



HAL
open science

Stress domain effects in French phonology and phonological development

Yvan Rose, Christophe dos Santos

► **To cite this version:**

Yvan Rose, Christophe dos Santos. Stress domain effects in French phonology and phonological development. Selected Papers from the 38th Linguistic Symposium on Romance Languages, pp.89-104, 2010, 10.1075/cilt.313.10ros . hal-01996413

HAL Id: hal-01996413

<https://hal.science/hal-01996413>

Submitted on 7 Jun 2024

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Copyright

**Stress Domain Effects in French Phonology
and Phonological Development***

Yvan Rose
Memorial University
of Newfoundland

Christophe dos Santos
Radboud Universiteit
Nijmegen

Abstract

In this paper, we discuss two distinct data sets. The first comes from the allophonic process of closed-syllable laxing in Québec French, which targets final (stressed) vowels even though these vowels should in theory be syllabified in open syllables in lexical representations (e.g. *lune* [ˈlɥ̃.n(ə)]; *[ˈlɥ̃.n(ə)]). The second is found in the forms produced by a first language learner of European French, who displays an asymmetry in her production of CVC versus CVCV target (adult) forms. The former displays full preservation (with concomitant manner harmony) of both consonants (e.g. *passee* → [ˈpat]). The latter undergoes deletion of the initial syllable if the consonants are not manner-harmonic in the input (e.g. *appétit* → [piˈti] versus *tennis* → [ˈni]). We argue that both patterns can be

* We wish to thank members of the audience at *LSRL* 38 for their useful questions and suggestions. This paper also benefited from independent discussions during a colloquium presentation at the Universidade de Lisboa by the first author in June 2008. We are also grateful to one anonymous reviewer for constructive feedback and illuminating comments. Of course, all errors or omissions remain our own.

explained in an approach that draws a formal distinction between phonological representation and phonetic implementation.

1. *Introduction*

Within the field of modern phonological theory (e.g. Chomsky & Halle 1968), the relationship between surface (phonetic) and deeper (phonological) levels of representation has constantly been subject to fierce controversy. While the 1980's mainstream literature generally favored a clear separation of the two levels, the rise of output-driven approaches (e.g. Prince & Smolensky 1993) contributed to a weakening of this trend. In this context, some phonologists have even proposed versions of phonological theory that directly incorporate phonetics into phonology (e.g. Steriade 1999).

In this paper, we take a position against this integrated approach to phonetics and phonology; we argue for the maintenance of a formal distinction between phonological and phonetic levels of analysis. Our argument is based on data from two different sources. The first is the process of closed-syllable laxing in Québec French; the second relates to a number of asymmetries in the productions of a first language learner of European French. As we will see, both patterns, which have different expressions in surface forms, can share the same basic analysis if one

considers both formal aspects of prosodic representations and general properties of domain-final (right-headed) stress systems.

Because of space limitations, we will be primarily concerned with the formal approach needed to account for these phenomena, as opposed to their actual origin. Concerning the attestation of closed-syllable laxing in most dialects of Québec French versus its absence in other dialects, we would need to foray into the historical phonology of various dialects of French, an investigation that would extend far beyond the scope of this paper. Similarly, phonological patterns observed in child language development can arise from a number of (often interacting) factors. A close scrutiny of all of these factors would require extensive discussions that are not possible in the context of the current work. We refer the interested reader to Rose (in press) for a recent discussion on the emergence of phonological processes in child language phonology.

2. *The data*

2.1 *Closed-syllable laxing in Québec French*

As documented in much of the relevant literature, several dialects of Québec (or Canadian) French display an allophonic process referred to as closed-syllable laxing (e.g. Walker 1984; Charette 1991). As its name indicates, this process, which targets underlying high tense vowels, yields

their laxing in phonetically closed unstressed and stressed syllables, as exemplified in (1).¹

(1) Closed-syllable laxing*

	Unstressed syllables		Stressed syllables	
a. Open syllables	<i>pitance</i>	[pi.'tãs]	<i>petit</i>	[pə.'tsi:]
	<i>lunette</i>	[ly.'net]	<i>vue</i>	['vɥ:]
	<i>toucher</i>	[tu.'ʃe]	<i>beaucoup</i>	[bo.'kɥ:]
b. Closed syllables	<i>pistache</i>	[pis.'taʃ]	<i>petite</i>	[pə.'tsi:]
	<i>pulpeux</i>	[pɥl.'pø]	<i>lune</i>	['lyɛ]
	<i>rumba</i>	[ɾum.'ba]	<i>roucoule</i>	[ɾu.'kɥ]

* Here and elsewhere, words are presented in citation forms, with stress on the final syllable; as we will see later, although it appears in citation forms, stress is not lexical but only occurs in phrase-final position, where vowels in open syllables or followed by voiced fricatives (see immediately below) display increased duration.

Closed-syllable laxing in stressed syllables however has a systematic exception to it: in stressed syllables, if the high vowel is followed by a voiced fricative ([v], [z], [ʒ], or [ʁ]²), it undergoes lengthening instead of laxing, as in (2).

¹ For additional observations about high vowel laxing in Québec French and related processes, see, for example Walker (1984), Déchaîne (1991), Poliquin (2007) and references therein.

² [ʁ] is phonologically a rhotic but phonetically a fricative in Québec French.

(2) Stressed high vowel lengthening before voiced fricatives

a. Open σ : no process	b. Closed σ (stressed): lengthening
<i>virer</i> [vi.'ɛe:]	<i>vire</i> ['vi:ɛ] <i>désire</i> [de.'zi:ɛ]
<i>gruger</i> [gʁy.'ʒe:]	<i>gruge</i> ['gʁy:ʒ] <i>refuge</i> [ʁə.'fy:ʒ]
<i>viser</i> [vi.'ze:]	<i>vise</i> ['vi:z] <i>devise</i> [də.'vi:z]
<i>cuver</i> [ky.'ve:]	<i>cuve</i> ['ky:v] <i>effluve</i> [ɛ.'fly:v]

2.2 CVC versus CVCV forms in the acquisition of European French

The second data set comes from the longitudinal, naturalistic study of a child code-named Marilyn, a learner of European French, documented in dos Santos (2007). Of interest is a systematic pattern observed between the ages 1;10.17 and 2;00.25, a period during which Marilyn showed different behaviors in her productions of CVC versus CVCV target (adult) forms. First, as exemplified in (3), Marilyn preserved both consonants of CVC targets in her productions, which also display manner (continuancy) harmony.³

³ We also observe place harmonies in some forms; these harmony processes, which are irrelevant for the present discussion, are discussed further in dos Santos (2007).

(3) CVC targets: Consonant preservation and harmony

Orthography	IPA Target	IPA Actual	Age
<i>bottes</i>	[ˈbɔt]	[ˈbɔt]	2;00.12
<i>berk</i>	[ˈbɛɾk]	[ˈbɛk]	1;11.13
<i>coupe</i>	[ˈkup]	[ˈkup]	2;00.25
<i>couettes</i>	[ˈkwɛt]	[ˈkɛk]	1;11.28
<i>passe</i>	[ˈpas]	[ˈpat]	1;11.13
<i>case</i>	[ˈkaz]	[ˈkak]	1;10.17
<i>triche</i>	[ˈtʁiʃ]	[ˈtit]	1;11.13
<i>soupe</i>	[ˈsup]	[ˈpup]	2;00.25

As opposed to this, CVCV forms showed two distinct behaviors. On the one hand, target forms whose consonants have the same manner features, in (4a), were produced with full preservation of both consonants. On the other hand, target forms containing consonants with different manner features underwent deletion of the first syllable, in (4b).

(4) Multisyllabic target forms*

a. Manner-harmonic: full preservation of the two syllables

<i>appétit</i>	[apɛˈti]	[piˈti]	2;00.12
<i>biquet</i>	[biˈkɛ]	[beˈkɛ]	1;11.13
<i>escargot</i>	[ɛskaʁˈgo]	[kaˈko]	1;11.13
<i>chaussure</i>	[ʃoˈsyʁ]	[lyˈly]	1;11.28

b. Manner-disharmonic: truncation of the initial syllable

<i>cassé</i>	[ka'se]	[^l le]	1;11.13
<i>tennis</i>	[te'nis]	[^l ni]	1;11.02
<i>château</i>	[ʃa'to]	[^l to]	1;11.02
<i>Lego</i>	[le'go]	[^l ko]	1;11.02
<i>morceau</i>	[mɔʁ'so]	[^l lo]	2;00.25
<i>jumeaux</i>	[ʒy'mo]	[^l mo]	1;11.28
<i>lunette</i>	[ly'net]	[^l nɛ]	2;00.12

* Coronal fricatives were independently realized as laterals in onsets.

Further evidence for the relationship between the manner harmony and deletion processes observed above and word shape (CVC versus CVCV) comes from the observations that at no point in the longitudinal study does Marilyn present a stage during which she manner-harmonizes consonants in CVCV forms. In addition, syllable truncation in manner-disharmonic CVCV forms disappears at the same time as manner harmony disappears from CVC forms, at age 2;00.25 (see dos Santos 2007 for more detail).

2.3 *Interim discussion*

The processes observed above primarily refer to the location of the stressed syllable, although not entirely. As discussed in section 2.1, the allophonic distribution of high vowels in Québec French final syllables is also dependent on whether these vowels are followed by voiced fricatives, an observation that suggests some interplay between phonology and phonetics. In a similar way, the different production patterns observed in Marilyn's outputs can only be predicted if one considers the shape of the

target (adult) word forms, an observation that points to conditioning at a more abstract, lexical level of representation (dos Santos 2007). Of course, the child's immature motor control must be considered in any explanation of the patterns observed. It is also logical to think that the resolution of articulatory difficulties at the end of the period studied largely contributed to the disappearance of the processes observed. Learning speech articulations is similar in this respect to learning how to walk. It is however the prosodic conditioning observed in the developmental data that primarily concerns us here. Marilyn is in fact not a unique case; similar prosodic conditioning (i.e. distinctive behaviors of CVC versus CVCV forms) has been observed in the early productions of at least another French learner (child Clara in Rose 2000). Finally, formal issues about the syllabification of final consonants both in French phonology and in phonological development offer a series of analytical challenges, which we address in the next section.

3. *Theoretical issues*

On the face of it, the patterns observed in section 2 point to some basic syllabification and stress related processes in Québec French and in Marilyn's phonology. However, hastily reaching this conclusion would elude important issues documented in the formal literature on the

syllabification of word-final consonants in French as well as in phonological development across various languages.

3.1 *Word-final consonants as onset of empty-headed syllables*

Focusing first on French, several analyses proposed for syllabification in this language argue for the status of word-final consonants as onsets of empty-headed syllables (e.g. Kaye, Lowenstamm & Vergnaud 1990; Charette 1991; Dell 1995). This hypothesis is supported by both distributional and phonetic arguments. Starting with distributional evidence, we first observe that the rhyme in French is maximally binary. For example, in Québec French, a dialect that maintains a lexical contrast of duration among non-high vowels (e.g. *faite* [fet] ~ *fête* [fɛ:t]), with mid long vowels being more or less diphthongized across sub-dialects (e.g. *fête* [fɛ:t/faʔt]), only short vowels can appear before (word-medial) codas, as exemplified in (5a). As opposed to this, we can see in (5b) that such long/diphthongized vowels are allowed before word-final consonants, similar to those lengthened high tense vowels before word-final voiced fricatives in (2b). In light of rhyme binarity, the examples in (2b) and (5b) strongly suggest syllabification of final consonants outside of the rhyme.

(5) Maximally binary rhymes: no branching nuclei before codas*

a. Before codas	b. Before word-final consonants
<i>verte</i> [vɛʁ.t] / *[va ¹ ʁ.t]	<i>vert</i> [vɛ.ʁ] / [va ¹ .ʁ]
<i>fierté</i> [fjɛʁ.te] / *[fja ¹ ʁ.te]	<i>fier</i> [fjɛ.ʁ] / [fja ¹ .ʁ]

* For the sake of clarity and consistency, the syllabifications indicated in the examples here and below reflect the analysis maintained throughout the paper.

Another distributional argument comes from the fact that word-final consonant clusters can display falling, flat, or rising sonority profiles. Representative examples are provided in (6).

(6) Sonority profile of word-final consonant clusters

a. Falling sonority	b. Flat sonority	c. Rising sonority
<i>verte</i> [vɛʁ.t]	<i>veste</i> [ves.t]	<i>cadre</i> [ka.dʁ]
<i>carte</i> [kaʁ.t]	<i>caste</i> [kas.t]	<i>rectangle</i> [ʁɛk.tɑ̃.ɡl]

An analysis of the falling sonority clusters in (6a) as branching codas would violate rhymal binarity. Furthermore, even though a branching coda analysis could accommodate the examples in (6a), any principled, sonority-based approach to syllabification would face problems with the flat-sonority clusters in (6b), and should preclude the attested rising sonority profiles in (6c) or else tri-consonantal final clusters with various sonority profiles such as in words like *castre* [kas.tʁ]⁴ or *arbre* [aʁ.bʁ]. As opposed to this, an analysis assuming rhymal binarity and allowing for the syllabification of word-final consonants as onsets of empty-headed

⁴ The devoicing of the final liquid in this context matches that observed in branching onsets in other positions (e.g. *train* [tʁɛ̃]).

syllables (with branching onsets also allowed in this position) readily accounts for all the attested data. Another distributional argument comes from the fact that except from [ʁ], which is phonetically a voiced fricative but phonologically patterns as a liquid (similar to [l]), the truly phonologically voiced fricatives [v], [z] and [ʒ] do not appear in surface word-medial closed syllables unless these syllables are derived from the elision of an underlying lexical schwa (e.g. *déguisement* [de.giz_s.¹mã:]; *mouvement* [muv_s.¹mã:], where subscript [s] indicates the underlying location of the elided schwa). No such distributional restriction exists in word-final position (e.g. words in (2b)) which, just like the word-medial onset position, displays a larger consonantal inventory, the onset being typically a better licenser of segmental contrasts than the coda (e.g. Itô 1986; Piggott 1999). Finally, another peculiarity of Québec French is that consonants that are part of a word-final consonant cluster tend to undergo reduction, sometimes with only the leftmost consonant of the final cluster being produced in the most extreme cases of erosion at the right edge (e.g. *ministre* [ministʁ]/[minist]/[minis]/*[mini]; *quatre* [katʁ]/[kat]/*[ka]). This fact is predicted by our analysis below, in which the consonant immediately following a stressed vowel phonologically interacts with this vowel to prosodically strengthen the stress domain and, as such, cannot be subject to deletion.

Turning now to word-final consonants in child language, because we are interested in patterns from the acquisition of French, we are already in a position to argue that the child, attending to the distributional evidence of the language, should attain word-final onset syllabification during the course of development (e.g. Goad & Rose 2004 for a similar view). This argument is further reinforced by the fact that several authors have argued in favor of an analysis of early consonants as onsets of empty-headed syllables across learners of different languages. First, final consonants generally emerge long before word-medial codas⁵ (this is the case for Marilyn, as documented in dos Santos 2007; see also Fikkert 1994 on Dutch; Freitas 1997 and Fikkert & Freitas 1997 on European Portuguese; Rose 2000 on Québec French; Barlow 2003 on disordered Spanish). Second, at the phonetic level, these final consonants display onset-like behaviors, as they are often strongly aspirated or else released into epenthetic vocoids or nasals (e.g. Goad & Brannen 2003). Finally, the same position has been argued for on structural grounds, as word-final onsets do not require a complex rhyme to license a consonantal position (Rose 2000), and may represent the default option in the face of typological evidence (e.g. Piggott 1999; cf. Rose 2003).

⁵ Exceptions to this generalization come from languages such as Spanish or Japanese whose word-final consonants display clear coda profiles. In such languages, word-medial and final codas are typically acquired within the same developmental period (see Rose 2003 for further discussion).

3.2 *Representational implications*

Following the arguments above, all final consonants in the data explored in section 2 should be analyzed as onsets of empty-headed syllables and, as such, syllabified outside of the syllable where the stressed vowel is located. This conjecture is further complicated by another property of French, namely that it displays phrase-final stress (e.g. Dell 1984; Walker 1984).⁶ Within prosodic phonology, the stress domain in French is often represented as a right-headed Foot constituent, as illustrated in (7).⁷

(7) Stress Foot in French

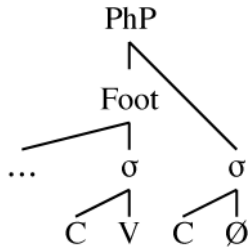


When we combine domain-final stress with the analysis of final consonants as onsets of empty-headed syllables, one consequence is that these final consonants must be prosodified at a higher level, outside of the stress domain itself, as illustrated in (8).

⁶ Some dialects of French such as those generally spoken in southern France arguably display a different prosodic structure (e.g. Durand 1976). This observation is however irrelevant to the current analysis, as both Québec French and Marilyn's target dialect display phrase-final stress.

⁷ Following Prince (1985) and Kager (1993), we assume that the Foot is binary at the lexical level and that all syllables within the domain are incorporated into it through stray adjunction at the surface level (see also Charette 1991; Rose 2000; Goad & Buckley 2006 for further discussion). The issue of Foot binarity is however tangential to the current argument. What matters is the fact that the domain of stress assignment is right-headed.

(8) Prosodification of onsets of empty-headed syllables in French



Finally, apart from the high lax vowels derived through closed-syllable laxing (in (1)), which remain short in stressed syllables (except in emphatic contexts, where they remain laxed but are also stylistically lengthened), Québec French stressed vowels are up to twice as long as unstressed vowels (e.g. O’Shaughnessy 1981, Morasse 1995). The same observations apply to Marilyn’s data; measurements of 22 randomly-selected CVCV productions from the period studied show that her stressed vowels are systematically longer, with an average of 1.94 times the duration of the unstressed vowel.

Final consonants are thus syllabified as onsets in both Québec French and Marilyn’s developing phonology. This conclusion however clashes with the behavior of final syllables as forming consistent domains for both closed-syllable laxing in Québec French, in (1b), and consonant preservation in Marilyn’s data, in (3). In the analysis proposed below, we argue that facts and theory can be reconciled if we take the position that while final consonants are truly onsets of empty-headed syllables phonologically, their behaviors with regard to closed-syllable laxing and

in Marilyn's data can be predicted from a general property of stress-final prosodic domains, whose head constituent typically undergoes strengthening, both cross-linguistically (e.g. Hayes 1985, 1995) and, we argue, in phonological development.

3.3 *Proposal*

Our proposal is in line with a vast literature within the framework of Prosodic Phonology (e.g. Selkirk 1984; McCarthy & Prince 1986). One of the tenets of Prosodic Phonology is that surface effects can be conditioned by deeper-level prosodic representations (see Harris 2004 for a summary of some of the relevant literature). As Jensen (2000) and Harris (2004) argue, neutralizing effects such as flapping or glottalization documented in the literature on consonant ambisyllabicity (e.g. Kahn 1976, Giegerich 1992) can be explained from the fact that the consonants that undergo neutralization are phonetically implemented in weak (dependent) prosodic positions. As opposed to this, in strong (head) positions, lexical contrasts are phonetically preserved and/or augmented (e.g. through increased segmental duration or stronger aspiration of obstruent stops).

While the literature on the topic primarily focuses on trochaic languages, that is, languages with strong-weak prosodic domains, similar effects are expected in languages with weak-strong prosodic domains. As argued for by, e.g. Hayes (1985, 1995), languages of the latter type typically display heavy syllables in prosodic heads, even in languages

which do not have vowel duration contrasts at the lexical level (Hayes 1995:269). This phonological process, which we refer to as iambic strengthening, is defined in (9), where the syllable in the head of the prosodic domain is underlined.

(9) Iambic strengthening (adapted from Hayes 1985)

$$(\sigma_{\mu}\underline{\sigma}_{\mu}) \rightarrow (\sigma_{\mu}\underline{\sigma}_{\mu}\mu)$$

Still according to Hayes, across languages, phonological iambic strengthening can manifest itself in many ways at the phonetic level, through processes such as vowel lengthening, gemination of the following onset (with the first half of the geminate incorporated in the coda of the stressed syllable) or, alternatively, weakening of the preceding, unstressed syllable, which effectively provides relative prominence to the neighboring stressed syllable. Explicit to this analysis is a formal distinction between underlying and surface levels of representation. This distinction finds independent motivation in the formal literature on rhythmic and stress-related segmental phenomena (see, e.g. Prince 1985 and Kager 1993 for further discussion). While iambic strengthening is typically discussed in the context of languages with alternating stress patterns, we hypothesize that it also applies to non-alternating stress systems such as that of French. We further hypothesize that all of the patterns discussed in section 2 can be accounted for following the same

logic: while word-final syllables are open in French (including Marilyn's) lexical representations, these syllables undergo phonological strengthening, which can take one of two different forms on the surface: vowel lengthening or final consonant incorporation into the stressed syllable, the choice of which is driven by independent, principled considerations.

4. *Analysis*

4.1 *Québec French*

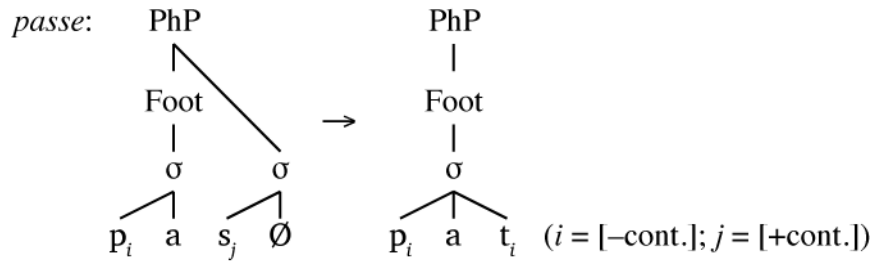
In Québec French, iambic strengthening yields different exponents at the surface level, depending on the segmental context. In vowel-final words, the stressed vowel undergoes lengthening (as in (1a)), which effectively makes the syllable heavy, without any further complication. When stressed vowels are followed by consonants, one of three possibilities can occur. First, if the consonant is a true coda, itself followed by the onset of an empty-headed syllable, for example in words like *caste* [kas.t(ə)] or *perdre* [pɛʁ.dʁ(ə)], then the stressed syllable is already heavy and does not undergo any further modification (except of course from laxing among high vowels; e.g. *piste* [pis.t(ə)]). Second, if the consonant is a voiced fricative syllabified in the onset of an empty-headed syllable, the vowel undergoes lengthening (and/or concomitant diphthongization, as in

codas are often favored over voiced codas. This typological tendency actually makes sense from the perspectives of both perceptual and articulatory phonetics. Indeed, post-vocalic voicing contrasts among obstruents are relatively difficult to perceive (e.g. Steriade 2001). Also, when maintained in production, the implementation of such contrasts is often enhanced through a lengthening of the preceding vowel (e.g. Borden, Harris & Lawrence 2003). We suggest that, in the context of iambic strengthening, vowel lengthening has been phonologized in Québec French as a means to preserve and enhance voicing contrasts among fricatives. Our explanation thus puts the burden on the phonetic implementation of a phonological contrast in post-vocalic positions, as opposed to particular representational aspects of voiced fricatives or their voiceless counterparts. Because vowel lengthening before voiced fricatives yields a heavy rhyme, no further iambic strengthening is needed in this context. Vowel lengthening thus effectively neutralizes closed-syllable laxing since high vowels followed by a voiced fricative remain in a phonologically open syllable.

4.2 *Marilyn*

Turning now to Marilyn's data, we argue that phonological iambic strengthening also applies to her outputs, whose surface manifestation enables preservation of word-final consonants, as illustrated in (11).

(11) Marilyn's CVC forms: coda incorporation and harmony

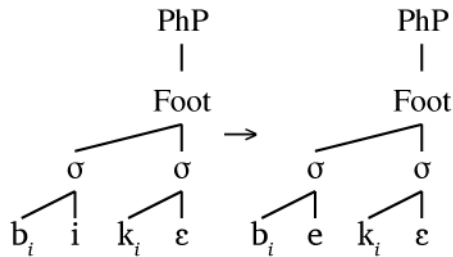


We further argue that word-final consonants undergo manner harmony because Marilyn can only maintain one continuancy feature per word in her outputs. Phonologically, this feature must be licensed by the prosodic head. This analysis follows proposals by, e.g. Rose (2000) and Goad (2001), who argue that harmony can emerge in child language as a surface exponent of prosodic licensing.

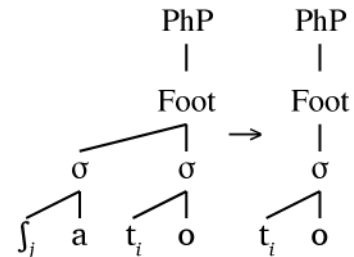
This analysis is further supported by the contrast observed in Marilyn's CVCV forms in (4), in which preservation of the first syllable is dependent on its onset being manner-harmonic with the onset of the stressed syllable, as illustrated in (12a) versus (12b).

(12) Marilyn's CVCV forms: preservation conditional on licensing

a) *biquet*:



b) *château*:



($i = [-\text{cont.}]$; $j = [+ \text{cont.}]$)

This analysis also implies that harmony was bound within the head of the Foot and could not dynamically extend outside of the head of the Foot to yield preservation. Only CVCV forms that were manner-harmonized in the input could display full preservation of both syllables in the output during this developmental stage.

5. Discussion

The analysis proposed above enables a unified account of the various patterns observed in both Québec French and Marilyn's productions. Starting with Québec French, this analysis first reconciles the data on closed-syllable laxing (and absence thereof) with the phonological analysis of word-final consonants as onsets of empty-headed syllables, thereby offering a solution to the long-standing controversy (at least since Charette 1991) as to why closed-syllable laxing should occur at all in the context of lexically open syllables. Under the current proposal, both

closed-syllable laxing and its alter-ego, stressed vowel lengthening before word-final voiced fricatives, are triggered in this context by iambic strengthening, a general rule of phonological enhancement of the syllable located in the head of the stress domain.

Our proposal also offers an explanation for the observation that laxing does not occur in the context of voiced ‘codas’ that are derived through phonetic schwa elision but that are onsets at the lexical level in French. Since surface ‘codas’ before elided schwas are not phonological codas, no closed-syllable laxing can occur in this context. Such observations would be extremely difficult to capture under approaches focusing solely on the shape of output forms.

In a similar way, the current analysis offers a consistent account of Marilyn’s production patterns. Through iambic strengthening, onsets of empty-headed syllables are incorporated into the stressed syllable. This enables their preservation and manner harmony, analyzed here as a surface manifestation of prosodic licensing. In CVCV forms, however, word-initial consonants cannot be incorporated into the stressed syllable. Preservation in this context thus depends on a pre-condition, that of manner harmony between the two consonants in the lexical representation.

Without a formal distinction between surface representations and deeper, lexical representations, it would be very difficult to explain such

domain-related phenomena in a principled way while keeping with the larger literature on theoretical phonology and phonological development.

References

- Barlow, Jessica. 2003. "Asymmetries in the Acquisition of Consonant Clusters in Spanish". *Canadian Journal of Linguistics* 48:179-210.
- Blevins, Juliette. 2004. *Evolutionary Phonology: The Emergence of Sound Patterns*. Cambridge: Cambridge University Press.
- Borden, Gloria, Katherine Harris & Lawrence Raphael. 2003. *Speech Science Primer*. Philadelphia: Lippincott Williams & Wilkins.
- Charette, Monik. 1991. *Conditions on Phonological Government*. Cambridge, Mass.: Cambridge University Press.
- Chomsky, Noam & Morris Halle. 1968. *The Sound Pattern of English*. New York: Harper & Row.
- Déchaîne, Rose-Marie. 1991. "Stress in Québécois: Evidence from High Vowels". *Papers from the Regional Meetings, Chicago Linguistic Society* 27:107-118.
- Dell, François. 1984. "L'accentuation des phrases en français". *Forme sonore du langage* ed. by François Dell, Daniel Hirst & Jean-Roger Vergnaud. Paris: Hermann. 65-122.

- _____. 1995. "Consonant Clusters and Phonological Syllables in French".
Lingua 95:5-26.
- dos Santos, Christophe. 2007. Développement phonologique en français
langue maternelle: Une étude de cas. Ph.D. dissertation. Université
Lumière Lyon 2.
- Durand, Jacques. 1976. "Generative Phonology, Dependency Phonology
and Southern French". *Lingua e Stile* XI:3-23.
- Fikkert, Paula. 1994. *On the Acquisition of Prosodic Structure*. The
Hague: Holland Academic Graphics.
- Fikkert, Paula & Maria João Freitas. 1997. "Acquisition of Syllable
Structure Constraints: Evidence from Dutch and Portuguese".
Proceedings of GALA 1997 ed. by Antonella Sorace, Caroline
Heycock & Richard Shillcock. Edinburgh: Edinburgh University
Press. 217-222.
- Freitas, Maria João. 1997. Aquisição da Estrutura Silábica do Português
Europeu. Ph.D. Thesis. University of Lisbon.
- Giegerich, Heinz. 1992. *English Phonology: An Introduction*. Cambridge:
Cambridge University Press.
- Goad, Heather. 2001. "Assimilation Phenomena and Initial Constraint
Ranking in Early Grammars". *Proceedings of the 25th Annual
Boston University Conference on Language Development* ed. by

Anna H.-J. Do, Laura Domínguez & Aimee Johansen. Somerville, Mass.: Cascadilla Press. 307-318.

Goad, Heather & Kathleen Brannen. 2003. "Phonetic Evidence for Phonological Structure in Syllabification". *The Phonological Spectrum, Vol. 2* ed. by Jeroen van de Weijer, Vincent van Heuven & Harry van der Hulst. Amsterdam: John Benjamins. 3-30.

Goad, Heather & Meaghen Buckley. 2006. "Prosodic Structure in Child French: Evidence for the Foot". *Catalan Journal of Linguistics* 5:109-142.

Goad, Heather & Yvan Rose. 2004. "Input Elaboration, Head Faithfulness and Evidence for Representation in the Acquisition of Left-edge Clusters in West Germanic". *Constraints in Phonological Acquisition* ed. by René Kager, Joe Pater & Wim Zonneveld. Cambridge: Cambridge University Press. 109-157.

Harris, John. 2004. "Release the Captive Coda: The Foot as a Domain of Phonetic Interpretation". *Phonetic interpretation: Papers in Laboratory Phonology 6* ed. by John Local, Richard Ogden & Rosalind Temple. Cambridge: Cambridge University Press. 103-129.

Hayes, Bruce. 1985. "Iambic and Trochaic Rhythm in Stress Rules". *Proceedings of the Berkeley Linguistics Society* 11: 429-446.

_____. 1995. *Metrical Stress Theory: Principles and Case Studies*. Chicago: University of Chicago Press.

- Itô, Junko. 1986. Syllable Theory in Prosodic Phonology. Ph.D. dissertation. University of Massachusetts, Amherst.
- Jensen, John. 2000. "Against Ambisyllabicity". *Phonology* 17:187-286.
- Kahn, Daniel. 1976. Syllable-based Generalizations in English Phonology. Ph.D. dissertation. MIT.
- Kager, René. 1993. "Alternatives to the Iambic-Trochaic Law". *Natural Language and Linguistic Theory* 11:381-432.
- Kaye, Jonathan, Jean Lowenstamm & Jean-Roger Vergnaud. 1990. "Constituent Structure and Government Phonology". *Phonology* 7:193-231.
- McCarthy, John & Alan Prince. 1986. Prosodic Morphology. Ms. University of Massachusetts, Amherst and Rutgers University.
- Morasse, Hélène. 1995. Variations intrinsèques et co-intrinsèques de durée vocalique en français québécois. M.A. Thesis. Université Laval.
- O'Shaughnessy, Douglas. 1981. "A Study of French Vowel and Consonant Durations". *Journal of Phonetics* 9:385-406.
- Piggott, Glyne. 1999. "At the Right Edge of Words". *The Linguistic Review* 16:143-185.
- Poliquin, Gabriel. 2007. Canadian French Vowel Harmony. Ph.D. dissertation. Harvard University.

- Prince, Alan. 1985. "Improving Tree Theory". *Proceedings of the Berkeley Linguistics Society* 11: 471-490.
- Prince, Alan & Paul Smolensky. 1993. *Optimality Theory: Constraint Interaction in Generative Grammar*. Ms. Rutgers University and University of Colorado, Boulder.
- Rose, Yvan. 2000. *Headedness and Prosodic Licensing in the L1 Acquisition of Phonology*. Ph.D. dissertation. McGill University.
- _____. 2003. "Place Specification and Segmental Distribution in the Acquisition of Word-final Consonant Syllabification". *Canadian Journal of Linguistics* 48:409-435.
- _____. in press. "Internal and External Influences on Child Language Productions". *Approaches to Phonological Complexity* ed. by Egidio Marsico & François Pellegrino. Berlin: Mouton de Gruyter.
- Selkirk, Elizabeth. 1984. "On the Major Class Features and Syllable Theory". *Language and Sound Structure* ed. by Mark Aronoff & Richard Oehrle. Cambridge, Mass.: MIT Press. 107-136.
- Steriade, Donca. 1999. "Phonetics in Phonology: The Case of Laryngeal Neutralization". *UCLA Working Papers in Linguistics* 3:25-246.
- _____. 2001. "Directional Asymmetries in Place Assimilation: A Perceptual Account". *The Role of Speech Perception in Phonology* ed. by Elizabeth Hume & Keith Johnson. New York: Academic Press. 219-250.

Walker, Douglas. 1984. *The Pronunciation of Canadian French*. Ottawa:
University of Ottawa Press.