Sonority and Syllable Structure in Relation to Laterals in Syllable Endings : A Morhophonological Study in French

Sonority and Syllable Structure in Relation to Laterals in Syllable Endings: A Morphophonological Study in French*

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1. Introduction

In general, a more sonorous segment tends not to be in a coda position. In many languages, if a sonorous segment is situated in a coda position in an input, that sonorant may be deleted or altered to a vowel in an output. In this paper, I treat French lateral /l/ in a coda position, and analyze some variations of emerging patterns of the segment.

In French, for example, an /l/ in a certain word ending as in soleil [sɔlɛj] "sun" alters to a glide /j/. Or in another case, such as in a plural formation, word final /l/ in a singular becomes silent in a plural as in a pair; cheval [ʃəval] - cheveaux [ʃəvo] "horse"sg./pl. These kinds of alternation (or deletion) couldn't occur in other obstruents in French, so /l/ in word endings in French behaves quite uniquely compared with other consonants.

In the case of other sonorants, nasals, in French, vowel nasalization can avoid nasal codas. Kuwamoto (2006, 2007) analyzed variations and distributions of nasal consonants and nasalized vowels in French and Portuguese Ø/C alternation in masculine-feminine alternation, and show the characteristic of nasality. These studies were based on sonority hierarchy, (Serkirk 1984, Kenstowitcz 1994, Kawagoe 1999, etc.) which indicates that nasals are more similar to vowels than obstruents because their sonority is higher, so nasals tend to be included in nucleuses compared to obstruents.

In this paper, the main object is another sonorant, /l/. I consider the characteristic of the sonorant /l/, by similar analyses in Kuwamoto (2006, 2007) in Optimality Theory (Prince & Smolensky 1993), then I show some similarities and differences to other sonorants, nasals.

2. Data

2.1 /l/ → /j/ in syllable final

In syllable final, French /l/ alters to a glide /j/ in the spellings of –il or –ille.

(1) /l/ → /j/¹⁾

    soleil [sɔlɛj]   "sun"

    travail [tʁavaj]   "work"

    fille   [fij]   "daughter"

On the other hand, /l/ emerges in almost all the other circumstances as in (2).

(2) /l/ → /l/

    animal[amimal] "animal"

    seul   [sœl]   "only"

    bel   [bɛl]   "beautiful" m. sg. irregular

    école [ekɔl]   "school"

2.2 Plural formation and /l/

    In general, plural form is made by adding the ending –s to its singular form. But this spelling cannot be pronounced. As a result, nouns and adjectives can be normally pronounced the same both in singular and plural forms.

(3) petit / petits   [pəti]   "small" m. sg./pl.

    jardin / jardins [ʒaʁdɛ̃]   "garden" sg./pl.

    ami / amis   [ami]   "friend (male)" sg./pl.

But a noun (or an adjective) ending with –al /al/ forms its plural counterpart pronouncing /o/ (and forming irregular spelling; -aux).

(4) cheval / chevaux [ʃəval/ʃəvo]   "horse" sg./pl.

    animal / animaux [animal/animo]   "animal" sg. pl.

    journal / journaux [ʒuʁnal/ʒuʁno]   "newspaper" sg. pl.

Although this exceptionality might be led from the high sonority of the segment /l/, other /l/-final words than /al/-finals remain the same as other obstruent-final words. /l/ sound is pronounced in both singular and plural forms as in (5), or, /l/ alters to /j/ in the /-il/ finals and also remain the same whether it is singular or plural as in (6).

(5) école / écoles	[ekɔl]	"school" sg./pl.
personnel / personnels	[pɛʁsɔnɛl]	"staff" sg./pl.
seul / seuls	[sœl]	"only" sg./pl.

(6) fille /filles[2)]	[fij]	"daughter" sg./pl.
feuille / feuilles	[fœj]	"leaf" sg./pl.

2.3 allomorphs of masculine singular adjectives and /l/

In French, with a few adjectives of adjective-noun order type, there are two masculine singular forms. Some examples of this pattern are as follows.

(7) beau / bel	- belle	[bo/bɛl]	- [bɛl]	"beautiful" m.(I/II)-f.
nouveau / nouvel	- nouvelle	[nuvo/nuvɛl]	- [nuvɛl]	"new" m.(I/II)-f.
mou / mol	- molle	[mu/mɔl]	- [mɔl]	"soft" m.(I/II)-f.

In each example the left one of the masculine form called "I type" is used before consonants (ie. a consonant initial noun follows this form), and the right one called "II type" is used before vowels (ie. a vowel initial noun follows the allomorph) while the feminine form of the same adjective remains the same at any circumstance.

(8) a. un <u>beau</u> jardin   "a beautiful garden"
          m.
      b. un <u>bel</u> arbre   "a beautiful tree"
          m.
      c. une <u>belle</u> fleur   "a beautiful flower"
           f.

From the above examples in (7) and (8), we notice that the word final is /-l/ in two forms out of three. Masculine singular I is the only one that doesn't have word final /l/.

2.4 Summary

In this section I take up some phenomena in relation to emergence of /l/ in French derivations. Any way, the emergence of /l/ in these derivations might have some relation to /l/'s peculiarity. In the next section I analyze the data in this section in Optimality Theory, and explain about the phenomena theoretically.

3. Analysis

3.1 Alternation of /l/ to glide /j/

A word final /l/ preceded by /i/ alters to a glide /j/ as in "soleil," "fille," etc. mentioned above. That is because the sonority of /l/ is higher than obstruents (or, even nasals) in the schema called sonority hierarchy (Selkirk 1984, Kenstowicz 1994, Kawagoe 1999, etc.).

(9) Sonority hierarchy

       vowel >> glide >> liquid (lateral) >> nasal >> obstruent

In (9), laterals are very close to vowels or glides that are the most suitable for nucleus in syllable structure. So it is possible that laterals, a kind of consonants and originally rather unsuitable ones for nucleus segment, become nucleus of a syllable. Within Optimality Theoretic framework, the sonority-based constraint can be proposed as in (10), following Kikuchi (2005).

(10)   MARGIN/x (*M/x): X must not be parsed as a marginal position.

I also adopt this constraint. As we mainly discuss laterals at a marginal position of the syllable, so it is adopted for laterals in (11).

(11)   MARGIN/LATERAL (*M/L): Lateral must not be parsed as a marginal position.

There is another reason for the glide formation. /l/ is considered to properly have a feature [high], and the preceding high vowel /i/ in ex. "soleil" merges [high] included by the following /l/, then the glide formation can take place. If the preceding vowel is low, ex. /a/, this kind of glide formation cannot take place. For example, "animal" cannot be pronounced as /animo/ of its own. /animo/ from "animal" can be formed in plural formation (ie. "animaux"). The syllable structures of "soreil" and "animal" is as follows.
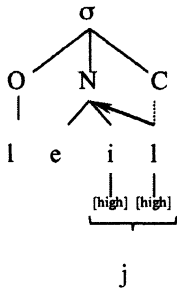
(12) soleil [sɔ.lɛj]   (13) animal [a.ni.mal]
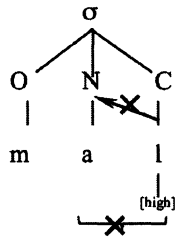
O: onset, N: nucleus, C: coda

This kind of merger in relation to highness can be accounted for the following constraint.

(14) IDENTITY-IO(high) (IDENT(high)): Output correspondents of an input [high] segment are also [high]

As the other relevant constraint I adopt MAX as a dominant constraint and the highest ranked one as in (15).

(15) MAXIMARITY (MAX): Every element in the input must have an output correspondent.

IDENT(high) must be higher ranked than *M/L because the glide formation take place only when the preceding vowel is high vowel /i/ that is harmony with the following "high tongue" lateral. The low vowel cannot merge the lateral because IDENT(high) is crucial in the case. So expectable constraint ranking is as (16) and evaluations of "soeil" and "animal" are illustrated (17) and (18) respectively.

(16) MAX >> IDENT(high) >> *M/L

(17) soleil → [sɔ.lɛj]

/so.leil/	MAX	IDENT(high)	*M/L
so.leil			*!
so.lei	*!		
☞ so.leil̂			

(18) animal →[a.ni.mal]

/a.ni.mal/	MAX	IDENT(high)	*M/L
☞ a.ni.mal			*
a.ni.ma	*!		
a.ni.maĺ		*!	

3.2 Plural formation

In French plural endings (normally -s) are not pronounced in spite of its spelling. In the case of /l/ final words the situation is the same. But like "cheval" → "chevaux," the preceding vowel /i/ merges /l/ as an element of the syllable while the /l/ in "animal" sg. itself cannot be merged by the preceding /a/. In that case, the highness of /l/ and /a/ is different, but here in "chevaux" this merger is permitted. The syllable structure of "chevaux" is in (19).

(19) che<u>val</u> + <u>-s</u> → [ʃəvo]
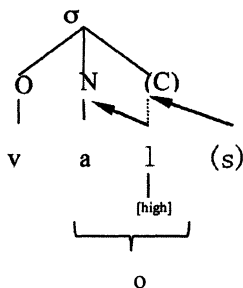
The reasons why /l/ can be merged with /a/ in spite of the difference of their highness are: [1] that /l/ is more sonorous than other consonants, and [2] that the plural ending must be linking to coda at any rate. The plural ending –s mustn't, at least structurally, be deleted because the /s/ emerges before a vowel initial word, such as in (20).

(20) journau<u>x</u> économiques   [ʒuʁ.no.ze.kɔ.nɔ.mik]   "economic journals" pl.

For this treatment of the plural ending –s, the constraint ALIGN (Kager 1999: 119, 169) functions crucially in the evaluation tableau in OT analysis (as in (23)).

(21) ALIGNMENT (Prwd, Right, σ, Right) (ALIGN): Every prosodic word ends in a syllable.

In addition, Kuwamoto's (2006: 61) proposal, SKELETON, is also crucial in this derivation.

(22) SKELETON: Skeletal structure in the input should be intact.

Skeletal structure in French morphology is very important in explaining deletion of a word final obstruent in a masculine singular word. In detail, see also Paradis & El Fenne (1995) and Kuwamoto (2006, 2007). The evaluation of "chevaux" is illustrated in the tableau (23).

(23) cheval -s → "cheveaux" [ʃəvo]

/ʃəval -s/	SKELETON	MAX	ALIGN	IDENT(high)	*M/L
ʃə.vals.	*!				*
ʃə.val.(s)		*	*!		*
ʃə.val͡s.	*!			*	
☞ʃə.val͡(s).		*		*	

The emergence of /s/ sound violates SKELETON (in the first and the third candidates in the tableau). The rest of the candidates, the second and the fourth ones, both violate MAX because of their segment deletion. In the second candidate "ʃə.val.(s)" the deleted segment (s) is not in the coda position, so this candidate violates ALIGN. As a result, the fourth one "ʃə.val͡(s)." is selected as an optimal candidate. In this case, /a/-/l/ merger (changing to /o/ sound) can be permitted in spite of the difference of their highness. It is because the constraint IDENT(high) is lower ranked and the violation of it can be ignored.

3.3 the variation of m./f. singular words containing /l/

In French adjectives preceding nouns, in the case of obstruent final pattern, a masculine one deletes their final obstruent. (24a), and a feminine one keeps the sound (24c). In (24b), masculine ending /t/ revives as an onset in the following syllable.

(24) a. un petit chat   [œ̃.pə.ti.(t).ʃa]   "a small cat"
              m.

       b. un petit ami   [œ̃.pə.ti.ta.mi]   "a boyfriend"
              m.

       c. une petite maison   [yn.pə.tit. mɛ.zɔ̃]   "a small house"
              f.

The distribution in this alternation is very similar to *beau-bel-belle* pattern. I show this pattern again here.

(25) (=8)

    a. un <u>beau</u> jardin   [œ̃.bo(l).ʒaʁ.dɛ̃]   "a beautiful garden"
         m.

    b. un <u>bel</u> arbre   [œ̃.bɛ.laʁvʁ]   "a beautiful tree"
         m.

    c. une <u>belle</u> fleur   [yn. bɛl.flœʁ]   "a beautiful flower"
         f.

The variation with nasal final is a little different. In (26b), a nasal in an indefinite article emerges ambisyllabically. And in the default masculine (26a), the word final nasal cannot be deleted in spite of the characteristic of masculine endings.

(26) a. <u>un</u> chat   [œ̃.ʃa]   "a cat"
        m.

    b. <u>un</u> étudiant   [œ̃.ne.ty.djɑ̃]   "a male student"
        m.

    c. <u>une</u> maison   [yn. mɛ.zɔ̃]   "a house"
        f.

The variation of (24) – (26) can be shown in the following table (27).

(27)

	masculine + C- word	masculine + V- word	feminine
laterals	$[b\widehat{ɛl}]_\sigma$ /bo/ merging with V	$[bɛ]_{\sigma\ \sigma}[l$ liaison	$[bɛl]_\sigma$
obstruents	$[pəti(t)]_\sigma$ deletion	$[pəti]_{\sigma\ \sigma}[t$ liaison	$[pətit]_\sigma$
nasals	$\widehat{œn}]_\sigma$ /œ̃/ merging with V (Ṽ)	$\widehat{œn}]_{\sigma\ \sigma}[n$ /œ̃.n/ liaison + Ṽ	$[yn]_\sigma$

In the second column in (27), the only difference between lateral- and nasal-final cases is ambisyllabicity. In this variation *AMBISYLL (Kuwamoto 2007) is rather crucial.

(28) *AMBISYLLABIC (x) (*AMBISYLL(X)): An ambisyllabic segment x is prohibited.

Laterals cannot be permitted to be ambisyllabic, so *AMBISYLL(Lateral) (henceforth *AMBISYLL(L)) is considered to be higher ranked than *AMBISYLL(Nasal) (henceforth *AMBISYLL(N)). I propose the following ranking (29). And the evaluations of lateral- and nasal-final words preceded by vowel initial words are shown in (30) and (31) respectively.

(29) *AMBISYLL(L) >> ALIGN >> *AMBISYLL(N)

(30) bel arbre /bɛl aʁbʁ/→ [bɛ.laʁbʁ]

/bɛl aʁbʁ/	SKELETON	MAX	*AMBISYLL(L)	ALIGN	*AMBISYLL(N)	IDENT(high)	*M/L
x x (x) x... | | | b ɛ l a [bɛ.a...]	*!	*					
x x [x] (x) x... | | | | b ɛ l a [bɛl.a...]	*!*						*
x x x x... | | / | ☞ b ɛ l a [bɛ.la...]				*			
x x (x) x... | |\ | b ɛ l a [bo.a...]	*!					*	
x x x x... | |\ / | b ɛ l a [bo.la...]			*!			*	
x x [x] x x... | | | / | b ɛ l a [bɛl.la...]	*!		*				*

(31) un étudiant /œn etydjã/→ [ɶ̃.ne.ty.djã]

/œn etydjã/	SKELETON	MAX	*AMBISYLL(L)	ALIGN	*AMBISYLL(N)	IDENT(high)	*M/L
x (x)x... | | œ n e [œ.e...]	*!	*					
x [x] (x)x... | | | œ n e [œn.e...]	*!*						
x x x... | / | œ n e [œ.ne...]					*!		
x (x)x... |\ | œ n e [ɶ̃.e...]	*!						
x x x... |\/ | ☞ œ n e [ɶ̃.ne...]					*		
x [x] x x... | |/ | œ n e [œn.ne...]	*!				*		

In the both tableaux, SKELETON is a dominant constraint. So SKELETON must be the highest ranked. In (30), the third and the fifth candidates don't violate SKELETON. As the fifth one has a ambisyllabic lateral, it violates *AMBISYLL(L). which is higher ranked than ALIGN. Although the third candidate violates ALIGN, this is lower ranked than *AMBISYLL(L). So the third one is optimal. On the other hand, in (31), *AMBISYLL(N) is lower ranked than ALIGN, so the ambisyllabic candidate (the fifth one) is selected as the optimal one. Through these evaluations the ranking order (29) is proved to be proper.

As for the default masculine singular adjective like "beau," "nouveau," input forms of them can be supposed originally to be l-final, ie. "bel," or "nouvel." This assumption can be valid in the following tableau which has the same ranking order as in (30) and (31).

(32) beau jardin /bɛl ʒaʁdɛ̃/ → [bo.ʒaʁ.dɛ̃]

/ bɛl ʒaʁdɛ̃ /	SKELETON	MAX	*AMBISYLL(L)	ALIGN	*AMBISYLL(N)	IDENT(high)	*M/L
x x x x x ... | | | | | b ɛ l ʒ a ʁ [bɛ.ʒaʁ...]		*!					
x x [x] x x x ... | | | | | | b ɛ l ʒ a ʁ [bɛl.ʒaʁ...]		*!					*
x x x x x ... | | /| | | b ɛ l ʒ a ʁ [bɛ.lʒaʁ...]				*!			
x x x x x ... | |\ | | | ☞ b ɛ l ʒ a ʁ [bo.ʒaʁ...]						*	
x x x x x ... | |\/| | | b ɛ l ʒ a ʁ [bo.lʒaʁ...]			*!			*	
x x [x] x x x ... | | | /| | | b ɛ l ʒ a ʁ [bɛl. l̥ʒaʁ...]		*!	*				*

4. Conclusion

In this paper I provided an OT account for emergence of French word final laterals. Syllable final laterals in this language tend to merge with preceding vowels, which is the same phenomenon as nasals. It is because the both segments have higher sonority than any other consonants like obstruents or fricatives. While in the case of nasals the feature [nasal] is easy to merge with a vowel, then a "nasalized" vowel is produced, [lateal] itself is difficult to merge with a vowel. There is no "laterlized" vowel at any rate. A lateral can merge with vowels giving [high] to the preceding vowel.

In the plural formation, word final /l/ emerges as a coda in the singular and merges with the preceding vowel in the plural. In the plural case, it must be considered that the plural ending /-s/ is temporarily linked to coda in a syllable, then deleted, and the preceding /l/ to the final /-s/ is syllabified as a nucleus element so merges with the preceding vowel, then a high vowel is produced. On the contrary, the final nasal, whether it's in a singular or a plural form, always emerges as the nasalized vowel. In this case the final nasal cannot be syllabified as a coda, ie. the nasal consonant.[3]

The *beau-bel-belle* pattern allomorphs are also explained by an OT analysis. The first allomorph of masculine singular like "beau" is originally considered to be /l/ final word like "bel" which in fact is rather idiosyncratic one. Based on this assumption, the *beau-bel-belle* pattern allomorphs seem to behave roughly the same as nasal final pattern like "un chat (vowel nasalization)," "un étudiant (vowel nasalization + liaison)," and "une maison (nasal consonant)." The only different behavior between

nasals and laterals is ambisyllabisity of nasals. this is specified in the constraints and their ranking: *AMBISYLL(L) >> ALIGN >> *AMBISYLL(N).

Notes

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1) There are some exceptions in such circumstances, /l/ → /l/: ville [vil] "town", /l/ →Ø: géntil [ʒɑ̃ti] "nice"

2) There are some exceptions: travail / traveaux [tʁavaj/tʁavo] "work," œil / yeux [œj/jø] "eye."

3) Word final nasal in feminine singular is syllabified as coda in principle. So in this case a nasal emerges as a consonant due to its skeleton structure. See Paradis & El Fenne (1995). Ex: Américaine [ameʁikɛn] "American" f.

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音節末における側面音のソノリティーおよび音節構造との関わりについて
―フランス語からの形態音韻論的考察―

桑本裕二

　一般に，ソノリティーの大きい分節音ほど音節の端に立ちにくいといわれている。本発表ではフランス語の側面音を扱い，鼻音や他の阻害音との異なるふるまいを観察し，最適性理論の枠組みで捉え直した。フランス語の側面音 /l/ は，soleil [sɔlɛj] の /j/ や，複数形形成での cheval / chevaux [ʃəval / ʃəvo] の /o/ のように先行母音と融合し高母音化する。これは鼻音と同じくソノリティーが大きいことに起因しているといえるが，さらに出力で音形を持たない複数語尾 –s が coda として音節化されると見なすことによって /l/ のもつ [high] の先行母音への融合が説明できる。さらに，男性単数第2型をもつ形容詞の活用（beau / bel / belle [bo / bɛl / bɛl] m.(I), m.(II), f.）は，第1型 "beau" が入力形で "bel" のように /l/ を含んでいると見なした場合、これら3様の交替形に見られる後続語との間の音節化による /l/ の出没が極めて規則的であると再解釈でき，第2型 "bel" の場合には鼻音が鼻母音化するほどの母音への融合を見せないものの，鼻音の場合と同様の評価表によって最適形が選択されうることを導いた。この際、決定的である制約として *AMBISYLL を提案し、両音節性を許容しない /l/ を含む場合に対して、制約 *AMBISYLL(L) を *AMBISYLL(N) より高い位置に配列することで両者の両音節性についての分布の差異を説明した。

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