [e] and [o]).[11]

Although the following constraint is not undominated, it is assumed to be only outranked by the above undominated constraints:

(5) MAX-IO(Open): Input segments in open-class items, such as nouns and

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[6] A coda is the consonant(s) of a rhyme. The vowel(s) of a rhyme and the initial consonant(s) of a syllable are called nucleus and onset, respectively.

[7] See McCarthy & Prince (1993, 1994) for Generalized Alignment.

[8] This very rough way of speech is described as "*higo*" or "vulgarisms" (Kawakami 1977:55; English translation by Vance 1987:26), in which /na+i/, for instance, is realised as [nee]. The vulgarisms, however, are beyond the scope of this paper.

[9] Coronal affricates (i.e. [ts], [dz], [tʃ] and [dʒ]) and palatalised consonants ([pj], [mj], [rj], etc.) are acceptable as onsets in Japanese.

[10] The consonant-vowel sequences, [ti], [di], [si] and [zi], are allowed in Foreign vocabulary. For Foreign vocabulary and the other four strata of Japanese vocabulary, see McCawley (1968:ch.2) and Itō & Mester (1995a), and for multiple input-output faithfulness relations, see Fukazawa (1998).

[11] This is a variation of Kager's (1999) *VwV, which disallows intervocalic labio-velar glides. *wV[-low] is not applicable to Foreign vocabulary, where [wi], [we] and [wo] can be observed.

full verb roots,[12] must have output correspondents. No deletion of segments is allowed at the surface level.

Syncope in Modern Japanese

In Classical Japanese, there was a tendency to avoid a vowel sequence, or "hiatus",[13] and when hiatus was created in the process of making compound words, it was often resolved by means of vowel deletion,[14] as seen in (6).[15]

(6) Vowel deletion from hiatus (Kishida 1984)[16,17]

	Underlying	Surface	Gloss
a.	aɾa#iso	aɾiso	'rough beach'
b.	ama#oɾi	amoɾi	'descending from the sky'
c.	toko#iha	tokiha	'Tokiwa' (place name)
d.	haja#ɯma	hajɯma	'fast horse'
e.	ko#ihe	kohe	'small house'
f.	ja#no#ɯtʃi	janɯtʃi	'inside of a house'

Within the framework of OT, the avoidance of hiatus can be accounted for by the interaction of the following two constraints:

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[12] Open-class items also include adverbs and adjective roots. Auxiliary verb roots, affixes, pronouns and particles are called closed-class items.

[13] In Classical Japanese, especially until the *Nara* period (710-794), hiatus was basically banned within single-morpheme-words, frequently avoided within compound words, and from time to time avoided within phrases. See Hashimoto (1950:210-214) for further discussion.

[14] It is a cross-linguistically common strategy to avoid onsetless syllables, which is observed in such languages as Modern Greek and Yokuts (Kager 1999:103-104).

[15] It appeared to me at first that Obligatory Contour Principle (Goldsmith 1976; henceforth OCP), which disallows identical adjacent elements, was at work, in conjunction with the vowel sonority, to determine which vowel to be deleted from hiatus. However, I realised that there are too many cases in which the OCP and the vowel sonority cannot explain the actual choice of the deleted vowel ((6f) for one). See Kishida (1984, 1998) for thought-provoking discussion on this matter.

[16] In underlying forms, # indicates a word boundary.

[17] Regarding the pronunciation of Classical Japanese:

(a) There is no agreement on the consonant of the *sa*-column in Classical Japanese. Tsukishima (1988:67-68) argues that it was either [tʃ] or [ts], based on Enjin's *"Zaitōki"* (858), while Mabuchi (1971:35) assumes that it varied, depending on the following vowel (i.e. [ʃ] before front vowels, [s] before back vowels, and [ts] before [a]).

(b) The consonant of the *ha*-column has undergone some phonetic changes (i.e. [p]→ [ɸ]→ [h] before non-high vowels, [p]→ [ɸ]→ [ç] before a high front vowel, and [p]→ [ɸ] before a high back vowel).

(c) There is no evidence that the high back vowel was already unrounded.

However, for convenience sake, I transcribe all these segments as they are transcribed in Modern Japanese. This is because how they were actually pronounced in Classical Japanese is of no relevance to the discussion of vowel deletion.

(7) a. ONSET: Syllables must have onsets (Itō 1989, McCarthy & Prince 1994, among others).
b. MAX-V-IO: Input vowels have output correspondents (Kager 1999).

When ONSET outranks MAX-V-IO, hiatus is resolved by deleting one of the vowels.

(8) Hiatus resolution in /ko#ihe/ 'small house' (6e)[18]

Input: /ko#ihe/	ONSET	MAX-V-IO
a. ☞ kohe		*
b. koihe	*!	

In modern Japanese, with the exception of a number of words that have gone through lexicalisation, such as /hada#asi/ → /hadasi/ → [hadaʃi] 'bare foot', syncope is no longer observed in the process of making compound words. This is one of the historical changes that have taken place in Japanese[19] and it can be ascribed to the promotion of MAX-V-IO above ONSET. However, in informal or casual speech or in fast speech, syncope does crop up from time to time[20] and the most obvious and productive example is the one in the *te*-form followed by vowel-initial auxiliary verbs.

Syncope in the *Te*-form with Vowel-Initial Auxiliary Verbs

In formal speech, when a vowel sequence is created in the concatenation of the *te*-form with a vowel-initial auxiliary verb, hiatus is left unscathed and the vowel sequence surfaces as it is. MAX-V-IO dominating ONSET ensures that no vowel is deleted.

(9) *Te*-form with vowel-initial auxiliary verbs in formal speech[21]

	Underlying	Surface	Gloss
a.	tabe+te#i+ɾɯ	tabeteiɾɯ[22]	'be eating'
b.	mat+te#iɾaʃʃaɾ+ɯ	matteiɾaʃʃaɾɯ	'be waiting (RESPECTFUL)'

[18] *[kihe] was eliminated possibly because the more sonorous vowel was deleted from the hiatus. Accounting for which vowel to be deleted from hiatus in Classical Japanese, however, is beyond the scope of this paper.

[19] For other historical changes, see Hashimoto (1950), Mabuchi (1971), Okumura (1972), Toyama (1972), Kishida (1984, 1998) and Tsukishima (1988), among others.

[20] See Vance (1987), Shibatani (1990) and Tsujimura (1996) for some of the other syncope and contraction processes in Modern Japanese.

[21] In underlying representations, + indicates a morpheme boundary. A morpheme is a minimum unit that carries a meaning or a grammatical function.

[22] /i+ɾɯ/ was /wi+ɾɯ/ in Classical Japanese, which was realised as [wiɾɯ]. The concatenation of this auxiliary verb with the *te*-form, therefore, did not create hiatus in Classical Japanese.

c.	kie+te#ik+ɯ[23]	kieteikɯ	'die down gradually'
d.	kaw+te#ok+ɯ	katteokɯ	'buy in advance'
e.	ne+te#oɾ+ɯ	neteoɾɯ	'be sleeping (HUMBLE)'
f.	mi+te#age+ɾɯ	miteaŋeɾɯ[24]	'check (as a favour)'
g.	kak+te#aɾ+ɯ	kaiteaɾɯ[25]	'have been written'

In informal speech, on the other hand, the less sonorous vowel[26] is deleted in order to avoid an onsetless syllable, as shown below: [27]

(10) *Te*-form with vowel-initial auxiliary verbs in informal speech

	Underlying	Surface	Gloss
a.	tabe+te#i+ɾɯ	tabeteɾɯ	'be eating'
b.	mat+te#iɾaʃʃaɾ+ɯ	matteɾaʃʃaɾɯ	'be waiting (RESPECTFUL)'
c.	kie+te#ik+ɯ	kietekɯ	'die down gradually'
d.	kaw+te#ok+ɯ	kattokɯ	'buy in advance'
e.	ne+te#oɾ+ɯ	netoɾɯ	'be sleeping (HUMBLE)'
f.	mi+te#age+ɾɯ	mitaŋeɾɯ	'check (as a favour)'
g.	kak+te#aɾ+ɯ	kaitaɾɯ	'have been written'

The difference between Classical Japanese and Modern Japanese with regard to syncope is that in the latter the more sonorous vowel is never deleted to resolve hiatus. Based on this fact, I propose the following constraints and ranking schema for syncope in Modern Japanese:

(11) a. *i: No [i]. [28]
b. *ɯ: No [ɯ].
c. *e: No [e].
d. *o: No [o].
e. *a: No [a].

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[23] /k/ is palatalised when followed by a front vowel. For convenience sake, however, I employ [k] for both this palatalised voiceless velar stop and the non-palatalised counterpart.

[24] /g/ is nasalised intervocalically in standard Japanese, or Tokyo dialect, although younger generations tend not to nasalise it nowadays.

[25] The constraints involved in the process of /kak+te/ to [kaite] is irrelevant to the syncope in question and I will not go into detail here.

[26] See Ladeforged (1993:245-246) for vowel sonority.

[27] Syncope in the *te*-form followed by vowel-initial auxiliary verbs was already observed in *"Ukiyoburo"* (1809-1813), so it has been a common practice for at least two centuries.

[28] The reason for proposing *i, *ɯ, etc., to which I refer as the *V subhierarchy, instead of a constraint requiring the less sonorous vowel to be deleted from hiatus, is that the *V subhierarchy can also correctly account for such vowel deletion processes as /anata/ → [anta] 'you' and /no#de/ → [nde] 'because' in informal speech. Orgun (1995) and Kager (1999) propose **No [a]**, **No V** (i.e. /a/, V is not allowed in open syllables) and **No [i]** (i.e. /i/ is not allowed in light syllables), respectively. The *V constraints I am proposing, however, are context-free.

(12) Ranking schema for syncope in Modern Japanese: [29]
ONSET >> *i >> *ɯ >> *e >> *o >> *a >> MAX-V-IO

The following tableaux show how [tabeteɾɯ] and [kattokɯ] are selected as the optimal candidates:

(13) /tabe+te#i+ɾɯ/ 'be eating' in informal speech

Input: /tabe+te#i+ɾɯ/	ONSET	*i	*ɯ	*e	*o	*a	MAX-V-IO
a. ☞ tabeteɾɯ			*	**		*	*
b. tabetiɾɯ[30]		*!	*	*		*	*
c. tabeteiɾɯ	*!	*	*	**		*	

(14) /kaw+te#ok+ɯ/ 'buy in advance' in informal speech

Input: /kaw+te#ok+ɯ/	ONSET	*i	*ɯ	*e	*o	*a	MAX-V-IO
a. ☞ kattokɯ			*		*	*	*
b. kattekɯ			*	*!		*	*
c. katteokɯ	*!		*	*	*	*	

Note that, due to high-ranking constraints NUCLEUS and *COMPLEX as well as **MAX-C-IO** (i.e. no consonant deletion; Kager 1999), vowels other than those across the morpheme boundaries are not deleted.

Triggering Factor of Syncope

In Classical Japanese, syncope frequently took place to avoid hiatus within compound words, but in Modern Japanese, the above-mentioned environment (i.e. the *te*-form followed by vowel-initial auxiliary verbs) seems to be one of only a few where syncope takes place systematically in order to get around hiatus. (Even so, it only occurs in informal speech.) For instance, the following compound words have /te/ followed by a vowel as a result of concatenation of morphemes but, unlike the *te*-form followed by vowel-initial auxiliary verbs, syncope never occurs even in informal speech or in fast speech, due to high-ranking MAX-IO(Open):

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[29] Beckman (1998:65) argues that the cross-linguistic height markedness hierarchy is *MID >> *HIGH, *LOW. In Japanese, however, *HIGH is apparently promoted above *MID due to sonority.

[30] Due to undominated CVLINKAGE, (13b) is never optimal. However, I decided to use *[tabetiɾɯ], instead of *[tabetʃiɾɯ], in this tableau, in order to show that it is the *V subhierarchy that casts the deciding vote when CVLINKAGE does not play any role in the selection of the optimal candidate, in such cases as /tabe+te#ok+ɯ/ 'eat in advance'.

(15) Compound nouns with initial /te/[31]

	Underlying	Surface	Gloss
a.	te#ɪɾe	teiɾe / *teɾe	'care'
b.	te#ɯsɯ	teɯsɯ / *tesɯ	'short of hands'
c.	te#oke	teoke / *toke	'pail'
d.	te#asi	teaʃi / *taʃi	'arms and legs'

What triggers syncope in Modern Japanese is no longer any hiatus created in the process of making compound words. What, then, triggers syncope in the *te*-form with vowel-initial auxiliary verbs? The *te*-form can precede just about any verb, and when the *te*-form is followed by vowel-initial full verbs, syncope does not take place even when uttered very casually or very fast.

(16) *Te*-form with vowel-initial full verbs

	Underlying	Surface	Gloss
a.	kak+te#ɪɾe+ɾɯ	kaiteiɾeɾɯ / *kaiteɾeɾɯ	'write and put in'
b.	hoɾ+te#ɯme+ɾɯ	hotteɯmeɾɯ / *hottemeɾɯ	'dig and bury'
c.	mi+te#oboe+ɾɯ	miteoboeɾɯ / *mitoboeɾɯ	'watch and learn'
d.	os+te#ake+ɾɯ	oʃiteakeɾɯ / *oʃitakeɾɯ	'push and open'

Therefore, it is not the *te*-form that triggers syncope and, as the examples in (16) show, it is not a vowel-initial full verb either. A vowel-initial auxiliary verb, which is always required to follow the *te*-form,[32] seems to be the only thing left that is considered to be the triggering factor of syncope.

In spite of the demotion of ONSET below MAX-V-IO, why does syncope still take place in the *te*-form followed by vowel-initial auxiliary verbs, even though it only occurs in informal speech? Arisaka (1959:152) argues that commonly used words and phrases tend to be pronounced casually and be realised incompletely but that they can still be understood because people are accustomed to such incomplete forms. The auxiliary verbs in question are all frequently used in speech and, as seen above, they always follow the *te*-form. The syncope must be ascribed to the frequent use of such auxiliary verbs and the predictability of what morphemes are involved in the contracted forms.[33]

Syncope does not take place to resolve hiatus within compound words, other than the *te*-form followed by vowel-initial auxiliary verbs in informal speech. Therefore, the ranking schema for syncope in Modern Japanese mentioned in (12) needs to be revised. (16) clearly shows that vowel-initial full verbs do not require ONSET to be satisfied while vowel-initial auxiliary verbs do in informal speech. I propose the following constraint and ranking schemata:

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[31] An asterisk * before a surface form indicates that the form is not grammatical.

[32] I do not consider verbs that follow the stem form, such as /hazime+ɾɯ/ 'start', /owaɾ+ɯ/ 'finish' and /sɯgi+ɾɯ/ 'do/be … too much', as auxiliary verbs because, unlike auxiliary verbs that follow the *te*-form, the meanings of such verbs remain the same as when they are used as full verbs.

[33] For detailed discussion on frequency effects, see Bybee (2001), especially ch.6.

(17) ALIGN-OPEN / ALIGN(PrWd, L, Open, R): The left edge of an open-class item must coincide with the right edge of a prosodic word.
e.g. /kak+te#iɾe+ɾɯ/ 'write and put in'
(*te*-form: prosodic word; /iɾe/: full verb root/open-class item.)

Input: /kak+te#iɾe+ɾɯ/	ALIGN-OPEN
a. kaiteiɾeɾɯ	
b. kaiteɾeɾɯ	*

e.g. /tabe+te#i+ɾɯ/ 'be eating'
(*te*-form: prosodic word; /i/: auxiliary verb root/closed-class item.)

Input: /tabe+te#i+ɾɯ/	ALIGN-OPEN
a. tabeteiɾɯ	
b. taberɛɾɯ	

(18) Ranking schemata for syncope in Modern Japanese (revised):[34]

a. In formal speech
ALIGN-OPEN, **MAX-V-IO**
>>
ONSET
>>
*i >> *ɯ >> *e >> *o >> *a

b. In informal speech
ALIGN-OPEN
>>
ONSET
>>
*i >> *ɯ >> *e >> *o >> *a
>>
MAX-V-IO

In formal speech MAX-V-IO dominates ONSET and so syncope does not take place. In informal speech, however, ONSET takes effect due to the demotion of MAX-V-IO below the *V subhierarchy, which induces syncope in the *te*-form followed by vowel-initial auxiliary verbs, while undominated ALIGN-OPEN prevents such phrases as /kak+te#iɾe+ɾɯ/ 'write and put in' from undergoing syncope across the morpheme boundaries.

How the reranking affects the selection of the optimal candidate is shown in Tableaux (19)-(20). (The *V subhierarchy is omitted from the tableaux.)

(19) /kak+te#iɾe+ɾɯ/ 'write and put in'
a. Before reranking

Input: /kak+te#iɾe+ɾɯ/	ALIGN-OPEN	MAX-V-IO	ONSET
a. ☞ kaiteiɾeɾɯ			**
b. kaiteɾeɾɯ	*!	*	*

NB: Constraints are divided by a dotted line where the ranking with respect to one another is irrelevant.

[34] The undominated constraints mentioned in (4) and MAX-IO(Open) are omitted from these schemata.

b. After reranking

Input: /kak+te#iɾe+ɾɯ/	ALIGN-OPEN	ONSET	MAX-V-IO
a. ☞ kaiteiɾeɾɯ		**	
b. kaiteɾeɾɯ	*!	*	*

(20) /tabe+te#i+ɾɯ/ 'be eating'

a. Before reranking

Input: /tabe+te#i+ɾɯ/	ALIGN-OPEN	MAX-V-IO	ONSET
a. ☞ tabeteiɾɯ			*
b. tabeteɾɯ		*!	

b. After reranking

Input: /tabe+te#i+ɾɯ/	ALIGN-OPEN	ONSET	MAX-V-IO
a. tabeteiɾɯ		*!	
b. ☞ tabeteɾɯ			*

Contraction of the *Te*-form with Auxiliary Verb /simaw+ɯ/

There is another auxiliary verb in Japanese that undergoes contraction processes. The auxiliary verb is /simaw+ɯ/ 'do … completely/finally/ regretfully', and it is contracted in informal speech in the following ways:

(21) Contraction of the *te*-form with /simaw+ɯ/

	Underlying	Surface Not contracted (formal)	Surface Contracted (informal)	Gloss
a.	mi+te#simaw+ɯ	miteʃimaɯ	mitʃimaɯ	'watch completely, etc'
b.	mi+te#simaw+ɯ	miteʃimaɯ	mitʃaɯ	'watch completely, etc.'

(21a) is used mainly by males but is not as often heard nowadays as (21b), which both males and females use. Shibatani (1990:177) accounts for the process in (21b) from a derivational theoretical point of view, as follows:

(22)

	mite simaw+ta[35]
e → ∅	mit simaw+ta
palatalisation	mitʃimaw+ta
C-assimilation	mitʃimatta
im → ∅	mitʃatta

In the above case, both [ts] and [tʃ] are allophones (i.e. variations of a sound)

[35] Shibatani uses the past tense to account for the process. However, the only difference in the derivation between the use of the past tense and that of the non-past tense is that in the latter w-deletion is required before im → ∅ instead of C-assimilation.

of /t/ and are used in the onset position in Japanese,[36] so the deletion of /e/ does not result in an unacceptable consonant cluster. Also, palatalisation of coronals[37] before /i/ is a cross-linguistically common process because of CVLINKAGE.[38] However, im-deletion seems to be a rather unusual rule. I will return to this point later in this paper.

Within the framework of OT, (21a) can be accounted for by the interaction of the constraints in (18) as well as IDENT-IO(place) and MAX-C-IO. The new ranking of the constraints and its effect are shown in (23) and (24), respectively.

(23) Ranking schemata for syncope in Modern Japanese (further revised):

a. In formal speech
ALIGN-OPEN, **MAX-V-IO**
>>
MAX-C-IO, IDENT-IO(place)
>>
ONSET
>>
*i >> *ɯ >> *e >> *o >> *a

b. In informal speech
ALIGN-OPEN
>>
MAX-C-IO, IDENT-IO(place)
>>
ONSET
>>
*i >> *ɯ >> *e >> *o >> *a
>>
MAX-V-IO

(24) /mi+te#simaw+ɯ/ 'watch completely' in informal speech[39]

Input: /mi+te# simaw+ɯ/	MAX-C-IO	IDENT-IO(place)	ONSET	*i	*ɯ	*e	*o	*a	MAX-V-IO
a. ☞ mitʃimaɯ	*	*	*	**	*			*	*
b. miteʃimaɯ	*	*	*	**	*	*!		*	

Note no avoidance of ONSET violation. The fact that neither [a] nor [ɯ] is deleted to resolve ONSET violation is due to the interaction of **ALIGN-SFX** (McCarthy & Prince 1994, 1995; see (26c) below) and **REALISETENSE** (/ɯ/ indicates the non-past tense). /w+ɯ/ cannot be realised as [jɯ] (i.e. *[mitʃimajɯ]) just to get around ONSET violation either, because IDENT-IO(place) dominates ONSET (see (23) above).

(21b) is a further contracted form of (21a), where /im/ is deleted. In Classical Japanese, according to Kishida (1998:203-214), VC-deletion (i.e. $C_1V_1.C_2V_2 \rightarrow C_1V_2$) had often been observed since the *Nara* period. In Modern Japanese, however, it is no longer a common practice and apart from the stem form of a verb followed by the topic marker *wa*, such as (25a), and a

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[36] [ts] and [tʃ] are pre-ɯ and pre-i allophones of [t], respectively. [tʃ] can precede [a], [o] and [ɯ] as well.

[37] Coronals are sounds produced with the blade of the tongue, such as [t] and [s].

[38] Palatalisation of coronal obstruents are observed in such languages as Hausa (Orgun 1995:10) and Nupe (Hyman 1975:77).

[39] Candidates that fatally violate undominated constraints, such as *[miteʃimawɯ] (*wV[-low] violation) and *[mitsimaɯ] (CVLINKAGE violation), are omitted from the tableau.

limited number of words, such as (25b), it can only be observed in the concatenation of the *te*-form with /simaw+ɯ/.

(25) VC-deletion in Modern Japanese

	Surface	Contracted	Gloss
a.	nomiwa	noma	'drinking (TOPIC)'[40]
b.	koʃiɾaeɾɯ	kosaeɾɯ	'create'[41]

Even so, when the root of the auxiliary verb, /simaw/, is followed by /i+mas+ɯ/,[42] which expresses politeness in the non-past tense, /te#simaw+i+mas+ɯ/ is never contracted to [tʃawasɯ]. Therefore, constraints to account for im-deletion from the root but not from the affixes are required. I propose the following constraints and the final ranking schemata of the constraints to account for im-deletion from /simaw/:

(26) a. MAX_{INIT}-C-IO: The leftmost consonant of a morpheme in the input must have a corresponding segment in the output.[43]
e.g./s/ and /m/ must not be deleted from /simaw/ and /mas/, respectively.

b. *LAB: No labials (Prince & Smolensky 1993, Beckman 1998, Kager 1999, among others).[44]

c. ALIGN-SFX: The left edge of a suffix must coincide with the right edge of a root (McCarthy & Prince 1994, 1995).

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[40] Nowadays in informal speech, a version with [j] (e.g. [nomja]) is far more commonly used.

[41] The avoidance of intervocalic /ɾ/ by means of deletion or feature change has been well attested both in Classical Japanese and in Modern Japanese. This is due to markedness constraint *ɾ (McCarthy & Prince 1995). Other examples currently observed in informal speech include: /tokoɾo/ → [toko] 'place', /keɾedomo/ → [kedomo] (or further contracted form [kedo]) 'although', and the negative form of a verb with a root-final /ɾ/, such as /wakaɾ+ana+i/ → [wakannai] 'do not know/understand'.

[42] The formative boundary in /i+mas/ is based on Suzuki (1972:265) and Shirota (1998:7). Even if /i+mas/ is considered to be monomorphemic /imas/, the difference in interpretation does not affect my OT analysis, for /m/ is still the leftmost consonant of the morpheme.

[43] MAX_{INIT}-C-IO is a positional faithfulness constraint. For Positional Faithfulness Theory, see Beckman (1998). The motivation to protect the leftmost consonant of a morpheme is the necessity to clearly indicate where within a word each morpheme starts. The only morpheme that violates this constraint is the topic marker /wa/, as seen in (25a). /wa/ is one of the most commonly used morphemes in Japanese, and I assume that its violation is due to token frequency effects.

[44] The tendency to under-pronounce labials has been attested throughout the history of Japanese, such as the loss of /w/ before non-low vowels (Hashimoto 1950, Mabuchi 1971, among others) and [p] > [ɸ] > [h] (Hashimoto 1950, Okumura 1972, among others) in Classical Japanese and [nakeɾja] for [nakeɾeba] 'if not …' and [sɯimaseN] for [sɯmimaseN] 'excuse me, I am sorry' in Modern Japanese.

e.g. /simaw+i+mas+ɯ/[45,46]

Input: /simaw+i+mas+ɯ/	ALIGN-SFX	
a. ʃimawimasɯ		
b. ʃimaimasɯ	*	(w)
c. ʃimawmasɯ	*	(i)
d. ʃimamasɯ	**	(w, i)
e. ʃimawasɯ	**	(i, m)

(27) Ranking schemata for syncope in Modern Japanese (final):

a. In formal speech

ALIGN-OPEN, **MAX-V-IO**
>>
ALIGN-SFX, MAX_{INIT}-C-IO
MAX-C-IO, IDENT-IO(place)
>>
ONSET, *LAB
>>
*i >> *ɯ >> *e >> *o >> *a

b. In informal speech

ALIGN-OPEN
>>
ALIGN-SFX, MAX_{INIT}-C-IO, IDENT-IO(place)
>>
ONSET, *LAB
>>
MAX-C-IO
>>
*i >> *ɯ >> *e >> *o >> *a
>>
MAX-V-IO

In formal speech, MAX-V-IO and MAX-C-IO dominate *LAB and the *V subhierarchy, so no deletion of vowels or consonants takes place.

(28) /mi+te#simaw+i+mas+ɯ/ 'watch completely' in formal speech[47]

Input: /mi+te#simaw +i+mas+ɯ/	MAX-V-IO	ALIGN-SFX	MAX_{INIT}-C-IO	MAX-C-IO	IDENT-IO(pl)	ONSET	*LAB	*i	*e
a. ☞ miteʃimaimasɯ		*		*	*	*	***	***	*
b. mitʃimaimasɯ	*!	*		*	*	*	***	***	
c. mitʃaimasɯ	*!	*		**	*	*	**	**	
d. mitʃainasɯ	*!	*		**	**	*	*	**	
e. mitʃamasɯ	*!*	**		**	*		**	*	
f. mitʃawasɯ	*!*	**	*	**	*		**	*	

Note the numbers of violation marks in the MAX-V-IO column for (28c-f). I consider /si/ → [ʃ] (via /sj/) as glide formation in which the /i/ features move

[45] Candidates (a) and (c) violate undominated *wV[-low] and CODACOND, respectively, so they are never optimal under any circumstances.

[46] Non-deletion of the morpheme /i/ is not due to **REALISEMORPHEME** (Itô & Mester 1998) because /i/ can drop from such compound verbs as /hɯk+i#kake+ɾɯ/ → [ɸɯkkakeɾɯ] 'blow/spray upon'.

[47] In order to save space, the constraints that do not play any role in the selection of the optimal candidate, such as ALIGN-OPEN and *o, are omitted from Tableaux (28)-(30).

into the onset /s/, and, therefore, /i/ is not deleted at the surface level.[48]

In informal speech, while ALIGN-SFX and MAX_{INIT}-C-IO are still highly ranked, MAX-V-IO is demoted below the *V subhierarchy, and MAX-C-IO is demoted below ONSET and *LAB. *LAB being ranked below IDENT-IO(place) but above MAX-C-IO means that a labial is deleted, rather than its place of articulation being altered, when it is not the leftmost consonant of a morpheme.[49] This ranking ensures that /im/ is deleted from /simaw/ but not from /i+mas/, as shown in Tableau (29).

(29) /mi+te#simaw+i+mas+ɯ/ 'watch completely' in informal speech (21b)[50]

Input: /mi+te#simaw +i+mas+ɯ/	ALIGN-SFX	MAX_{INIT}-C-IO	IDENT-IO(pl)	ONSET	*LAB	MAX-C-IO	*i	*e	MAX-V-IO
a. miteʃimaimasɯ	*		*	*	***!	*	***	*	
b. mitʃimaimasɯ	*		*	*	***!	*	***		*
c. ☞ mitʃaimasɯ	*		*	*	**	**	**		*
d. mitʃainasɯ	*		**!	*	*	**	**		*
e. mitʃamasɯ	**		*!		**	**	*		**
f. mitʃawasɯ	**	*!	*		**	**	*		**

Tableau (30) is a revised version of Tableau (24). It shows how [mitʃimaimasɯ], instead of [mitʃaimasɯ], is selected as the optimal candidate by keeping MAX-C-IO above ONSET and *LAB.[51]

(30) /mi+te#simaw+i+mas+ɯ/ 'watch completely' in informal speech (21a)

Input: /mi+te#simaw +i+mas+ɯ/	ALIGN-SFX	MAX_{INIT}-C-IO	MAX-C-IO	IDENT-IO(pl)	ONSET	*LAB	*i	*e	MAX-V-IO
a. miteʃimaimasɯ	*		*	*	*	***	***	*!	
b. ☞ mitʃimaimasɯ	*		*	*	*	***	***		*
c. mitʃaimasɯ	*		**	*!	*	**	**		*
d. mitʃainasɯ	*		**	*!*	*	*	**		*
e. mitʃamasɯ	**		**!	*		**	*		**
f. mitʃawasɯ	**	*	*!*	*		**	*		**

To return to the im-deletion rule under the derivational theoretical analysis:

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[48] A similar process is observed in such languages as Luganda (Katamba 1989:171-172) and Ilokano (Hayes 1989:269-278).

[49] Needless to say, labials in other positions within open-class items are not deleted due to MAX-IO(Open), as in /kimaɾ+ɯ/ → [kimaɾɯ] 'be decided'.

[50] [mitemaimasɯ] (MAX_{INIT}-C-IO violation due to the deletion of /s/ from /simaw/) is actually heard in some dialects (e.g. Osaka and Nagoya dialects). In this paper, however, I am only dealing with phonetic variation observed in standard Japanese and accounting for dialectal variation is beyond the scope of the paper.

[51] Another way of accounting for this type of variation, with no reranking of constraints, is to adopt a "partially ordered grammar", in which both *LAB >> MAX-C-IO and MAX-C-IO >> *LAB are permitted in the same register of speech. See Anttila (1997, 2002) and Anttila & Cho (1998) for this theory.

within the framework of OT it can be accounted for by the interaction of a number of constraints.

In informal speech, the demotion of MAX-C-IO below IDENT-IO(place) and *LAB causes m-deletion from the auxiliary verb root /simaw/, which results in /tsiaw/ when preceded by the *te*-form. Here, there are three ways to avoid ONSET violation: (1) delete /i/, (2) delete /a/, and (3) absorb /i/ into /s/ to make /si/ surface as [ʃ].[52] The choice is (3) due to the *V subhierarchy and MAX-V-IO, and the following tableau shows how [mitʃatta] becomes optimal:

(31) /mi+te#simaw+ta/ 'watched completely' in informal speech[53]

Input: /mi#te#$s_1i_2$maw+ta/	ONSET	*LAB	MAX-C-IO	*i	*a	MAX-V-IO
a. ☞ mitʃ$_{12}$atta (3)		*	*	*	**	*
b. mitʃ$_1$atta		*	*	*	**	**!
c. mitsatta (1)		*	*	*	**	**!
d. mitʃitta (2)		*	*	**!	*	**
e. mitʃiatta	*!	*	*	**	**	*

Conclusion

In Modern Japanese, hiatus is no longer resolved by means of vowel deletion, with the exception of the *te*-form with vowel-initial auxiliary verbs in informal speech. This is due to the promotion of faithfulness constraint MAX-V-IO above markedness constraint ONSET. In this paper, I have proposed MAX-IO(Open) and ALIGN-OPEN to account for the non-occurrence of vowel deletion from hiatus in other environments in Modern Japanese, and I have shown, in regard to the difference in the choice of vowels to be deleted between Classical Japanese syncope and Modern Japanese syncope, that it is ascribed to the establishment of the sonority-based set of ranked constraints, the *V subhierarchy, in Modern Japanese.

The motivation for the contraction of /te#simaw+ɯ/ to [tʃaɯ] 'do … completely/ finally/regretfully' in informal speech is the under-pronunciation of labials, which has been well attested both in Classical Japanese and in Modern Japanese. In formal speech, markedness constraints, such as *LAB, are dominated by faithfulness constraints so that contraction does not take place. In informal speech, on the other hand, the demotion of context-free MAX family constraints below some markedness constraints induces less marked structures. In casual speech, no matter what the language is, there is a tendency to opt for less marked structures, and it is a cross-linguistic fact that

[52] Insertion of a segment between /i/ and /a/ is not an option due to undominated DEP-IO (i.e. no insertion of segments). In standard Japanese [ts] is disallowed unless followed by [ɯ] so (31c) can be ruled out for this reason as well. ([tsa] may be heard in such words as [otottsaN] 'father', but those words are not in common use.)

[53] The C-assimilation (i.e. /w/ → [t]) involves other constraints but I will not go into detail here.

labials are more marked than other segments, such as coronals.[54] The contraction of /te#simaw+ɯ/ to [tʃaɯ] is a good example of manifestation of this tendency.

Phonetic variation, such as [mitʃimaɯ] and [mitʃaɯ] 'watch completely', can be accounted for by means of constraint reranking. As stated earlier, the latter is far more often used than the former these days, from which we can assume that the constraint ranking mentioned in (27b), that is *LAB above MAX-C-IO, is being firmly established in informal speech.

The strength of OT over derivational theories, I believe, is to do away with rules and rule ordering. Once the basic ranking of constraints for some register of speech is established, other processes observed in the same register can and should be accounted for easily. As mentioned in the footnotes, there are other syncope and contraction processes in Modern Japanese. It is my intention to make further investigation in these areas and to attempt to account for those processes within the framework of OT as well.

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[54] Dorsals (i.e. sounds produced with the back of the tongue in contact with the roof of the mouth, such as [k] and [g]) are more marked than coronals as well ("Place Markedness Hierarchy"; Prince & Smolensky 1993). However, the relative ranking of labials and dorsals seems to be language-specific rather than universal.

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