Sandhi in a Salishan Language: Okanagan (Nicole Lake)  1
by
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This paper will discuss four points: (1) liaison, with special reference to the X notation (Chomsky 1970; Jackendoff 1974), supported by standard French liaison in elevated speech (Selkirk 1976), and to the hypothesis (Kinkade 1977; Kuiper 1965) that there is no noun/verb distinction in Salishan languages; (2) the realization of labialization, i.e., of a single feature as a separate sequential surface element, occurring in liaison contexts; and elsewhere; (3) the manifestation, in a sandhi context, of a sound (X) which happens to be precisely what is missing in the affricate series of the phonemic consonant inventory of this language; and (4) sandhi and syllabification.

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Okanagan\(^2\) is an Interior Salish language, mostly spoken throughout the Okanagan Valley in British Columbia and Washington State. This particular dialect is spoken in an adjoining northwestern valley by the Upper Nicola Band, residing ons Quilchena and Douglas Lake Reserves, located northeast of Merritt, B.C., in Nicola Valley.

1. Linear \(\mathcal{I}\) notation, and nouns and verbs

In 1970, Chomsky proposed for English that the classes N, A, and V constitute a natural category, demonstrating that each may be strictly subcategorized for the same variety of complements: S, PP, AP, NP, VP, etc. He suggests (a) that the lexical categories N, A, V be represented by a variable \(X\) in phrase structure rules, for the rules:

\[
\begin{align*}
\text{AP} & \rightarrow A \text{ Comp} \\
\text{VP} & \rightarrow V \text{ Comp} \\
\text{NP} & \rightarrow N \text{ Comp}
\end{align*}
\]

(b) that, abbreviating the four rules above, each of these categories \(X\) is dominated in turn by a category \(\mathcal{X}\) which includes the possible set of complements of \(X\):

\[
\mathcal{X} \rightarrow X \text{ Comp}
\]

and further, (c) that elements referred to as specifiers are sisters to the \(\mathcal{X}\), dominated by double-bar phrases, designated as \(\mathcal{X}\):

\[
\mathcal{X} \rightarrow [\text{Spec}, \mathcal{X}] \mathcal{X}
\]

The specifiers of an NP are elements such as determiners, quantifiers; of an AP, elements such as comparatives and other qualifying or quantifying expressions; of a VP, elements such as auxiliaries and certain adverbials. Chomsky and Jackendoff differ in that the former prefers one lexical entry for pairs such as refuse, refusal, undifferentiated for noun or verb, while the latter prefers two lexical entries, related by a lexical redundancy rule.

This \(\mathcal{X}\) notation is of particular interest for the analysis of Salishan and other NW coast languages. Although the literature on the topic is meager, many linguists working on these NW languages feel that there is no noun/verb distinction and that \(N\) and \(V\) (and probably adjectives, too) are derived from the same root. Kinkade (1977) and Kuipers (1966) claim that there is no distinction, according to their analyses of Salishan, wherein the
so-called 'noun' and 'verb' are capable of taking the same inflections, of taking the same kinds of complements and are from the same roots. Neusten (1977), in a footnote, states that for Salishan languages, a distinction must be made between lexical category and syntactic category, wherein 'noun' and 'verb' are syntactic categories.

What is common to these proposed analyses of Salishan languages and the development of X notation is that both discuss the logical structure of phrases. Chomsky proposed to codify the similarities of phrase structure by abbreviating with X in the PS rules and by showing the relationship in the lexicon with a single lexical entry, for lexical pairs, unmarked for the syntactic feature differentiating nouns from verbs. Thus this predicts that the use of this notation would simplify rule statement for phenomena affecting both syntactic categories of noun and verb. For Salishen, then, in a transformational framework, within this lexicalist hypothesis, roots could be entered into the lexicon without being differentiated as N, A, or V.

Questioning the existence of natural classes proposed by theory but which do not appear in rules, Selkirk (1976) demonstrates that liaison in formal Standard French does support the grouping of N, A, and V in a natural class and that the rule for liaison is most simply stated in terms of the X notation.

In French, a final obstruent is deleted before an initial consonant in the following word. If the following word is vowel initial, liaison may occur. In elevated speech, the rule is extended to a head N, V or A which is inflected may be in a liaison context with the word that follows, if that word is in its complement. In terms of the X notation, one can simply say that a liaison context exists between an inflected X and its complement, both dominated, of course, by X. (Selkirk, 1976,p.21)

Complements to N, dominated by N, are in liaison contexts:

1) des endroits obscurs — "dark places" (Selkirk, (14))
2) des vieux soldats à moustaches grises — "old soldiers with grey mustaches" (Selkirk, (14))

But elements outside an N+ are not in a liaison context with an inflected X:

3) Donnez ces lunettes à Marcel. — "Give these glasses to Marcel.
4) J'ai trouvé mes lunettes à la mérite. — "I found my glasses at the town hall.
5) Les animaux / accouraient. — "The animals came running up.

And it is similar for plural adjectives which are in liaison with their vowel-initial following complements, in elevated speech.

Within a verb phrase, liaison exists with direct and indirect objects in immediate proximity of the V.
Thus, Selkirk shows that, for one style of one French dialect, the simplest and most general formulation of the liaison rule is best expressed in terms of X notation (cf. her (13) X-Comp rule, p. 582) and
thus we see that phonology has provided evidence for a very abstract hypothesis about syntactic structure.

(Selkirk, 1976, p. 599)

Let us now turn to Okanagan data to see where liaison contexts occur. Basically, liaison occurs across a word boundary, between a vowel-initial segment and a consonant-final one, with the vowel attaching itself to the preceding consonant.

By comparison, for French the final obstruent attaches itself to the initial vowel in the appropriate liaison context. The determiner /1/, definite, also the all-purpose preposition, is especially fruitful for providing liaison contexts.

The following examples support the X notation:

Example 14 supports the X notation within a NP:

(14) /i tɛst yɛ spɛ'tɛ'n - s /

def. boy def. rope his

"the boy's rope"

By contrast ils mangent / après avoir fini leur partie
d'œufs / une petite choucroute.

(34)

"usually they eat / after having finished their eggs / a little sauerkraut."

Symbols used: \( \ddagger \) devoiced; \( \ddagger \) unreleased; \( \ddagger \) partially devoiced; \( \ddagger \) apenthetic; \# syllabic; \( \ddagger \) retracted, after pharyngesal and uvular stops; C' glottalized; C" labialized; / phonemic or near-phonemic; [ ] phonetic; - morpheme boundary; # word boundary; $ syllable boundary; \# primary stress; \$ secondary stress.

The consonant inventory is given on page 19.
Every baby cries.

As in French, liaison does not occur across a major intonation break.

In French, the formulation of liaison can be stated as a readjustment of word boundaries. Raising a final word boundary of an inflected lexical category dominated by X, Selkirk's X-Comp rule leaves only one word boundary between two major lexical categories, thus predicting liaison contexts correctly for

In Okanagan cannot be accounted for in terms of X-notation, or for that matter, in terms of phrase structure because liaison occurs between major lexical categories and between

*The phonology* (\(G, G\), \(G\), \(G\)) predictably occur with an unaccented lary, central vowel and it is almost impossible to induce an error to counteract it. For example, every can be perceived as *every* or *every*, while *boy* appears as either *boy* or *boy*. These few word-initial phonemes which are followed by a laryngeal are pronounced as [\(\text{\textbackslash i}\)] and [\(\text{\textbackslash i}\)], as in *teeth* /\(\text{\textbackslash i}\text{\textbackslash e}\)/, *man* /\(\text{\textbackslash m\textbackslash a}\)/, *tired* /\(\text{\textbackslash t\textbackslash i\textbackslash r\textbackslash d}\)/, *tried* /\(\text{\textbackslash t\textbackslash r\textbackslash i\textbackslash d}\)/. No success with a high, back vowel has yet been collected: [\(\text{\textbackslash 3\textbackslash o}\)] /\(\text{\textbackslash 3\textbackslash o}\)/, [\(\text{\textbackslash 3\textbackslash o\textbackslash n\textbackslash m\textbackslash o}\)] /\(\text{\textbackslash 3\textbackslash o\textbackslash n\textbackslash m\textbackslash o}\)/, [\(\text{\textbackslash 3\textbackslash o\textbackslash n\textbackslash m\textbackslash o}\)]. Festin (1782) was already noted for Lannian (Calixild) and other Interior Salish languages, that phonemes migrate to the nasal streamer V and affect these Vs by lapping them. One phoneme in my data did not migrate. In one realization, it was salient in the other, most peculiar phonemized syllables resulted from *father* /\(\text{\textbackslash fa\textbackslash t\textbackslash h}\)/, *monkey* /\(\text{\textbackslash m\textbackslash n\textbackslash k\textbackslash o\textbackslash m}\)/, *man* /\(\text{\textbackslash m\textbackslash a\textbackslash n}\)/, *man* /\(\text{\textbackslash m\textbackslash a\textbackslash n\textbackslash y\textbackslash k\textbackslash a\textbackslash m}\)/. However, consents *fatherless* /\(\text{\textbackslash fa\textbackslash t\textbackslash h\textbackslash l\textbackslash e\textbackslash s}\)/, *man* /\(\text{\textbackslash m\textbackslash a\textbackslash n}\)/. *man* /\(\text{\textbackslash m\textbackslash a\textbackslash n\textbackslash y\textbackslash k\textbackslash a\textbackslash m}\)/.
In all of the examples given above, a non-lexical item of a major category is linked to a preceding consonant-final lexical item of the same major category as in (14), (15), or of different major lexical categories, as in (23), (24), and (26).

Although referring to grammatical information is permissible in phonological analysis, the X-notation, which unites the phrase structure of nouns and verbs, is of no benefit to the statement of liaison in Okanagan. Moreover it should be noted that it is of limited benefit to the analysis of French liaison since the extensive liaison presented by Selkirk (1976) occurs in one very formal style of one dialect.

Therefore liaison in Okanagan does not provide support for or against the X-notation. Nor does it provide support for or against the proposed analysis of Salishan languages as being without a noun/verb distinction. It is precisely because of this proposed analysis that one would expect an abstract hypothesis about syntactic structure, such as the X-notation, to be of use in the phonological analysis of liaison in these languages.

Before discussing the probable function of liaison in Okanagan, two other related matters will be discussed.

5 Non-lexical items which are considered to be articles, complementizers, prepositions, modals, etc., are not flanked by word boundaries, according to SPE convention 366, while 'noun,' 'verb,' 'adjective,' 'sentence,' 'noun phrase,' 'verb phrase,' being lexical items, are.
2. Liaison with labialized consonants

In the examples given in section 1, none of the consonants in a liaison context were labialized. However, these do occur, and their phonetic realization is most interesting because one feature of the bundle $C^W$ is manifested as an additional sound segment, in temporal sequence. In Okanagan, a labialized consonant immediately followed by another consonant or by a word boundary is realized as a $C^W + V$ sequence, and this vowel is usually voiceless when word-final. When followed by a vowel, the labialization is realized as a separate consonant, a glide, i.e., as $C + w$. The latter occurs in liaison contexts.

The following examples illustrate the phenomenon, first, the realization of $C^W$ before another consonant or a vowel:

(27) /q'4q'yÁna/ títok'tá

small esf. house

$[c'q	yÁna\quad títok'tá]$

second, the realization of $C^W$ before a vowel, including within a liaison context:

(30) /k'6\quad t' - k'\quad n - k'\quad i - n' - m\quad t\quad sp'í't'n/

2s cisloc. -mobile -mobile -intr. -take -redup. -med, indef. rope

"You're holding a rope (while walking)." (for a long time)

$[k'6\quad k'\quad kwí\quad kwí\quad n'\quad t'sp'í't'n]$
You pull the dog's tail.

They water the flowers with tea.

In this example, the labialization of \( q^{w} \) in 'flowers' is realized as a low vowel, partially voiced. The height of this vowel is affected by the preceding consonant, and doubly so in this example, since both preceding consonants are [back, -grave].

As part of this phenomenon, the manifestation of labialization, a reduplicated labiovelar \( w \) is realized as the vowel \( o \) between consonants.

To my knowledge, there is no provision in SPE for dealing with sequencing of this type, where one feature of a bundle is realized as a separate sound segment.

3. Sandhi and the phonemic inventory

There occurred in the data collected to date a few instances of a sound which is not represented in the phonemic inventory of this language. This is not unusual, but what is of interest is that the resulting sound, a non-glottalized lateral affricate \( \lambda \), is what would be needed to fill one of the two gaps in the phonemic inventory.

\[ \begin{array}{cccccccccc}
\text{English} & p' & t' & c' & k' & k' & q' & q' & ? \\
\text{Colville} & p & t & c & k & k & q & q & ? \\
\text{Colville} & s & i' & x & w & x & w & h \\
\text{Colville} & m' & n' & r' & 1' & y' & s' & \zeta' & \zeta' & ?
\end{array} \]

(Mattina, 1975)
Does the appearance of \( \checkmark \) mean some sort of change in the phonemic inventory? Was it at one time a phoneme or is it becoming one? Comparative evidence does not support any speculations of a former phonemic status, since \( \checkmark \) is not reconstructed for Proto-Salish (Kinkade, 1978). It seems odd that no Salishan language has a /\( \checkmark \)/ phoneme, except for a couple which have clearly borrowed it from Kwakiutl. Because of a general lack of written historical documents, one cannot expect to find evidence to indicate any previous existence or length of existence of this morphophonemic change. At the synchronic level, Mattina (1973) does not discuss the appearance of a \( \checkmark \) for Colville, another dialect of Okanagan; nor do Thompson and Thompson (1977) discuss it for the other language of Nicola Valley, Thompson.

Questioning the psychological reality of underlying forms is not appropriate. Do speakers merge levels of inventories? or permit overlays? or fill in ‘dead cases voids?’ These questions cannot be answered; nevertheless, the appearance of \( \checkmark \), as a result of sandhi, remains interesting because such an element is indeed missing at the phonemic level.
4. Sandhi and syllabification.

In section 1, a hypothesis (Kinkade 1973, and Kuipers 1968) was referred to, which claims that there is no noun/verb distinction in Salishan languages because these take the same affixation, the same kinds of complements and the same morphological derivation. Moreover, Kinkade (1977) claims that arguments of predicates are predicates themselves. X - notation (Chomsky 1970, and Jackendoff 1974) was also referred to in section 1, since they propose with considerable detail that N, A, and V can all be generated by the same phrase structure rules, using a general X instead of each of N, A, V, because these all take the same kinds of complements. The similarity of these hypotheses lies in uniting major lexical categories.

Salikir (1975) provides evidence from the phonological level of an elevated form of French that the statement for liaison is simplified thru the use of X notation. It is plausible then to look for similar phonological evidence in a Salishan language, to support abstract hypotheses about grammatical structure. However, Okanagan, which does have liaison, does not provide any, as has already been seen. What then is the function of sandhi in Okanagan?

The outstanding characteristic of Salishan languages is the remarkably large inventory of consonants, coupled with the relatively few vowels, producing forms such as:

\[ \text{kn n} = 16x^n - x^n - x^n - nk \]

- contained=core - reduct- inside- stomach intr. (loc.)

"My stomach's roaring."

b. at'xst - k

"broth"

How then are such forms realized? How can these be articulated? Sandhis' liaison, labial realization and epenthesis provide a complex puzzle, with syllable structure the key. Elsewhere have been discussed stress which may shift from root to strong suffix (Mattina 1973; also Kinkade for Columbia, 1978), and pharyngeals which migrate to stressed vowels (Mattina 1976) in Interior Salishan languages.

Mattina (1973) also gives the conditioning environments of the variable epenthetic vowels for Okanagan (Colville). Similar processes occur in Okanagan (Nicole Lake), although the details are not specified herein. Stress is treated as already assigned.

Let us now examine some evidence of sandhi contributing to the articulatory realization of Okanagan.

(40) a. / kwipon - t - p delayed

- rope - trans - 2pl 3rd. dog

"You-23 rope the dog."

b. normal speeds / kwipon\[\text{sp}i\] 3rd. wi k\[\text{sp}i\]

c. with syllable boundaries indicated / kwipon\[\text{sp}i\] 3rd. wi k\[\text{sp}i\]

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The above example (44) as well as (45) and (46) below show that a word-initial C' is subject to entering the preceding syllables:

(45) a. /kউ tɔqtɔŋtɔs/.
   "You fall down"  
   [kwɔstɔŋtɔŋtuŋtɔs]

b. /k� tɔŋtɔmŋtɔs/.
   "You cry."  
   [kwɔstɔŋtɔmŋtɔs]

(46) /lɔt k০ o an - ka - 76m - m t kɔʃkɔmɔt;  
   mag. is 2s, pass, unrealized - call - medio indef. Grandpa;  
   /sub.  
   k০ o 76m - n suʃt/  
   ls - call - Uncle  
   "Don't call me Grandpa; call me Uncle." (JAP)  
   [lɔt kwɔstɔtɔmɔt kəʃkɔmɔt; kɔʃ 76mŋ suʃt]

The following two examples illustrate that a syllable cannot be vowel-initial, i.e., its initial segment must carry a feature [+consonantal], thus accounting for syllabic resonants:

(47) /i in-stim-tim? k০ o k - spʃʃtə - a t spʃʃnə-/  
   def. my-grandmother is distributive - 3s def./ indef. rope - 3a  
   - whip - prep  
   "My grandmother whipped me with her rope."  
   [yisstɔmstɔmə kωɔstɔʃʃtəʃɔŋtə kωɔstɔspʃʃnə] (JAR)  
   or [yisstɔmstɔmə] (JAR)
These additional examples raise the question of how the analyst is to proceed to formulate the organization of syllable structures.

A possible way to effect these structures is as follows:

1. assume the following:
   i) stress - given, already assigned (cf. 30, 49);
   ii) migration of pharyngeals - not illustrated in the data of this section;

2. then apply processes in an order such as this (while presumably readjusting Cs, left or right, after each has applied):
   i) liaison occurs (cf. 41 c,b; 42; 44);
   ii) realization of labialized Cs (cf. 45);
   iii) merger of identical Cs or Vs across word boundaries (cf. 43b, 47);
   iv) epenthesis (cf. 43b);
   v) flaking off the word-initial C' to preceding segment, if any, (all clitics, in this data) (cf. 45a,b);
   vi) syllebicity of nasals (cf. 46).

However, this does not guarantee the correct output, since it does not specify a procedure. One could, with epenthesis for example, still not know where to begin if a word needed more than one epenthetic vowel.
Therefore, some principles of syllable structure are needed.

Pulgram (1975, in Hyman 1975) proposed three principles:
I Maximal Open Syllabicity; II Minimal Coda and Maximal Onset; and III Irregular Coda. Applying these from word initial to final, Pulgram assigns 1) a syllable boundary after every vowel (the principle of maximal open syllabicity); 2) then readjusts as many consonants as needed to provide permissible closed syllables (the principle of minimal code and maximal onset) because, in English, lax vowels are disallowed in final position and must be in closed syllables; and 3) readjusts again to yield syllable onsets which are permissible word-initial sequences (the principle of the irregular code). Similar principles, applied in reverse direction, from word final to initial, seem to determine syllable structure in Okavanag, quite possibly operating to avoid consonant clusters, building the application of the processes of liaison, epenthesis, lexical realization and resonant syllabicity, i.e., sandhi.

Details of their application differ somewhat: 1) the principle of maximal open syllabicity is basic, with an open syllable, CV, clearly the preferred structure; 2) the principle of minimal code and maximal onset restricts, at least in these data, a) the permissible codes to one or two consonants (see, for example, (14) and (44) for Resonant + C coda, -1s' and Ith'), and b) also restricts longer consonant sequences to onset rather than code; 3) while the principle of the irregular code breaks down an inadmissible syllable-initial CC so that the previous code rather than the onset bears the burden of irregularity (see (46) where the ke sequence, as the unrealized morpheme, is a code but not so in (47) where this same sequence is not a morpheme, and receives epenthesis, thus distinguishing the two sequences.)

An alternate procedure to guide sandhi in this language may be by ordering the preferred syllable structures, but this ordering itself requires a set of criteria or guiding principles. Therefore, this ordering of syllable structures, up to the formula already given \((#C_1^3)C_0^2(w)\ 5\ C_2^2\), is dispensed with in favor of guiding principles, such as Pulgram's, which state more simply that consonant clusters are to be broken down, that open syllables are preferred to closed ones, and that CCs are preferred for onsets rather than for codes.

In this solution, a further set of assumptions has been made: a) that syllable structure is not an abstract distinctive unit but a unit required for the production of utterances (cf. Fromkin 1958, in Hyman 1975); b) that the syllable is a phonetic unit, i.e., surface or very near surface phenomena; c) that the 'pause groups' observed in the production of the language consultant are largely indicative of syllable boundaries, along with 'syllabic weight', and that glottalized Cs, for example in initial position, may provide articulatory pauses, without forming a separate syllable; and d) that the syllable is a necessary concept, guiding certain rules of sandhi.
thus alleviating the analyst of the burden of ordering or not such rules.

The application of these principles of syllable structure is now illustrated:

(51) (from (47)) \[ k^o \quad k - spf'c'a - s \quad i \]

liaison, I

I \[ spf's1 \]

II \[ spf's1, s1 \]

I \[ spf's1, s1 \]

II \[ spf's1, s1 \]

Epenthesis, II

I \[ spf's1, s1 \]

II \[ spf's1, s1 \]

Epenthesis, II

It can be seen that the first principle, maximal open syllabicity, has priority over the others. Morpheme boundaries probably also enter into the determination of syllables, for example, the prefix \( ks- \), unrealized, (cf. (46)) has not yet occurred with an epenthetic vowel, which contrasts with the \( sk\$s1 \) observed in (51 = 47).

In the next example, \( ...S1\$s1 ... \) is possible as well as what occurs \( ...S1(r)s1 ... \). This shows that, although open syllables are preferred, a syllable may be closed to avoid CC onsets. Compare also (50) and (49).

(52) (from (44)) \[ k^o \quad k - spf'c'a - i \quad in-spf'c'a \n
liaison, I

II, III \[ in-spf'c'a \]

II, III \[ in-spf'c'a \]

II \[ in-spf'c'a \]

Syllabic, I

II \[ spf'c'a \]

II \[ spf'c'a \]

Rezgar, II

It is suspected that the principles and processes illustrated above apply first to the main predicate, then to the arguments (or adjuncts, according to one's preference.) This cannot be supported at this time, due to having collected an insufficient number of utterances of appropriate length and complexity, with sandhi, etc. recorded. Example (52) indicates that this is probably the case, in order to get the correct output of liaison and optional length. Example (43b), like (52), shows the
merger of identical segments across word and phrase boundaries. If one proceeds from back to front for each surface level 'word', then this merger happens to occur last, to link 'words' together. One could just as well postulate that syllable structure is determined from the very end of the utterance to the front. This is not as appealing, since speakers make a pause between the merged segments, when slowing down their speech.

Thus, in Okanagan, a Salishen language, where one would hope to find phonological support for a hypothesis claiming that there is no noun/verb distinction, there is none; a language, where one would expect to find phonological support from liaison for a theoretical proposal that the phrase structures of N, A, V are the same, there is none. No evidence for them, but also importantly, no evidence against them. Instead, sandhi phenomena has been analyzed as functioning within the articulatory realization of characteristically complex consonant clusters, guided by principles of syllable structure.

Addendum

Since writing this paper, I have seen Hoard's (1977) manuscript on syllabification in NW languages and Snyder's (1965) description of So. Puget Sound Salish. To deal with syllabic stops and affricates, Hoard suggests that these are complex segments where each may be represented as two or more columns of distinctive features. This would establish mechanisms to use for writing rules for an analysis such as mine, using distinctive features, within a generative phonology framework, if so desired. Proceeding from different assumptions than mine, Hoard claims that syllabicity has phonemic status, ex., /sr/ which is to claim that syllable structure is phonemic. This conflicts with my present analysis and understanding of Okanagan (NL), ex., sp'ihn “rope” may be syllabified as sp'ih'n or sp'ih'n depending on the preceding environment (cf. (16), (18), (23-24), (26), (30), (42-46), (52)).

However, regardless of different assumptions, phonemic or phonetic, the conclusions are similar: that syllable structure, masked by phonemic transcriptions, renders consonant clusters pronounceable.

Snyder states that aspiration alternates with aspiratic vowels to form syllable peaks. This does not seem to be the case in Okanagan, where non-glottalized C's are predictably aspirated, although in my case, forgetfully not always recorded. (See Mattmann, 1973, p. 8)
Bibliography


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