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PHONOLOGY

ARTICLE

Non-final final consonants in the Croissant

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Abstract

This article discusses data from a Romance variety spoken in the linguistic region of France referred to as the Croissant. When roots in this language exhibit a phonologically problematic right edge, the problem is treated differently depending on whether the stem is nominal or verbal. We propose that this unequal treatment reflects an underlying distinction: seemingly unsuffixed verbs are in fact underlyingly suffixed, whereas nouns are truly unsuffixed. The final consonant of the verbal stem is therefore not final underlyingly. It is claimed that this solution is preferable to relying on distinct grammars for nouns and verbs or assuming transderivational relations between words. The article also clarifies the purview of Strict CV, the framework that it is couched in. Strict CV is a theory of representations that defines well- and ill-formed structures, some of which are universal. It needs to be complemented by a theory of computation.

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1. Non-final right edges

Often, phonological analysis reveals that a phonetically final segment is not phonologically final. This article provides such an analysis for data from North-Eastern Creusois (NEC), a Gallo-Romance variety spoken (by very few people) in a contact region of French and Occitan in central France, known as the linguistic Croissant. It therefore joins previous work with similar claims regarding Finnish (Pöchtrager 2008), Somali (Godon 1998; Lampitelli 2013b), Dutch (Cavirani & van Oostendorp 2017) and Palestinian Arabic (Faust 2019).

The main locus of interest is the comparison between the indicative singular (IND.SG) of the main class of verbs and the nominal form of the same root. As shown in (1a) and (1b), the IND.SG does not regularly exhibit a suffix. As in many other languages (see §3.2), final TR clusters (where T = obstruent, R = liquid [r/ʁ,l]) are disallowed in this variety. In verbs, the stem-final TR cluster is always broken up word-finally by a vowel [œ] (underlined in (1c)). In the corresponding nouns, the R systematically disappears altogether. Finally, in a third class of verbal stems which are CG-final (where G = glide), an [e] systematically follows the cluster in the IND.SG (in bold in (1d)). No [e] occurs in the parallel noun; instead, that noun ends in a homorganic VG sequence. Note that throughout the language stress falls on the last vowel.

(1) *Infinitive, indicative and noun in North-Eastern Creusois*

	a. 'advice'	b. 'load'	c. 'sugar'	d. 'grill'
INF	kõsɛj-a	ʃaʁʒ-a	sykʁ-a	gœʁj-a
IND.SG	kõsɛj	ʃaʁʒ	syk<u>œ</u>ʁ	gœʁj-**e**
IND.1/3PL	kõsɛj-ã	ʃaʁʒ-ã	sykʁ-ã	gœʁj-ã
NOUN	kõsɛj	ʃaʁʒ	syk	gʁij

We assume a classic approach to phonology, whereby a single underlying representation consisting of only phonological information is fed to the phonological grammar of the language: the absence of alien pieces in phonology is the foundational statement of Prosodic Phonology embodied in Indirect Reference (Nespor & Vogel 1986: 3), as opposed to Direct Syntax approaches where phonological computation can freely make reference to morphosyntactic information (e.g., Kaisse 1985). On this take, information about the lexical category or paradigmatic relations of an item is not available to the phonology (such alternatives are discussed in §5). The challenge is then to account for the differences between verbs and nouns without access to such information.

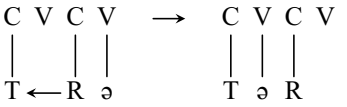
We propose an account using the autosegmental theory of Strict CV (Lowenstamm 1996; Scheer 2004). Beginning with TR-final stems, we relate the alternation in the verbal forms to another phonological aspect of the language: the distribution of the vowel /ə/, realised as front rounded [œ]. This vowel, though it is a lexical vowel of the language, is weak: it alternates with zero under certain conditions. There is also a stable front mid rounded vowel, which is realised as [ø] or [œ] and never alternates with zero (as in [ʒønɛs] 'youth'). When realising /ə/, [œ] cannot appear in word-final position or after branching TR onsets. Word-internally, when a sequence TRə occurs in the French cognate, NEC shows TəR. Thus, French [gʁønuj] 'frog', [pʁømje] 'first' or [vãdʁødi] 'Friday' are [gœʁnuj],

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[pœʁmje], [vãdœʁdi] in NEC.[1] There is thus reason to suppose a diachronic process of metathesis in NEC whereby TRə > TœR.

Following Cyran (2010), we propose that in this variety /ə/, being a weak vowel, cannot license branching onsets, that is, TR clusters. As a result, metathesis TRə → TəR was triggered in the diachronic development of NEC. In Strict CV, TR sequences involve an intervening V-slot, which means that metathesis may be stated merely at the melodic level, that is, without involving any modification of constituent structure. Thus under (2), /ə/ cannot license the TR cluster, and therefore metathesis occurs (the arrow in T←R is discussed in §3.2).

(2) *Metathesis:* /TRə/ → [TœR]



Returning to the difference between verbs and nouns, we submit that there is a final schwa in verbs, which expones IND.SG, for example, (3a) /sykʁ-ə/ 'sugar-IND.SG'. The inability of schwa to license a preceding TR that was observed in the diachronic development of NEC is still synchronically active in the language: thus /sykʁ-ə/ undergoes metathesis and appears as [sykœʁ]. In nouns, in contrast, there is no suffix /-ə/. Since neither licensing nor metathesis can save it, the problematic final TR is gotten rid of otherwise: it is reduced to T.

In VC-final and CC-final verbs such as (3b) and (3c), the final /ə/ simply fails to surface: there is no trigger for metathesis, and /ə/ cannot be realised in word-final position. Since the right edge of the stem is well-formed, no repair is needed. (In (3), this is indicated by the word 'none' in the 'repair' column.) This explains why, unlike (3a)/(3e), the verb–noun pairs (3b)/(3f) and (3c)/(3g) are identical.

(3) *Snapshot of proposed analysis (see glosses in (1))*

	Verbal IND.SG					*Noun*			
	Underlying		*Surface*	*Repair*		*Underlying*		*Surface*	*Repair*
a.	/sukʁ-ə/	→	[sykœʁ]	metathesis	e.	/sykʁ/	→	[syk]	loss of R
b.	/kõsɛj-ə/	→	[kõsɛj]	none	f.	/kõsɛj/	→	[kõsɛj]	none
c.	/ʃaʁʒ-ə/	→	[ʃaʁʒ]	none	g.	/ʃaʁʒ/	→	[ʃaʁʒ]	none
d.	/gʁij-ə/	→	[gœʁje]	fortition	h.	/gʁij/	→	[gʁij]	none

Finally, we claim that pairs such as (3d)/(3h) support our account, because they show that under certain circumstances the proposed IND.SG marker *is* realised, only not as [œ]. An underlying representation like /gʁij-ə/ contains a homorganic vowel–glide (VG) sequence. Such sequences are reduced to G alone whenever possible, in a process called syneresis (VG+V → ∅G+V).[2] Syneresis is impossible in the noun, since it would leave behind a final cluster of rising sonority (CG#) that is unattested in the language: /g**ʁij**/ → *[gʁj] or *[gœʁj]. In the verb, in contrast, there *is* a vowel after the stem: the proposed suffix /-ə/. Since /-ə/ cannot occur word-finally, it undergoes fortition /g**ʁij**-ə/ → /gʁij-**e**/, allowing for syneresis (and leading to the breaking of the word-initial TR cluster through [œ] epenthesis): → [gœʁj**e**]. Thus, the different treatment of the homorganic VG-final stems in nouns and verbs corroborates the proposal that there is a final /-ə/ in verbs, but not in nouns.

[1] In Hexagonal French, /ə/ is realised as [ø], as the phonetic measurements in Bürki *et al.* (2008) show. Their study found slightly less rounding in the realisation of /ə/ than in the realisation of /ø/. This difference may follow from the stress facts of the language, which the study does not seem to have controlled for, comparing stressed /ø/ and unstressed /ə/ (the latter being unstressable). Hutin *et al.* (in press), who did control for stress, found no acoustic difference between /ə/ and /ø/.

[2] Note that the symbol ∅ denotes the empty set (or an empty nucleus), while the lowercase letter *ø* represents the front rounded vowel.

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Our account thus designates the phonetically final segment of many items as non-final phonologically. In verbs, this is true of all seemingly unsuffixed, C-final IND.SG forms, which according to us end in /-ə/. In nouns, it is true mainly for underlyingly TR-final nouns, which surface without the final R.

Of course, the account summarised above raises several questions. One may ask why fortition does not occur in (3a), or why metathesis does not apply in (3c) and (3d). In §6, we present a hierarchy of constraints that leads to the choice of the specific repair or lack thereof in each of the cases in (3), including the nominal forms. We show that when there is an underlying suffixal /-ə/, the language prioritises metathesis, but falls back on fortition if metathesis is not an option (i.e., when /ə/ is preceded by homorganic VG). In nouns, where there is no /-ə/, neither metathesis nor fortition is viable, and so the R is deleted. Other unattested solutions, such as epenthesis for TR-final nouns, are also discussed.

Regarding phonological theory, the analysis speaks to two issues: i) how phonological computation makes reference to non-phonological factors in general and to syntactic labels (nouns *vs.* verbs) in particular; ii) the purview of Strict CV. Let us first consider the latter.

Strict CV is a theory of representations and needs to be coupled with a theory of computation (and parametric variation). In this article, we use Optimality Theory (OT; Prince & Smolensky [1993] 2004) for computational aspects. Section 3.3 discusses the relationship between Strict CV and constraint interaction based on the premise that some properties of phonological patterns are negotiable (across languages and within a given language), while others are not.

Regarding the issue of the interface between phonology and morphosyntax, the pattern discussed is category-specific in the sense that verbs and nouns show different behaviours. This type of data is typically analysed by devising distinct phonologies for nouns and verbs (indexed constraints, cophonologies). Alternatives to this effortless restatement of the observation elaborate an actual analysis of the specific pattern at hand in which phonological computation makes reference only to phonological vocabulary, thereby complying with modularity (Indirect Reference; Nespor & Vogel 1986: 3). The question is whether this kind of analysis can cover all cases of category-specific phonology, and the NEC pattern contributes to this debate.

The remainder of the article is structured as follows. In §2, we present more background regarding the language, and provide more data. Section 3 introduces the theoretical framework assumed, namely the aforementioned Strict CV, and specifically its take on branching onsets and computation. Section 4 lays out the analysis of stem-final TR (as in (3a) and (3e)) and provides some additional support from infinitives. In §5, the fortition attested with stem-final homorganic CG (as in (3d) and (3h)) is motivated, again with additional support, this time from verbs with latent final consonants. Section 6 presents the computation of all types of roots involved. Finally, §7 discusses alternative analyses (namely cophonologies and Paradigm Uniformity) as well as the issue of category-specific phonology, and §8 offers some concluding remarks.

2. More data, background and basic assumptions

2.1. The Croissant

Traditionally, modern-day geographical France is divided into three main linguistic areas as shown in Figure 1, representing the development of Latin in Gaul: 'langue d'Oïl' to the north, 'langue d'Oc' or Occitan to the south, and Franco-Provençal in the Alps (Arpitan on the map).[3] Modern French is an Oïl variety. The variety studied in this article belongs to the contact area of Oïl and Oc, referred to as 'the linguistic Croissant' (Ronjat 1913; Guérin 2022) because of its crescent shape.

The varieties of the Croissant display characteristics of both language groups. For instance, like Oc languages, many of them distinguish between singular persons in the imperfect form of the verb, a feature that has been lost to the north of the Croissant. Conversely, Oc languages exhibit final unstressed vowels other than [ə], but Croissant languages, like Oïl ones, are by and large stress-final

[3]The map in Figure 1 is from https://atlas.limsi.fr/.

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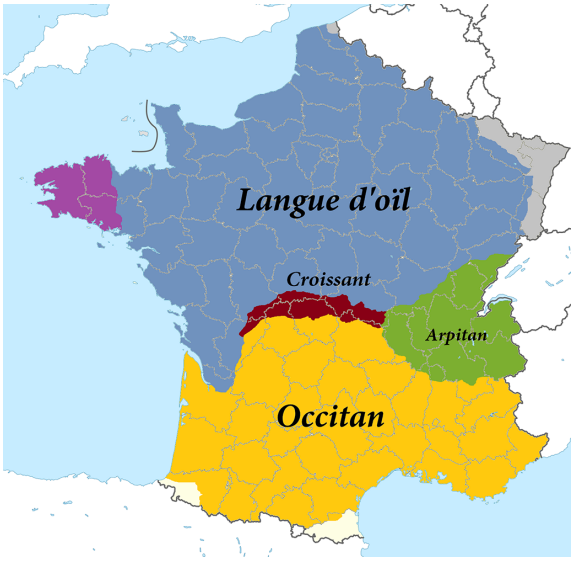


Figure 1. *Linguistic areas of modern-day France.*

(with principled exceptions). This feature, which will play a role in our analysis, is the criterion that marks the southern border of the Croissant region.

2.2. North-Eastern Creusois (NEC)

The specific variety of the Croissant that features in this work is that of the village of Saint-Pierre-le-Bost, situated in the centre of the Croissant near the purported border with the langue d'Oïl; the location is marked by × in Figure 2.[4] Accordingly, this variety is more similar to French than to Occitan. Fieldwork has been carried out by the first author with one speaker in his late sixties.[5]

Also helpful was the translation of *Le Petit Prince*, accomplished by the speaker with the help of the linguist Nicolas Quint as part of a large documentation project of the languages of the Croissant (Quint 2021b).[6] While the facts discussed in this article are attested in other Croissant varieties, too, we henceforth discuss only NEC, in order to avoid overgeneralisation.

The phonemic system of NEC is only slightly different from the familiar system of French. The consonantal array is nearly identical: it includes plosives /p, b, t, d, k, g/; fricatives /f, v, s, z, ʃ, ʒ/; the rarer affricates /ʧ, ʤ/; nasals /m, n, ɲ/; liquids /l, ʁ/; and approximants /j, w, ɥ/. The phoneme /v/ is often pronounced as an approximant [ʋ] or [w], and the fricatives /ʃ, ʒ/ are very rarely debuccalised to [h]. This variation, irrelevant for the present purpose, is glossed over in this article.

Based on ongoing research, the vocalic system of NEC is slightly more different from that of general French spoken today in France. The following statements seem to hold. The language has three nasal vowels [ɛ̃, ɔ̃, ɑ̃]. The phoneme /ɑ/, which is by and large gone from the standard French vernacular in France, is very much present in NEC, mostly in (stressed and unstressed) open syllables, for example,

[4] The map in Figure 2 is from https://parlersducroissant.huma-num.fr/projet.html.

[5] A second speaker was also consulted, a woman in her eighties from the nearby village of Nouzerines. Her speech showed the same phenomena as the first speaker's, but less consistently so, a fact which we attribute to the influence of General French and possibly her experience as a grammar school teacher.

[6] This site (https://parlersducroissant.huma-num.fr/index.html) features a great wealth of data, including the full conjugation of several verbs in several varieties, including the variety discussed here.

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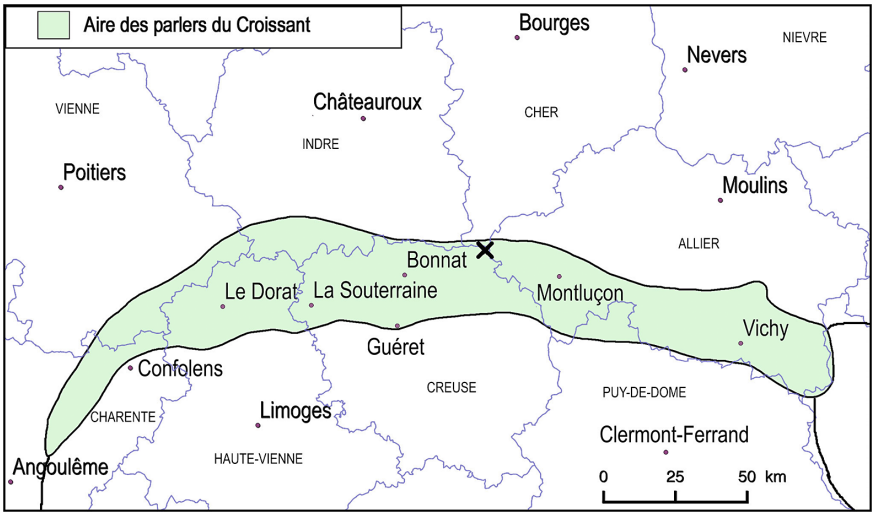


Figure 2. *The Croissant region.*

[gɑ] 'guy', [lɑʃ-a] 'let.go-INF'.[7] There are signs of neutralisation of /a/ and /ɑ/ in favour of [ɑ] before [ʁ], especially in stressed closed syllables, for example, [mɑʁ] 'Mars'. The front mid vowels /ɛ, e/ are contrastive word-finally, that is under stress, for example, [pɒʁtʁɛ] 'portrait' *vs.* [pɒʁt-ʁ-e] 'carry-FUT-1SG'. They are neutralised in favour of [ɛ] in closed unstressed syllables, and in favour of [e] in open unstressed ones. Unlike in French, /e/ can be faithfully realised in stressed closed syllables, for example, [tet] 'head'. As for the back mid vowels /ɔ, o/, they can both appear in unstressed open syllables, as in [ɔʃu] 'gosling', [sot-a] 'jump-INF'. Word-finally and before [ʁ], /o/ is attested but /ɔ/ isn't. Instead one finds a lower [ɒ] only in these environments, [vɒ] 'calf', for example, [nɒʁityʁ] 'food', [sɒʁ] 'go.out.IND.SG'. This sound, which is not found in Standard Metropolitan French at all, is therefore probably an allophone of /ɔ/. In unstressed closed syllables other than before [ʁ], /ɔ/ and /o/ are neutralised to [ɔ]. In addition, NEC has a diphthong /wɛ/, which is faithfully realised regardless of the syllabic environment, for example, [etwɛl] 'star', [twɛlɛt] 'wardrobe', [ʃwɛz-iʁ] 'choose-INF'.

All of the above-mentioned facts about the vocalic system have little bearing on the issues discussed in this article. More central is the behaviour of non-back rounded vowels [ø, œ]; it is returned to in §2.3. In slight anticipation of that discussion, Table 1 provides the vocalic phonemes of NEC and their realisations according to their prosodic position; cases in which the underlying phoneme is not faithfully realised are shaded grey.

Finally, a word is due regarding syllable structure. Word-initially NEC exhibits clusters of falling sonority (#RT), for example, [**ʁm**ɒʁ] 'regret'. Such words cannot be pronounced as the French cognate [ʁømɔʁ]. It is therefore unsurprising to find sonority plateaus, too, for example, [**pt**i] 'small' (which cannot be pronounced with a vowel as in French [pøti]), and sonority rises [**gʁ**ij] 'grill'. It is less clear if RT, RR and TT sequences represent syllable-initial clusters word-internally. More important for the present purpose, and therefore worth repeating, are the facts illustrated in (1) above: NEC, like French, allows for RT, RR and TT clusters at the right edge of the word; but completely disallows TR clusters in this environment.

[7]Note that in this section, we use syllabic terminology as a descriptive *lingua franca,* rather than in any technical theoretical sense. In the present case, a vowel in an open syllable is one that is not followed by a coda. The representation of open syllables and codas in Strict CV is discussed in §3.1 and §3.2.

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Table 1. *The vowels of NEC*

				Unstressed		Stressed		Examples (stressed)	
				Closed	Open	Closed	Open	Closed	Open
Front	High	[−round]	/i/	[i]	[i]	[i]	[i]	[ptit] ‘small.F’	[pti] ‘small.M’
		[+round]	/y/	[y]	[y]	[y]	[y]	[dyʁ] ‘hard’	[dy] ‘must.PRTCP’
	Mid [+ATR]	[−round]	/e/	[ɛ]	[e]	[e]	[e]	[tet] ‘head’	[aʒut-ʁ-e] ‘add-FUT-1SG’
		[+round]	/ø/	[œ]	[ø]	[œ]	[ø]	[mœt] ‘put.INF’	[mø] ‘me’
	Mid [−ATR]	[+nasal]	/ɛ/	[ɛ]	[e]	[ɛ]	[ɛ]	[ɛt] ‘be.INF’	[ʒamɛ] ‘never’
		[−nasal]	/ɛ̃/	[ɛ̃]	[ɛ̃]	[ɛ̃]	[ɛ̃]	[mɛ̃ʒ] ‘eat.IND.SG’	[desɛ̃] ‘drawing’
Back	High		/u/	[u]	[u]	[u]	[u]	[kum] ‘like’	[ʒu] ‘day’
	Mid [+ATR]	[+nasal]	/õ/	[õ]	[õ]	[õ]	[õ]	[ʁõd] ‘round.F’	[ʁõ] ‘round.M’
		[−nasal]	/o/	[ɔ]	[o]	[o]	[o]	[ʃoz] ‘thing’	[po] ‘fear’
	Mid [−ATR]		/ɔ/	[ɔ]	[ɔ]	[ɔ]	[ɒ]	[pɔʃ] ‘pocket’	[ʃapɒ] ‘hat’
	Low		/ɑ/	[ɑ]	[ɑ]	[ɑ]	[ɑ]	[ɑb] ‘tree’	[gɑ] ‘guy’
Central	Mid		/ə/	[œ]	–	[œ]	–	[ʒœt] ‘throw.IND.SG’	–
	Low	[+nasal]	/ã/	[ã]	[ã]	[ã]	[ã]	[gʁãd] ‘round.F’	[grã] ‘big.M’
		[−nasal]	/a/	[a]	[a]	[a]	[a]	[sab] ‘sand’	[pus-a] ‘push-INF’

2.3. Front rounded mid vowels in NEC

In NEC, the vowel [œ] in a closed syllable can correspond to at least three different underlying representations. The first two are distinguished by the behaviour of this vowel when the syllable is opened by the addition of a V-initial suffix. In the simplest case, illustrated in (4a), the [œ] alternates with [ø] in an open syllable (the so-called *loi de position* known from French, Morin 1986). In the second configuration, in (4b), the [œ] disappears when the syllable is opened. Even though this vowel alternates with zero, it cannot be regarded as epenthetic, as at least some of the items in which it appears would also be well-formed without it: compare for instance [kakœt] ‘cackle.IND.SG’ and [kaʁœl] ‘tile.IND.SG’ in (4b) with [ʁɛspɛkt] ‘respect.IND.SG’, [yʁl] ‘scream.IND.SG’. The occurrence of [œ] in these cases is thus unpredictable, and its presence in the middle of the final cluster in the roots at hand must be

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marked in the lexicon: in these cases the [œ] cannot be epenthetic. Also note that this [œ] occurs only in closed syllables: it is left unpronounced in open syllables, and obligatorily so. Indeed, unlike in French, where alternating vowels in open syllables may or may not be pronounced (*caqueter* [kakøt-e]~[kakt-e] 'cackle-INF'; *carreler* [kaʁøl-e]~[kaʁl-e] 'tile-INF'), their absence is mandatory in NEC: *[kakœt-a] 'cackle-INF', *[kaʁœl-a] 'tile-INF'. It was already mentioned in the previous section that alternating vowels in open syllables that may or may not be pronounced in French (*le remords* [løʁømɔʁ]~[løʁmɔʁ] 'regret') cannot be pronounced in the NEC cognate ([lœʁmɒʁ] 'regret', *[lœʁœmɒʁ]).

(4) *Three underlying identities of [œ]*

	Unsuffixed		*Suffixed*		*Underlying identity*
a.	ʒœn	'young'	ʒøn-ɛs	'youth'	/ø/
	gœl	'mouth (vulg.)'	gøl-a	'scream-INF'.	
b.	kakœt	'cackle.IND.SG'	kakt-ã	'cackle-IND.I/ʒPL'	/ə/
	kaʁœl	'tile.IND.SG'	kaʁl-ã	'tile- IND.I/ʒPL'	
c.	pwɛv	'pepper'	pwɛvœʁ-je	'pepper mill'	∅
	syk	'sugar'	sykœʁ-ʁi	'candy'	
	kat	'four'	katœʁ-jɛm	'forth'	

To distinguish between the vowels in (4a) and (4b), it is customary in the literature on French, where similar patterns occur, to say that the latter is underlyingly schwa /ə/, while the former is /ø/ (e.g., Tranel 1987: 87; Durand 2014: 31). We follow this analytic choice.

Finally, a third possible source for the vowel [œ] is epenthesis, as in (4c), where [œ] appears in the middle of a TR cluster that is followed by a consonant ([sykœʁ-ʁi] 'candy'). In absence of a suffix, however, the R in the nouns at hand is deleted (following the regular pattern of (3a)/(3e)): [syk] 'sugar'. Were the [œ] present in the lexical form, there would be no reason to delete the R, since a hypothetical /sykəʁ/ could be faithfully realised as *[sykœʁ]: no final TR arises, so there is no reason to delete the R. Therefore, the fact that the R is deleted indicates the absence of a vowel in the underlying form, which means that the vowel is epenthetic when it appears on the surface in [sykœʁ-ʁi] 'candy'. It occurs to avoid a CCC cluster, and is inserted between the first two consonants: /CCC/ → [CœCC]. Thus epenthetic [œ] always occurs in a closed syllable.

Note that there are also nouns ending in TœR# in which the [œ] alternates with zero in nominal derivation. Thus [manivœl] 'crank' derives [manivl-ɑʒ] 'cranking'. The [œ] cannot be epenthetic in this case since /TR#/ would produce the loss of the R (as in /sykʁ/ → [syk] 'sugar'). The fact that no harm is done to the R thus mandates the lexical presence of the vowel: /manivəl/. That is, the contrast between TR# appearing as T# (/sykʁ/ → [syk] 'sugar') in some words but as TœR# in others (/manivəl/ → [manivœl] 'crank') leaves no other option than considering that in the lexicon, a vowel is present in the middle of the cluster in the latter, but not in the former case. The [œ] in [sykœʁ-ʁi] 'candy' is necessarily epenthetic.

The three phonological identities of [œ] are thus distinguished as follows. Items that never alternate with zero are regular /ø/ (which appears as [œ] in closed syllables and as [ø] in open ones). This includes the cases in (4a) as well as word-final instances of [ø] as in [vojaʒø] 'traveller' or [vjø] 'old'; also note that stable /ø/ can sustain TR clusters to its left, for example, [fløʁi] 'bloom.IND.SG', [kʁøz-a] 'dig-INF'.

Items that alternate with zero are either /ə/ or epenthetic. In both cases, [œ] is realised on the surface, and only ever occurs in closed syllables. We know that the language distinguishes /ə/ and epenthetic [œ] for the reasons mentioned, but it may not always be possible to determine whether an alternating [œ] in a given morpheme represents /ə/ or epenthesis. The cases in (4b) are clear-cut: the [œ] in [kakœt] and [kaʁœl] cannot be epenthetic since, as was mentioned, the clusters produced in absence of [œ], kt# and ʁl#, would be well-formed. But when the clusters produced in absence of [œ] do not occur in the language (like [ʃt]# in [aʃœt] 'buy.IND.SG' – [aʃt-a] 'buy-INF') or when the [œ] is the only vowel of the word (as in [ʒœt] 'throw.IND.SG' – [ʃt-a] 'throw-INF'), it could be argued that [œ] represents either /ə/

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or epenthesis. The latter would occur in order to break up illegal clusters, or to provide a vowel to a stem which has none. The discussion in §4.2.1 will provide reason for [œ] in both cases to be lexical, though: it will be claimed that epenthetic vowels cannot be stressed, whereas the [œ] in [aʃœt] and [ʒœt] is stressed. But in cases like [kœlw-ã] 'nail-I/3PL' – [klu] 'nail (noun)', the alternating [œ] is unstressed and could be either epenthetic or lexically present.

The phonological ambiguity of alternating [œ] in some words is orthogonal to the analysis developed below. The only thing that will be important (in §4.1) is the fact that the [œ] in the middle of root-final TRs in nouns as in (4c) is epenthetic, which is guaranteed for the reasons mentioned.

Given this situation, we believe that the phonological identities of the three types of [œ] are as shown in (5).[8] Note that this implies for (5b) that schwa is pronounced [œ]: the fact that /ə/ appears as [œ] is merely implementational; it has nothing to do with phonological computation. The fact that a phonological item is not pronounced according to its properties is common. Its surface shape is then acquired by operations that occur post-phonologically: feature filling (see, for instance, Dresher 2009) or operations relating phonology and phonetics. The latter may be cue constraints (Boersma & Hamann 2008), phonetic interpretation in Element Theory (Backley 2011: 18–22) or spell-out (Scheer 2014: /ə/ ↔ [œ]).

In this perspective, the epenthetic vowel of the language that is used in (5c) can be said to be /ə/: once it is inserted, it will be converted into [œ] upon pronunciation by the same implementational routine (see §4.2.2).[9]

(5) *Three phonological identities of [œ]*

a. *Stable [œ] (4a):* associated



b. *Alternating [œ] (4b):* floating schwa

c. *Alternating [œ] (4c):* zero

An alternative representation for (5b) would be a floating /ø/ (rather than a floating /ə/): in this case, stable and alternating [œ] would both be /ø/, and they would be distinguished only by the fact that the stable [œ] in (5a) is lexically associated, while alternating [œ] floats. This analysis is known from Slavic languages where, as in NEC (and French), vowels with identical phonetic realisations alternate with zero in some morphemes, but not in others (Scheer 2011b).

[8]Note that for expository reasons, below we only talk about [œ] when mentioning the front mid rounded vowel, leaving out the fact that /ø/ appears as [ø] in open syllables; as was mentioned, /ə/ and epenthesis never occur in open syllables.

[9]Note that technically, the floating nature of the schwa in (5b) is not necessary. Schwa in this configuration could also be lexically associated: it would then need to be dissociated by phonological action when it does not appear on the surface, that is, in open syllables. We favour a floating underlying representation for two reasons: i) unification of suffixal and non-suffixal instances of (5b) and ii) the economy of an extra mechanism. If schwa is floating as in (5b), its association is entirely determined by the need for repair: it only associates when it is needed to repair an ill-formed structure. Note that association as repair is independently needed for epenthetic schwa in (5c), whose segmental existence is due to epenthesis, but which will need to be associated once it is epenthesised. Thus, no extra mechanism is needed if schwa is floating as in (5b). By contrast, if schwa is lexically associated, an extra mechanism needs to be posited to dissociate (or erase) it in open syllables. The floating character of schwa in (5b) also allows for a unified representation of suffixal and non-suffixal schwas: the former cannot be associated in the lexicon, since they belong to a different morpheme.

Also note that the linearity of floating segments with respect to other segments is classically defined by the linear nature of segments, which is recorded in the lexicon independently of their association. The linear order of liaison consonants in French, which on the classical analysis are floating (Encrevé 1988), is defined in the lexicon: they come last in the morpheme (e.g., *petit* 'small' is represented as /peti^{t}/, where superscript indicates a floating consonant). This is notably the case also in templatic morphology, typical of Semitic languages: root segments are believed to be independent of their templatic support, and yet they are still ordered. For example, the Modern Hebrew roots √ʃlχ and √χlʃ are lexically associated with different meanings, as in the verb forms [ʃalaχ] 'send' *vs.* [χalaʃ] 'oversee, govern'.

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However, this alternative is not viable in NEC, because the alternating [œ] shows weak behaviour: TR clusters cannot exist to its left (i.e., in terms of Strict CV, it cannot license TR clusters). A diachronic manifestation of the weakness of (5b) is discussed in the following section. As mentioned, we believe that its synchronic manifestation is the fact that root-final TR clusters followed by a suffix /-ə/ undergo metathesis: /TR-ə/ → [TœR]. This pattern is further discussed in §4.2.

Therefore, the vowel in (5b) must be phonologically weak (TR cannot exist to its left), as opposed to the vowel in (5a), which is non-weak (TR can exist to its left). Classical segmental identities for /ø/ and /ə/ express this difference: in terms of Element Theory (Backley 2011), /ə/ will be an empty-headed item that bears the element A (∅-A), while /ø/ bears the full set of place definers (I-U-A). The alternations of mid–low vowels [ɛ, ɔ, œ] with mid–high vowels [e, o, ø] (the *loi de position*) may also receive a classical account in terms of headedness (Harris 1994): the former are unheaded (I-A [ɛ], U-A [ɔ], I-U-A [œ]) while the latter are headed (I-A [e], U-A [o], I-U-A [ø]). The phonological weakness of /ə/ (∅-A) is then expressed by the fact that this vowel is the only one in the system that is empty-headed.[10]

2.4. Metathesis

Morpheme-internally, NEC systematically shows TœR where French has TRø. This is illustrated in (6) below.

(6) *Fr TRø corresponding to NEC TœR*

French: TRø	NEC: TœR	Gloss
gʁønuj	**gœʁ**nuj	'frog'
pʁømje	**pœʁ**mje	'first'
vã**dʁø**di	vã**dœʁ**di	'Friday'
ʃɛ**vʁø**fœj	ʃø**vœʁ**fœj	'honeysuckle'
bʁøtɛl	**bœʁ**tœl	'suspenders' / 'braces'

In NEC, the [œ] in these words always stands in a closed syllable, with the following vowel belonging to the same morpheme. Therefore, there is no way to observe the behaviour of these [œ]s in open syllables and we must conclude that its underlying identity is a stable /ø/ as in (5a).

But the synchronic state of NEC is the result of a diachronic change of metathesis whereby TRø has become TœR: French has preserved the diachronically earlier TRø (Lat. *prīmārius* > Fr. *premier* [pʁømje], NEC [pœʁmje]; Lat. *capra* > Fr. *chèvre* [ʃɛvʁ(ø)], NEC [ʃøvœʁ(fœj)]; Old High German *bittil* > Fr. *bretelle* [bʁøtɛl], NEC [bœʁtœl]; etc.).

This evolution occurred only with schwa, not with /ø/. Vowels that appear as stable [ø] in French did not trigger metathesis: French *fleuri* [fløʁi] bloom.IND.SG', *creuser* [kʁøz-e] 'dig-INF' correspond to NEC [fløʁi] 'bloom.IND.SG', [kʁøz-a] 'dig-INF', not *[fœlʁi], *[kœʁz-a]. In both languages, what today are stable [œ] and schwa were presumably phonetically distinct, since schwa /ə/ was originally pronounced [ə].

It may thus be concluded that there was a diachronic metathesis in NEC as shown in (7) below (recapitulating (2)).

(7) *Metathesis in NEC*
TRə → TəR

It was mentioned in the previous section that an alternative to the representation of alternating [œ] (5b) as a floating schwa would be a floating /ø/, as shown in (8a). In this case, there would be no metathesis, though, since the floating /ø/ could simply attach to its nucleus and then be indistinguishable

[10] It is not possible to reduce /ə/ to unheaded |A|, since the language has two low vowels [a] and [ɑ], and headedness is necessary to express that distinction.

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from the stable /ø/ of (5a). Rather, metathesis is triggered because the vowel following TR is unable to sustain this cluster. The vowel in question must thus be distinct from all others, or, more precisely, its melody must be different (whether floating or attached). Schwa as in (8b) is a valid candidate, since it is intrinsically weak (whether floating or attached): it cannot sustain (license) the preceding TR, and this is resolved by metathesis.[11]

(8) *Metathesis-triggering structure*

a. *TR + floating /ø/*



b. *TR + floating schwa*



Evidence from the adaptation of French loanwords into NEC suggests that the metathesis process in (7) is still synchronically active in NEC. For instance, when asked about the NEC equivalent of the French word *écrevisse* [ekʀøvis] 'crayfish', the informant said that they have never heard of crayfish in their region, but that the word would be pronounced [ekœʁvis]. That metathesis is still synchronically active in NEC receives further support in §4.2 below, where stem-final TR in verbal forms is discussed.

2.5. More data

The data in (9) show that the behaviour of TR-final stems obeys a general pattern. In verbs, the TR sequences are syllabified together as a complex onset before a vowel-initial suffix, and separated by [œ] in the IND.SG, where there is no surface suffix. The corresponding noun is consistently pronounced without the liquid.

(9) *Infinitive, indicative and noun in NEC*

	a. 'buckle'	b. 'breathe'	c. 'wire'	d. 'frame'	e. 'sugar'	f. 'pepper'
INF	bukl-a	sufl-a	kabl-a	ãkadʁ-a	sykʁ-a	pwɛvʁ-a
IND.SG	bukœ̲l	sufœ̲l	kabœ̲l	ãkadœ̲ʁ	sykœ̲ʁ	pwɛvœ̲ʁ
IND.1/3PL	bukl-ã	sufl-ã	kabl-ã	ãkadʁ-ã	sykʁ-ã	pwɛvʁ-ã
NOUN	buk	suf	kab	kad	syk	pwɛv

Note that verbs like those in (9c)–(9f) are clearly denominal; we take that to support a unified analysis, in which both the noun and the verb are derived from the same underlying representation with a final TR#. Additional reason to assume that the basic nouns also contain the liquid comes from nominal derivations based on these nouns. For instance, we have already seen in (4c) that [pwɛv] 'pepper' derives [pwɛvœ**ʁ**je] 'pepper mill, pepper tree' with the suffix [-je], and [syk] 'sugar' derives [sykœ**ʁ**ʁi] 'candy' with the suffix [-ʁi]. Other nouns, which do not have denominal verbs, also behave in this manner: the number 'four' is pronounced [kat], but when the ordinal suffix [-jɛm] is added, one finds [katœ**ʁ**jɛm] 'fourth'; the cardinal 'eighty' (lit. 'four score') is pronounced [katœʁvɛ̃]. Similarly, [sab] 'sand' yields [sabœ**l**jɛʁ] 'sand mine'.

[11] The pattern described in (6)–(8) is also found in Acadian French. Charette (2017) proposes that in this language, there are no branching onsets: all clusters (i.e., TR, RT, TT, RR alike) enclose an empty V-slot that requires government. Thus on Charette's analysis, [gœʁnuj] 'frog' is underlyingly /g∅$_1$ʁ∅$_2$nuj/. Since the second empty nucleus (∅$_2$) is governed, the first (∅$_1$) needs to be realised through epenthesis. This analysis is not possible for NEC, because TR clusters in this language behave like onset clusters: preceding mid vowels in unstressed position are mid–high [e, o], as in [ovʁiʁ] 'open'. Recall from §2.2 that the contrast between /o/ and /ɔ/ is neutralised in unstressed closed syllables in favour of [ɔ]. Thus [o] in [ovʁiʁ] shows that the following TR is not a coda-onset cluster, which would produce a preceding [ɔ]. For more on branching onsets in NEC, see Faust (2025), as well as below.

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Moving on to verbs with a seemingly suffixed [-e] in the IND.SG, Quint (2021a) reports on this phenomenon in several Croissant varieties. He lists 12 verbal stems of this type, all of which are 'asyllabic', meaning that their stems do not have any realised nucleus – see the NEC examples in (10), with the [-e] in bold. According to Quint, the asyllabic nature of the root is the motivation for the appearance of the [-e].

(10) *'Asyllabic' bases showing an* -e *at their right edge*

	a. 'knot'	b. 'rent'	c. 'brood'	d. 'shit'	e. 'trust'	f. 'saw'	g. 'sweat'
INF	nw-a	lw-a	kw-a	ʃj-a	fj-a	sj-a	sɥ-a
IND.SG	nw**e**	lw**e**	kw**e**	ʃj**e**	fj**e**	sj**e**	sɥ**e**
IND.I/3PL	nw-ã	lw-ã	kw-ã	ʃj-ã	fj-ã	sj-ã	sɥ-ã

Additional NEC data show that the *raison d'être* of the [-e] cannot be the absence of a full nucleus in the stem, though – at least not synchronically. Alongside the items mentioned by Quint, there are also disyllabic roots which bear the extra vowel [-e], as in (11).[12] These verbs also point to another aspect of the data: the parallel nouns end in a vowel, which is the vocalic equivalent of the glide in the verbal forms; compare IND.SG. [kop**j**e] with the noun [kop**i**], IND.SG. [kœl**w**e] with the noun [kl**u**], etc.

(11) *Disyllabic roots with the extra [-e]*

	a. 'nail'	b. 'copy'	c. 'bet'	d. 'shout'	e. 'accustom'
INF	kœlw-a	kopj-a	paʁj-a	kœʁj-a	abitɥ-a
IND.SG	kœlwe	kopje	paʁje	kœʁje	abitɥe
IND.I/3PL	kœlw-ã	kopj-ã	paʁj-ã	kœʁj-ã	abitɥ-ã
NOUN	klu	kopi	paʁi	kʁi	–

In §1, we selected the verb [gœʁje] 'grill.IND.SG', whose related noun [gʁij] is not V-final, to represent this class in (1d). It is noteworthy that none of the items in (10) and (11) can be related to a noun ending in a homorganic VG sequence. We show in §4.3 that the two kinds of nouns do not have the same underlying form: the items in (10) and (11) are lexically V-final (e.g., /si/ 'saw'), while the 'grill' type have a homorganic VG sequence (-ij, -uw, -yɥ) in the lexicon (/gʁij/).

Still, all of the items in (10) and (11), as well as [gœʁje] 'grill.IND.SG' from §1, share the property that their *verbal* stem ends in a CG sequence on the surface. Only such verbs exhibit the extra [-e], which never occurs after stems ending in non-homorganic VG: IND.SG. [fuj] 'search.IND.SG', [kõsɛj] 'advice.IND.SG', [syʁvœj] 'oversee.IND.SG', [tʁavaj] 'work.IND.SG', etc.

The verbs in (10) and (11) relate to those in (9) in that their stems end in a syllabically problematic sequence: like TR, CG clusters are of rising sonority. Taking into account the parallel nouns, another similarity is observed between the two groups: the right edge behaves differently in nouns and in verbs, though the differences between nominal and verbal forms are not the same in TR and CG contexts.

All the pieces of the puzzle are summarised in (12). RT-final stems (as in (12a)) and non-homorganic VG-final stems (as in (12b)) behave unremarkably: they do not pose a sonority problem, and their stems are constant in all configurations, including the related noun. Verbal stems ending in CG sequences on the surface (as in (12c) and (12d)) appear with the extra [-e], and are related to nouns ending either in a vowel (as in (12c)) or in a homorganic VG sequence (as in (12d)). Finally, underlyingly TR-final stems (as in (12e)) show an [œ] in the middle of the cluster in the IND.SG, and R-deletion in the noun.

[12] Quint (2021a: 195, fn. 19) mentions verbs such as those in (11) very briefly, without discussing the extra [-e]. He suggests that these verbs are loans from French.

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(12) *Summary of data*

	a. -RT	b. -V_iG_j	c. -CV	d. -CV_iG_i	e. -TR
INF	RT (ʃaʁʒ-a)	V_iG_j (fuj-a)	CG (sj-a)	CG_i (gœʁj-a)	TR (sykʁ-a)
IND.SG	RT (ʃaʁʒ)	V_iG_j (fuj)	CGe (sje)	CG_ie (gœʁj-e)	TœR (sykœʁ)
NOUN	RT (ʃaʁʒ)	V_iG_j (fuj)	CV (si)	CV_iG_i (gʁij)	T (syk)

The next section presents Strict CV, the theory in which the representational part of the analysis is couched.

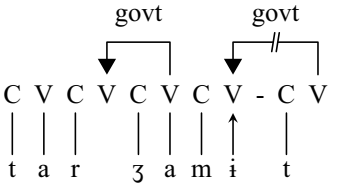
3. Theoretical framework: Strict CV

3.1. Government and final empty nuclei

Strict CV is a theory of autosegmental representations, developed as an offshoot of Government Phonology (GP), for instance, in Lowenstamm (1996), Enguehard & Faust (2018), Faust (2014, 2015, 2017), Passino (2013), Fathi (2017), Enguehard (2017), Lahrouchi (2018), Lampitelli (2017), Newell (2021a), Polgárdi (2014), D'Alessandro & Scheer (2015), Scheer (2019). For book-length discussion of Strict CV, see Scheer (2004, 2012). The basic tenet of this approach is simple: there is only one skeletal unit, the CV unit. Every C-slot is followed by a V-slot, and every V-slot preceded by a C-slot.

This basic assumption has two consequences, both of which are illustrated by the Palestinian Arabic example [tarʒamɨt] 'I/you translated' in (13), underlyingly /tarʒam-t/.[13] First, word-final consonants are followed by an empty nucleus at the skeletal level. Second, phonetically adjacent consonants like [rʒ] are separated by an empty V-slot (or nucleus) on the skeletal tier. Empty nuclei are realised as epenthetic vowels unless epenthesis is inhibited. For medial empty nuclei, inhibition is made possible through a relation of right-to-left government from a following contentful nucleus, shown in (13) by the arrow from the V-slot associated with [a] to the empty V-slot to its left.

(13) *Government and empty nuclei*
Palestinian Arabic /tarʒam-t/ → [tarʒamɨt] 'I/you translated'



Inhibition of final empty nuclei (FEN) is parametrised. If the words of a language can end in consonants at the melodic level, as is the case for Arabic, it is assumed that FEN are allowed to remain unrealised: they are parametrically governed (rather than licensed, as in Standard GP; see Scheer 2004: §150). In languages like Italian where all (native) words end in a vowel, FEN are disallowed (they are ungoverned by the parameter setting for the language).[14]

[13] In Strict CV, syllable structure (C and V positions) is part of the underlying, lexical representation.

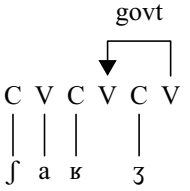
[14] In this system, coda consonants are those that occur before a governed nucleus, that is, in a position that is either preconsonantal (the ∅ in …R∅TV… is governed by the V) or word-final (the FEN is governed). On the other hand, consonants that are non-codas, that is, which stand in intervocalic or strong position (initial and post-coda), occur before a contentful nucleus. Accordingly, a vowel is in a closed syllable if the following nucleus is governed (the case of V_1 in …V_1R∅TV_2… and V_1C∅#). By contrast, vowels that are followed by an ungoverned nucleus (V_1 in …$V_1C V_2$…) stand in an open syllable. The status of branching onsets TR is discussed in §3.2. In anticipation of that, the empty nucleus in T∅R is not governed, but rather silenced by the infrasegmental relationship contracted by the two consonants. Therefore, the vowel preceding a branching onset (V_1 in …V_1T∅RV_2…) occurs before an ungoverned nucleus and therefore stands in an open syllable.
The definition of syllabic positions, as well as of additional parametric variation such as the status of the final consonant as a coda or a non-coda (extrasyllabic in traditional accounts) is quite orthogonal to our purpose. It is discussed in greater detail in Scheer (2004: §524) and Scheer & Ziková (2010).

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While internal empty nuclei cannot govern in any circumstance, the ability to govern is parameterised for FEN (although they are themselves governed; see Scheer 2004: §524; Scheer & Ziková 2010). In Palestinian Arabic, they cannot govern; therefore, the penultimate V-slot in (13) cannot be inhibited (as indicated by the broken arrow) and is thus realised through epenthesis, signalled by the upwards arrow in place of an association line.

Unlike in Palestinian Arabic, though, FEN are clearly able to govern in NEC, as evidenced by the existence of words like the morphologically simplex noun [ʃaʁʒ] 'load', whose representation is provided in (14).

(14) *Final empty nuclei can govern in NEC*



3.2. Branching onsets and the difference between RT# and TR# clusters

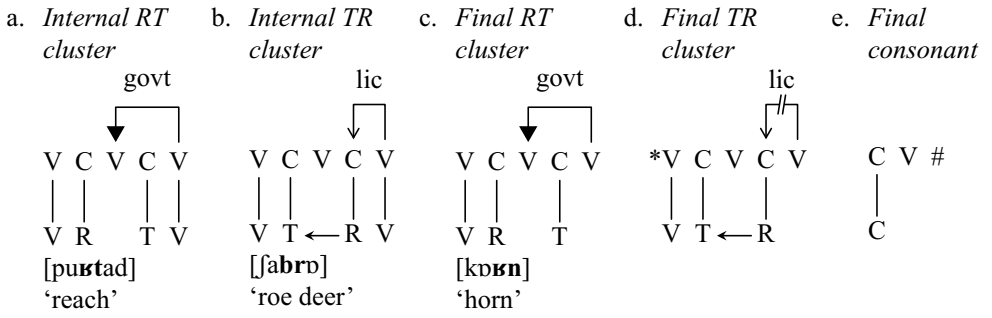
Let us now consider how the crucial distinction between TR clusters on the one hand and RT, TT and RR clusters on the other is represented in Strict CV. (NEC examples of the latter include [ʃa**ʁʒ**-a] 'load-INF', [a**kt**ivitad] 'activity' and [y**ʁl**-a] 'scream-INF'.) In regular syllabic accounts, a TR cluster is a branching onset, while the other type (RT, TT, RR; collectively referred to below as RT for short) is a coda–onset sequence. This distinction is in many ways crucial, since in relevant languages an intervocalic CC cluster may or may not close the preceding syllable (VR.TV *vs.* V.TRV). If it does not, it is always of the TR kind (onset maximisation; e.g., Hayes 2009: 252–253). The contrast also appears at the left edge of words, where languages like English restrict initial clusters to #TR.[15] The symmetric situation is displayed at the right edge of words, where in the same languages only RT# clusters are found. If an illegal final TR# occurs, it is repaired by various means: in Czech, German and English (Scheer 2009), the R becomes syllabic (thus vocalic in kind); in Modern Hebrew, loans such as French *Louvre* [ˈluvʁ(ø)] or English *Beatle* [bitl̩] are adapted by breaking up the cluster with the epenthetic vowel [e]: [ˈluveʁ], [ˈbitel].

In traditional syllabic models, the fact that the two consonants of a TR cluster enter into a closer relationship than those of an RT cluster is represented by treating a TR cluster as a single constituent (a branching onset) and an RT cluster as two separate constituents (a coda and an onset). In Strict CV (where constituents do not branch), the contrast between TR and RT clusters lies in the management of the intervening empty nucleus. The tighter relation between the consonants of the traditional branching onset is expressed graphically by the symbol ← in (15b). This right-to-left relation is referred to as 'infrasegmental government' (IG), and is established between sonorants and preceding obstruents (in NEC, specifically liquids and preceding obstruents), with the sonorant assuming head status (Scheer 2004: §14). Thus TR can contract IG, but RT cannot (given that IG is right-to-left, the head R must be preceded by the T).

[15] Also possible word-initially are s+C clusters, which notoriously violate sonority sequencing (Goad 2011), and in French a class of learned vocabulary items have initial clusters such as [ps] (*psychologue* 'psychologist'), [pt] (*ptérodactyle* 'pterodactyl') and so on.

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(15) *TR* vs. *RT in Strict CV (with NEC examples)*



Languages impose variable restrictions on what kind of nucleus can license a TR cluster. In Polish or French, where final TR# goes unrepaired, TR can be licensed by a FEN (see also §3.3). This is not the case in NEC, where a full vowel is required to the right of a TR cluster. In principle, repairs other than the loss of R can be thought of when an unlicensed (final) TR is encountered: the loss of T or the establishment of a governing relation between the FEN and the nucleus in the middle of the cluster, as in the RT cluster in (15c). As a matter of fact, NEC does not use these solutions (see also fn. 18).

The closer relationship within a TR cluster silences the intervening empty nucleus, which is therefore not in demand of government. The difference between (15a) and (15b) thus boils down to the fact that the nucleus following the cluster in (15a) needs to govern the preceding empty nucleus, while in (15b) the nucleus after the cluster has no such governing duties.

In this approach, a consonant is thus a coda iff the following nucleus is empty and governed (see fn. 14); this is the case of the R in (15a). Regarding the right edge of the word, recall from §3.1 that FEN in languages like NEC are governed. Thus, the final C in (15e) is a coda. By contrast, since the nucleus following T in (15b) is empty but not governed, T is not a coda.

The contrasting behaviour of final TR (repair needed) and final RT clusters (unproblematic) follows from this setting. It was shown in (14) that FEN can govern in NEC: this is the situation of RT# in (15c). But since in NEC the nucleus following TR clusters needs to be associated with a vowel (a *full* vowel; see §4.1) in order to license them, such clusters cannot remain intact in final position, where the following nucleus is empty. This is shown in (15d), where the final empty nucleus is unable to license the T←R cluster.

3.3. A clarification on the purview of Strict CV

Government Phonology in general and Strict CV in particular are representation-oriented. They define well-formed and ill-formed structures, some of which are supposed to be universal. For instance, in Strict CV, a representation bearing an ungoverned empty nucleus that is not silenced by a TR cluster (as in (15d)) is ill-formed.

What happens when an ill-formed structure arises is of course different from language to language. In the case of word-final TR clusters, most languages do not allow them and offer no repair either: TR# is then ungrammatical. On the other end of the scale of tolerance, some (rare) languages allow final TR clusters without any repair. This is the case in Polish, where *Piotr* [pʲɔtr] 'Peter', for example, remains unrepaired (Bethin 1984; Rubach & Booij 1987; Charette 1992), and it is an option in French, where *cadre* 'frame' may be pronounced [kadʁ] (or [kad] with R drop) (Dell 1973: 225, 1976; Tranel 1987: 103–104). When word-final TR clusters are repaired, a number of strategies are observed. A popular repair is to make the R syllabic (provided the language allows syllabic consonants): thus, English *bottle* [bɔtl̩] (compare with non-syllabic R in *bottl-ing* [bɔtlɪŋ]), German *Regen* 'rain' [ʁeːgn̩] (compare with non-syllabic R in *regn-en* 'rain-INF' [ʁeːkn-ən]) or Czech *Petr* 'Peter-NOM.SG' [pɛtr̩] (compare with non-syllabic R in *Petr-a* 'Peter-GEN.SG' [pɛtra]). Two other repairs occur in NEC: the appearance of a vowel in the middle of the cluster and R drop (the latter is also found occasionally in French; see above).

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Strict CV as such has nothing to say about these parameter settings, that is, about the kind of repair, if any, that is encountered across languages. Therefore, nothing prevents encoding this variation in terms of constraint interaction or more traditional parameter theory (e.g., Ulfsbjorninn 2017). Thus, the FEN can license word-final TR# in Polish (Charette 1992), but not in English. French shows variation: FENs can optionally license TR#, and if they do not, the R is lost (unlike in English, where it is made syllabic). In this article, we do not engage with this kind of debate, and, while remaining agnostic, we will represent cross-linguistic variation in terms of constraint interaction.

Finally, languages may prefer to repair a given structure but, when no repair is available, may leave it unrepaired, which does not cause it to be ill-formed. This pattern is trivial in OT, where a candidate that violates some constraint may be nonetheless be optimal and therefore appear on the surface. In NEC, homorganic VG sequences are a case in point: the language tries to avoid them, but leaves them unrepaired unless a following vowel is available (which would enable syneresis; see §5.3). Thus, the final /ij/ of the root /gʁij/ 'grill' is repaired through syneresis /ij/ → /∅j/ when verbal morphology offers a vowel-initial suffix (/gʁij-a/ → [gœʁj-a] 'grill-INF'), but remains unrepaired in nouns where no suffix is available (/gʁij/ → [gʁij] 'grill (N)').

Again, Strict CV has nothing to say about that, unless the ill-formedness in question is universal: an ungoverned empty nucleus (which does not occur in a branching onset TR), for example, cannot remain unrepaired. Restrictions whose violation makes representations ill-formed, either universally or in a given language, with no repair possible, are referred to as principles below. Restrictions that are subject to negotiation in a constraint hierarchy are called constraints. This terminology merely translates the fact that not everything is negotiable: some properties of phonology hold no matter what, either universally or in a given language. Principles have been present in the OT agenda from its beginnings in the form of universally undominated constraints or fixed rankings (e.g., Prince & Smolensky [1993] 2004: ch. 9; McCarthy & Prince 1995).

In sum, Strict CV is a theory of representation. Its practitioners have only rarely dwelled on a theory of computation.[16] OT and rule-based approaches are theories of computation. A complete theory of phonology needs both (Anderson 1985; Scheer 2010). Therefore, constraint interaction and Strict CV are not incompatible and have actually been combined, for example, by Polgárdi (2014), Cavirani (2015) and Faust & Torres-Tamarit (2017). But given its focus on representations, most work in Government Phonology and Strict CV typically states computational events in prose without further formalisation ('and then the floating vowel associates to the empty nucleus'). The same goes for the statement of parametric choices ('this language has no branching onsets', 'in this language, FEN govern'). Formalising computation in terms of constraint interaction (or ordered rules, which are also an option) is thus making explicit what is typically left to prose statements.

Having presented the language, the data and the theory, we now turn to the analysis.

4. Analysis of TR-final stems

4.1. Schwa and empty nuclei cannot license TR

It is not rare that vowels which alternate with zero, even when they are pronounced, behave as if they were not. This is the case in Midi French where (unlike in Northern varieties of French) the ATRness of mid vowels is in true complementary distribution: [ɛ, ɔ, œ] occur in closed syllables ([bɛt] 'stupid', [alɛχte] 'alert-INF'), while [e, o, ø] are found in open syllables ([betiz] 'stupidity', [metrik] 'metrical', [fe] 'done.prtc') (Durand *et al.* 1987, Durand 1990: 24 ff.). But when a mid vowel is followed by a single consonant plus schwa (which alternates with zero in free variation), it is [−ATR] no matter whether the schwa is actually pronounced: [bɛtøʁav]~[bɛtʁav] 'beet root', [pɔtøʁi]~[pɔtʁi] 'pottery'. A [+ATR]

[16] On the sparse indications of how computation works in Government Phonology, see Scheer (2011a: 425–426). The only instance where this embryotic approach based on inviolable constraints is worked out is Edmund Gussmann's book on Polish (Gussmann 2007).

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realisation would be expected when schwa is pronounced, since its phonetic existence should place the preceding mid vowel in an open syllable. But this is not the case, and the complete distributional statement is thus that mid vowels are [−ATR] in closed syllables or before a (pronounced) schwa, while they are [+ATR] in open syllables, except when the following vowel is schwa. In terms of Strict CV, [−ATR] vowels thus occur before a governed empty nucleus (i.e., in a closed syllable, as in the structures in (15a) and (15e)) and before schwa.

The same disjunction defines the ill-formedness of TR in NEC. We have seen in (6) that in the diachronic development of the language, TR clusters followed by schwa undergo metathesis ([gʁœnuj] > [gœʁnuj]). They are also ill-formed when followed by a governed empty nucleus, that is, when TR occurs in word-final position as in (15d): /sykʁ/ → [syk] 'sugar'.

The generalisation thus appears to be that weak nuclei – that is, nuclei that are empty or contain schwa – are unable to sustain TR clusters in NEC.[17] The segmental identity of schwa introduced in §2.3, ∅-A, shares with empty nuclei the fact of being empty-headed: having an empty head thus translates as weakness when it comes to licensing preceding clusters.

Therefore, we believe that the repair observed for TRə in the diachronic development of NEC has the same cause as the one that is applied to TR# synchronically in the language. But the two structures undergo different repairs: TRə is remedied by metathesis (→ TœR) as in (2), while TR# results in the loss of R (→ T#).

The main argument is that metathesis also occurs word-finally when verbal stems are followed by the IND.SG marker /-ə/: /sykʁ-ə/ → [sykœʁ] 'sugar.IND.SG'. Thus the two distinct repairs observed for stem-final TR (the appearance of [œ] in the middle of the cluster in verbal roots *vs.* the loss of R in nominal stems) are the consequence of this suffix /-ə/, which is present in verbs, but absent in nouns.

4.2. TR-final stems

4.2.1. Loss of R ([syk] 'sugar'). Let us assume for the sake of argument, and against the proposal that we have just foreshadowed, that both [syk] 'sugar (N)' and [sykœʁ] 'sugar.IND.SG' are derived from the same underlying representation /sykʁ/. Given that verbs consistently surface with [œ]-insertion and nouns consistently lose the liquid, two questions arise. First, why are the repairs different? And second, how does each environment motivate its particular repair, given that two different repairs are possible? In other words, why is deletion not observed in verbs and [œ]-insertion in nouns? And why are nouns not repaired by epenthesis to the right of the offending TR# cluster, or indeed inside it?

Let us begin with nominal forms such as /sykʁ/ → [syk] 'sugar'. We submit that epenthesis is ruled out in this case by a combination of two factors:

(16) *Principles of epenthesis and stress in NEC*

a. *Epenthetic* /ə/ must not be stressed.

b. Stress is assigned to the last realised nucleus.

Principle (16a) is shared with many languages (see, for instance, Broselow 2008). (16b) describes the stress pattern of NEC, where it is surface-true. Assuming that like (16b), (16a) is inviolable in NEC, the lack of epenthetic [œ] in TR-final nouns is derived: both *[ˈsykœʁ] and *[ˈsykʁœ] would violate (16b), while *[syˈkœʁ] or *[sykˈʁœ] would violate (16a). Since [sykʁ] would involve an unlicensed TR, the R is deleted.[18]

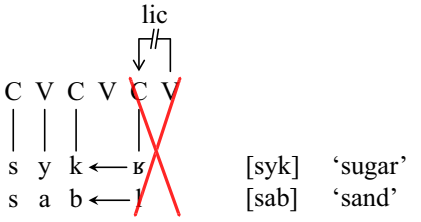
[17] See the cross-linguistic implicational strength hierarchy of nuclear categories established by Cyran (2010): V > ə > ø.

[18] Recall from §3.3 that in some languages (Polish and French for instance), FEN are able to license final TRs. This is not the case in NEC, which in this respect behaves like many other languages where final TRs do not survive without a repair. And of course, in principle, there are also solutions other than R deletion when faced with a final unlicensed TR. One would be the deletion of the T, another the establishment of government from the final empty nucleus to the nucleus in the middle of TR. We are not aware of any language that adopts either of these solutions.

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The Strict CV take on R-deletion in TR-final nouns is shown in (17). The R cannot be licensed to head the TR sequence, and epenthesis is not possible in either the final or penultimate nucleus. The only solution is deletion (of the liquid and its syllabic support).

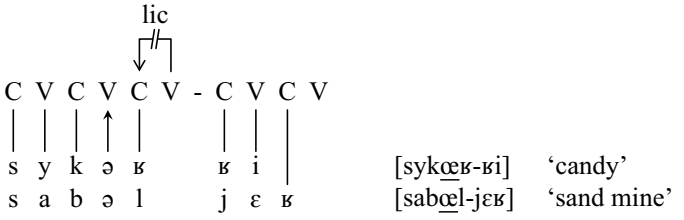
(17) *Word-final TR# in nouns*



4.2.2. Epenthesis ([sykœʁ-ʁi] 'candy'). In the discussion of TR-final nouns in §2.3 (/sykʁ/ → [syk] 'sugar'), it was shown that when a derivational suffix is added to such a noun, the underlying stem-final liquid *is* realised. If the suffix is C-initial (as in all cases discussed), an epenthetic vowel occurs between the liquid and the C before it: /sykʁ-ʁi/ → [sykœʁ-ʁi] 'candy', /sabl-jɛʁ/ → [sabœl-jɛʁ] 'sand mine'. Note that epenthesis is possible in this configuration precisely because the epenthetic vowel is non-final, so it can be unstressed in accordance with (16a) without violating (16b).

In (18), epenthesis occurs inside the stem-final cluster, rather than in the FEN of the stem. This makes sense if the epenthetic vowel is phonologically schwa (∅-A), rather than stable /ø/ (I-U-A), since, as has been shown, /ə/ cannot license a TR cluster. The epenthetic schwa (∅-A) is then realised as [œ] in phonetic interpretation, just like lexical schwa.

(18) *Stem-final TR in suffixed nouns*



4.2.3. Metathesis ([gœʁnuj] 'frog', [sykœʁ] 'sugar.IND.SG'). So far, we have established three solutions for an unlicensed TR cluster, depending on whether it precedes an empty nucleus or a nucleus hosting /ə/, as shown in (19). Before a final empty nucleus, the R is deleted. Before a non-final empty nucleus, epenthesis occurs (as in (18)). Finally, before /ə/, metathesis applies. This last scenario was observed only non-finally, in the diachronic development of NEC ([gʁœnuj] > [gœʁnuj] 'frog', §2.4).

(19) *Realisation of unlicensed TR*

	Medial	Final
TR∅	TœR	T
TRə	TœR	**?**

While the principles in (16) motivate the lack of epenthesis in TR-final nouns, (16a) would be challenged by the occurrence of [œ] in the parallel verbal form [syˈkœʁ] 'sugar.IND.SG' in (1c) if the [œ] were epenthetic. As foreshadowed, though, we propose that the vowel [œ] in these verbs is *not* epenthetic. Rather, it is a suffix /-ə/ exponing IND.SG and thus recorded in the lexicon as such. In other words, this is the missing configuration in (19): as in the internal position, final /TRə/ undergoes metathesis and is realised as [TœR]. Because the vowel is lexical, it is not subject to (16a), and can be stressed.

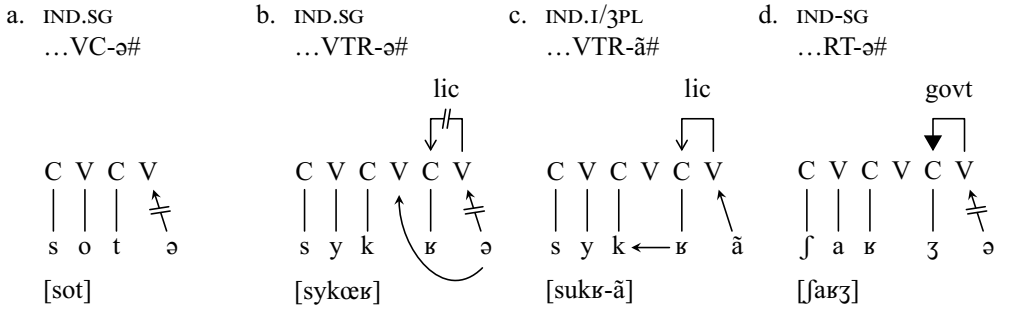
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4.2.4. IND.SG /-ə/. If /-ə/ expones IND.SG, it must do so for all verbs. As a matter of fact, though, it never appears in its regular phonetic guise [œ] in word-final position. Only when metathesis places /-ə/ in the middle of a stem-final TR cluster as in (20b) does it surface as [œ]. In all other contexts – that is, after a single stem-final consonant (as in (20a)) or after a stem-final RT (as in (20d)) – /-ə/ has no phonetic realisation.

We know from §2.3 that vowels which alternate with zero, namely /ə/ and epenthetic [œ], occur only in closed syllables: their absence in open syllables is mandatory (unlike in French). This is why /ə/ cannot surface word-finally: final vowels stand in an open syllable.

Given the absence of schwa in open syllables, the suffixal schwa in (20a), (20b) and (20d) cannot attach to the final empty nucleus of the root. The RT cluster in (20d) is well-formed, and nothing more needs to be said. But the TR cluster in (20b) would be ill-formed without the /ə/, and the language has a general repair strategy for /TRə/ sequences, namely metathesis: TRə → TəR. Again, unlike epenthetic /ə/, lexical /ə/ may be stressed, and therefore, the result of metathesis is well-formed with stress falling on the schwa in [syˈkœʁ].[19] For completeness, we also provide in (20c) the representation of a TR-final stem followed by a vowel-initial suffix that is not schwa. In this configuration, the stem-final TR can survive intact, since the R is licensed.

(20) *Word-final TR#: verbs*



Note that like all other suffixes, /-ə/ is linearised after the last segment of the stem; it comes without its own syllabic support, and seeks to associate with a nucleus in the base.

To summarise, vocalic suffixes attach to the first nucleus available, which is the final empty nucleus of the stem. However, /ə/ cannot attach to that nucleus. Therefore, it either remains unrealised (after VC and RT clusters) or metathesises (after TR clusters) – as elsewhere in the language.

4.2.5. Summary. To summarise, we have claimed that an inflectional suffix /-ə/, which appears on verbal stems, is responsible for the retention of all stem consonants. No such suffix occurs on nouns. Only epenthesis could save the R of a final TR sequence in a noun, but epenthesis is not well-formed because it would lead to non-final stress. Therefore, the R is deleted in nouns. Note that deriving the difference between verbs and nouns by this means is supported by the cross-linguistically common appearance of agreement suffixes on verbs, but not on nouns.

To recapitulate, two key properties of the analysis are as follows:

- In NEC, TR clusters cannot be licensed either by an empty nucleus or by the weak vowel /ə/, lexical or epenthetic.

[19]Once learners have concluded that there must be a vocalic suffix which appears through metathesis, they can identify the intruding suffix as /ə/ based on its inability to appear at the right edge (unlike /ø/) and the fact that it alternates with zero. In this sense, the suffix is what O'Hara (2017) calls 'restrictedly abstract': it is a phoneme that does occur in the language, but not in the position under investigation (final).

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- The repair depends both on the distinction between /ə/ and an empty nucleus and on the position of the TR cluster. Before an empty nucleus, a word-medial TR undergoes epenthesis, while a word-final TR loses its R. Before /ə/, metathesis occurs regardless of the position in the word.

In the next subsection, we provide corroborating evidence for the correlation between the deletion of R in nouns and the lack of an inflectional suffix.

4.3. Additional support for /-ə/: infinitives

In several Romance languages, and specifically in French, verbs are traditionally divided into three classes. The logic of this division is presented with data from NEC in (21). Group 1 includes those verbs which have an infinitive in [-a]. Verbs of Group 2 have an [-i-ʁ] infinitive. Group 3 comprises all verbs which do not fall into Group 1 or 2, such as V-final stems with infinitive [-ʁ], like 'see', and T-final stems with no apparent infinitival suffix, such as 'sell'.

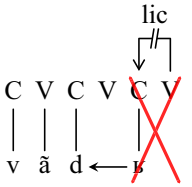
(21) *Three verbal groups in NEC*

	Group 1	Group 2	Group 3	
	'jump'	'end'	'see'	'sell'
INF	sot-a	fin-i-ʁ	ve-ʁ	vãd
IND.SG	sot	fin-i	vœj	vã
IND.I/3PL	sot-ã	fin-is-ã	vœj-ã	vãd-ã

Two aspects of the classification are specific to the variety discussed here. First, all verbal stems in Group 1 end in a consonant (unlike in French, which has Group 1 stems like *créer* [kʁe-e] 'create-INF', IND.SG [kʁe] and *broyer* [bʁwaj-e] 'grind-INF', IND.SG [bʁwa]). Second, as just mentioned, some Group 3 infinitives lack a final /ʁ/. Besides 'sell' in (21), other cases in point are [mɔʁd] 'bite', [tɔʁd] 'twist', [kunɛt] 'know', [pʁãd] 'take' – in fact, all Group 3 verbs whose root ends in a consonant. Also note that the [-ʁ] is present in the French cognates of these verbs: *mordre* [mɔʁd-ʁ(ø)], *tordre* [tɔʁd-ʁ(ø)], *connaître* [konɛt-ʁ(ø)], *prendre* [prãd-ʁ(ø)] (though it may also be left unpronounced; see §3.3).

The presence of /ʁ/ exponing the infinitive may be generalised to all verbs of Groups 2 and 3 (Group 1 having an /-a/ allomorph) given our analysis of TR-final stems. As shown in (22), the situation created in C-final stems in Group 3 is analogous to that of TR-final nouns in (17) above: no suffix /-ə/ occurs underlyingly; epenthesis is prohibited; and the R is not licensed. Thus there is no way to avoid deletion (of the R together with its syllabic support).

(22) *Group 3 C-final infinitives: T-R# leads to R deletion*



We take the fact that Group 3 infinitives behave like nouns to support our analysis, which predicts deletion in infinitives exactly where it is observed (assuming, as is the null hypothesis, that infinitives do not carry a suffix other than /-ʁ/).

4.4. Interim summary

In this section, we have provided an analysis of the different solutions to TR-final stems by appealing to the difference between an underlying, stressable /-ə/ (exponing IND.SG) and an epenthetic schwa. Verbs

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and nouns with TR-final stems implement different solutions because nouns are truly unsuffixed: the R in TR# can only be saved from deletion by an epenthetic [œ], and such epenthesis is disallowed. But in verbs, stem-final TR undergoes metathesis with the IND.SG suffix /-ə/, and the R is saved. Infinitives are not expected to carry an agreement marker, and therefore behave like nouns.

5. Analysis of CG-final stems

In this section, we provide additional evidence for the reality of the suffix /-ə/, which in fact appears on the surface as [-e] in suffixal position after stems ending in a dispreferred homorganic VG sequence.

5.1. Adjustment of basic stems

The basic facts from verbs with CG-final stems (§2.5) are recalled in (23). The [-e] occurs after surface [Cw, Cj, Cɥ] (regardless of whether the stem is otherwise asyllabic). Note that verbs with CG-final stems are arguably denominal, and that the corresponding nouns are vowel-final (we will return to the case of the noun type [gʁij] 'grill' below).

(23) *Glide-final stems*

	a. 'nail'	b. 'copy'	c. 'saw'	d. 'bet'
INF	kœlw-a	kopj-a	sj-a	paʁj-a
IND.SG	kœlw**e**	kopj**e**	sj**e**	paʁj**e**
IND.1/3PL	kœlw-ã	kopj-ã	sj-ã	paʁj-ã
N	klu	kopi	si	paʁi

Crucially, all verbs with the extra [-e] belong to Group 1 (infinitive /-a/). Now recall the generalisation about this group from §4.2: all stems in this group are consonant-final. This generalisation is recast in terms of Strict CV in (24):

(24) *Condition on Group 1 roots*
Group 1 roots must end in an empty nucleus (i.e., in a consonant on the surface).

This condition suggests that nominal bases like [kopi] cannot serve as Group 1 verbal roots. Such bases must be adjusted to comply with the condition. The only way this is possible in Strict CV is through the addition of a CV unit, as shown in (25). The vowel-final forms in (25a) correspond to the lexical identity of the root. In order for the stem to comply with (24), an additional CV is added as in (25b), and the final vowel spreads onto the following onset. The VG sequences created are thus homorganic. Stems ending in a lexical (non-homorganic) VG sequence, as in (25c), are not expected to be adjusted, as they already end in an empty nucleus. Note that we represent glides and corresponding high vowels with the symbols I / U, which are neutral regarding vowelhood and consonanthood.

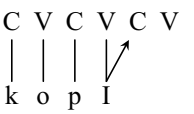
(25) *Root adjustment due to (24)*

a. *Noun stem*



kopi 'copy'
klu 'nail'

b. *Adjustment in G1 verbs*



kopi → kopij
klu → kluw

c. *No adjustment to VG*



(tʁa)vaj 'work'

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Because of this adjustment process, the verbal forms of vowel-final stems in Group 1 end in a homorganic VG sequence. The extra vowel [-e] thus appears after underlying /Cij/ or /Cuw/, and only in this context: [kœlwe] 'nail.IND.SG' originates in /kluw/; [kopje] 'copy.IND.SG' originates in /kopij/; and so on. This adjustment process thus unifies (adjusted) V-final stems with stems whose final homorganic VG sequence is lexical, such as /gʁij/ 'grill': the noun reveals whether the homorganic VG# sequence of the verbal stem is lexical (in which case the noun ends in homorganic VG: [gʁij] 'grill') or derived (in which case the noun ends in V: [kopi] 'copy').

For what follows, it is important to note that the adjustment in (25b) is not phonological, but rather a lexical condition on Group 1 stems. Thus, it is not the case that the input to phonology is /klu+CV/ and *then* the /u/ spreads to occupy the C-slot. Rather, the input to phonology is the result of the adjustment, /kluw/.

5.2. Homorganic VG in NEC and French

The glide in (23) thus comes into being through root adjustment (25). But this cannot be the entire story: after adjustment, the underlying forms in (23) have a homorganic VG sequence /ij/ or /uw/ (/kopij/, /kluw/), but their surface realisation lacks the vowel. This observation may be formulated as the following constraint:

(26) *HOMORGANIC VG (preliminary)
Homorganic vowel–glide sequences are disallowed.

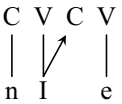
At this point, it is useful to compare the situation of homorganic VG sequences in NEC and French. French (like other languages) shows a reaction against homorganic VG whereby the V is deleted (ij → j; uw → w); this is called syneresis (e.g., Dell 1972; Klein 1992; Bullock 2002; Hualde 2020: 165 ff.). Thus in French, roots ending in /i, u, y/ appear as such in word-final position: *nie* [ni] 'deny.IND.SG', *loue* [lu] 'rent.IND.SG', *tue* [ty] 'kill.IND.SG'. When followed by a vowel-initial suffix such as infinitival /-e/, the hiatus is resolved through gliding, that is, the insertion of a glide corresponding to the preceding high vowel: [nij-e], [luw-e], [tyɥ-e]. The vowel may then optionally be omitted through syneresis: [nje], [lwe], [tɥe]. But not all homorganic VG sequences are affected by this process: the [ij] in *habille* [abij] 'clothe.IND.SG', *pétille* [petij] 'sputter.IND.SG', *fusille* [fyzij] 'shoot.with.a.rifle.IND.SG' and many others is stable when a vowel-initial suffix is added. Thus the infinitives of these three verbs are *habiller* [abij-e], *pétiller* [petij-e] and *fusiller* [fyzij-e], where the [i] cannot be left unpronounced: *[abj-e], *[petj-e] and *[fyzj-e] are ungrammatical. Hence, there are two types of homorganic VG sequences in French: one optionally undergoes syneresis, while the other cannot. The distinction between these types lies in the lexical presence or absence of the glide in the root: roots of the type *nie* 'deny.IND.SG' are V-final /ni-/, while roots like *habille* 'clothe.IND.SG' are Vj-final /abij-/.

This distribution also has a diachronic rationale: the stable glide goes back to a palatal lateral [ʎ], which was pronounced as such until the early 19th century (Nyrop 1899: §351) and is still reflected in spelling, while the unstable glide has no diachronic ancestor.

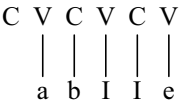
The two types of [ij] sequences may therefore be represented as in (27).

(27) *Two types of [ij]*

a. *A single |I| that spreads*
(French *nier* 'deny')



b. *Two independent |I|s*
(French *habiller* 'clothe')



The stable yod in (27b) is a segment in its own right that is independent of the preceding [i]: the [ij] sequence involves two |I|s. The structure is thus equivalent to non-homorganic VG sequences, as in

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(25c) [tʁavaj] 'work', except that the V happens to be |I|. By contrast, the unstable yod in (27a) is the result of the spreading of an /i/ to a following empty onset: there is only one |I| in this structure.

NEC also features the two types of [ij] sequences, but, as shown in (28), they are not distributed in the same way as in French. In NEC, syneresis occurs with the items in (28a) and (28b), which also show the extra [-e]. In the French cognates, syneresis can only apply to the items in (28b) (except when preceded by a TR cluster as in *trier* and *clouer*, a fact that has no bearing on the argument): it is impossible for those in (28a), which feature a former palatal lateral [ʎ].

NEC also has stable stem-final [ij] sequences, as in (28c): these never undergo syneresis, and no extra [-e] appears in the IND.SG. They always feature a former palatal lateral [ʎ] (and thus their French cognates are of this kind as well).

(28) *NEC: two types of [ij]*

	Verb		*Noun*		*French cognate*		*Gloss (for verb, in*
	__#	__-V	-ij	-i	__-INF		*both NEC and Fr.)*
	IND.SG	I/3.PL					
a.	gœʁj-e	gœʁj-ã	gʁij		*griller*	[gʁij-e]	'grill'
	vœʁj-e	vœʁj-ã	vʁij		*vriller*	[vʁij-e]	'turn suddenly'
b.	tœʁj-e	tœʁj-ã		tri	*trier*	[tʁij-e]	'sort'
	kopj-e	kopj-ã		kopi	*copier*	[kopj-e]	'copy'
	sj-e	sj-ã		si	*scier*	[sij-e]	'saw'
	kœlw-e	kœlw-ã		klu	*clouer*	[kluw-e]	'nail'
c.	abij	abij-ã		abi	*habiller*	[abij-e]	'clothe'
	ʃwij	ʃwij-ã		ʃwi	*cheviller*	[ʃøvij-e]	'peg'

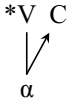
Our best guess is that in NEC, the two types which are distinguished in French as (27a) and (27b) diachronically merged into (27a). That is, all native NEC words, as in (28a) and (28b), are like (27a): they have a single |I| that spreads and thus undergoes syneresis. The NEC words in (28c) are loans from French and instantiate (27b): they do not undergo syneresis and show no extra [-e] for that reason.

Thus the NEC roots in (28a) lexically end in /-ij/ (/gʁij/), which has the structure in (27a): it appears as such in nouns ([gʁij] 'grill (N)') and undergoes syneresis when followed by a vowel ([gœʁj-ã] 'grill-I/3PL'). On the other hand, the NEC roots in (28b) are lexically V-final (/tʁi, klu/) and appear as such in nouns ([tʁi] 'sort (N)', [klu] 'nail (N)'). When used as verbs, they undergo adjustment (25b), which also produces (27a). Therefore, they are subject to syneresis and receive the extra [-e].

In sum, then, the two structures in (27) exist both in French and in NEC. In both languages, (27a) is subject to syneresis (optionally in French, obligatorily in NEC), while this process does not apply to (27b). In NEC, the extra [-e] is concomitant with syneresis – that is, it occurs if and only if syneresis does.

Given the distinction between (27a) and (27b), the constraint against homorganic VG sequences in (26) needs to be updated as in (29): its target is not *any* surface VG sequence, but specifically the type of VG sequence in (27a): a prime (|I| or |U|, represented by the variable α in (29)) that is attached to a nucleus and spreads onto the following onset.

(29) *HOMORGANIC VG (final)



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5.3. Syneresis

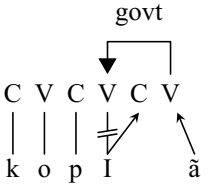
This section is concerned with lexical items instantiating the branching structure in (27a) that the constraint under (29) militates against. We first (in §5.3.1) look at stems that are V-final in the lexicon, as in (28b), then (in §5.3.2) at those that are already equipped with a homorganic VG sequence in the lexicon, as in (28a).

5.3.1. Stems ending in /-V/. For syneresis to apply, a vowel must follow the homorganic VG: the nucleus hosting the V which is vacated by syneresis (/ij/ → ∅j) needs to be governed. This is what Haworth (1994) and Charette (2003) argue for regarding French. In their analysis, syneresis is triggered by government, that is, government is its cause. While we agree that syneresis occurs under government, we believe that it has an independent cause: the process is about undoing the double association of the |I| in (27a) by severing its bonds with the nucleus. The empty nucleus thus created then requires government, in absence of which the structure is ill-formed and syneresis cannot go into effect.

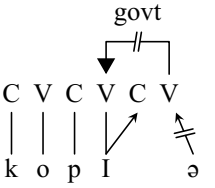
Whereas in French syneresis is optional, in NEC it seems to be obligatory. Before a regular suffix /-ã/, the position of the unpronounced high vowel is governed, and the elimination of the homorganic VG is achieved in a straightforward manner, as shown in (30a) (note that there is no IG between the |I| and the preceding consonant because the intervening V-slot is lexically filled). In contrast, a problem arises before the IND.SG suffix /-ə/, as shown in (30b). Recall from §4.2.4 that the suffixal vowel cannot associate with the final nucleus because final schwa is prohibited.

(30) *Elimination of homorganic VG before a full vowel suffix, problem before /-ə/*

a. IND.I/3PL [kopj-ã]



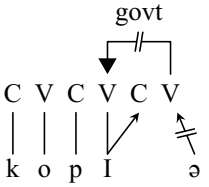
b. IND-SG *[kopij]



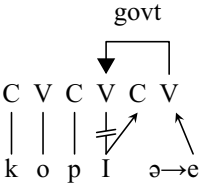
This, we propose, is the reason that the [-e] appears. Recall from §2.2 and §4.2 that /ə/ cannot appear (as [œ]) in word-final position because it is banned from open syllables. It strengthens to [-e] after homorganic VG as in (31b) in order to be able to appear word-finally and thus to make syneresis viable. This fortition is phonological (rather than merely concerning phonetic implementation): only a modification of the segmental makeup ∅-A can do away with the weakness of the vowel and allow it to occur word-finally. The fortition of schwa thus involves the epenthesis of an |I| element, changing ∅-A to I-A [e]. This vowel can associate with the final empty nucleus and enable syneresis, that is, the elimination of the offending homorganic VG sequence, as shown in (31).

(31) *Fortition /ə/ → [e]*

a. IND-SG *[kopij] (=(30b))



b. IND-SG [kopj-e]



The suffixal /-ə/ does not undergo metathesis as in (20b) (IND-SG /sykʁ-ə/ → [sykœʁ] 'sugar') because unlike in /sykʁ-ə/, the V-slot that metathesised /ə/ would target is already associated with |I|, as shown in (31a) (/kop**ij**-ə/). Since syneresis cannot apply without a following vowel, the lexically

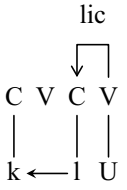
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associated |I| is present when the suffixal schwa is concatenated, and therefore blocks metathesis. This causes fortition, and the schwa in its strengthened guise as [e] can associate with the FEN, making metathesis unnecessary: now syneresis can go into effect.

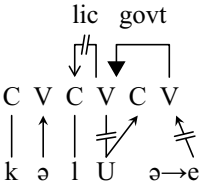
Finally, note that syneresis sometimes brings about another problem that requires repair. In the base noun /klu/ → [klu] 'nail' in (32a), the stem-final vowel licenses the preceding TR cluster, and the item appears as such on the surface. In the adjusted verbal stem /kluw/, however, syneresis eliminates the high vowel and thus leaves the preceding TR cluster unlicensed throughout the paradigm, as in (32b) and (32c). This situation triggers the appearance of an [œ] in the first nucleus, which is now ungoverned, as shown in (32b) and (32c). Recall from §2.3 that it is hard to tell whether this [œ] is epenthetic or present in the lexicon (its absence in (32a) is only due to expository reasons).

(32) *Epenthesis triggered by following syneresis (VG → G)*

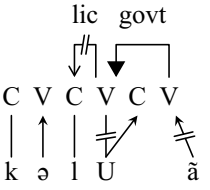
a. Noun [klu]



b. IND-SG [kœlw-e]



c. IND.I/3PL [kœlw-ã]

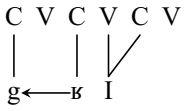


To summarise, according to our analysis, the same suffix /-ə/ that produces metathesis with TR-final verbal stems undergoes fortition in homorganic VG-final stems, because the nucleus that would be the target of the metathesised vowel is already associated with another vowel (as in (31a)); this blocks metathesis. The question thus arises why fortition, being a possible repair, is not resorted to in TR-final stems. That is, why is /sykr-ə/ 'sugar-IND.SG' not realised as *[sykr-e] with strengthened schwa? We answer this question in §6 below, where we argue for a constraint ranking that derives a hierarchy of solutions: fortition occurs only if metathesis is impossible.

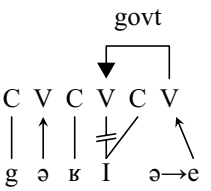
5.3.2. Stems ending in a homorganic VG sequence. Items of the /gʁij/ type in (28a) are interesting because the lexical homorganic VG sequence is not repaired. The related verbs, however, behave like the V-final stems discussed in the previous section: they take the extra [-e] and undergo syneresis as shown in (33b) and (33c). Also, initial TR clusters are broken up. Thus, /gʁij-ã/ → [gœʁj-ã] 'grill-I/3PL' (with lexical /ij/, in (28a)) is just like /kluw-ã/ → [kœlw-ã] 'nail-I/3PL' (with lexical /u/, in (28b)).

(33) */VG/-final stem: noun* vs. *IND.SG*

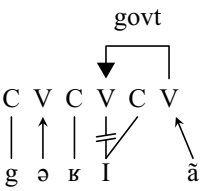
a. Noun [gʁij]



b. IND-SG [gœʁj-e]



c. IND.I/3PL [gœʁj-ã]



As in the case of TR-final stems (metathesis in verbs, R loss in nouns), distinct solutions are adopted in the noun and the verb: the noun is left intact, while the verb is repaired through strengthening of the suffixal /-ə/. The reason for this asymmetry and the one observed in TR-final stems is the same: only in verbs is there a suffix /-ə/ that may undergo fortition; in the noun, this repair is not available. Thus, nothing can be done to save the R in TR-final nouns, and nothing can be done against the dispreferred /ij/ in /gʁij/ 'grill' given the repair strategies chosen in NEC. That is, the constraint against homorganic VG sequences in (29) is violable. In §6, we also discuss other possible repairs such as the loss of the stem-final glide (/gʁij/ → *[gʁi]), which are not adopted by the language.

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5.4. Additional support: [œ]/[e] alternations in Group 3

Alongside the infinitive /-ʁ/, verbs of Group 3 are characterised by a specific stem alternation: the last consonant of the stem is missing in the IND.SG. In the subjunctive, this missing consonant reappears, even though there is no suffix on the surface. For instance, for the verbal root 'sell' in (34a), the consonant /d/ is missing in the IND.SG. Now consider the three verbs in (34b)–(34d). They exhibit the same C–zero alternation, except that the subjunctive is of the form [C**œ**C]; the suffixed form IND.I/3PL loses the [œ] and becomes [CC-]; but, crucially, the IND.SG, lacking the final consonant, exhibits the vowel [e], appearing as [Ce].[20]

(34) *[œ]/[e] alternation in Group 3*

	a. 'sell'	b. 'put'	c. 'must'	d. 'see'
IND.SG	vã	me	de	ve
IND.I/3PL	vãd-ã	mt-ã	dv-ã	vjã
SUBJ.SG	vãd	mœt	dœv	vœj

The alternations in (34b)–(34d) are perfectly regular if one assumes that the underlying form of these verbs is /CəC/. When the final consonant is missing, the lexical /ə/ finds itself in an open final syllable. Since it is the only vowel of the stem, it cannot delete.[21] However, because this vowel is /ə/, it cannot be realised faithfully in the final syllable; instead, it undergoes fortition to [e]. We thus take the alternations in (34) to provide independent support for the proposed fortition process, which not only concerns the suffix /-ə/, but also the root vowel /ə/ when placed in an open syllable.[22]

To summarise, we have proposed a unified account of the data, in that all differences between nouns and verbs follow from the presence of a suffix /-ə/ in verbs, which is absent in nouns. Independent support was provided by considering Group 3 verbs: the infinitives of consonant-final stems in this group predictably lack the expected /ʁ/, and the root vowel /ə/ of /CəC/ stems strengthens to [e] when word-final.

6. Deriving the hierarchy of solutions

In this section, we formalise the hierarchy of solutions that needs to be assumed in NEC so that each of the patterns discussed is resolved in the attested manner. The facts to be accounted for are recapitulated in (35). In verbs, the suffixal /ə/ remains unpronounced after an RT cluster as in (35a); it metathesises with a preceding R when preceded by a stem-final TR cluster as in (35b), and strengthens into [e] after homorganic VG as in (35c). In nouns, final RT clusters and final homorganic VG sequences remain unaltered as in (35a) and (35c), but final TR clusters lose their liquid as in (35b).

(35) *Patterns and solutions observed*

		Realisations		*Examples*		
		Verb /-ə/	*Noun*	*Verb*	*Noun*	
a.	RT#	RT#	RT#	[ʃaʁʒ]	[ʃaʁʒ]	'load'
b.	TR#	TœR#	T#	[sykœʁ]	[syk]	'sugar'
c.	CV(G)#	CGe#	CV(G)#	[gœʁje]	[gʁij]	'grill'

The formalisation is couched in OT (Prince & Smolensky, [1993] 2004). We follow the view expressed both within OT (Rice 2007; Smith 2007; Uffmann 2007; Jaker 2023) and from the outside

[20] The verbs 'put' and 'see' have alternative IND.SG forms in free variation that do include the final consonant, that is, [mœt] and [vœj].

[21] Function words, as in French, can be purely consonantal; this may be due to the fact that they are clitics; and therefore, do not form a domain on their own. But content words always contain a vowel.

[22] Another [œ]/[e] alternation is found in the adjective [se] 'dry.M', [sœʃ] 'dry.F'. Compare this with the pair [mø] 'ripe.M', [mœʁ] 'ripe.F', which involves an underlying /ø/.

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of this theory (Vaux 2005; Rasin & Katzir 2015; Vaux & Samuels 2018; Rasin, in press) that Richness of the Base (McCarthy 2002: 70–71) may be inadequate: there is reason to believe that restrictions on the input exist.

The first four constraints to be considered are all undominated in NEC: they appear in (36). Sonority, in (36a), rules out final unlicensed TR and CG clusters – that is, TR and CG clusters that are not followed by a full vowel – in line with the discussion in §3.2. The definition of this constraint in the present context uses the terms of Strict CV, but replicates the Sonority Sequencing Generalisation (SSG; Clements 1990) as it is used in constraint form in the cited sources. The constraint *ə# in (36b) rules out weak (empty-headed) vowels at the edge of the word. Recall that the realisation [œ] is only the phonetic interpretation of /ə/. Since the candidates in tableaux correspond to a stage prior to purely phonetic effects – the 'surface form' as opposed to the 'phonetic form', in the terms of Boersma & Hamann (2008) – they will appear with [ə] rather than [œ]. That is, during phonological computation relating the input to the output only schwa occurs. This schwa present in the phonological output is then converted into [œ] post-phonologically.

Moving on, (36c) Head-Dep is a common constraint used to express the problem of stressing epenthetic vowels, discussed around (16). Finally, the constraint FaithVAss in (36d) militates against a V-slot associated with a vowel in the lexicon becoming associated with another vowel. Crucially, as we will see below, it is phrased such as to penalise not dissociation, but rather association of a V-slot to a vowel other than the one it was associated with underlyingly.[23] As mentioned, the constraints in (36a)–(36c) have numerous precedents in the literature (with slightly different definitions); (36d) is somewhat special to the present account, since it is intended to disallow the replacement of one vowel by another, but not the filling of an empty nucleus; OT analyses rarely involve empty nuclei.

(36) *Undominated constraints*

a. Son(ority) (e.g., Bat-El 1996, Hall 2002)
Assign one violation for any unlicensed relation of Infrasegmental Government.

b. *ə# (e.g., Kennedy 2008)
Assign a violation for the empty-headed (∅,A) at the right word edge.

c. Head-Dep (Alderete 1999)
Assign a violation for each prosodic head in the output that is not part of the input.

d. FaithVAss
Assign a violation for every V-slot associated with V_i in the input that is associated with V_j in the output.

The next four constraints, in (37), are crucially dominated by the ones in (36), and ranked in the order shown. (37a) does not require motivation. (37b) is the constraint that drives syneresis. It is a VG-specific version of the constraint Integrity in McCarthy & Prince (1995), which bans one-to-many associations.[24] (37c) is also a standard constraint; here, it is intended to rule out fortition. Finally, (37d) Linearity is a standard constraint against metathesis.

(37) *Dominated, ranked constraints*

a. MaxC
Assign one violation to every underlying association with a consonant that is not preserved in the output.

b. *H(omorganic)B(ranching)VG
Assign one violation to every homorganic vowel–glide sequence where the prime(s) associated with a nucleus is/are also associated with a following onset.

[23]This constraint can also be regarded as ruling out vowel harmony and metaphony, insomuch as such processes involve the association of one lexical vowel to positions underlyingly occupied by other vowels.

[24]In the analysis below, we assume that the branching association of homorganic VG sequences is underlying, as in (27a). For these inputs, we do not consider candidates that introduce a separate element, as in (27b).

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c. IDENTV
Assign one violation to every vowel whose surface featural make-up differs from its underlying featural make-up.

d. LIN(EARITY) (McCarthy & Prince 1995)
Assign one violation to every pair of segments a…b whose order is inverted in the output.

In the tableaux below, we only include stress-final candidates, final stress being exceptionless in NEC. For explicitness, stress is nevertheless marked by an acute accent.

A tableau for an RT-final noun is given in (38). Underscores in candidates represent empty V-slots. Candidates (38b)–(38d) involve a stressed epenthetic vowel as the last nucleus of the stem, thus violating HEAD-DEP (recall that stress is final in NEC). Candidate (38e) violates MAXC by deleting the final consonant. Candidate (38c) also violates the constraint against the realisation of a weak vowel at the word edge. Note that candidates with epenthetic vowels in (38) do not violate IDENTV, because epenthetic vowels realise empty nuclei.

(38) *RT-final noun: faithful candidate optimal*

C V C V C V | | | | ʃ a ʁ ʒ		*ə#	SON	HEAD DEP	FAITH VASS	MAXC	*HBVG	IDENTV	LIN
Faithful	☞ a. ʃáʁ_ʒ_								
e# epen.	b. ʃaʁ_ʒé			∗!					
ə# epen.	c. ʃaʁ_ʒə́	∗!		∗					
CəC# epen.	d. ʃaʁə́ʒ_			∗!					
Final C del.	e. ʃáʁ_					∗!			

In the representational analysis, we argued that the corresponding verb has an underlying suffix /-ə/ in the seemingly unsuffixed IND.SG. The tableau in (39) shows why that final /ə/ is expected to be deleted from the surface representation. Again, the final C cannot be deleted due to MAXC (candidate (39e)). /ə/ cannot be realised at the right edge in its regular realisation (candidate (39c)), as this is a violation of *ə#. Fortition (candidate (39b)) and metathesis (candidate (39d)) violate IDENTV and LINEARITY, respectively. Candidate (39a), which does not realise the suffixal /-ə/, is optimal.[25] Note that candidates (39b)–(39d) do not violate HEAD-DEP, because the /ə/ is not epenthetic. This tableau motivates the ranking of MAXC above IDENTV and LIN.

(39) *RT-final verb: deletion of final lexical /ə/*

C V C V C V | | | | ʃ a ʁ ʒ ə		*ə#	SON	HEAD DEP	FAITH VASS	MAXC	*HBVG	IDENTV	LIN
ə# del.	☞ a. ʃáʁ_ʒ_								
ə# fortition	b. ʃaʁ_ʒé							∗!	
ə# assoc.	c. ʃaʁ_ʒə́	∗!							
Metathesis	d. ʃaʁə́ʒ_								∗!
Final C del.	e. ʃáʁ_					∗!			

[25] We do not include in our tableaux a constraint that would penalise the deletion of a final schwa. We assume that this constraint is ranked below all the constraints mentioned.

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For a TR-final noun such as /sukʁ/ in (40), a fully faithful realisation (candidate (40a)) violates Sonority. Candidates (40b)–(40d) involve epenthesis into the last realised V-slot, violating Head-Dep. The remaining candidate (40e) wins, despite its violation of MaxC. This tableau motivates the ranking of MaxC below the constraints in (36).

(40) *TR-final noun: deletion of final R*

C V C V C V | | | | s y k ← ʁ	*ə#	Son	Head Dep	Faith VAss	MaxC	*HBVG	IdentV	Lin
Faithful a. súk_ʁ_		*!						
e# epen. b. syk_ʁé			*!					
ə# epen. c. syk_ʁə́	*!		*					
CəC# epen. d. sykə́ʁ			*!					
Final C del. ☞ e. sýk_					*			

Note that the input involves Infrasegmental Government. We assume this is the case for all TR-final stems, possibly through a morpheme structure constraint. Again, we do not consider cases where an input would not involve such a relation, because we do not follow Richness of the Base. Also recall from fn. 18 that there are a number of possible repairs which are not discussed here, including the deletion of T in TR-final stems or the government of the empty nucleus in the middle of the TR cluster by the FEN. Constraints could be devised against these outputs, but we follow the common practice in OT to not burden tableaux with all possible repairs.

The tableau in (41) shows the same stem when it is suffixed with /-ə/ in the IND.SG. Again, candidates (41b)–(41d) do not violate Head-Dep, because the /ə/ vowel is part of the input. For this reason, candidate (41e), which was the winner in the unsuffixed noun despite its violation of MaxC, incurs a fatal violation in the suffixed verb. Of the two remaining candidates, (41b) and (41d), the one with the violation of Linearity is preferred, because the anti-fortition constraint IdentV is ranked higher. This constraint ranking expresses the 'hierarchy of solutions' mentioned in §5: it is more costly to strengthen the final /ə/ than to have it break a final illicit sequence. This tableau motivates the ranking of IdentV above Linearity.

(41) *TR-final verb: metathesis*

C V C V C V | | | | s y k ← ʁ ə	*ə#	Son	Head Dep	Faith VAss	MaxC	*HBVG	IdentV	Lin
ə# del. a. súk_ʁ_		*!						
ə# fortition b. syk_ʁé							*!	
ə# assoc. c. syk_ʁə́	*!							
Metathesis ☞ d. sykə́ʁ								*
Final C del. e. sýk_					*!			

The next two tableaux illustrate how the same ranking produces the correct results for the stem /gʁij/. The tableau in (42) shows the noun. Again, any epenthesis in the last realised V-slot, strengthened or not, is ruled out by Head-Dep (candidates (42b)–(42c)). Importantly for what follows, candidate (42d) also violates FaithVAss, by replacing the lexically associated /i/ with another vowel. Deleting the vowel of the offending VG sequence would create a violation of Sonority (candidate (42e); Head-Dep is also

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violated for this specific homorganic VG-final input, as an epenthetic vowel will have to be stressed). Deleting the /j/ in order to satisfy *HBVG (candidate (42f)) is ruled out by MaxC. The homorganic sequence /ij/ is preserved in the optimal candidate (42a) despite the violation of *HBVG.[26] This tableau motivates the ranking of MaxC above *HBVG.

(42) *Homorganic VG-final noun: faithful candidate optimal*

C V C V C V | | | g ʁ I	*ə#	Son	Head Dep	Faith VAss	MaxC	*HBVG	IdentV	Lin
Faithful ☞ a. g_ʁíj_						*		
e# epen. b. gœʁ_jé			*!					
ə# epen. c. gœʁ_jə́	*!		*					
CəC# epen. d. g_ʁə́j_			*!	*			*	
V del. e. gœ́ʁ_j		*!	*					
Final C del. f. g_ʁí					*!			

A verbal form like /gʁij-ə/ produces a different result, again because the realisation of /-ə/ is not ruled out by Head-Dep. The metathesis solution that applied to /sykʁ-ə/ is ruled out for /gʁij-ə/ because it violates FaithVAss, by replacing the lexically-associated /i/ with another vowel. Deleting the final /j/ is more costly than either strengthening the final /ə/ or leaving the homorganic VG intact, because of the assumed ranking MaxC ≫ *HBVG ≫ IdentV. This tableau, like (41), expresses the proposed hierarchy of solutions: metathesis can occur as in (41), unless that involves occupying a position that is lexically associated with another vowel. Also note that insofar as /ə/ is present in the input, the winning candidate does not violate Dep.

(43) *Homorganic VG-final noun: final /ə/ fortition*

C V C V C V | | | g ʁ I ə	*ə#	Son	Head Dep	Faith VAss	MaxC	*HBVG	IdentV	Lin
ə# del. a. g_ʁíj_						*!		
ə# fortition ☞ b. gœʁ_jé								
ə# assoc. c. gœʁ_jə́	*!							
Metathesis d. g_ʁə́j_				*!			*	
V del. e. gœ́ʁ_j		*!	*					
Final C del. f. g_ʁí					*!			

To summarise, it was shown that there is a hierarchy of constraints such that the correct forms in (35) are produced, and the above-mentioned hierarchy of solutions is obtained. The constraint hierarchy is given in (44):

(44) *Constraint hierarchy*
*ə#, Sonority, Head-Dep, FaithVAss ≫ MaxC ≫ *HBVG ≫ IdentV ≫ Linearity

It emerges that in NEC, consonantal associations can be undone if they interfere with sonority requirements, but not if there is a suffixed /ə/ that can occupy the penultimate empty nucleus through

[26] We do not include candidates with syneresis but without the epenthetic vowel in the first syllable, for example, *[gʁje]. Such candidates violate Sonority as defined, since the they involve an empty nucleus after an IG domain: [g←ʁ_je].

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metathesis. Metathesis cannot occur if that nucleus is not underlyingly empty. Instead, the same suffixed /ə/ will undergo fortition if that can eliminate a homorganic VG sequence; but it will remain unpronounced otherwise.

The formalisation in this section joins previous work (Polgárdi 2014; Faust & Torres-Tamarit 2017) in showing that there is no contradiction between the representations of Strict CV and OT computation. Like these studies, it illustrates some of the constraints that emerge from that combination. For instance, it is in line with the spirit of the theory to have constraints referencing the relation between a lexical vowel and its slot, such as FAITHVASS, which do not apply to empty nuclei.

7. Alternative analyses

The analysis proposed here has the advantage of unifying the account of TR-final and homorganic VG-final verbs and nouns. Thus, the extra [œ] in /TR/-final verbal stems is underlyingly the same as the extra [-e] appearing after homorganic VG-final stems; also, the repair of TR-final nouns and Group 3 infinitives is motivated by the same rationale as the absence of repair in homorganic VG-final nouns. Finally, our account generalises the diachronic metathesis /TRə/ → [TœR]: it is also synchronically active at the right edge of the word.

For an alternative account to be preferred to this one, we believe that it should have the same virtue of unification. In this section, we consider two alternatives that rely not on underlying differences between verbs and nouns, but rather on the mere difference in category. In other words, we consider accounts assuming that the input for unsuffixed verbs and nouns is the same, not different, as in our account.

First, we examine the predictions of an account which assumes different grammars for nouns and verbs; then, we consider an analysis based on the type of analogy known as Paradigm Uniformity.

7.1. Category-specific phonology

7.1.1. Can phonology make direct reference to morphosyntactic labels? Category-specific phonology is a phenomenon whereby the phonology of a language treats items belonging to major syntactic categories (noun, adjective, verb) in different ways (see the cross-linguistic overview in Smith 2011). A case in point is English stress assignment, which is sensitive to the distinction noun *vs.* verb (Chomsky & Halle 1968: 69–100), producing pairs such as *récord–recórd, cóntest–contést, pérmit–permít,* where the items with penultimate stress are nouns, while verbs show final stress.

Category-specific phonology may be approached by simply transcribing the observation into phonological instructions, which will be split into two types, those applying to nouns and those applying to verbs. Thus, Smith (2001) covers a number of patterns found in different languages with noun-specific faithfulness constraints, and there are a number of different ways to technically implement the direct reference of phonological computation to syntactic categories, including indexed constraints (Pater 2000) and cophonologies (Anttila 2002).

A concern when phonology makes direct reference to syntactic items is that this appears to be incompatible with modularity (Fodor 1983; Coltheart 1999): computational systems such as syntax and phonology are domain-specific, that is, they operate only over their own proprietary vocabulary and are thus oblivious to foreign items. As was mentioned earlier, this is the heart of Prosodic Phonology's Indirect Reference (Nespor & Vogel 1986: 3), which in the 1980s opposed Direct Syntax approaches. Category-specific phonology, that is, making phonological computation sensitive to syntactic labels, is a modern incarnation of Direct Syntax. For this and other reasons, alternatives to the mere transcription of the observation into phonological computation have been sought.

Two main avenues are pursued in the literature. In the first, the relevant distinction is not between syntactic categories, but rather between bound and free roots (Optimal Paradigms; Kenstowicz 1996; Cable 2004; McCarthy 2005). That is, noun stems can often appear without further affixes (free), while verb stems may not be able to surface alone (bound).

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The second solution is somewhat akin to this idea, but has a different implementation: verbs have more internal morphosyntactic structure than nouns, and this is reflected in the spell-out. Thus, phonology may receive nouns as one piece (they represent a single cycle or phase), while verbs are multiphasal and thus enter the phonology in successive pieces. For instance, in Itelmen (Chukotko-Kamchatkan family, Kamchatkan peninsula), Bobaljik (2008: 44–46) argues that a rule of epenthesis applies at every cycle within a verb, but only to the noun as a whole. Verbal stress in Cupeño is analysed along the same lines by Barragan & Newell (2003). In this perspective, the noun–verb distinction only exists in the morphosyntax where it produces different structures: phonology never makes reference to syntactic labels, but merely computes items with distinct phase/cyclic structure.

The question is whether all cases of category-specific phonology can be reduced to this kind of modularity-compliant analysis. Smith (2011: 2453) says they cannot, arguing that a residue of patterns resists this perspective.

The present article may be viewed as a contribution to this debate: the analysis takes the NEC pattern back to normal, non-transderivational morphological exponence followed by regular phonological computation in which phonology makes no reference to syntactic category. The way this is achieved follows the basic insight of the two perspectives mentioned above, that is, the fact that verbs are morphologically more complex than nouns. In the case of NEC, this is not manifested as a distinction between free *vs.* bound morphemes or different phasal/cyclic structure. Rather, it is the simple presence of an affix in verbs, against its absence in nouns, that causes the phonological contrast observed.

The case of category-specific phonology in fact falls into a larger class of phenomena whose surface description involves direct reference either to non-phonological items in the phonology or, conversely, to phonological items in the morphosyntactic component (look-ahead). A growing body of literature aims at reducing these phenomena to regular spell-out and regular phonology, thus doing away with diacritics in phonological computation that are used, for example, when reference is made to word classes (Lampitelli 2013a; Barillot *et al.* 2018; Trommer 2021; Alexei & Ulfsbjorninn 2022), items of the prosodic hierarchy (Beausoleil & Newell 2023) or morpheme-specific phonology (Faust & Lampitelli 2017; Newell 2021b). The reanalysis of the latter also reduces multiple mini-phonologies (cycles, strata) to just a single computational system. Other aspects of this trend address reduplication (Zimmermann 2021) and the reinterpretation of allomorphy as pure phonology, that is, where all surface forms are derived from a single underlying form (Larsen 1998; Lampitelli 2010, 2013a; Passino 2014; Scheer 2016; Faust *et al.* 2018; Ziková & Faltýnková 2021). In all cases, the virtue (getting rid of modularity violations, diacritics and allomorphy) is achieved by building on enriched phonological representations.

7.1.2. Category-specific phonological computation and a unified analysis. The issue that category-specific phonological computation raises regarding modularity may be reason to prefer alternative analyses like, in our case, the presence *vs.* absence of a suffix. But it also appears that, beyond this more general debate, category-specific phonological computation faces an intrinsic challenge in the case of the NEC pattern: we argue that it is unable to provide a straightforward unified analysis of the two types of roots considered here, -TR# and -VG#.

There are at least two ways of formalising the difference between nouns and verbs without assuming different inputs. The most obvious option is to assume that the extra [œ] and [e] in verbs are epenthetic, and epenthesis is allowed in verbs (IND.SG /sykʁ/ → [sykœʁ] 'sugar.IND.SG'), but not in nouns (/sykʁ/ → *[sykœʁ] 'sugar'). In Optimality Theoretic terms, this means that DEP is ranked higher in nouns than in verbs. Infinitives behave like nouns (/vãd-ʁ/ → *[vãd-œʁ] 'sell-INF') because they are nominal.

Like our proposal, this approach unifies the reason for deletion of R in TR# (/sykʁ/ → [syk] 'sugar') and the absence of homorganic VG repair (/gʁij/ → [gʁij] 'grill') in nouns. In both, the epenthetic repair that is available in verbs is ruled out by the high-ranked DEP. However, all other things being equal, this solution makes the prediction that epenthesis should be ruled out in nouns in general. This prediction is not borne out: when /TR/-final nouns receive a C-initial suffix, epenthesis occurs in the

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middle of the TR cluster, for example, [syk] 'sugar' - [sykœʁ-ʁi] 'candy' (§2.3). To repair this effect, one could try to limit the ban on epenthesis in nouns to the right edge, as we have done by disallowing stressed epenthetic vowels. But crucially, that would lead to assuming different stress grammars for nouns and verbs – epenthetic vowels would be stressable in verbs – in a language which is otherwise straightforwardly stress-final. It seems to us that insofar as this proposal is falsifiable, it is falsified by items like [sykœʁ-ʁi] 'candy'.

A second formalisation of the difference between nouns and verbs would use MAX rather than DEP, again assuming [œ] and [e] are epenthetic in verbs. The deletion of R would be illicit in verbs because of the a high-ranked constraint MAX (/sykʁ/ → *[syk] 'sugar.IND.SG'), and epenthesis would follow; but in nouns, deletion would be allowed (/sykʁ/ → [syk] 'sugar'). This solution fares less well than the previous one, in that it has nothing to say of roots with final homorganic VG. Since no R is deleted anywhere in this pattern, the result of both types of homorganic VG-final stems, where VG is either lexical (in nouns: /gʁij/ 'grill') or derived (in verbs: /kopi/ → /kopij/ 'copy.IND.SG'), should be the same. In other words, an analysis using MAX focuses only on R deletion: it has nothing to say about VG-final nouns and verbs not behaving alike. Verbs (with derived VG) surface with an extra [-e] (/kopij/ → [kopj-e] 'copy-IND.SG'), while nouns (with lexical VG) remain unrepaired (/gʁij/ → [gʁij] 'grill'). Recall that our analysis kills these two birds (TR- and VG-final stems) with one stone.

In addition, since neither the DEP-based nor the MAX-based category-specific accounts employ a suffix /-ə/ in verbs, neither is able to tie together the occurrence of [œ] in [sykœʁ] 'sugar.IND.SG' and the diachronic metathesis TRə > TəR ([gʁœnuj] > [gœʁnuj] 'frog'; see §2.4). In our analysis, both are the result of the same process.

Finally, the strongest argument against several category-specific phonologies may be that the difference between verbs and nouns remains unmotivated: why is epenthesis allowed in verbs but not in nouns, rather than the other way around? If anything, the reverse is expected given the cross-linguistic generalisation made by Smith (2011: 2439): in category-specific patterns, nouns have 'the ability to support a greater array of phonological contrasts, whether this is manifested as a larger number of underlying distinctions, more variety in surface patterns, or a greater resistance to assimilation or other phonological processes'. In the NEC pattern, nouns, not verbs, are thus expected to sustain the R of TR# clusters.

In the absence of a reason why verbs, rather than nouns, maintain the R, category-specific phonologies do little more than ignore the explanandum – or, possibly, claim that it does not require explaining. Conversely, in our account, the difference follows from the cross-linguistically recurrent appearance of agreement suffixes on verbs, but not on nouns.

7.2. Paradigm Uniformity

Another way of motivating the difference between nouns and verbs exploits the fact that the seemingly unsuffixed IND.SG is just one inflected form of the verb. Nearly all other verbal forms in NEC are suffixed, mostly with V-initial suffixes, for example, IND.I/3PL [sykʁ-ã]. Such suffixes allow the realisation of the final liquid. Nouns, in contrast, are only suffixed in derivation, as in /sykʁ-ʁi/ → [sykœʁʁi] 'candy' above. Therefore, one may posit that the suffixed forms of verbs put pressure on the unsuffixed forms, but that nouns are not subject to this pressure, because there are no suffixed forms in their inflectional paradigm. Such effects are known as 'Paradigm Uniformity' (Downing *et al.* 2005): because one form of the paradigm behaves in some way due to a surface-true trigger, another one behaves in that way, too, even though the trigger is absent.

The obvious disadvantage of such an approach is transderivationalism: the treatment of one underlying string would be dependent on the result of the treatment of another. Let us nevertheless examine what an analysis of the patterns discussed along these lines would look like. Again, we assume that, unlike in our own analysis, the stem is underlyingly identical in both verbs and nouns; otherwise, there is no reason to attempt to derive the difference from Paradigm Uniformity.

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Again, in our case, an account based on Paradigm Uniformity would argue that deletion of the R in an unsuffixed IND.SG form /sykʁ/ → *[syk] is problematic because the R is realised in the suffixed IND.1/3PL [sykʁ-ã] and uniformity is enforced in paradigms. This cannot be the whole story, because we know that in other respects, paradigms are allowed to be non-uniform. For instance, in IND.SG–IND.1/3PL pairs such as [sykœʁ]–[sykʁ-ã] 'sugar' and [kaʁœl]–[kaʁl-ã] 'tile', [œ] is present in the stem-final cluster in unsuffixed forms but absent in suffixed forms, creating different syllable structures within the same paradigm. If Paradigm Uniformity were a general requirement, it would generate the incorrect but phonotactically licit paradigm *[kaʁl]–[kaʁl-ã]. Instead, it must target a more specific aspect of the stem. One possibility is to assume, alongside a general deletion process for TR-final stems, a Paradigm Uniformity constraint requiring that the *consonants* of all stems in a paradigm be identical. Thus, again, deletion of the R in an unsuffixed IND.SG form /sykʁ/ → *[syk] is prohibited because the R is realised in the suffixed IND.1/3PL [sykʁ-ã]. Conversely, in nouns, since there are no suffixed forms in the paradigm, deletion may apply. This Paradigm Uniformity constraint would not be affected by the epenthesis in /sykʁ/ → [sykœʁ].

This analysis does not immediately offer an account for homorganic VG-final stems. An IND.SG–IND.1/3PL paradigm without syneresis, for example, *[gʁij]–[gœʁj-ã] 'grill' (the observed pair being [gœʁj-e]–[gœʁj-ã]), does not violate the constraint, as the consonants of the paradigm remain untouched. One may assume, as we have, that there is an *additional* constraint against homorganic VG, and this constraint is obeyed through the addition of an *epenthetic* [e] (not the fortition of a suffix /-ə/) in the observed paradigm [gœʁ**j**e]–[gœʁj-ã]. Thus, on this account, the reason for epenthesis in TR-final and homorganic VG-final verbs is not uniform: non-phonological pressure due to Paradigm Uniformity in TR-final stems, as opposed to the markedness constraint against homorganic VG in Homorganic VG-final stems. Moreover, by separating these two stem types in this way, the account makes a wrong prediction: since epenthetic [e] in verbs is unrelated to paradigmatic effects, it is expected to occur in nouns, too. Yet, as we have seen repeatedly, it does not: /gʁij/ remains [gʁij] 'grill (N)'. We conclude that a Paradigm Uniformity account that is as unified as our own is not straightforwardly available.

Like the category-specific accounts discussed, another aspect of the facts that the Paradigm Uniformity account fails to express is the link between the verbal [sykœʁ] 'sugar.IND.SG' and the general metathesis /TRə/→[TœR] in the language.

Finally, another obvious problem with Paradigm Uniformity as a phonological force is that some paradigms are not uniform in the same way as others. This is true, for instance, of many verbs in Group 3, where the suffixed form (and the unsuffixed subjunctive) carry an additional consonant, for example, [vã] 'sell.IND.SG', [vãd-ã] 'sell.1/3PL' (see (34)). There is no phonological problem with having an IND.SG *[vãd], yet such paradigms are exempt from analogical modification. To formalise this exception, one would have to restrict the Paradigm Uniformity constraint to verbs of Group 1, that is, make it diacritic-specific. In our opinion, this raises the price of an analogical analysis even higher than it already was due to transderivationalism.

We mentioned in the beginning of this article that we adhere to a classic, 'one UR, one phonology' approach. We hope to have argued here that competing approaches, while they might initially seem tempting, either do not provide a unified analysis, or make incorrect predictions, or are prone to additional complications that are best avoided.

8. Conclusion

This article concerned data from a little-known Gallo-Romance variety located in the contact area between Oc and Oïl languages known as the linguistic Croissant. Examining the indicative verbal paradigm and its differences with related nominal forms, we argued that the seemingly unsuffixed IND.SG in fact involves a suffix /-ə/. Thus, what seems to be a word-final consonant is in fact underlyingly non-final.

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The analysis is recapitulated in (45). Depending on the phonological form of the stem, the truly final segment /-ə/ undergoes a process of metathesis that is general in the language, as in (45a); remains unpronounced, as in (45b) and (45c); or is strengthened to [e] in its original word-final position, as in (45d). The differences in the parallel nouns (45e)–(45h) follow from the absence of any suffix.

(45) *Proposed analysis (repeated from (3); glosses in (1))*

	Verbal IND.SG					*Noun*			
	Underlying		*Surface*	*Repair*		*Underlying*		*Surface*	*Repair*
a.	/sukʁ-ə/	→	[sykœʁ]	metathesis	e.	/sykʁ/	→	[syk]	loss of R
b.	/kõsɛj-ə/	→	[kõsɛj]	none	f.	/kõsɛj/	→	[kõsɛj]	none
c.	/ʃaʁʒ-ə/	→	[ʃaʁʒ]	none	g.	/ʃaʁʒ/	→	[ʃaʁʒ]	none
d.	/gʁij-ə/	→	[gœʁje]	fortition	h.	/gʁij/	→	[gʁij]	none

Data from Group 3 verbs support the analysis in (45). Infinitives like /vãd-ʁ/ 'sell-INF' surface without the suffix /ʁ/ for the same reason as nouns like (45e), and stems like /mə/ 'put.IND.SG' surface with a strengthened /ə/ as [me], for the same reason as (45d).

We have also attempted to argue against alternative analyses that do not implement a suffix /-ə/ and where stem-internal [œ] and the extra [e] instead are regarded as epenthetic. Such analyses, we argued, are unable to provide an account which is as uniform as our own.

Finally, the analysis presented may be viewed as a contribution to the more general trend that, given modularity, takes issue with the presence of morphosyntactic information in phonological computation (as well as with the presence of phonological information in morphosyntactic computation, such as allomorphy). Among the various phenomena targeted by this trend, the specific concern in this article is category-specific phonology. In all cases, the modularity-compliant solution aims at reducing the analysis to regular exponence and regular phonology.

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