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ABSTRACT

When strings of phonological segments are organized into syllable structures, diverse phonological processes fall together as adjunctions of syllable-free segments to syllabified segments.

In French a sequence of vowel and nasal consonant contract to a nasalized vowel before a consonant (1a), but not before a vowel (1b).

- (1) a. bon garçon
b. bon ami

Also, obstruents delete before consonants (2a), but not before vowels (2b).

- (2) a. petit garçon
b. petit ami

Both nasalization and deletion occur as well before a strong boundary (utterance finally, for example). But neither nasalization nor consonant deletion occur before a feminine ending as in (3a,b), which has the effect of an overt vowel in this context, though it is not pronounced.

- (3) a. bonne fille
b. petite fille

Nasalization in (1a) is consistent with an analysis of French as a CV language where only consonant positions pre-

ceding vowels are licensed. Sonorant consonants like n, however, when syllable-free (in a CVN sequence, for example, where only C and V occupy licensed syllable structure positions), adjoin to the preceding vowel position, giving a nasalized vowel. In (1b), on the other hand, there is a vowel following n which licenses it as onset. Since onsets are obligatory, adjunction to the preceding vowel is ruled out. In (2a), t, an obstruent, followed by a consonant g deletes since to be phonetically interpreted it must be licensed by a following vowel, as it is in (2b). Obstruents, unlike sonorants, cannot adjoin to a preceding vowel. In (3a,b) the feminine ending serves as the licensor of the preceding consonant. Thus, consonant licensing is effected by an overt vowel or by a grammatical entity like the feminine ending which may be phonetically empty.

In the above account, consonant licensing is determined by syllable structure. I assume every syllable is headed by a vowel and every consonant must be incorporated into a syllable, that is, licensed by a vowel. Typical syllable structures are illustrated in (4), where V^0 is the nucleus, V^1 the rhyme which optionally dominates a C-category (coda), and V^2 the syllable category, which obligatorily dominates a C-category (onset).

- (4) a. V^2
 $\begin{array}{c} / \\ | \\ / \ V^1 \\ | \\ \ C \ V^0 \ C \end{array}$
 b. V^2
 $\begin{array}{c} / \\ | \\ / \ V^1 \\ | \\ \ C \ V^0 \end{array}$

In the unmarked case, a vowel in French licenses consonants in onset position only as in (4b). This property of French syllables is consistent with nasalization and deletion phenomena such as those illustrated in (1-3). In particular, nasalization is analyzable as the adjunction of the nasal consonant to the preceding vowel position in the case where there is no following vowel to license it as onset. Deletion of obstruents in the same context follows from their not being licensed as onsets to a following vowel and their inability to adjoin to a preceding vowel. Thus, nasalization is represented as the adjunction of a syllable free nasal segment as in (5a) to a syllable nucleus position as in (5b).

- (5) a. V^2
 $\begin{array}{c} / \\ | \\ / \ V^1 \\ | \\ \ C \ V^0 \ N \end{array}$
 b. $\cdot V^2$
 $\begin{array}{c} / \\ | \\ / \ V^1 \\ | \\ \ C \ V^0 \\ | \\ \ V^0 \ N \end{array}$

Adjunction creates a new category, identical to the one which dominates the vowel, which now dominates both the vowel and the nasal, that is, a new syllable nucleus which is a nasalized vowel.

A salient fact about the analysis outlined above is that

it requires no language particular rules. The theory of syllable structure, where vowels project syllables and consonants must be in positions licensed by vowels, is assumed to be universal. The fact that languages divide up into CV and CVC types is a general parametric division established for each language on readily available data. The CV type language appears to be the unmarked case. Thus, for example, the child would need evidence that vowels licensed following consonants to set the CVC parameter for his language. The kind of evidence that is salient for this setting would include geminate clusters of consonants, which by definition require that one be coda, the other onset of separate syllables.

The only rule that is required by the analysis is a general (presumably, universal) adjunction rule. That is, a rule which says adjoin anything to anything else within the limits set by the inherent categories of segments and the universal principles of syllable structure. By definition adjunction does not create new syllable structure positions. It merges a syllable-free segment into an already established position. Thus, adjunction is structure preserving. The limits set by the inherent properties of segments seem to be general compatibility limits. Thus, a nasal consonant is not incompatible with a syllable nucleus position through adjunction, but an obstruent is generally incompatible with a vowel nucleus position under the same circumstances. In traditional terms, a nonvocalic segment cannot be adjoined to a vocalic segment, and vice versa.

Japanese is also a CV language. However, in Japanese, sequences of two consonants across a syllable boundary are allowed under quite specific conditions.

These conditions are illustrated in the following verb forms.

(6)	Present	Past
a.	taberu	tabeta
b.	wakaru	wakatta
c.	yomu	yonda
d.	yobu	yonda
e.	toku	toita
f.	togu	toida
g.	hanasu	hanasita

In the past forms (6b,c,d) there are sequences of two consonants (tt, nd, nd). In each case the features for place, voice and continuance form a kind of long component across the sequence. In addition, if the first consonant is voiced, it is also nasal. In (6a), the stem is tabe and the endings are ru in the present and ta in the past. In the past tense, the remaining examples show ta or its voiced alternate da. In the present the r of the ending seems to merge into the final consonant of the stem to which it is attached. Thus, in the present tense cases (6b) through (6g), the final consonant of the stem surfaces before the residual u ending. In (6e,f), in the past, stem final k and g are lost and the vowel i emerges in their place. In (6g), in the past, the vowel i emerges after the stem final consonant and palatalizes it.

I assume that in (6a) the basic forms of the present and past tense suffixes surface following a vowel final stem. Thus we get the analysis in (7).

(7) tabe+ru, tabe+ta

The tabe- case illustrates the basic CV pattern of Japanese where every vowel licenses a single consonant to its left as onset. It is where this pattern is perturbed in the remaining examples of (6) that rather complex adjustments in segmental structure come into play. The perturbation is caused when consonant initial suffixes are added

to consonant final stems creating a sequence C_1, C_2 with no intervening vowel. In the case of the present tense suffix, the r appears to merge completely with the final consonant of the stem which precedes it. Assume that r in this case is a maximally unmarked liquid, a kind of archisegment R such that it is nondistinct from any other consonant and that this accounts for its chameleon like nature. Then, if the final consonant of the stem is syllable free and adjoins to R in the position licensed by the following vowel, we get the analyses in (8).

(8)	b.	wakar+Ru	wakaru
	c.	yom+Ru	yomu
	d.	yob+Ru	yobu
	e.	tok+Ru	toku
	f.	tog+Ru	togu
	g.	hanas+Ru	hanasu

In the past tense, the examples in (6e,f,g) suggest that the suffix is -ita. In (6g), the stem final s is syllable free and adjoins to the initial i of the suffix which palatalizes it. In (6e,f), the stem final velar consonant is syllable free and adjoins also to the initial i of the suffix. In these cases, however, we get velar elision, a not uncommon result of the adjunction of a velar consonant to a high, front vowel. For example, in Kasem, also a CV type language, nouns suffixed by a are singular, by i are plural as in bakada, bakadi. In stems that end in a velar consonant such as dig-, the velar is preserved in the singular before a (diga), but lost in the plural before i (di, from intermediate di+i).

In the remaining cases of the past tense in Japanese illustrated in (6a,b,c,d), the i of the suffix deletes. Where the stem is vowel final as in (6a), suffix i must adjoin to it since it has no onset. Since, i is nondistinct from the stem final vowel, it must be a relatively

unmarked vowel. Where the stem ends in a consonant as in (6b,c,d), the suffix i deletes and the final stem consonant assimilates for place to the t of the suffix. In addition if the stem final consonant is voiced it voices the suffix t and is itself realized as a nasal.

The interesting fact about these last cases is that Japanese allows the CVC structure just where the coda C has an identity relation with the following onset. The identity relation appears to involve the agreement of voice, continuance and place, the long component mentioned above. The intervening i is retained in the (6e,f,g) cases because the velars in (6e,f) do not agree with the following dental for place and the s in (6g) does not agree with the following stop for continuance. If this agreement pattern represents a kind of adjunction

of the stem final, syllable-free segment to the licensed suffix initial consonant, then we have the suggestion of an explanation for this interesting array of assimilations and deletions. The suffix initial i appears to be a defective vowel which will delete wherever it can (or alternatively, an epenthetic vowel which is inserted only where it must be). The conditions surrounding the deletion of i are linked to the possible adjunction of the consonants which surround it. Where the adjunction is possible because the consonants are compatible with respect to voice, place and continuance, then i can delete. Where they are not compatible, i cannot delete. Alternatively, in an epenthesis analysis, i is inserted where the stem final consonant cannot adjoin to the suffix initial consonant because of an incompatibility.