Affixes' morphological selections of stems in Japanese and a dialect

Artificial Brain Engineering Study Group
Hiroki Koga
Saga University

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Abstract: Part 1 The current paper articulates the problem on how affixes select particular stems of the base forms of verbal lexemes in case there are more than one stem for the lexeme in Japanese and a dialect, pointed out in the framework of Koga and Ono (in review), which assumes that there are more than one stem of the base form for each of 1) the 'weak vowel /e/ final' base verbal lexemes in Yanagawa dialect and 2) the strong base verbal lexemes /k/ 'come' and /s/ 'do' in standard as well, in order to explain the apparent 'irregular conjugations'.

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Part 2: An extension of Bonami and Boyé's 2002 and 2006 analysis of stem selections by affixes is proposed to explain the remaining problem of Koga and Ono (in review). The current study found the stem dependency of verbal lexemes in Japanese and one dialect and vowel-adjusted stems other than the basic stems if there are two stems for verbal lexemes, and points out that some constraints on affixes' selection of stems are stated in the morphological component, and others are stated as **surface** constraints, in order to explain the dialectal differences and identicalities.

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1 Phenomenon

1.1 The stem-affix concatenation phenomenon that Koga and Ono (in review) have left as a remaining problem

In Yanagawa dialect: Koga and Ono (in review) assumed that each lexeme of the standard 'vowel /e/-final' base verbs in Yanagawa dialect is associated with two base forms (or stems), as affixes concatenate with two different stems, as in Table 1, in contrast with identical stems for the consonant-final base verbs and with identical forms for the vowel /i/-final base verbs, as in Table 2.

stem	'-Non-past'	'-Past'	'-Caus'	'-Imper'	'-Not'
'sleep'					
ne	***ne**-ru	**ne**-ta	**ne**-sas(e)	**ne**-ro	**ne**-N
n	**n**-u-ru	***n**-ita	***n**-as(e)	***n**-e	***n**-aN
'eat'					
tabe	***tabe**-ru	**tabe**-ta	**tabe**-sas(e)	**tabe**-ro	**tabe**-N
tab	**tab**-u-ru	***tab**-ita	***tab**-as(e)	***tab**-e	***tab**-aN

Table: 1 The verbal forms of the vowel /e/-final base verbs in Yanagawa dialect

stem	'-Non-past'	'-Past'	'-Caus'	'-Imper'	'-Not'
'speak' **hanas**	**hanas**-u	**hanas**-ita	**hanas**-ase	**hanas**-e	**hanas**-aN
'wake' **oki**	**oki**-ru	**oki**-ta	**oki**-sase	**oki**-ro	**oki**-N

Table: 2 The verbal forms of the two types of verbs: consonant-final base verbs and vowel /i/-final base verbs in Yanagaw dialect

Koga and Ono's (in review) assumption was made in order to explain the 'non-past' forms 1) of the 'vowel /e/-final' base verbs in Yanagawa dialect, 2) of the consonant /n/-final base verbs in Yamaguchi dialect and 3) of the strong base verbs in standard. See Koga and Ono (in review) for the explanation of why the 'non-past' forms of the 'vowel /e/-final' base verbs contain /u-ru/, but not /u/ alone.

The affixes that take the base forms (or stems) of verbs are, for example, the morphemes of:

- invitation /oi/ $\sim$ /yui/ in Yanagawa dialect,
- 'non-past' /(r)u/ (or the default morpheme of tense as proposed in Koga and Ono (in review)) and the /(r)eba/ conditional in Yanagawa dialect and standard,
- past /(i)ta/ in Yanagawa dialect and standard,
- imperative /e/ $\sim$ /ro/ $\sim$ /i/ in Yanagawa dialect and standard,
- causative /(s)ase/, passive /(r)are/ and honorific /(r)as/ or /(r)are/ in Yanagawa dialect and standard and
- negation /(a)N/ in Yanagawa dialect, negation /(a)nai/ and invitation /(y)ou/ in standard.

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The ‘non-past’ affix /(r)u/ and the conditional affix /(r)eba/ take exactly the same verbal stem if there are two stems for a verb. (On the other hand, there are many affixes that take other forms than stems (or base forms), for example, the present participle form of a verb phrase, for example, the affix of desiderative /tak/ ‘want’, as in /hanas-i-tak/ ‘want to speak’, where /hanas-i/ is the present participle form.)

As had been ignored as ‘irregular conjugations’ of the strong base verbs /k/ ‘come’ and /s/ ‘do’, Koga and Ono (in review) claimed that they are explainable to some extent, assuming that each of the strong base verbal lexemes is also associated with two base forms (or stems): /k/ and /ko/ for the lexeme of ‘come’ and /s/ and /se/ for the lexeme of ‘do’ in Yanagawa dialect, as in Table 3.

stem	‘-Non-past’	‘-Past’	‘-Caus’	‘-Imper’	‘-Not’
‘do’					
se	***se**-ru	***se**-ta	??**se**-sase	**se**-ro	**se**-N
s	**s**-u-ru	**s**-ita	**s**-ase	***s**-e	***s**-aN
‘come’					
ko	***ko**-ru	***ko**-ta	**ko**-sase	***ko**-ro	**ko**-N
k	**k**-u-ru	**k**-ita	***k**-ase	**k**-e	***k**-aN

Table: 3 The verbal forms of the strong base verbs in Yanagawa dialect

In standard Japanese: The standard Japanese has simpler affix-stem concatenations than Yanagawa dialect as follows. Differently from those in Yanagawa dialect, there is only one base form (or stem) associated with each lexeme of the 'vowel /e/'-final base verbs in standard Japanese, as exemplified in Table 4.

stem	'-Non-past'	'-Past'	'-Caus'	'-Imper'	'-Not'
'sleep'					
ne	**ne-ru**	ne-ta	ne-sase	ne-ro	ne-nai
*n	***n-u-ru**	*n-ita	*n-ase	*n-e	*n-anai
'eat'					
tabe	**tabe-ru**	tabe-ta	tabe-sase	tabe-ro	tabe-nai
*tab	***tab-u-ru**	*tab-ita	*tab-ase	*tab-e	*tab-anai

Table: 4 The verbal forms of the vowel /e/-final base verbs in standard

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The lexeme of ‘sleep’, for example, has only one stem /ne/ in standard. The stem in Yanagawa dialect /n/ is not a stem of the lexeme in standard.

The imperative form of the strong base verb /k/ in standard is /ko-i/, which uses the longer base form plus /i/, and is not /k-e/.

stem	'-Non-past'	'-Past'	'-Caus'	'-Imper'	'-Not'
'come'					
k	k-u-ru	k-ita	*k-ase	***k-e**	*k-aN
ko	*ko-ru	*ko-ta	ko-sase	**ko-i**	ko-N
'do'					
s	s-u-ru	s-ita	s-ase	***s-e**	*s-anai
si	*si-ru	*si-ta	**?*si-sase**	**si-ro**	si-nai

Table: 5 The verbal forms of the strong base verbs in standard

The other stem of the strong base verb /s/ in standard Japanese is /si/, which is used for the verbal forms of imperative and negation.

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What remains to explain in Koga and Ono 2010:
Koga and Ono 2010 could not explain the fact that affixes concatenate only with particular stems, leaving it for a future research. Which stem affixes take is different from affixes to affixes. For example, the 'non-past' affix selects the base forms of the 'vowel /e/-final' base verbs with the final /e/ absent /tab/ as in /tab-u-ru/ 'eat-Non-past', but NOT /tabe/ as not in */tabe-ru/, as in Table 1, and selects the base form of the strong base verb /k/ as in /k-u-ru/ 'come-Non-past', but NOT /ko/ as in */ko-ru/ and the base form of the strong base verb /s/ as in /s-u-ru/ 'do-Non-past', but NOT /se/ as in */se-ru/, as given in Table 3.

1.2 The data seen from a perspective of affixes

In Yanagawa dialect: What follows are observed if the data in the last section are arranged in the order of 1) the 'non-past' stems, 2) the past stems, 3) the causative stems and the imperative stems and 4) the negation stems. The longer stems are used from the past stems through the causative and imperative stems to the negation stems for the 'vowel /e/'-final base verbs, as seen in the first two rows of Table 6.

stem	'-Non-past'	'-Past'	'-Caus'	'-Imper'	'-Not'
... /e/	*	√	√	√	√
... /e/ ⊖ F/e/	√	*	*	*	*
/se/	*	*	??	√	√
/s/	√	√	√	*	*
/ko/	*	*	√	*	√
/k/	√	√	*	√	*

Table: 6 In Yanagawa dialect

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For the strong base verb /s/, the longer stem /se/ is used from the imperative stems to the negation stems in the hierarchical order. For the strong base verb /k/, the longer stem /ko/ is used from the causative stems to the negation stems in the hierarchical order. There is no hierarchical order between the causative stems and the imperative stems in terms of which inherits the longer stems from the other.

In standard Japanese: In standard, the longer stems are used in **the stems of all affixes for the 'vowel /e/'-final base verbs**, as seen in the first two rows of Table 7.

stem	'-Non-past'	'-Past'	'-Caus'	'-Imper'	'-Not'
... /e/	√	√	√	√	√
... /e/ ⊖ F/e/	$\underline{*}$	*	*	*	*
/si/	*	*	?*	√	√
/s/	√	√	√	$\underline{*}$	*
/ko/	*	*	√	√	√
/k/	√	√	*	$\underline{*}$	*

Table: 7 In Standard

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For the strong base verb /s/, the longer stem /si/, but not /se/ of Yanagawa dialect, is used from the imperative stems to the negation stems in the hierarchical order. The causative stems are higher than the imperative stems in terms of which inherits the longer stems from the other, and there is no hierarchical order between the imperative stems and the negation stems.

1.3 The stems for the past affix as basic ones

The past stems are the base among those of the affixes that take verbal base forms. The past stems can only be the 'input' to their present participle forms since the lexical rule to derive their present participle forms can be simply stated as follows:

(1) If the basic stem of the verbal base form is consonant-final, as in /hanas/ 'talk', /k/ 'come' and /s/ 'do', then the present participle form is the same as the stem for the past affix except for /i/ occurring at the final. If it is vowel-final, as in /oki/ 'get up', /tabe/ 'eat' and /ne/ 'sleep', then the present participle form is the same as the stem for the past morpheme.

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The 'non-past' stems nor the imperative stems nor the causative stems can be used to derive their present participle forms, or cannot be an 'input' for the derivation of their present participle forms, as the first rejected as in (2a) (cf. (2b)), the second rejected as in (3a) (cf. (3b)) and the third rejected as in (4a) (cf. (4b)).

(2) a. tabe taka.
eat [Prp] want [Non-past]
'(He) wants to eat (it).'

b. * tab-i taka. [Yanagawa]
eat-Prp want [Non-past]

(3) a. s-i taka.
do-Prp want [non-past]
'(He) wants to do (it).'

b. * se taka.
do [Prp] want [Non-past]

(4) a. k-i taka.
come-Prp want [Non-past]
'(He) wants to come (here).'

b. * ko taka.
come [Prp] want [Non-past]

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2 An analysis along the line of Bonami and Boyé 2002 and 2006

2.1 Each verbal lexeme associted with two stem slots: the slots for the basic stem and the vowel-adjusted stem

We assume that each verbal lexeme is associated with possibly different phonological representations (Bonami and Boyé 2002 and 2006). Specifically, each verbal lexeme is associated with its basic stem and possibly the other stem adjusted by vowel-'addition' or 'elimination' of the basic one in standard and Yanagawa dialect. The basic stems are those that the past affix concatenates with since the past stems are more basic than the others, as discussed in the last section.

This is formalized as each lexeme in the base form having the feature specification of [STEMS | [BASIC *phon*]] and [STEMS | [Vwl-Adjst *phon*]]. The sequence of phonemes of the lexeme is identical to the basic stem by default, and there is no vowel-adjusted stem in the case, as specified in Figure 1.

$$\begin{bmatrix} \textsc{phon} & \boxed{1} \\ \textsc{stems} & \begin{bmatrix} \textsc{basic} & \boxed{1}\textit{phon} \\ \textsc{Vwl-Adjst} & \textit{elist} \end{bmatrix} \\ \textsc{head} & \textit{v}\begin{bmatrix}\textsc{vform} & \textit{bse}\end{bmatrix} \end{bmatrix}$$

Figure: 1 The stem specifications of verbal lexemes in the base forms by default

The value of the feature STEMS | Vwl-adjst is the empty list (elist) by default.

The verbal base form /ne/ ‘sleep’ in the dialect as well as standard is, for example, specified as in Figure 2, adding the stem feature, consisting of the BASIC feature and the Vwl-Adjst feature, as well as the phon feature to a constraint-based grammar of Koga 2000.

$$\begin{bmatrix} \textsc{phon} & \boxed{1} \\ \textsc{stems} & \begin{bmatrix} \textsc{basic} & \boxed{1}\textit{ne} \\ \textsc{Vwl-Adjst} & \textit{elist} \end{bmatrix} \\ \textsc{head} & \textit{v}\begin{bmatrix}\textsc{vform} & \textit{bse}\end{bmatrix} \\ \textsc{head-ag-st} & \boxed{2} \\ \textsc{content} & \boxed{2}\Big[\textsc{arg} \ \lambda e \lambda t\big[\textit{sleep'(e) \& Cul/Hold(e)(t)}\big]\Big] \end{bmatrix}$$

Figure: 2 The verbal base form /ne/ ‘sleep’ in Yanagawa dialect as well as standard

All the consonant-final base verbal lexemes and all the /i/ vowel-final base verbal lexemes are specified similarly in Yanagawa dialect as well as standard similarly to the verbal base form /ne/ ‘sleep’ in Figure 2.

For the verbs with the basic stem being vowel /e/-final in Yanagawa dialect:

(5) **Lexical Rule:** If the basic stem of a verbal lexeme ends with the vowel /e/, then there will be another stem for the lexeme, or its vowel-adjusted stem, which is the same sequence of phonemes as the basic one except for the final vowel /e/ absent, as this rule associating that of Figure 3 and that of Figure 4. [Yanagawa dialect]

$$\begin{bmatrix} \text{PHON} & \boxed{1} \\ \text{STEMS} & \begin{bmatrix} \text{BASIC} & \boxed{1}\textit{...e} \\ \text{Vwl-Adjst} & \textit{elist} \end{bmatrix} \\ \text{HEAD} & \boxed{3}\ v\begin{bmatrix}\text{VFORM} & \textit{bse}\end{bmatrix} \\ \text{HEAD-AG-ST} & \boxed{4} \\ \text{CONTENT} & \boxed{5} \end{bmatrix}$$

Figure: 3 The base form of each 'vowel /e/-final' base verb with its phoneme identical to the basic stem

$$\begin{bmatrix} \text{PHON} & \boxed{2} \\ \text{STEMS} & \begin{bmatrix} \text{BASIC} & \boxed{1}\textit{...e} \\ \text{Vwl-Adjst} & \boxed{2}\begin{bmatrix}\boxed{1}\ominus e\end{bmatrix} \end{bmatrix} \\ \text{HEAD} & \boxed{3} \\ \text{HEAD-AG-ST} & \boxed{4} \\ \text{CONTENT} & \boxed{5} \end{bmatrix}$$

Figure: 4 The other in Yanagawa dialect with the phoneme identical to the stem with its final vowel /e/ absent

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A sequence of phonemes A $\ominus$ another sequence of phonemes B is the same as the former sequence (A) except for its last sequence identical to the latter sequnece (B) absent; e.g., /abc # defg/ $\ominus$ /fg/ is /abc # de/ with # a morpheme boundary.

The lexical rule associates, for example, the verbal base form in Figure 2 with that in Figure 5 in the dialect, and only in the dialect.

$$\begin{bmatrix} \textsc{phon} & \boxed{2} \\ \textsc{stems} & \begin{bmatrix} \textsc{basic} & \boxed{1}\textit{ne} \\ \textsc{Vwl-Adjst} & \boxed{2}\textit{n} \end{bmatrix} \\ \textsc{head} & \textit{v}\begin{bmatrix}\textsc{vform} & \textit{bse}\end{bmatrix} \\ \textsc{head-ag-st} & \boxed{3} \\ \textsc{content} & \boxed{3}\Big[\textsc{arg} \ \lambda e \lambda t\big[\textit{sleep'(e) \& Cul/Hold(e)(t)}\big]\Big] \end{bmatrix}$$

Figure: 5 The verbal base form /n/ ‘sleep’ in Yanagawa dialect only

For the verb with the basic stem being one phoneme /k/ only:

(6) If the basic stem of a verbal lexeme is one phoneme /k/ only, then there will be another stem for the verbal lexeme, or its vowel-adjusted stem, which is the same sequence of phonemes as the basic one except for a vowel /o/ occurring at the final, i.e., is the same as /ko/, as the other lexeme formalized in Figure 6. [Yanagawa dialect and Japanese]

$$\begin{bmatrix} \textsc{phon} & \boxed{2} \\ \textsc{stems} & \begin{bmatrix} \textsc{basic} & \boxed{1}k \\ \textsc{Vwl-Adjst} & \boxed{2}\left[\boxed{1} \oplus o\right] \end{bmatrix} \\ \textsc{head} & v\left[\textsc{vform}\ bse\right] \\ \textsc{head-ag-st} & \ldots \\ \textsc{content} & \ldots \end{bmatrix}$$

Figure: 6 The verbal base form /ko/ with its vowel-adjusted stem

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A sequence of phonemes A $\oplus$ another sequence of phonemes B is the same as the former sequence (A) except for the latter sequnece (B) occurring at the final; e.g., /abc # defg/ $\oplus$ /h/ is /abc # defgh/ with # a morpheme boundary.

For the verb with the basic stem being one phoneme /s/ only:

(7) a. If the basic stem of a verbal lexeme is one phoneme /s/ only, then there will be another stem for the verbal lexeme, or its vowel-adjusted stem, which is the same sequence of phonemes as the basic one except for a vowel /e/ occurring at the final, i.e., is the same as /se/. [Yanagawa dialect]

b. If the basic stem of a verbal base form is one phoneme /s/ only, then there will be another stem for the verbal lexeme, or its vowel-adjusted stem, which is the same sequence of phonemes as the basic one except for a vowel /i/ occurring at the final, i.e., is the same as /si/. [Standard]

The verbal base forms with vowel-adusted stems are formalized similarly to that of Figure 6.

2.2 Affix stems inheritance trees

As Bonami and Boyé 2002 and 2006 clarified stem dependency among the verbal and adjectival stems of affixes in French, we found in Japanese and Yanagawa dialect that the stems of a type of the verbal lexemes for an affix are identical to those at the immediately higher node in the hierarchical inheritance tree structuring the affix stems at its nodes unless otherwise specified if the affix stems hierarchical inheritance tree is devised in a particular manner. The affix stems inheritance tree of Yanagawa dialect is given in Figure 7, and that of standard is given in Figure 8.

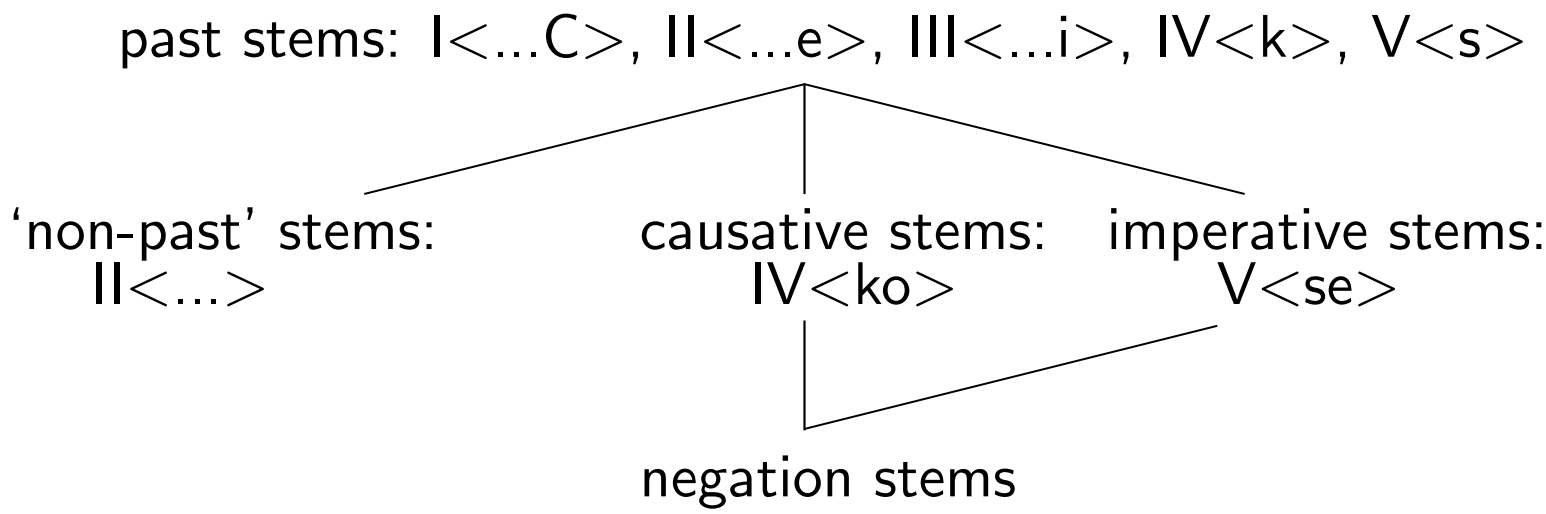

Figure: 7 The hierarchical inheritance tree of the affix stems in Yanagawa dialect

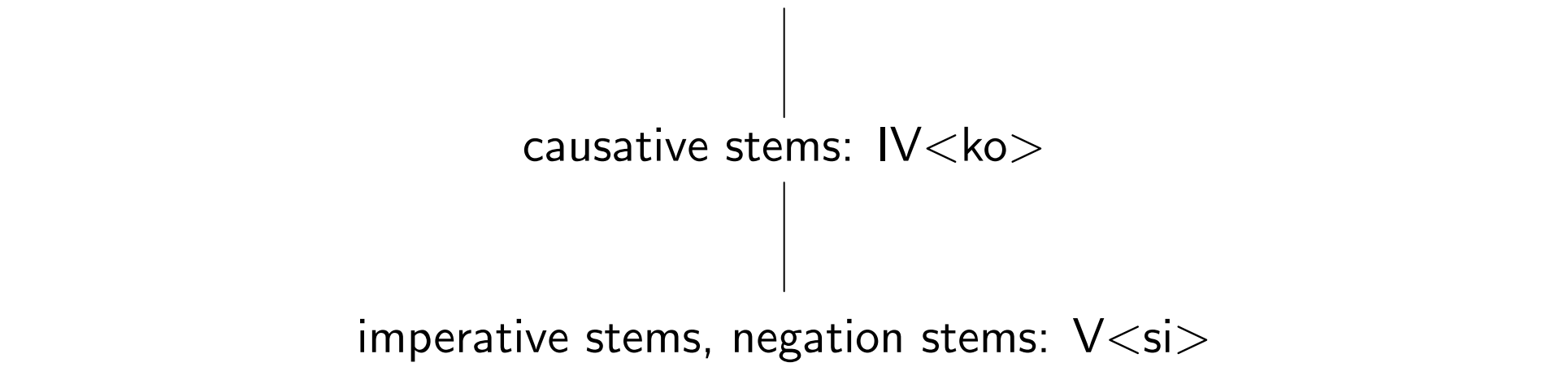

Figure: 8 The hierarchical inheritance tree of the affixes' selections of appropriate stems in Standard

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The past stems are located at the top node, the ‘non-past’ stems, the imperative stems and the causative stems are located at the immediately lower node of the top node, and the negation stems are located at the immediately lower node of the nodes of the imperative stems and the causative stems in the hierarchical inheritance tree of the affix stems in Yanagawa dialect. That of standard is much simpler. The ‘non-past’ stems are identical to the past stems, and both are located at the top node of the hierarchical inheritance tree of the affix stems. The causative stems are located at the immediately lower node of the top node. The imperative stems are identical to the negation stems, and both are located at the immediately lower node of the causative node.

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For example, the stems of the 'vowel /e/-final' base verbs for the 'non-past' affix are the same stems as those for the past affix except for the final /e/ absent in Yanagawa dialect. The stems of those verbs for the past affix end with the vowel /e/. The stems for the imperative affix are the same as those at the immediately higher node, the past stem node. Similarly, the stems of those verbs for the causative affix and the negation affix are computed as the same as those at the past stem node. The affix stems inheritance trees explain the affix stem concatenation phenomenon, given in Sections 1.1 and 1.2.

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A question arises why the hierarchical inheritance trees of the affixes' selections of stems underlies the hierarchical stuructures as are, i.e., the shorter to longer allomorphs needed in the order of the affixes of 1) the default morpheme of tense, 2) past tense, 3) imperative, 4) cause, passive and honorific and 5) negation in Yanagawa dialect. We have no answer to this question. Our speculation is that the order is from less to more in terms of the intuitive meaning contributions of affixes to their morphological complements.

2.3 An affix's morphological specification and surface constraints outside of the grammar

Departing from Bonami and Boyé 2002 and 2006 regarding where we state constraints on the affixes' selections of stems in linguistic theory, we claim that there are two possible places to specify constraints: one, in the morphological component of grammar, and the other, outside of the core components of the grammar, or as surface constraints. Our leading idea to state them in which place is as follows: **If a constraints is statable in the morphological component, and the relevant affix-stem concatenation phenomenon is found both in dialects and standard, then the constraint will be stated in the morphological component. Otherwise, the constraint will be stated as a surface constraint.** Bonami and Boyé 2002 and 2006 state every stem-related constraint in the morphological component. The leading idea we follow lets us explain dialectal differences using the same grammar with differences as surface constraints, that Bonami and Boyé 2002 and 2006 prevents us from explaining.

2.3.1 An affix's morphological specification within its morphological complement

The affix-stem concatenation phenomenon related to the past affix is the same between in Yanagawa dialect and in standard. In addition, the constraint is statable in the morphological component of the grammar, as will be clarified soon. We propose as a morphological constraint:

(8) The past affix /(i)ta/ takes, as the complement, a verb phrase in the base form (or as formalized in [HEAD *v* [VFORM *bse*]] and [COMPS *elist*]) and with the base form identical to the basic stem (or as formalized as the identity between [STEMS [BASIC α]] and [PHON α]) to be a verb phrase with the finite form, as formalized as in Figure 9.

$$\begin{bmatrix}
\text{PHON} & \textit{(i)ta} \\
\text{HEAD} & v\left[\text{VFORM } \textit{fin}\right] \\
\text{CONTENT} & \begin{bmatrix} \text{REL} & \lambda P \lambda e \lambda t\left[P(e)(t) \,\&\, t \in Past\right] \\ \text{ARG} & \boxed{2} \end{bmatrix} \\
\text{COMPS} & \left\langle \begin{bmatrix} \text{PHON} & \boxed{1} \\ \text{STEMS} & \left[\text{BASIC } \boxed{1}\right] \\ \text{HEAD} & v\left[\text{VFROM } \textit{bse}\right] \\ \text{COMPS} & \textit{elist} \\ \text{CONTENT} & \boxed{2} \end{bmatrix} \right\rangle
\end{bmatrix}$$

Figure: 9 An analysis of /(i)ta/ ‘Past’ in Yanagawa dialect as well as in standard

$$\begin{bmatrix}
\textsc{phon} & \boxed{1}\oplus\boxed{5} \\
\textsc{head} & \boxed{6} \\
\textsc{comps} & \textit{elist} \\
\textsc{hd-arg-st} & \boxed{8} \\
\textsc{content} & \boxed{7} \\
\textsc{Non-HD-Dtr} & \begin{bmatrix}
\textsc{phon} & \boxed{1} \\
\textsc{stems} & \begin{bmatrix} \textsc{basic} & \boxed{1}\textit{ne} \\ \textsc{Vwl-Adjst} & \textit{elist} \end{bmatrix} \\
\textsc{head} & \textit{v}\left[\textsc{vform}\ \textit{bse}\right] \\
\textsc{comps} & \textit{elist} \\
\textsc{hd-arg-st} & \boxed{4} \\
\textsc{content} & \boxed{4}\left[\textsc{arg}\ \lambda e\lambda t\left[\textit{sleep'(e)}\ \&\ \textit{Cul/Hold(e)(t)}\right]\right]
\end{bmatrix} \\
\ldots\ldots & \text{(continued to Figure 11)}
\end{bmatrix}$$

Figure: 10 A half of an analysis of /ne-ta/ ‘slept’

$$\left[\begin{array}{ll} \ldots\ldots & \text{(continued from Figure 10)} \\ \text{HD-DTR} & \left[\begin{array}{ll} \text{PHON} & \boxed{5}\textit{(i)ta} \\ \text{HEAD} & \boxed{6}\textit{v}\left[\text{VFORM}\ \textit{fin}\right] \\ \text{HD-ARG-ST} & \boxed{8} \\ \text{CONTENT} & \boxed{7}\left[\begin{array}{ll} \text{REL} & \lambda P\lambda e\lambda t\left[P(e)(t)\ \&\ t \in Past\right] \\ \text{ARG} & \boxed{4} \end{array}\right] \\ \text{COMPS} & \left\langle \left[\begin{array}{ll} \text{PHON} & \boxed{1} \\ \text{STEMS} & \left[\begin{array}{ll} \text{BASIC} & \boxed{1} \\ \text{VWL-ADJST} & \textit{elist} \end{array}\right] \\ \text{HEAD} & \textit{v}\left[\text{VFORM}\ \textit{bse}\right] \\ \text{COMPS} & \textit{elist} \\ \text{CONTENT} & \boxed{4} \end{array}\right] \right\rangle \end{array}\right] \end{array}\right]$$

Figure: 11 The other half of the analysis of /ne-ta/ ‘slept’

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The verbal base form with the phoneme /n/ ‘sleep’ identical to the vowel-adjusted stem and the past affix do not combine to be a verb phrase in the finite form since the past affix only takes a verb phrase in the base form with its phoneme identical to the basic stem. Thus, the sequence of the verbal base form /n/ plus the past affix /(i)ta/, or */n#ita/, is predicted not to be grammatical, which is a correct prediction. This explains the fact that the sequence */n#ita/ ‘sleep-Past’ is ungrammatical both in the dialect and in standard.

If we stated the constraint on the past affix's selection of stems as a surface constraint in Yanagawa, then we would need to analyze, for example, /k-ita/ 'come-Past' and */ko-ta/ as grammatical and only the latter as inappropriate, and */tab-ita/ and /tabe-ta/ 'eat-Past' as grammatical and only the former as inappropriate in the dialect. This would be desirable if */ko-ta/ were appropriate in some dialect and */tab-ita/ were appropriate in some dialect. However, this is not the case. No dialect allows */ko-ta/ 'came' to be appropriate or */tab-ita/ 'ate' to be appropriate. It is thus better to exclude the forms */ko-ta/ and */tab-ita/, for example, as ungrammatical or by a constraint in the core components of grammar. The morphological sepcification of the past affix in its morphological complement in the current analysis is thus on the right track. A similar discussion is true to the selections of stems by the 'non-past' affix in standard.

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There is no other affix combining with a verb phrase in the base form that specifies a morphological stem selection in the complement as the past affix does. The negation affix, for example, combines with a verb phrase in the base form to be a negation phrase, whether the phoneme is identical to the basic stem or not, since the affix does not specify any morphological specification (such as the identity between the PHON value and the STEMS | BASIC value) of its complement, as formalized in Figure 12.

$$\begin{bmatrix} \text{PHON} & \textit{(a)N} \\ \text{HEAD} & \textit{v}\left[\text{VFORM}\ \textit{fin}\right] \\ \text{CONTENT} & \begin{bmatrix} \text{REL} & \lambda P \lambda e \lambda t [\neg\ P(e)(t)\ \&\ t \in \textit{Non-past}] \\ \text{ARG} & \boxed{2} \end{bmatrix} \\ \text{COMPS} & \left\langle \begin{bmatrix} \text{HEAD} & \textit{v}\left[\text{VFROM}\ \textit{bse}\right] \\ \text{COMPS} & \textit{elist} \\ \text{CONTENT} & \boxed{2} \end{bmatrix} \right\rangle \end{bmatrix}$$

Figure: 12 An analysis of /(a)N/ ‘not’ in Yanagawa dialect

The phoneme feature and the stems feature are not in the complement of the negation affix ‘(a)N’, as in Figure 12, whereas they are in the complement of the past affix ‘(i)ta’, as in Figure 9.

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For example, the negation affix /(a)N/ is allowed to combine with /n/ as well as /ne/ whether the phoneme is identical to the basic stem or the vowel-adjusted stem to be */n#an/ for the former as well as /ne#N/ for the latter. The former is excluded by a surface constraint, but not excluded by any constraint of a core component of grammar.

2.3.2 Surface constraints in the stem dependency trees
Similarly to the negation affix, other affixes that combine with a verb phrase in the base form, than the past affix, have the selectional constraints on the stems, as surface constraints, or those outside of the core components of grammar.

(9) The constraints related to others than the past affix on the hierarchical inheritance tree of affix stems in Yanagawa dialect are stated as surface constraints.

a. **Consistent stems:** If the basic stem of a verbal lexeme is 1) consonant-final and more than one phoneme or 2) /i/ vowel-final, then there will be no other actual stem for the verbal lexeme. [Yanagawa dialect and Standard]

(10) a. **'Non-past' stems:** If the basic stem of a verbal lexeme is /e/ vowel-final, then its 'non-past' stem will be the vowel-adjusted stem, or the shorter one; otherwise, its 'non-past' stem will be identical to its basic stem. [Yanagawa dialect]

b. **Causative stems:** If the basic stem of a verbal lexeme is one phoneme /k/ only, then its causative stem is the vowel-adjusted stem, or the longer one; otherwise, its causative stem will be identical to its basic stem. (Or, only the causative stem of the verbal lexeme /s/ only is the shorter.)[Yanagawa dialect and Standard]

(11) a. **Imperative stems:** If the basic stem of a verbal lexeme is one phoneme /s/ only, then its imperative stem is the vowel-adjusted stem, or the longer one; otherwise, its imperative stem will be identical to its basic stem. (Or, only the imperative stem of the verbal lexeme /k/ only is the shorter.)[[Yanagawa dialect]

b. **Negation stems:** If the basic stem of a verbal lexeme is one phoneme /s/ or /k/ only, then its negation stem will be the vowel-adjusted stem, or the longer one; otherwise, its negation stem will be identical to its basic stem. (Or, all the negation stems is the longer.)[Yanagawa dialect and Standard]

(12) The constraints related to others than the past affix on the hierarchical inheritance tree of affix stems in Standard are stated as surface constraints.

a. **Consistent stems:** If the basic stem of a verbal lexeme is 1) consonant-final and more than one phoneme or 2) /i/ or /e/ vowel-final, then there will be no other actual stem for the verbal lexeme. [Standard]

b. **'Non-past' stems:** The 'non-past' stems are identical to their past stems. [Standard]

c. **Imperative stems** The imperative stems are identical to their negation stems. [Standard]

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If we stated the constraint on the imperative affix's selection of stems as a morphological specification in Yanagawa dialect, then we would need to just stipulate that the imperative stem of the strong base verb /k/ is the basic stem /k/ (as required for /ke/) and that of the strong base verb /s/ is the vowel-adjusted stem /se/ (as required for its imperative form /se-ro/ 'do-Imperative'). There is no analysis found for those stems of the basic stem /k/ 'come' and the vowel-adjusted stem /se/ 'do'. Our analysis is better since surface constraints are allowed to possess such a stipulative nature. The same discussion is true to the causative affix' selection of stems in Yanagawa dialect and standard.

If we stated, for example, the constraint related to the negation stems in Yanagawa dialect as a morphological one, then we would need to say that the negation affix selects the longer morphemes among the vowel-adjusted stem /ko/ and the basic stem /k/ and the basic stem /tabe/ and the vowel-adjusted stem /tab/. It is difficult to decide which is longer in the morphological component since the length of stems is the number of the phonological segments. There is no way to count the phonological segments in morphology. Our analysis treats this constraint as a surface constraint outside of the core components of grammar where constraints are allowed to use any description in the core components.

The same discussion is true to the imperative stems in standard. A discussion similar to the discussion here is also true to the 'non-past' stems in Yanagawa dialect and in standard; the 'non-past' affix selects the shorter morphemes among the vowel-adjusted stem /ko/ and the basic stem /k/ and the basic stem /tabe/ and the vowel-adjusted stem /tab/.

3 Predictions

3.1 The ‘non-past’ form /tab-u-ru/ ‘eat-Non-past’ forms, but NOT */tabe-ru/, for example, in Yanagawa dialect

Koga and Ono’s 2010 prosodic minimality over the class of the verbs in conjunction with the analysis of the morpheme /(r)u/ as the default morpheme of tense explains, for example, why /tab-u-ru/ ‘eat-DfltMT-DfltMT’ is more appropriate than /tab-u/ in Yanagawa dialect. Our analysis on this paper correctly predicts that the vowel-adjusted stem /tab/ ‘eat’, for example, is more appropriate than the basic one /tabe/ for the default morpheme of tense, as given in the hierarchical inheritance tree of the affixes’ selections in Figure 7.

3.2 The imperative form /k-e/ in Yanagawa dialect and /ko-i/ in standard

Since the affixes from the 'non-past' one to the imperative one in the hierarchical tree select the basic stem /k/ for the lexeme /k/ $\sim$ /ko/ 'come' in Yanagawa dialect, the imperative affix selects the basic stem. Thus, /k-e/ 'come-Imperative' is more appropriate than /ko-i/ 'come-Imperative' in Yanagawa dialect. On the other hand, since the affixes from the 'non-past' one to the past one in the hierarchical tree select the basic stem /k/ for the lexeme /k/ $\sim$ /ko/ 'come' in standard, the imperative affix selects the vowel-adjusted stem. Thus, /ko-i/ 'come-Imperative' is more appropriate than /k-e/ 'come-Imperative' in stanard.

3.3 The inappropriateness, but not ungrammaticality, of ?*/si-sase/ ‘do-Causative’ in standard and ??/se-sase/ in Yanagawa dialect

The surface constraint on the concatenations of the causative affix to verbal stems in Yanagawa dialect predicts that /s-ase/ ‘do-cause’ is grammatical and /se-sase/ is ungrammatical. Similarly, that in standard predicts that /s-ase/ ‘do-cause’ is grammatical and /si-sase/ is ungrammatical. Actually, ??/se-sase/ and ?*/si-sase/ sounds better than the complete ungrammaticality. In contrast, this does not hold in the case that the causative affix selects the stem of the strong base verbal lexeme /k/ ‘come’, as in (13).

(13) a. ko sase
come cause
“... cause ... to come ...”

b. * k ase
come cause

Furthermore, in contrast, it does not hold in the case that the negation affix selects the stem of the strong base verbal lexeme /s/ ‘do’, as in (14) and (15).

(14) a. se N
do Not
“... do not ...”

b. * s aN
do Not

(15) a. si nai
do Not
“... do not ...”

b. * s anai
do not

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The unique property of the verbal lexeme /s(i/e)/ ‘do’, maybe due to the fact that the verbal lexeme is used as the light verb combining with the verbal noun, is influential to the degree that it makes the negation affix not use the shorter one /s/ and makes the causative affix use the shorter one. The unique property of the verbal lexeme /s(i/e)/ ‘do’ may be relevant to the fact that the semantic content of the verbal noun plus the light verb, as in /benkyou s(i/e)/ ‘study [verb]’ comes mostly from the verbal noun. This is easily explained if we replace the constraints of the affix stem concatenations, as follows for each of Yanagawa dialect and Standard.

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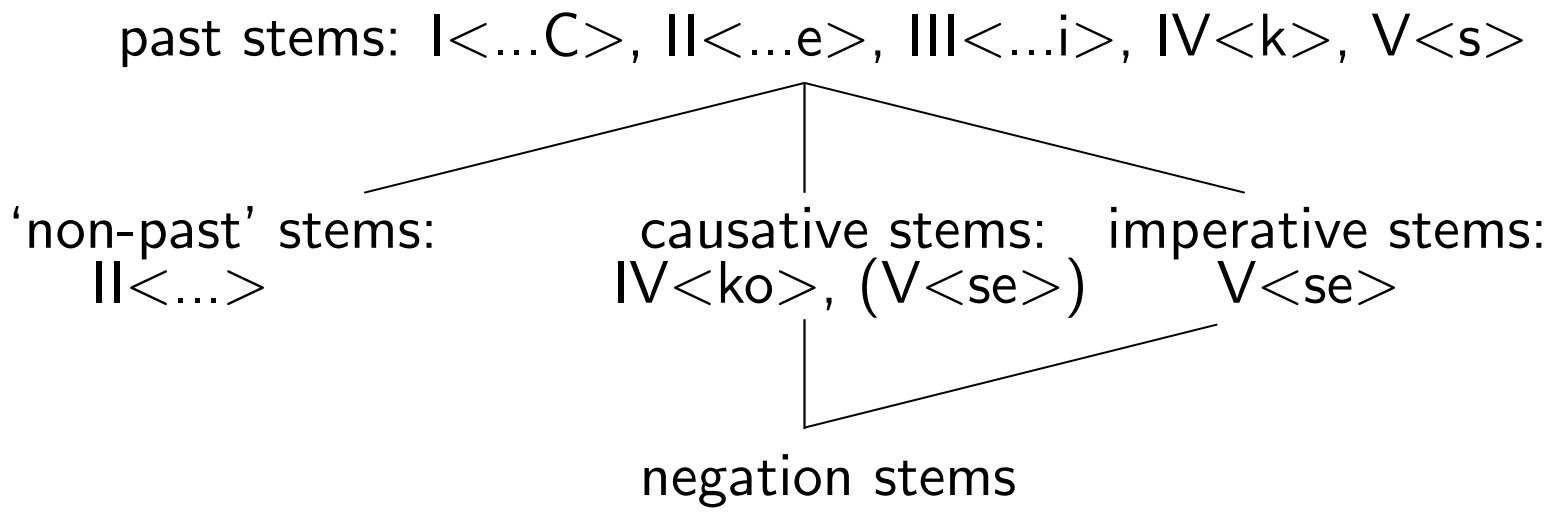

Figure: 13 The hierarchical inheritance tree of the affix stems in Yanagawa dialect

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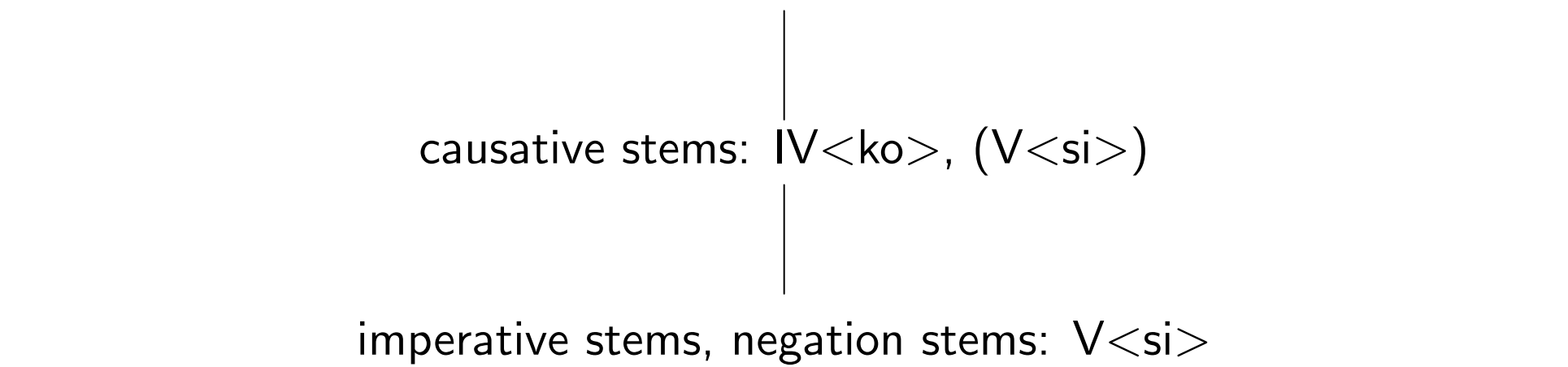

Figure: 14 The hierarchical inheritance tree of the affixes' selections of appropriate stems in Standard

Summary: We articulated the remaining problem of Koga and Ono (in review), restating the 'non-past' forms, the past forms, the imperative forms, the causative forms and the negation forms of the 'vowel /e/-final' base verbal lexemes in Yanagawa dialect and the strong base verbal lexemes /k/ and /s/ in standard in section 1.1. Then, we observed that the shorter to longer stems are used for affixes in the order of 1) the 'non-past' affix, 2) the past affix, 3) the imperative and causative affixes and 4) the negation affix in the dialect and for those in the order of 1) the past and 'non-past' affixes, 2) the causative affix and 3) the imperative and negation affixes in the standard in section 1.2. In section 1.3, we observed that the past stems are more basic than the other affix stems since the present participle forms are simply derived only from their past stems, but not from the other affix stems.

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We proposed an extension of Bonami and Boyé 2002 and 2006 in section 2 as an analysis to explain the problem. Each verbal lexeme may be associated with two phonological representations: one, the basic stem, and the other, its vowel-adjusted stem, and lexical rules are proposed to associate one base form with the basic stem with another verbal base form with its vowel adjusted stem (section 2.1). After clarifying the stem dependencies of Yanagawa dialect and standard, we presented a constraint on stem selections by the past affix as a morphological constraint in section 2.3.1 and presented the other constraints as surface constraints in section 2.3.2. In section 2, we discussed why we need to state constraints as proposed, as opposed to being stated in the other place between one, in the morphological component, and the other, as surface constraints, or the constraints outside of the core components of grammar. We saw correct predictions by our analysis in section 3.

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