French verbal inflection revisited:
Constraints, repairs and floating consonants

Carole Paradis, Fatimazohra El Fenne

Département de langues et linguistique, Université Laval, Québec, Québec G1K 7P4, Canada

Abstract

This article updates Paradis and El Fenne (1991, 1992). The C/Ø alternation (including the \( \tilde{V}/VN \) one) in French verbal inflection (e.g. \( d\text{o}rt \) [dɔʁ]/\( d\text{orment} \) [dɔʁm] 'to sleep' 3sg. and 3pl. Present Indicative), which occurs in 588 regular (non-suppletive and non-defective) verbs, is explained and related naturally to the C/Ø alternation found in many other morphological and syntactic environments. More specifically, we maintain that the notion of 'floating consonant' (i.e. a consonant without a timing slot) along with two principles, the No Empty Onset Principle and the Licensing Principle, used in the framework of the Theory of Constraints and Repair Strategies (cf. Paradis, 1988a,b), suffices to handle the C/Ø alternation in verbal inflection and elsewhere. Not only does the system we propose result in a considerable simplification of French verbal inflection (it gets rid of numerous thematic segments and ad hoc – when not contradictory – context rules), it makes important new predictions concerning the selection of Infinitive suffixes in relation to the nature of a stem-final consonant (floating/non-floating). We show that these predictions are confirmed by the results of production tests, administered by El Fenne (1994), which clearly indicate that the floating consonant system we propose reflects the competence of French speakers.

1. Introduction

This article updates and improves on Paradis and El Fenne (1991, 1992). Although our analysis of latent consonants in the Present Indicative has not changed, we depart slightly from the two previous versions mainly in the way we explain

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latent consonant deletion in the Infinitive. The deletion account we offer here is both simpler and more general.

Along with, for instance, Togeby (1951), Schane (1968), Selkirk (1972) and Dell (1973), we maintain that the well-known consonant/Ø (C/Ø) alternation in French should be analyzed as much as possible in a uniform way, independently of the context where it occurs (verbal, nominal, adjectival inflection or derivation, and liaison). We argue that the C/Ø alternation, which can be observed in (1), originates in the overwhelming majority of cases from the presence of a floating consonant (FC), traditionally called a 'latent' consonant (LC) in non-generative (Togeby) and linear generative treatments (Schane, Selkirk, Dell).

(1) Floating consonants in
   
   (a) inflection
   
   adjectives [pati] petit (masc.) / [petit] petite (fem.) 'small'
   | [gro] gros (masc.) / [gros] grosse (fem.) 'big'
   nouns [marf] marché (masc.) / [marf] marchande (fem.) 'merchant'
   | [avsk] avocat (masc.) / [avsk] avocate (fem.) 'lawyer'
   verbs [ku] coud (3sg.) / [kuz] cousent (3pl.) 'to sew'
   (Pres. Ind.) [kor] sort (3sg.) / [kor] sortent (3pl.) 'to go out'

   (b) derivation
   
   N → V [sav] savon 'soap' / [savan-e] savonner 'to soap'
   λ → V [gro] gros 'big' / [gros] grossir 'to enlarge'

   (c) liaison
   
   [pati] petit (masc.) 'small' / [patigmar] petit amour 'little love'
   [ri] long (masc.) 'long' / [liart] long article 'long article'
   | [le] les (det. pl.) 'the' / [lezaf] les enfants 'the children'

   This FC, which we analyze as a segment without an x-slot (a timing unit), as shown in (2), violates either the Licensing Principle or the No Empty Onset Principle, which will be formally expressed in section 3. Informally, the Licensing Principle disallows empty onsets preceded by a consonant as in (1bc). Both principles cause the application of a repair strategy – deletion (of the FC) or insertion (anchorage of the FC).

   (2) a) x x x x b) x x x b x x c) x x timing units
   | l l l l l l l l
   | p a t i t [pati] m a r f à d [marf] k u z [ku]
   | 'small' 'merchant'

   Hyman (1985) and Prunet (1986, 1987, 1992) have already offered interesting analyses of LCs in French adjectives and of the liaison through the means of FC, as defined here, in an informal constraint-based approach. Here we will make use of a formal constraint-based framework, the Theory of Constraints and Repair Strategies (TCRS) proposed in Paradis (1983a, 1990, 1992), Paradis and Prunet (1988) and Paradis and LaCharité (1993), and will focus on LCs in French verbal inflection, which have never been handled in a generative phonological multilinear framework. In addition to being found in many suppletive and defective verbs, LCs are found in 588 regular – non-suppletive, non-defective – verbs (cf. El Fenne, 1994: 33, 327–344, for detailed tables and lists). The TCRS will allow us to account for the C/Ø alternation in an even more explanatory way than the formal constraint-based analysis of Charette (1991), where LCs are also interpreted as FC. We define an 'explanation' as a generalization that allows one to straightforwardly (1) reduce the number of sources for a given phenomenon, (2) relate apparently unrelated phenomena, and (3) make predictions. The notion of FC and the TCRS will enable us to demonstrate that the C/Ø alternation is phonologically and morphologically predictable, resulting in a considerable simplification of the French verbal inflection system.

From a general point of view, this article aims at showing that the C/Ø alternation in French is always caused – directly or indirectly – by phonological constraint violations. Phonological alternations in the TCRS, among which is the C/Ø alternation, result precisely from the repair of these violations. We will see that the C/Ø alternation in verbal inflection is partly morphologically conditioned, i.e. it results from an affixation operation, in only a few well-determined contexts, and is memorized in only a small number of suppletion cases.

Violations can result intrinsically from (1) underlying ill-formed phonological material, as in (2), (2) morphological and syntactic operations (internal and external sandhi), as in (1b) and (1c) respectively, and (3) constraint conflicts. Extrinsic sources of violations include borrowings (cf. Paradis et al., 1993, 1994), paraphasias (cf. Béland et al., 1993), etc. Here we will be concerned with only the first two intrinsic sources of violations. It will be shown that a large number of C/Ø alternations, including the V/νV alternation (e.g. il crait [kr] 'he fears/ils craignent [kʁɛ̃] 'they fear'), in the Present Indicative and the Infinitive are due to the presence of an ill-formed segment in underlying representation (UR), namely a FC at the end of a verbal stem as in (2c) (cf. Paradis, 1988b, 1993b, c, on ill-formedness in the dictionary, the first input list to the lexicon).

At first sight, we may seem to posit a slightly larger number of Infinitive suffixes than some previous descriptive or analytical studies (five versus apparently two in some analyses). We will show that this is only an illusion, since we do not need to resort to two classes of -ir verbs (cf. classificatory studies such as Grevisse, 1986, where there are fin-ir (2nd group) 'to end' and sent-ir (3rd group) 'to smell, to feel') or four classes of -ir Infinitive suffixes (cf. more analytical studies such as Martinet, 1969, where we find fini-ir 'to end', dorm-ir 'to sleep', cou-d-ir 'to sew' and voul-oi-r

1 French is described traditionally as having three groups of verbs. The 1st group consists of the verbs ending with the Infinitive suffix -er, e.g. manger [mæn-er] 'to eat'. The 2nd group contains only verbs ending with the suffixes -ir whose present participial suffix is -issent, e.g. finir [fin-er] 'to finish/finsissent [fin-if] 'finishing'. As for the 3rd group, it is a potpourri of all the remaining types of verbs, i.e. those ending with, for instance, -oir such as vouloir [vul-oir] 'to want', -ere such as parade [par-ere] 'to seem', -dre such as prendre [pr-der] 'to take' and -er such as dormir [dorm-er] 'to sleep', whose present participle is dorm-ant,not dorm-issent as with the 2nd group verbs.
'to want', i.e. an -r suffix with no thematic segment, an -r suffix with a thematic vowel and another one with a thematic consonant, and finally an -r suffix with a thematic dipthong), which amounts to positing four -r suffixes. It will be shown that, in comparison with previous treatments, not only does our proposal of five phonetically distinct Infinitive suffixes (-er, -er, -ir, -ir, -er, -uir) not increase the total number of Infinitive suffixes, it actually obviates the need for the numerous thematic vowels and consonants, or for the arbitrary deletion and epenthesis rules of previous treatments.

Furthermore, it will be argued that the traditional classification of verbs into three groups, which is essentially based on the form of the Infinitive suffixes, is phonologically unjustified and misleading. The notion of FC and the TCRS will allow us to make important new predictions regarding the selection of Infinitive markers, and to posit a classification into two main groups of verbal stems — those with a permanent consonant (PC), i.e. a consonant which is always pronounced, and those with a FC — justified on phonological and morphological grounds. We will see at the end of section 4 that our claim of a productive C/0 alternation in verbal inflection is supported by the results of production tests in El Fenne (1994), a fact which indicates that our system reflects the linguistic competence of French native speakers.

The paper is organized as follows. Section 2 surveys previous treatments of the C/0 alternation in French before we present our own treatment in section 3, and its application to French verbal inflection in section 4. Finally, a conclusion is offered in section 5.

2. Previous treatments of the C/0 alternation

Logically, there are three possible analyses that can account for the C/0 alternation within a paradigm: (1) suppletion (i.e. the memorization of two or more stems) and (2) insertion or (3) deletion of the LC at the end of a stem. The suppletive treatment, which is — from the point of view of phonology and, to a certain extent, morphology — unexplainable in the sense of the definition we have provided (it does not make any link between facts, it requires a maximum of sources, and, of course, it does not make any predictions), has been proposed in non-generative studies, either analytical or pedagogical (cf., e.g., Michaut, 1934; Trager, 1944; and Pinchon and Coutte, 1981), with the notable exception of Morin (1987). Table 1 offers a classification of some of the previous epenthesis and deletion treatments of LCS.

2.1. The consonant epenthesis treatment

In the consonant epenthesis treatment, a single stem is generally posited for every paradigm where the C/0 alternation is found. The longest form is derived from the shortest one by a morphophonological rule of thematic consonant epenthesis: e.g. rompt [rɔmpt] 'to break off' (3sg. Pres. Ind.) → rompont [rɔmpɔnt] (3pl.). Morin and Kaye (1982), who claim that liaison consonants are subject to various specific and independent treatments, posit multiple rules of epenthesis, shown in (3), to account for some of the Modern French LCS. Morin (1987) rejects any type of phonological conditioning in the so-called C/0 alternation. A verb which displays such an alternation is immediately interpreted in his model as being suppletive (cf. the suppletive bases lâdr and lâdrj for dormir ‘to sleep’ in 1987: 63, ex. (34)). Morin, whose argumentation is mainly based on synchronic arguments and the behavior of defective and suppletive verbs, claims that his model is better suited to account for speaker competence than phonologically conditioned models. We believe that Morin’s rejection of (morpho)phonological treatments of verbal inflection in French is partially due to the fact that the treatments he argues against (namely, Schane, 1968, and Piérad, 1981) were couched in Chomsky and Halle’s (1968) framework, i.e. a linear model of phonology. We will see in the next sections that a treatment that takes into account the TCRS and some refinements of the linear approach can capture both important phonological and morphological generalizations concerning the distribution of Infinitive suffixes and speaker competence, missed by previous linear approaches, as well as by Morin’s (1987) morphological model (cf. El Fenne, 1994, for a more thorough criticism of Morin, 1987).}

Table 1 Classification of previous works by treatment type (non-exhaustive)

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<th>Epenthesis</th>
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<td>Non-generative</td>
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They point out that the non-linking liaison (i.e. the so-called liaison sans enchâinement) is problematic for this proposal, and adds that this is the reason which led Morin to abandon it.
Furthermore, Tranel's treatment misses the important fact that his liaison rules all apply prevocationally, and that the LC of a base is most of the time realized the same in liaison, inflection and derivation contexts, e.g. petit ami 'little friend', petitesse 'smallness' and petite 'small' (cf. also Durand, 1986: 170-171, for insightful criticisms of the epenthetic treatments, and El Fenne, 1994: 253-296, for a straightforward treatment of apparent liaison idiosyncrasies).

2.2. The consonant deletion treatment

The deletion treatment has been proposed by many authors. As is the case with the epenthesis treatment, the deletion treatment generally maintains a single stem within a paradigm exhibiting the C/∅ alternation. The shortest form is derived from the longest one by loss of the final consonant: e.g. rompent [ɾɔmpɛ] (Sp. Pres. Ind.) "to break off" → rompt [ɾɔmt] (Spg.).

For instance, Dell (1973), influenced by Milner (1967) and Schane (1968), resorts to a rule that deletes final obstruents in the following contexts: _+C, _C, _# (1973: 182). In petit ami #petition #/tailam# #/boyfriend/, the deletion rule is blocked since its structural description is not met; liaison must then occur ([petitam]). This rule advantageously accounts for the fact that the latent obstruent in petitesse [peti+ es] 'smallness' is retained as well. In other words, a phonological link is formally established for the first time between these two types of examples: they share a C-V context. However, some of the C-V contexts posited are abstract and ad hoc, i.e. they are posited only to protect the PC from deletion. For instance, Dell claims that deletion is blocked in words with an alleged final schwa like petite [petitel] 'small' (fem.), an abstract vowel which must be subsequently deleted, as in (7), since final schwas do not occur in Northern French dialects ([petit] *petit).

(7) Schwa deletion rule (for sg. and pl. fem.): o → 0 / _C0 # (1973: 188)

Compared to the epenthetic treatments, Dell’s treatment is in some respects simpler and more general, since it implies fewer rules and unifies the different contexts in which a LC surfaces. Yet it suffers from important weaknesses. Not only does the rule in (7) apply to a vowel that never shows up at the end of words in Northern French dialects (except in function words like je 'I', le 'the', etc., or within some long consonant sequences as in un infect brailleur [ʌn ɪfɛkt(ʊ)brɛl] 'a rotten brawler'), it must also be extrinsically ordered after the obstruent deletion rule. Furthermore, the obstruent deletion rule is unable to account for the C/∅ alternation in cases where C is a sonorant: léger [leʒɛ] /léʒɛr/ 'light' (masc./fem.), soit [su] /sɔt/ 'drunk' (masc./fem.), moué [mu] /mʊjəl/ 'to grind' (Spg./Pl. Pres. Ind.), etc. Nor does it account for words like honnête 'honest', vague 'vague', céleste 'celestial', where the final obstruent is a permanent one. These examples are analyzed by Dell as ending in an abstract schwa (1973: 189). Note that this results in two final schwas in the feminine, which must both be deleted. For the V/YN alternation, an extra rule is needed which, rather questionably, both deletes the nasal and nasalizes the preceding vowel (1973: 191).
Along with Dell (1973), Anderson (1982) accounts for LCs by means of an obstruct rule. As opposed to Dell's treatment, however, Anderson's analysis takes syllables into account, which allows him to make this important formal generalization: only obstruents within codas are deleted. His deletion rule, shown in (8b), applies after the liaison rule in (8a).

(8) (a) **Liaison Rule**

\[ X \quad (C) \quad \# \quad \varepsilon \quad V \quad X \]

\[ \rightarrow \varepsilon[\{1\}] \quad \varepsilon[1] \quad [2 \quad 3 \quad 4 \quad 5] \quad (\sigma = \text{syllable}) \]

To avoid deletion, the LC of a masculine adjective must be syllabified into the onset of the following word. Like Dell, however, Anderson makes use of abstract schwas which are inserted in abstract V positions. As shown in (9b), the feminine does not undergo the obstruct rule because the LC is no longer in final position after schwas are inserted in empty final Vs (pVitt + V→ /patit+α/).

(9) (a) **UR**

\[ \sigma \quad \sigma \quad \sigma \quad \sigma \]

\[ R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R \quad / \quad R 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be considered as an exception in Schane’s (1968) and Dell’s (1973) views, among others. Boooij’s analysis of the CV/Ø alternation is also more explanatory in the sense that it does not need any extrinsic rule ordering, as is crucially the case with Dell, and less significantly so with Anderson and Clements and Keyser, nor any abstract schema in Dell’s and Anderson’s analyses.

Nevertheless, Boooij must resort to a diacritic feature, [extrasyllabic], i.e. a feature which is often motivated in phonology by no other considerations than the mere handling of exceptions. Furthermore, Boooij, like Clements and Keyser, cannot account for the V/VN alternation (e.g. bonne [bɔ̃ne] or bonne [bɔ̃n], parfum [parfœ̃] or parfum [parfym], pain (pœ̃) or pain (pœ̃]), in a simple way. The V/VN alternation is treated separately from the general CV/Ø alternation, a weakness we remedy in our treatment (cf. Durand, 1986: 175, 181, for similar flaws within a dependency treatment).

The dichotomy established by Clements and Keyser between the CV/Ø alternation and the V/VN one is based on the fact that, in contrast with the V/VN alternation, can be deleted not only in final position but within words. To our knowledge, however, this nasal ‘deletion’ occurs in only two words (bonne [bɔ̃-te]/bɔ̃-te/ ‘goodness’ and chrétien [krẽ-te]/krẽ-te/ ‘Christian’: note that superscript consonants stand for FCS), derivational suffixes in French being mostly vowel-initial. The few consonant-initial ones are unproductive except in the case of the adverbial suffix -ment, which attaches to feminine bases where the LC is always realized for morphological reasons (cf. also Durand, 1986: 181, for further arguments against Clements and Keyser’s dichotomy, and Tranel, this volume).

Furthermore, an extrasyllabic treatment does not account for the facts, since the latent nasal is not actually ‘deleted’ but simply attached to the preceding vowel, a subtlety that cannot be expressed easily in Clements and Keyser’s and Boooij’s treatments because of the way LCS are represented: extrasyllabic items are either unpronounced, when they fail to be syllabified, or pronounced normally, when they are syllabified. As pointed out by Hyman (1985: 56), it is not obvious whether extrasyllabic material (if this material is justified at all) can be mute, i.e. prevented from receiving a phonetic interpretation, as posited by Boooij for extrasyllabic consonants in French. According to Hyman (1985: 56), extrasyllabic segments are always pronounced.

Along with Clements and Keyser (1983) and Boooij (1984), Plénat (1987) invokes the notion of extrasyllabicity to account for LCS in French, with the difference that, in his treatment, the diacritic [+extrasyllabic] is allegedly dispensed with. Tranel (this volume) shows very cogently that not only is this inaccurate but that an extra diacritic feature [appendix] is also required. Since Tranel (this volume) offers a detailed presentation of Plénat’s proposal, and since the problems we would raise regarding this proposal are not substantively different from those pointed out by Tranel, we refer the reader to Tranel’s article for detailed criticisms.

For Hyman (1985), LCS are FCS as illustrated in (12a). In spite of the fact that his syllabic model is moraic, Hyman recognizes an x-slot skeleton (cf. Tranel, this volume, on the incapacity of strictly moraic models to handle LCS straightforwardly). We can see in (12b) that the feminine inflection consists simply in the adjunction of an x-slot (a timing unit) to the final FC, a proposal that we have borrowed in Paradis and El Fenne (1991, 1992), and that we will retain in this article.

However, since moraic models are proposed specifically as alternatives to the constituent syllable (i.e. the syllable with a hierarchized rime) with x-slots, Hyman must later get rid of the x-slot he posits in UR. He proposes two rules to this effect, the Onset Creation Rule and the Margin Creation Rule, whose purpose in both cases is to convert X-slots into moras x.

We can see in (14) how the Onset Creation Rule converts, in the course of a derivation, the UR of the adjective petit ‘small’ into a moraic structure. The Margin Creation Rule cannot apply in (14) because the final consonant of the adjective is floating (slotless). According to Hyman, it is precisely this failure to be integrated into a syllable that accounts for its non-realization at the phonetic level.

Hyman’s (1985) treatment is attractive but the general framework in which it is couched entails greater complexity than models with a single intermediate level – either the skeleton or the moraic level – in the sense that it requires more theoretical tools than these models. Moreover, even though each of these tools (levels) is independently justified in the literature, the skeletal and moraic levels are generally perceived as redundant, rather than complementary. After all, both x-slots and moras are the units which license segments for syllabification, and which encode, among other things, vocalic length. Therefore, a model which makes use of these two levels not only involves more complexity, it may face redundancy problems as well. The same criticism can be directed at Piggott (1991), who also resorts to these two levels (cf. Tranel, this volume, for a meticulous review of Piggott, 1991).

One might also fault Hyman (1985) for the asymmetrical behavior of the Onset Creation Rule and the Margin Creation Rule. While a FC cannot undergo the Margin Creation Rule (cf. (14)), it may undergo the Onset Creation Rule as in petit ami [petit ami] ‘boyfriend’, a discrepancy which remains unexplained. Furthermore, Hyman’s (1985) treatment is limited to a few adjectives and is, therefore, incomplete. For instance, no detail is provided regarding what happens ultimately to a FC – is it deleted by a rule or simply left unpronounced? – nor how the V/VN alternation is to be dealt with. As far as we can see, the V/VN alternation is problematic for
the Margin Creation Rule since it requires that, in the masculine, a non-syllifiable consonant, i.e. the floating nasal, attach somewhere to the preceding syllable in spite of its being slotless, to account for the nasalization of the preceding vowel (e.g. bon [bɔn] → [bɔ̃] ‘good’).

Along with Hyman (1985), Encrevé (1988) analyzes LCs as FCs, with the difference that, for Encrevé, a FC is a consonant with a timing unit to which it is attached. This is illustrated in (15), where it can be observed that codas are also floating, whether the consonant is latent as in (15a) or non-latent as in (15b). The contrast between the two types of consonants is expressed by the fact that PCs alone, i.e. consonants which are prelinked to their timing unit, can be syllabified into a coda (cf. 15b,c). This is how the distinction between the feminine and the masculine of an adjective is made. As we understand it, however, this is tantamount to saying that the feminine and the masculine are suppletive variants, i.e. they each have their own UR, a very costly analysis.

(15) (a) O N O N C (oda)
   x x x x
   p o t i t FC (UR)

(b) O N O N C
   x x x x
   p o t i t PC (UR)

Encrevé’s model is designed to handle both types of liaison, with and without linking (avec ou sans enchaînement), e.g. j’avais un rêve [ʒave zɛ rev]/[ʒavez ɛ rev] ‘I had a dream’, a point to which we will return in our discussion of Tranel’s (1990, this volume) proposal. However, it is odd for several reasons. For instance, why does the floating t of petit not automatically link to its timing unit in (15a)? To avoid such an association, Encrevé must resort to the ad hoc condition presented in (16), which states that a FC can be anchored in the skeleton only if it is followed by an empty onset as in, for instance, petit ami [potitami]. Such a condition leaves unexplained the link between the FC anchorage and the following empty onset.

(16) Condition (paramétrique) d’ancrage des consonnes finales flottantes:
   “En français, une consonne finale flottante ne peut s’ancrer dans le squelette que si le mot suivant dans la chaîne parlée commence par une attaque nulle [vidée].” (Encrevé, 1988: 179)

Encrevé must resort to many other arbitrary conventions, criticized by De Jong (1990), in order to achieve adequate syllabification. De Jong concludes that Prunet’s (1986, 1987, 1992) treatment, which does not need any of these arbitrary conven-


tions, any more than it needs to posit suppletive forms for all feminine and masculine forms of adjectives and nouns, is more elegant and straightforward.

Prunet (1986, 1987, 1992) defines a FC exactly as Hyman (1985) does, i.e. as a consonant without a timing unit, which, consequently, must delete if unable to anchor somewhere in the skeleton. In contrast with Hyman (1985) though, who proposes a moraic model, Prunet assumes the constituent syllable. This avoids the problem of resorting to conversion rules of x-slots into moras as in Hyman (1985). To handle liaison, Prunet claims that vowel-initial words start with a segmentally-empty onset which contains a bare timing unit, as shown in (17a) (cf. also Piggott and Singh, 1985, for a similar proposal). The association of the FC with the following empty x-slot, (17b), accounts for the realization of the FC.

(17) (a) O N O N O N N
   x x x x x x x x x
   p o t i t a m i [patitami] ‘boyfriend’

(b) O N O N O N
   x x x x x x x x
   p o t i t a m i [patitami]

However, this representation faces a problem in forms such as honnête ami ‘honest friend’ and avec elle ‘with her’, where the stem-final consonant is anchored, i.e. it has its own timing unit. The timing unit prelinked to the empty onset is then superfluous, and must consequently be deleted.

(18) avec elle [avek ɛl]
    *[avek kɛl]
    O N O N C O N C
    x x x x x x x x
    a v e k ɛ l

The same problem arises in derivations such as allégresse [alegʁɛs] ‘elation’, certitude [sɛʁdi tɛd], pilotage [pilotag], etc., where a suffix with an empty onset prelinked to an x-slot would presumably have to be posited. Here again one of the timing units would have to be eliminated.

Consider now the feminine suffix posited by Prunet (1986, 1992). As shown in (19a), it consists of an empty syllable. (19b) illustrates the automatic association of the FC of petite ‘small’ with the empty onset of the suffix.

(19) (a) O N (Prunet, 1992: 31)
    x x
    p o t i t

(b) O N O N O N
    x x x x x x
    p o t i t [patit]
Prunet argues that the empty nuclei in (20b) are later filled with schwas. However, he provides no formal mechanism to this effect. Moreover, as final schwas are not pronounced in Northern French, he needs an extra rule to delete them in this position: "We may assume that dialects of Northern French have a rule which deletes a word-final schwa" (1992: 32). We will see that this complication is eliminated in our analysis.

Regarding the V/VN alternation, Prunet (1986, 1987, 1992) offers a very straightforward analysis: the nasalized vowel simply results from the association of the nasal with the preceding vowel as shown in (20a). Compare (20a) with (20b), where the obstruent ends up being deleted.

(20) (a) x x x x x x b  n [bɛ] 'good' p t i t p (e) t i θ [p(ə)t] 'small'

Nuclear syllabification of the floating nasal is allowed because of a parameter, the Nasality Parameter (cf. Prunet, 1992: 53), which allows a floating nasal consonant to be associated with a nuclear position.

The feminine suffix posited by Charette (1991) is essentially the same as Prunet’s (1986, 1992), except that the empty onset of her suffix is not preassociated with a timing unit as in Prunet’s analysis.

(21) (a) O R R O R → (b) O R R R O R

| | | | | |
| N N N | N N N |

x x x x x x x x x

p t i t p t i t (Charette, 1991: 127)

(21a) shows the adjective petit in its UR followed by the feminine suffix, in italics, consisting in Charette’s terms of an O-R (onset-rime) sequence.4 In (21b), we can see that the FC /t/ at the end of the adjective attaches to the empty onset of the suffix. A problem arises here, however. In getting rid of the superfluous timing unit Prunet’s analysis generates in (18), Charette simultaneously loses all motivation for the attachment of the floating /t/ to the following onset. Why should a slotless segment spread to the following onset? No principle or constraint is ever invoked. She simply states (1991: 126–127): "The floating segment associates with the available onset constituent, this association triggering [...] the creation of a skeletal point". What mechanism is responsible for the creation of a skeletal point? This second question is also left unanswered. As illustrated in (22), the problem becomes worse with adjectives such as fortiforte ‘strong’ (masc./fem.), where the FC is preceded by an unsyllabified PC.

---

4 Links between onsets and skeletal slots in (21b) result from what Charette calls governing relations (1991: 127). Her analysis is couched within the framework of Government Phonology, proposed initially by Kaye et al. (1985).

| (22) (a) O R O R N N |
| | | | | |
| | | | | |
| x x x x x x x x x |
| f o r t |
| (Charette, 1991: 131) |

Here one may wonder why it should be the slotless consonant that links to the empty suffix onset, and not the already anchored but nonetheless unsyllabified liquid. We understand that the liquid can be syllabified into the rime after /r/ is syllabified into the onset because of the Coda Licensing Principle (1991: 120), according to which "A non-nuclear point is syllabified within the rime if there is a governor [content] in the following onset". Why the syllabification of the /t/, which is slotless, should have precedence over the syllabification of the /r/, which already has a slot, is not clear, however. One would normally expect well-formed segments (anchored segments) to be taken care of first. It seems that an extrinsic ordering is required here in order to prevent the expected syllabification: *[fɔːr] (fem.).5

There are several additional complications. For instance, as in Prunet’s analysis, empty nuclei are filled with schwas, except for word-final ones, which must undergo special treatment in order not to be filled/rerealized: in both analyses an abstract final empty nucleus must be posited. Furthermore, regarding the V/VN alternation, Charette (1991), in contrast with Prunet, does not offer any analysis at all: we suspect that this alternation would not be easily accounted for in her approach. Our rejection is also motivated by the way nuclei are treated in this framework: nuclei are presyllabified (memorized), which means that they are construed as diacritics, in spite of the fact that they are predictable on segmental sonority grounds in the overwhelming majority of the cases. Altogether, the predictions Charette purports to make concerning LCs, and schwa distribution, are made at the cost of numerous theoretical stipulations, in addition to a high level of abstraction and memorization regarding syllabic structure.

5 Charette claims that her treatment accounts advantageously for the length difference observed in adjectival pairs like [fɔːr] ‘strong’ (masc.)/fɔːr/ (fem.) in certain Quebec French dialects. She argues that the adjective’s UR contains a long vowel, which is shortened in the feminine /fɔːr/ → [fɔːr] because the liquid is syllabified into a rime in the feminine, which violates one of her government conditions, whereas it is syllabified into the onset of the following empty nucleus in the masculine. First, it seems to us that the vowel shortening posited by Charette can be equally well explained by a dissimilation constraint, like the obligatory contour principle (cf., e.g., McCarthy, 1988), on branching constituent sequences within the rime: no branching nucleus if a branching coda. Since the feminine [fɔːr] contains a branching coda, the vowel must be short. Constraints on branching constituent sequences exist independently of the intrasyllabic government condition she invokes. For instance, Fula, which prohibits branching codas as well as branching onsets, also disallows V:C sequences, i.e. geminate sequences, while it does allow V:C:C sequences. Clearly here, Charette’s government condition cannot account for the data (cf. Paradis, 1988a, for a discussion of this constraint in relation to a government treatment). Second, one wonders how her treatment would handle the well-documented non-harmonic high vowel laxing in Quebec French (cf., e.g., Walker, 1980), which strictly occurs in closed syllables, e.g. vit ‘test’/vit/ → [vi] (cf. also pete in (21b), pronounced [p(ə)ti] in Quebec French), since the final t, in her treatment, is obligatorily syllabified into the onset of the following empty nucleus (cf. Tranet, this volume, for a similar criticism).
Like Hyman (1985), Prunet (1986, 1987) and Charette (1991), Tranel (1990, this volume) represents LCS as FCs. However, liaison in his treatment is achieved in two extrinsically ordered independent steps as in Encrevé’s treatment. Except that Tranel’s treatment pertains to, in his own terminology, the skeletal floatation approach – as opposed to, e.g., Clements and Keyser’s (1983), Booij’s (1984) and Pléniat’s (1987) treatments, which belong to what Tranel calls the syllabic floatation approach – whereas Encrevé’s (1988) treatment is hybrid, i.e. both syllabic and skeletal (cf. Tranel, this volume, for more details). In Tranel’s view, the two distinct steps preceding over the realization of FCs are: (1) skeletal anchoring, which is performed by Weizels’s (1987) language-specific rule, shown in (23), and (2) subsequent syllabification.

(23) Liaison as skeletal slot insertion (Weizels, 1987; Tranel, 1990, this volume)

\[
\begin{align*}
\text{x} & \xrightarrow{\text{LV}} \text{x} \\
\text{C V} & \rightarrow \text{C V} \quad \text{(within the appropriate domain)}
\end{align*}
\]

However, as admitted by Tranel (this volume) himself, one shortcoming with this rule is “that it does not explain why a floating consonant gets to be realized before a vowel, but not before another consonant or at the pause. The other skeletal approaches (e.g. Paradis and El Fenne, 1991, 1992) do provide a natural phonological explanation for this fact, through the notions of available onset and automatic association. This debit on the language-specific approach ledger is the price paid for keeping liaison and syllabification distinct” p. 143). Tranel’s (this volume) main argument for keeping the two operations separate rests on the existence of liaison without linking, i.e. the fact that some French speakers can say [zavez e rev] (liaison without linking) ‘j’avais un rêve’ I had a dream instead of the more common form [zav ez rev] (liaison with linking). According to Tranel, this clearly indicates that the insertion of a timing unit applies prior to syllabification and that, consequently, it is not triggered by the following vowel – an empty onset in our view – since the newly anchored segment can be equally associated with a coda or an onset.

Actually, this assertion is not totally accurate. Encrevé’s (1988) results clearly indicate that linking must apply with obligatory liaison: “dans les contextes de liaison où la consonne de liaison est réalisée invariablement (liaison obligatoire), cette consonne est invariablement enchâlée à la voyelle du mot suivant” (1988: 75). Thus either rule (23) must be viewed as making false predictions for obligatory liaison or it must be restricted to optional liaison, since syllabification of a LC into a coda in obligatory liaison context is perceived as a mistake by French speakers (cf. Encrevé, 1988: 23, who quotes Fouché’s, 1959, advice to foreigners, and specifically Anglo-Americans, to pronounce [potiʃà] petit enfant ‘small child’, not [potiʃà]: “On ne saurait trop recommander aux étrangers et particulièrement aux Anglo-Américains de prononcer […] [potiʃà] = petit enfant et de ne faire aucune pause entre petit (avec f final prononcé) et enfant”.

Thus rule (23) ends up describing the competence of a very small portion of the population since, as Encrevé (1988) points out, most French speakers produce

optional liaison only rarely, this type of liaison being the hallmark of the dominant class:

“Compte tenu de ce que les liaisons facultatives ne sont en aucun cas réalisées à 100% (tous de), on entend toujours plus de liaisons obligatoires que de facultatives. Mais ce qui caractérise le locuteur peu scolarisé, c’est de se bomer aux liaisons invariables et de ne réaliser qu’un taux très faible de liaisons variables” (1988: 49); “La réalisation des liaisons facultatives étant socialement répartie, c’est nécessairement auprès de locuteurs socialement dominants que peut s’étudier cette variation particulière, qui s’observe sur les liaisons facultatives, la liaison sans enchânement” (1988: 49-50).

Even within the dominant class, where optional liaison is more frequent, liaison without linking is scarce. Encrevé’s (1988) study, which examines the speech of 21 French politicians in media, thus in formal contexts (interviews on the radio, television, etc.) – “les discours apparentiennent tous au style «surréel», quand ils ne relèvent pas du style «soutenu»” (1988: 61) – reveals that the non-linking liaison is produced in less than 10% of cases (9%; cf. 1988: 68). This figure is misleading, since some of the politicians of the sample hardly produce the non-linking liaison at all (e.g. Rocad (0%) and Garaud (3.2%), 1988: 56; cf. also p. 61), which tends to indicate that not only is the non-linking liaison found almost exclusively in the formal speech of the dominant class in optional liaison context, but that in addition it does not characterize all individuals pertaining to this class.

Even more important is the fact that a LC never surfaces next to the vowel of the following word in non-linking liaison since, as reported by Encrevé (1988), a glottal stop (92% of cases) or a schwa (83% of cases) is always inserted between the two segments: “Dans 92% des cas, le non-enchaînement se traduit par une occlusion glottale entre CL et V, et dans 8% des cas seulement par la présence d’un schwa” (1988: 62). This clearly shows that, even when a LC is syllabified into a coda word-finally, instead of being syllabified in the following empty onset, this empty onset must be filled, a fact which is naturally captured by our No Empty Onset Principle (to be formally presented in the next section) – this principle states that an empty onset cannot be preceded by any type of consonant – but which cannot be handled straightforwardly in Tranel’s treatment. Tranel has no formal means to connect glottal or schwa insertion with the linking liaison or with enchânement (consonant linking) tout court, since the syllabic model he adopts does not allow segmentally-empty onsets – onsets are treated on a par with codas in his model, even though the former are unmarked while the latter generally increase syllabic complexity (cf., e.g., Kaye and Lowenstamm, 1984) – and since the insertion of a timing unit in his view results from a non-contrast-induced rule. All these processes must therefore be analyzed as distinct language-specific and extrinsically ordered unmotivated rules.

It must be clear that what we mean here is not that liaison without linking does not deserve the attention of linguists because its range of application is (socio-)linguisit-
3. Framework and proposals

As mentioned in section 1, our representation of LCs is the same as that offered by Hyman (1985), Prunet (1986, 1987, 1992) and Charette (1991) for adjectives and/or determiners, and as that proposed by Paradis and El Fenne (1991, 1992) mainly for verbs, i.e. we construe LCs as FCs. In line with these works, we believe that the deletion treatment makes more predictions than the eponymy or the supplementation ones. In particular, it predicts contexts where a FC is deleted or realized, and relates them to each other by means of a small number of universal constraints. In contrast with Hyman, however, we do not need to resort to conversion rules of X-slots into moras, which have the disadvantage of being complex and asymmetric (cf. section 2, where it is shown that FCs can be targeted by the Onset Creation Rule but not by the Margin Creation Rule). We also depart from Prunet and Charette in the way we represent the feminine suffix. Along with Hyman, we analyze this suffix as a bare X-slot, (24a). A similar suffix, shown in (24b), is responsible for the realization of a FC in the 3pl. Present Indicative (cf. (1a)). Both suffixes attach to FCs only, which follows from a general constraint against (word-final) consonantal geminates at the lexical level.10

(24) (a) x
   .adj/noun fem.
(b) x
   3pl. Pres. Ind.

We also disagree with Prunet’s proposal that empty onsets, such as those found at the beginning of arb’re ‘tree’ or ami ‘friend’, automatically contain a segmentally-empty X-slot. We argue that the X-slot a FC receives in liaison context, or in any empty onset context, is provided by the repair strategy in (25a). Let us recall that there are only two possible repair strategies in TCRS, delete and insert, which are both provided by Universal Grammar, i.e. although they may be partly parametrized in some cases, they are not language-specific per se. Furthermore, a repair strategy is distinct from a traditional phonological rule (Chomsky and Halle, 1968) in at least two fundamental ways. First, it is context-free: repairs always apply according to the Minimality Principle in (25c), i.e. at the lowest level to which the violated constraint refers; levels are ranked according to the Phonological Level Hierarchy in (25d). Second, in contrast with rules, which are contextual and arbitrary, repairs are always motivated, i.e. triggered by the violation of a constraint, either universal or parametrized (for more details on the framework, cf. Paradis, 1988a,b, 1990, 1993b,c, and Paradis and LaCharité, 1993).

10 Intrasemantic consonantal geminates are never distinctive in Standard French. Even intersemantically, they are distinctive only in a few cases, which all involve a verb with a stem-final r conjugated in the Conditional or Future, e.g. courait [kure] ‘to run’ (3sg. Imperfect/courrait [kure] (3sg. Conditional).
(25) (a) \( \emptyset \rightarrow Z \) (insert)  
(b) \( Z \rightarrow \emptyset \) (delete)  
where \( Z \) represents any phonological material, including a link between two items.

(c) Minimality Principle: 
A repair strategy must apply at the lowest phonological level to which the violated constraint it preserves refers.

(d) Phonological Level Hierarchy: 
metrical > syllabic > skeletal > segmental (root node > articulator)

Insertion of an x-slot between a FC and an empty onset, illustrated in (26), proceeds in the same spirit as the Node Generation Convention of Archangeli and Pulleyblank (1986), according to which missing intermediate material is automatically generated: "A rule or convention assigning some feature or node \( x \) to some node \( b \) creates a path from \( x \) to \( b \)" (1986: 75). We claim that this convention is simply a repair strategy: it creates a licit path between a FC and an onset.

(26) (a) syllabification of the FC  
\[
\begin{array}{ccccccc}
  O & N & O & N & O & N & O \\
  1 & 1 & 1 & 1 & 1 & 1 & 1 \\
\end{array}
\]
\[
\begin{array}{cccccccc}
  x & x & x & x & x & x & x \\
  1 & 1 & 1 & 1 & 1 & 1 & 1 \\
\end{array}
\]
\[
\begin{array}{cccccccc}
  p & a & t & i & t & a & m & u & r \\
  1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\
\end{array}
\]

(b) insertion of an x-slot  
\[
\begin{array}{ccccccc}
  O & N & O & N & O & N & C \\
  1 & 1 & 1 & 1 & 1 & 1 & 1 \\
\end{array}
\]
\[
\begin{array}{cccccccc}
  x & x & x & x & x & x & x \\
  1 & 1 & 1 & 1 & 1 & 1 & 1 \\
\end{array}
\]
\[
\begin{array}{cccccccc}
  p & a & t & i & t & a & m & u & r \\
  1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\
\end{array}
\]

One might be tempted to argue (cf. Tranel, this volume) that our analysis is flawed because syllabification rules can see only timing units, not segments. We assume that syllabification rules aim primarily at encoding segments, not timing units, even though timing units are obligatory intermediate units, in the same way that immigration offices deal primarily with persons, not passports, although individuals are all required to have passports. In other words, we maintain that segments are visible to syllabification rules, whether they are, with respect to these rules, well-formed (anchored) or not. This reasoning is on a par with that applied to segmental assimilation, where a feature (say [+round]) can anchor to a segment even though this segment does not have the appropriate mother node (i.e. Labial). Moreover, if syllabic rules were insensitive to segments, how could syllabic rules determine whether a given segment must be syllabified into a nucleus or an onset? This is precisely one of the reasons that led McCarthy (1988) to incorporate the features [sonorant] and [consonantal] into the root node; cf. also Kensewicz (1994: 453): "[Consonantal] and [Sonorant] are major determinants of the sonority-driven syllabification routine that imposes the initial and most basic prosodic structure over the string of phonemes. Locating these features at the root highlights their special status in this regard also".

The insertion of a slot in (26b) is governed by the No Empty Onset Principle in (27).

(27) No Empty Onset Principle  
(universal within stems and bound-stem derivations)  
An empty onset cannot be preceded by a consonant, either floating or anchored.11  
*Precedence is established on syntactic and morphological grounds.12  

Domain of activation of this principle in French:  
The whole lexicon and some syntactic domains (cf. Morin and Kaye, 1982, for a painstaking description of liaison domains in French).

The No Empty Onset Principle constitutes a universal core, i.e. an obligatory subset, of the CV bias encoded by I6's (1989) Onset Principle. Although the formulation proposed here might at first glance seem overly conservative, even stipulative, it in fact expresses the only universal manifestation of the constraint (\*CSV, where \( S \) is a syllabic boundary).13 As shown in (28), the syllabic model we adopt is the constituent syllable (cf. Kaye and Lowenstamm, 1984, among others), whose only optional constituent is the coda.14 This model directly encodes the fact that the universally least marked syllable is the CV one.15

---

11 Recall that we analyze the absence of linking in optional liaison – an unquestionably marked option – as resulting from a resyllabification process due to the attraction of word-boundaries (cf. our discussion of Tranel, this volume, in section 2.2).

12 The formulation of this principle also rests on the assumption that segments are visible to syllabic rules and constituents.

13 The No Empty Onset Principle is in a sense a reinterpretation of Hyman's Onset Creation Rule, about which Hyman (1985: 16) says: "This rule is considered to apply universally in level 1 phonology in the lexicon [...]. It frequently reappears at level 2 and post-lexically, though some languages do not require this reappearance". Our principle is also largely inspired by the Onset Principle proposed by I6 (1989: 223), which states that "sonorless syllables are avoided wherever possible". However, this formulation is not sufficiently clear in the cases we address: does the presence of a slotless consonant in the environment of an empty onset constitute a possible, impossible or obligatory syllabification context? In contrast, the No Empty Onset Principle clearly stipulates that syllabification in such a case is obligatory. Note that I6 assumes a mosaic model, where FCs such as the ones at hand are not easily handled (cf. Tranel, 1990, this volume). Furthermore, I6's Onset Principle cannot account, among other things, for heterosyllabic vowel sequences in languages like French, where these sequences are found in numerous underived words such as Noël (note! 'Christmas', chou (chou) 'chou', gotland (goula) 'sea gull', rel (rel) 'real', etc., whereas the No Empty Onset Principle says nothing about these sequences. Their marked status is expressed through the constituent syllable, where the onset is left segmentally empty, a marked option.

14 In contrast with Kaye and Lowenstamm (1984), however, we assume that syllabic structure, being redundant information, is generally absent in UR: it is provided by structure-building rules.

15 The unmarked character of the CV syllable is established on the following grounds. First, the CV-syllable is universal. Second, CV-syllables in all languages are always more numerous than any other type of syllable. Third, there is no language with V or CVC syllables only, whereas there are languages with only CV syllables.
The empty onset representation we adopt — the one with no x-slot — avoids the problem of our being left with a superfluous timing unit as in Prunet (cf. (18)), while the No Empty Onset Principle provides a justification for the syllabification of a FC into an empty onset, a justification which is crucially lacking in the case of Charette (cf. (21)–(22)). We claim that a FC not yet syllabified by the post-syntactic level is deleted by the repair strategy in (25b), which in this case preserves the Licensing Principle presented in (29).

(29) Licensing Principle
All phonological units must be incorporated into a complete phonological structure (cf. Itô, 1986: 2, for a narrower version, and Paradis and Prunet, 1989: 323, for a slightly different formulation).

4. Application to the Present Indicative and the Infinitive

In section 4.1, we show how our treatment applies to FCs, including floating nasals (the V/NVN alternation), in the Present Indicative and the Infinitive (cf. El Fenne, 1994, for an application of our treatment to all tenses), while sections 4.2 and 4.3 are devoted to justifying respectively the Infinitive suffixes and the verbal groups we posit.

4.1. FCs in the Present Indicative and the Infinitive

As shown in (30), we argue that verbs such as connaître ‘to know’, conduire ‘to drive’, moudre ‘to grind’, coudure ‘to sew’ and écrire ‘to write’ all contain a stem-final FC in UR.

(30) (a) connaître Pres. Ind.: il connaît [kɔnɛ], ils connaissent [kɔnɛs]
UR 3sg. 3pl.
x x x x x x x x x k ə n ɛ s k ə n ɛ s
l l l l l l l l
(b) conduire Pres. Ind.: il conduit [kɔdɥi], ils conduisent [kɔdɥiz]
UR 3sg. 3pl.
x x x x x x x x x x x x x x x k ə dɥ iz k ə dɥ iz
l l l l l l l l

In the 3pl., the suffix in (24b) attaches to a stem-final FC, which has the effect of anchoring it; this accounts for the realization of a FC in this context. In the 3sg., the FC cannot anchor, unless an x-slot is inserted to form a coda. However, this strategy, x-slot insertion, would not be a ‘minimal’ repair (cf. the Minimality Principle in (25c)) given that the lowest level referred to by the constraint violated, the Licensing Principle in (29), is, in the case at hand, segmental; an x-slot relates to the skeleton, a higher level according to the Phonological Level Hierarchy in (25d). Deletion (25b), then applies — in conformity with the Minimality Principle — to preserve the Licensing Principle.

The realization of a FC in (30) is morphologically conditioned, since it results from the concatenation of a suffix (24b). In the majority of cases, however, its manifestation is entirely phonological: it is caused by the presence of an empty onset, as in (31).

(31) coudure [kudr] 1pl. and 2pl. Present Indicative

1pl. O N O N 2pl. O N O N
l l l l k u z - 5 [kuz3] k u z - e [kuz3]

The 1pl. and 2pl. Present Indicative suffixes, respectively /-3/ and /-e/, both begin with an empty onset. Their attachment to a consonant-final stem results automati-
cally in a violation of the No Empty Onset Principle in (27). Since deletion of the FC would result in a marked nucleus sequence, insertion of an x-slot is then selected, enabling the FC to be syllabified. This is true of all the vowel-initial inflectional suffixes in Frenh; e.g., the imperfect je cousais [kuz-ɛ] ‘I used to sew’ and the Present Participle en cousant [kuz-â] ‘in sewing’. It is also the true of derivatives such as coustable [kuz-abl] ‘sewable’, petitesse [petiتس] /peti-ɛl/ ‘smallness’, and so on.

As in the case of the 3sg., the FC cannot anchor anywhere in the Infinitive in (32), where both suffixes are consonant-initial, -r in (32a) and -tr in (32b). This again causes deletion of the FC, which would otherwise violate the Licensing Principle. We argue in section 4.2 that there are five Infinitive suffixes: -s, -sr, -sr (;d-f), -war and -or. The suffix -sr is always realized -dr, i.e. with a voiced consonant, when preceded by a voiced consonant; this results from an assimilation process formalized in Paradis and El Fenne (1991, 1992). Interestingly, this generalization can only be captured if the FC is analyzed as part of the stem, not as a thematic consonant as in, for instance, Martinet (1969). Indeed, such a treatment maintains that the thematic consonant is simply absent in the Infinitive, thus losing all phonological motivation for the complementary distribution of -tr/-dr.

(32) (a) infinitive suffixation

<table>
<thead>
<tr>
<th>ON</th>
<th>ON</th>
<th>ON</th>
<th>ON</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>e</td>
<td>r</td>
<td>i</td>
<td>v</td>
<td>r</td>
</tr>
</tbody>
</table>

(b) infinitive suffixation

<table>
<thead>
<tr>
<th>ON</th>
<th>ON</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>k</td>
<td></td>
<td>uz</td>
</tr>
</tbody>
</table>

Deletion of a FC in front of a consonant is not restricted to the Infinitive. As shown in (33), it also applies before the plural suffix -z in adjectives.

As in (31), the empty onsets have to be filled because of the No Empty Onset Principle, which prohibits their being preceded by a consonant. The plural -z is targeted as the first problematic consonant since it is the first accessible consonant at the periphery of the preceding morphological construction ([fam] [fam]). As in (31), insertion of an x-slot applies, enabling the syllabification of the plural suffix into the empty onset. Once syllabification has taken place, however, the stem-final FC is in the same situation as the FC in the Infinitive in (32): it has nowhere to anchor and must therefore be deleted.

When the Licensing Principle is violated, deletion is not always the preferred strategy. In fact, reassociation (insertion of a link between x and y), which preserves at least part of the segment, is selected whenever possible (cf. the Preservation Principle in Paradis et al., 1993, 1994). Since French allows nasal vowels, a nasal FC is never deleted but instead attached to the preceding vowel, which results in a nasal vowel. This is illustrated in (34) with the verb craindre [krɛ̃dʁ] /kɾɛ̃dʁ/ ‘to fear’.

14 Standard French has four nasal vowels, a, å, ë, ã (cf., e.g., Lasagrande, 1984: 21), though some Northern dialects have replaced the central one, å, with the front one, ë. Nasalization in (34) is due simply to the fact that French allows nasal vowels, and that partial spreading of the FC (insertion of a link between a terminal feature, [nasal], and a node of the preceding segment) is more structure-preserving than complete deletion of the FC, as is the case with oral obstruents – oral obstruents cannot form a permitted configuration with the preceding vowel. The presence of nasal vowels in French is accounted for by the following parameters: Nasal Vowels? French: yes, while nasal vowel quality is due to other parameters: e.g. Tensed Nasal Vowels? French: no (cf. LaCharité and Paradis, 1993; Paradis, 1993a; and El Fenne, 1994; cf. also Prunet, 1992: 33, for a different version of the Nasality Parameter). Note that in some dialects, where tensed nasal mid-high vowels are allowed (cf. Pilet, 1987), the feature [tone] of our parameter would have to be replaced with the less restrictive feature [+high] [+high], [+nasal], i.e. *r, *s, *q).
based on the 3pl. Present Indicative, not on the stem. This was in order to account for the verbs vaincre, rompre and vivre, which are, actually, the only cases with a non-coronal FC, apart from écrire. All the other verbs end with a coronal FC. This led us to believe that the distinction between coronal and non-coronal was an essential one, which proved to be wrong when contexts other than verbal ones (cf. (33b)) were taken into consideration.21

Before ending this section, let us point out that no phonotactic constraints of the type *sr, *ldr and *sr could account for the deletion in (32) (cf. Martinet, 1969: 106, for such a proposal, where the constraint *-izr is invoked), since deletion occurs even in paralire /paralir/, where str is a very well-formed sequence indeed (e.g. ministre 'minister', astre 'star', rustre 'brutish'). A synchronic rule which would change fricatives and sonorants into stops in front of the Infinitive suffix -r (i, i, e, n, n → t/ôf/ - r - e.g. [paras-†] → [pares-t]) does not constitute a viable hypothesis either. Not only would this proposal predict incorrect Infinitive forms such as *[finir] for finir /finis-t/ 'to finish' and *[dider] for dire /dis-t/ 'to say' but it would be unable to handle the V/VN alternation, where the consonant is realized on the vowel, not turned into a stop.

4.2. Infinitive suffixes

So far, we have seen that the C/B alternation is accounted for in a very illuminating way with the aid of only two universal constraints, the No Empty Onset Principle and the Licensing Principle, which are preserved in the TCRS by universal and principled mechanisms called repair strategies. We also invoked the notion of affixes (cf., e.g., (24b)), which are found in every natural language. The analysis we propose is thus explanatory in the sense that it is economical (a minimum of sources and mechanisms), general (it is not restricted to verbal inflection nor to French), and it makes predictions (a FC must be pronounced in front of a vowel, otherwise it is deleted except in a few specific morphological environments). However, we might conceivably be faulted for positing a larger number of Infinitive suffixes: five – e/-r, -r/-ir, -war/-otr (otr) – versus two phonetically distinct ones in some previous analyses, as indicated in Table 2. As shown in Table 2, such a generalization is misleading, however, because authors who propose systems with only two phonetically distinct Infinitive suffixes -er(r) and -r/-ot(r), always also posit at least three – usually four –

19. We analyze examples such as ton ami ([Onami] /mamî/ 'your friend' and engraville ([enzegrav] /[β̃ṽẽg̃ẽ]-) 'to be proud of' as instances of pre-stressed nasals in UR. In other words, we claim that the link between the nasal and the vowel is not derived as in (33b), but present in the dictionary. The nasal has nevertheless its own consonantal root node, which violates the No Empty Onset Principle in the environment of a following empty onset. In this context, we argue that the root node is syllabified in the following onset while the nasal feature remains attached to both the consonant and the preceding vowel. Indeed, there is no reason for the nasal to delink from the preceding vowel (cf. Pruente, 1986, 1987, 1992, for a syntactic-based alternative).

20. Verbs like boître 'to drink' (boîte [bɔv] (3sg.), buvons [buv-3] (1pl.), boivant [buvavr] (3pl.)) are suppletive verbs (i.e. verbs with more than one memorized base) since they display alternations other than the C/B alternation which are not synchronically predictable.
morphologically unpredictable -r suffix variants. This is tantamount to positing five infinitive suffixes: -er(r), -r, with no thematic segment as in dire [dz-er] 'to say', -r, with a thematic vowel as in partir [parti-r] 'to leave', -r, with a thematic consonant as in courdre [ku-d-r] 'to sew', and finally -r, with a thematic diphthong as in vouloir [vu-wa-r] 'to want'. Schane (1968) also posits two -ir variants in addition to his three -rs, while Van den Eynde and Blanche-Blanceneitse (1970: 411) invoke unformalized rules (régles de représentation) turning -r into -war and -ir. These systems end up being ad hoc and complicated as those found in textbooks such as, for instance, Bescherelle (1985), where two -ir endings are posited: -ir 2nd group, as in finir ([finit]/finis), and -ir 3rd group, as in partir ([parti]/parti), along with many other endings.

Most of the systems in Table 2 seek to capture the fact that Infinitive suffixes, apart from -er perhaps (depending on the system), all have a final r. However, we do not believe that this generalization is a true synchronic one, i.e. one which plays a role in speaker competence. All told, the price paid for capturing such an empty generalization is high: it leads to many idiosyncratic devices as thematic segments – segments whose sole purpose is to justify suffixes and stems proposed by their authors – in addition to numerous feature-changing and deletion rules as shown in Table 3. Treatments summarized in Table 3 are often arbitrary and, in many cases, incoherent. For instance, Martinet (1969) proposes two phonotactic constraints which have contradictory effects, i.e. *mr, which triggers insertion of a thematic vowel, and *izyr, which causes deletion of the fricative. Van den Eynde and Blanche-Blanceneitse (1970), for their part, claim that /i/ is deleted in front of /j/ in lire [fiz-r], but changed into /d/ in the same context in courdre [ku-z-r].

Along with Pinchon and Coute (1981), we analyze the ending /[s] in verbs like finis 3pl. Present Indicative as part of the stem, not as a suffix.22 In contrast with

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22 As noted by Martinet (1969: 111), verbs with -is do not form a coherent semantic class; -is cannot, therefore be analyzed as a suffix.

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Table 3 (non-exhaustive)

<table>
<thead>
<tr>
<th>Authors/</th>
<th>-ir (trans)</th>
<th>-er (trans)</th>
<th>-ir (trans)</th>
<th>-ir (trans)</th>
<th>-ir (trans)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schane</td>
<td>finis-ir</td>
<td>dorir</td>
<td>lire</td>
<td>prendre</td>
<td>connaître</td>
</tr>
<tr>
<td>(analytical)</td>
<td>[finis-ir]</td>
<td>[dorir]</td>
<td>[lire]</td>
<td>[prendre]</td>
<td>[connaître]</td>
</tr>
<tr>
<td>Pfeifer</td>
<td>finis-ir</td>
<td>dorir</td>
<td>lire</td>
<td>prendre</td>
<td>connaître</td>
</tr>
<tr>
<td>(analytical)</td>
<td>[finis-ir]</td>
<td>[dorir]</td>
<td>[lire]</td>
<td>[prendre]</td>
<td>[connaître]</td>
</tr>
</tbody>
</table>
naitre (f[केज]/[केस]) and croître (f[krᵊw]/[krᵊwa]). Since the 1st group does not contain verbs with a PC – this is discussed in the next section – this means that floating *s*, like any non-nasal PC, are systematically deleted in front of a syllabified consonant.

4.3. Verbal groups

Verbs are traditionally classified as follows in textbooks:

<table>
<thead>
<tr>
<th>1st group = 11,294</th>
<th>2nd group = 331</th>
<th>3rd group = 375</th>
</tr>
</thead>
<tbody>
<tr>
<td>-cr: e.g. aimer ‘to love’</td>
<td>-ir: e.g. finir ‘to finish’</td>
<td>-er: e.g. croître ‘to grow’</td>
</tr>
<tr>
<td>-dr: e.g. condre ‘to sew’</td>
<td>-ir: e.g. dire ‘to say’</td>
<td>-ir: e.g. sortir ‘to go out’</td>
</tr>
<tr>
<td>-wr: e.g. pouvoir ‘to be able’, etc.</td>
<td>-er: e.g. start ‘to go out’</td>
<td>-er: e.g. start ‘to go out’</td>
</tr>
</tbody>
</table>

This type of classification, which aims essentially at establishing ‘morphological’ links between verbal stems and their inflectional suffixes, cannot capture the phonologically induced behavior of the C/W alternation in verbs. Similar criticisms are made by Plénat (1981: 8), for whom the classification in Table 4 is based largely on diachronic facts. Plénat, who tries to improve on Van den Eynde and Blanche-Benveniste (1970), proposes instead two verbal groups: one for verbs in -er and one for those in -ir, the latter being characterized by the feature [other conjugation] (plus autre conjugaison). Plénat (1981: 30) blames Van den Eynde and Blanche-Benveniste (1970: 411) for suggesting a complementary distribution of the endings -er, -ir and -war based on unnatural phonological classes and rules, such as their conversion rules of -er into -war and -ir (note that the system they propose is very informal).

In contrast, Plénat accounts for the endings -ir and -war by positing thematic vowels, which undergo formal deletion and insertion rules. This allegedly captures phonological generalizations, this time based on natural classes. However, the complementary distribution he argues for requires unpredictable segments (thematic vowels), which must undergo arbitrary rules. Plénat's system also requires another 15 extrinsically ordered rules in addition to a diacritic feature [other conjugation].

Table 4
Verbal group classification (after Bescherelle, 1985)

<table>
<thead>
<tr>
<th>-dr/</th>
<th>-ir</th>
<th>-war</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>%</td>
<td>Total</td>
</tr>
<tr>
<td>PC 143</td>
<td>1.2</td>
<td>422</td>
</tr>
<tr>
<td>PC 0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>V 0</td>
<td>0</td>
<td>34</td>
</tr>
<tr>
<td>Total 143</td>
<td>1.2</td>
<td>456</td>
</tr>
</tbody>
</table>

Conversely, the presence of a PC at the end of a verb indicates to the speaker that the suffix -er will have to be selected, except in 30 verbs in -ir such as cuellir ‘to pick up’ (only 0.3% of the verbs), where the final consonant is a permanent one. Furthermore, if we look at Table 6, we note that the PC in this latter case is always r or j.

Table 6

<table>
<thead>
<tr>
<th>-dr</th>
<th>-ir</th>
<th>-war</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>%</td>
<td>Total</td>
</tr>
<tr>
<td>PC 1.5</td>
<td>d.z,i,a,n</td>
<td>s.z,p,k,v</td>
</tr>
<tr>
<td>PC 0</td>
<td>j</td>
<td></td>
</tr>
<tr>
<td>V 0</td>
<td>a,y,i,e</td>
<td></td>
</tr>
</tbody>
</table>

23 The fact that finir ‘to finish’ and connaitre ‘to know’ have been treated as distinct by most authors comes from the influence of traditional classifications found in textbooks (1st, 2nd and 3rd groups; cf. Bescherelle, 1985), which are largely based on the infinitive endings (finir 2nd gr., connaitre 3rd gr.), and historical and orthographical considerations. For instance, the classification of maudire (m[डॉ]dr/m[डॉ]dr) ‘to damn’, whose conjugation is like that of finir (finir/f[डॉ]r) except for the feminine Past Participle (fini but mauditch), into the 3rd group instead of the 2nd one is essentially based on the fact that maudire is written with a final ending *er* whereas finir takes a final *r*.

24 Verbs like nettoyer ‘to clean’, whose 3sg. is nettoie (netwja) but 1pl. is nettoyons (netwoj) in the Present Indicative, are not analyzed as FC stems since their 3pl. always end with a vowel (e.g. ils nettoient (netwoj), not (netwoj)), except in some (Quebec French) dialects, where the whole paradigm contains a /j/ (i.e. je nettoie (netwoj), tu nettoies (netwoj), etc.). In this latter case, the final glide is clearly a stem-final PC. Otherwise, the yod is analyzed as epenthetic or the result of vowel propagation as in essuyer ‘to wipe up’ /esju-e/ → [esjuje] (cf. El Fenne, 1994: 207–208, for details on epenthetic yod).
In other words, if the stem ends with a PC other than r or j, the speaker may correctly predict that the suffix will be -er. The speaker can also predict that a stem with a non-coronal FC will not select the suffix -tr (or its variant -dr), and that a stem with a final sonorant will not take -r. As for the suffix -war, it can be preceded by l or v only.  

To summarize, we claim that, apart from a few vowel-final stems (e.g. voir /vwa-t/ 'to see', créer /kre-el/ 'to create', distraire /distra-t/ 'to entertain', conclure /k3k3l3-t/ 'to conclude', etc., i.e. 4.3% of the verbs in French as shown in Table 3), verbal stems are divided mainly into two large categories: those with a final FC like partir (part [par]l'partir [part]) 'to leave' (as indicated in Table 3, 642 verbs out of 12,000, i.e. 331 2nd gr. verbs + 375 3rd gr. verbs = 34 vowel-final verbs = 30 FC-final verbs), and those with a final FC like aimer (aimer [aim]laimer [laim]) 'to love', which constitute the vast majority of French verbs (94%, i.e. 11,294 verbs).  

We claim that a French native speaker can easily distinguish between these two main types of stems, given that the C/Ø alternation is present in all French morphology, and that it is always predictable on morphological (e.g. 3pl Present Indicative, feminine of adjectives and nouns, etc.) and phonological (before an empty onset) grounds, both at the lexical (inflexion and derivation) and syntactic levels (liaison). As seen in section 4.1, a speaker who identifies a stem as a FC-final non-defective verb (basing the identification on the 3sg. and 3pl. Present Indicative) can predict that the FC will be realized in the 1pl. and 2pl., given that the verbal suffixes -s and -er both start with an empty onset. The same is true of all FCs in front of a vowel-initial suffix. This prediction is confirmed by the results of two production tests, reported in El Fenne (1994), which were each administered to twenty different native (Quebec and European) French speakers, who were not pre-informed of the purpose of the test (cf. El Fenne for details on the methodology). The results of the first test show that speakers can produce the 1pl. and 2pl. Present Indicative as well as the Imperfect and the Present Participle of non-verbs without any problem as long as they know the 3sg. and 3pl. Present Indicative, which were provided with the test. For instance, when they were given the non-verb *vanire [vanit] and its 3sg. and 3pl. Present Indicative [vanis/vanis], subjects could produce without any difficulty the whole conjugation, e.g. the 1pl. and 2pl. Present Indicative [vanis-3], [vanis-e], the 1sg. and 2sg. Present Indicative [vanis], the 1-2-3sg. Imperfect [vanis-e], the 1-3pl. Future [vanis-tr-5], and so forth.  

The second test was more difficult. Subjects were given only the Infinitive of a verb (e.g. vanir [vanit]) and its 3pl. Present Indicative (i.e. [vanis]), and asked to derive the rest of the Present Indicative conjugation. They had no problem deriving the singular of the Present Indicative (e.g. [vanis]) and the 1pl. and 2pl. ([vanis-2], [vanis-e]). In other words, as soon as subjects had identified the Infinitive suffix (i.e. -tr), most of them automatically knew that the verb was a FC stem, and that this FC was the one at the end of the 3pl. The rate of success for the five non-[er] non-verbs tested — vanire, calandre, joir, conmavoix and bëdir — was 85% (84.2% for vanire, in particular). For the [er] non-verbs — tapoquer, fubiler and gadier — for which only the Infinitive was provided, the rate of success in deriving the whole Present Indicative, Imperfect and Future paradigms was 100%.  

These results clearly indicate that the correlation we capture between the selection of Infinitive markers and the nature of a consonant (FC/PC) at the end of a verbal stem reflects the competence of French native speakers. It is nevertheless conceivable that some speakers have a more suppletive system than others — since the FC system, in comparison with the PC one, is a marked system. However, El Fenne's results show that this is not the case for the vast majority of French speakers, who have a systematic and productive (they can apply it to non-words) FC system.  

5. Conclusion  

The C/Ø alternation (including the V/VN one) in French verbal inflection, which occurs in 588 regular (non-suppletive and non-defective) verbs, is explained and related naturally to the C/Ø alternation found in many other morphological and syntactic contexts in a very simple and uniform way by the TCRS. More specifically, we have maintained that the notion of FC (as defined here, i.e. a consonant without a timing slot) along with two principles, the No Empty Onset Principle and the Licensing Principle, used in the framework of the TCRS, suffices to handle the C/Ø alternation in verbal inflection and elsewhere.  

Not only does the system we propose result in considerable simplification of the French verbal inflection (it gets rid of numerous thematic segments and ad hoc — when not contradictory — context rules), it makes important new predictions concerning the selection of Infinitive suffixes in relation to the nature of a stem-final consonant (FC/PC). We have shown that these predictions are confirmed by the results of production tests, administered by El Fenne (1994), which clearly indicate that the FC system we propose reflects the competence of French speakers.  

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25 We analyze defective verbs like choir 'to fall', whose Present Indicative is [j...xova], as [j...xova-t, not j...xova-w].  
26 El Fenne (1994) shows that 83.5% of the 2nd and 3rd group verbs (i.e., 588 instances) are non-suppletive and non-defective. But even in the case of suppletive or defective verbs, the distinction between FCs and PCs helps to reduce the number of sources in an explanatory way, e.g. petit 'to be little', whose 3sg. is pinit [pinit] and 3pl. is pinit [pinit] can be derived from two suppletive bases [pinit-pinit] instead of three [pinit-lpinit-lpinit], as in a non-FC analysis.  
27 This distribution is explained by the fact that FC verbs, even though regular, are nevertheless more marked than PC verbs. The speaker must learn that such stems contain a consonant that, as opposed to the other stem segments, does not have a timing unit.  
28 Invoking analogy to account for our results would be unexplanatory since it would imply that the analogical referent is the FC system itself, a circular statement. Rare analogical bases (say paralire [para], pares 'to appear' for vanire [vanis], vanis[e]) could not yield as significant results as those obtained by El Fenne (1994) for a total of 13 non-verbs and 40 speakers.
References


Le mot retrouvé

Chantal Lyche*, Francine Girard*

* Mat. nat. Fak., Universitetet i Oslo, Oslo, Norway
** Agder Diorikhøgskole, Kristiansand, Norway

Résumé

Nous abordons dans ce travail la place du mot dans la phonologie du français. Nous montrons qu'un ensemble de phénomènes phonologiques conspirent à donner au mot une importance toute particulière et nous évoquons un nouveau type d'accentuation de plus en plus répandu chez les locuteurs français qui prennent régulièrement la parole en public. Après avoir donné les caractéristiques de cet accent, que nous appelons accent initial, nous envisageons comment il influe sur certains domaines de la phonologie du français, comme par exemple la liaison et la chute de schwa, modifiant aussi les règles de syllabation et la structure prosodique. Nous montrons enfin que la fonction principale de l'accent initial est de donner au mot une autonomie encore plus marquée.

I. Introduction

Le mot, disait Saussure (1975: 154), "malgré la difficulté qu'on a à le définir, est une unité qui s'impose à l'esprit, quelque chose de central dans le mécanisme de la langue". Ceci est vrai à tous les niveaux linguistiques et pourtant si une définition du mot comme "élément linguistique significatif composé d'un ou plusieurs phonèmes" représentant une suite graphique comprise entre deux blancs ne s'applique pas de problème particulier en français, il n'en est pas de même de la définition du mot comme unité accentuelle. Le mot n'est pas isolable dans la chaîne parlée puisque les règles de syllabation ne respectent pas les frontières définies par ces deux blancs et puisque le domaine de la règle d'accentuation est le groupe et non pas le mot. De ce
