

Loanword Phonology, Lexical Exceptions, Morphologically Driven Underapplication, and the Nature of Positionally Biased Constraints*

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Abstract

In this paper we provide a formal account for underapplication of vowel reduction to schwa in Majorcan Catalan loanwords and learned words. On the basis of the comparison of these data with those concerning productive derivation and verbal inflection, which show analogous patterns, in this paper we also explore the existing—and not yet acknowledged—correlation between those processes that exhibit a particular behaviour in the loanword phonology with respect to the native phonology of the language, those processes that show lexical exceptions and those processes that underapply due to morphological reasons. In light of the analysis of the very same data and taking into account the aforementioned correlation, we show how there might exist a natural diachronic relation between two kinds of Optimality Theory constraints which are commonly used but, in principle, mutually exclusive: positional faithfulness and contextual markedness constraints. Overall, phonological productivity is proven to be crucial in three respects: first, as a context of the grammar, given that «underapplication» is systematically found in what we call the productive phonology of the dialect (including loanwords, learned words, productive derivation and verbal inflection); second, as a trigger or blocker of processes, in that the productivity or the lack of productivity of a specific process or constraint in the language is what explains whether it is challenged or not in any of the depicted situations, and, third, as a guiding principle which can explain the transition from the historical to the synchronic phonology of a linguistic variety.

Keywords: Catalan; underapplication of vowel reduction; loanwords and learned words; differential importation; contextual markedness; positional faithfulness.

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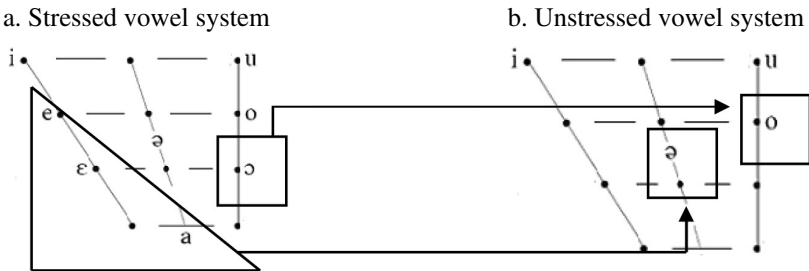
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1. Introduction

1.1. Empirical focus

Most Majorcan Catalan varieties have a vowel system of eight vowels in stressed position (1a) and four vowels in unstressed position (1b). This specific picture is the result of a general process of vowel reduction, according to which the mid front vowels /é/ and /ê/ and the open central vowel [á] are reduced to [ə] in unstressed position, while the open mid back vowel /ɔ/ is reduced to the close mid back vowel [o], also in unstressed position (1b) (see, among others, Bibiloni 1983, Mascaró 2002). The vowels /í/, /ó/, /ú/ and /ə/, on the contrary, remain unaltered in unstressed position.

(1) Process of vowel reduction in Majorcan Catalan



The reduction of the mid front vowels /é/ and /ê/ and the central vowel /á/ to [ə] explains the alternations shown in (2a), as well as the absence of the vowels [e], [ɛ] and [a] in unstressed position in those cases where there are no morphophonological alternations which shed light on the underlying representation of the vowels (2b).

(2) a. Morphophonological alternations provoked by vowel reduction

Stressed position		Unstressed position	
<i>c[á]sa</i>	‘house’	<i>c[ə]s[ə]ta</i>	‘house <i>dim.</i> ’
<i>caf[é]</i>	‘coffee’	<i>caf[ə]t[ə]t</i>	‘coffee <i>dim.</i> ’
<i>carr[é]r</i>	‘street’	<i>carr[ə]r[ə]</i>	‘street <i>dim.</i> ’
<i>cont[é]st</i>	‘(I) answer’	<i>cont[ə]st[ə]m</i>	‘(we) answer’
<i>tol[é]r</i>	‘(I) tolerate’	<i>tol[ə]r[ə]m</i>	‘(we) tolerate’
<i>x[é]rr</i>	‘(I) chat’	<i>x[ə]rr[ə]m</i>	‘(we) chat’

b. Absence of non-alternating unstressed [e], [ɛ] and [a]

<i>m[ə]nifestaci[ó]</i>	‘demonstration’	(cf. orthography: <i>manifestació</i>)
<i>p[ə]ssi[ó]</i>	‘passion’	(cf. orthography: <i>passió</i>)
<i>c[ə]r[ə]m[é]l-lo</i>	‘candy’	(cf. orthography: <i>caramel-lo</i>)
<i>p[ə]d[á]ç</i>	‘dishtowel’	(cf. orthography: <i>pedaç</i>)
<i>v[ə]ll[ú]t</i>	‘velvet’	(cf. orthography: <i>vellut</i>)
<i>[ə]f[ə]g[í]r</i>	‘to add’	(cf. orthography: <i>afegir</i>)

In loanwords and learned words, however, it is possible to find the mid front vowel [e] in unstressed position when it is located in the initial syllable of the stem (Pons-Moll 2011a, b), and especially—but not necessarily—when the vowel is preceded by a labial consonant (Bibiloni 1998) (3a, 3b). Inherited words, on the contrary, do not ever show [e] in unstressed position, even under the same contextual conditions (3c) (Bibiloni 1998). As shown in the examples of (3), this [e], reduced or not, always corresponds to an orthographic *e*. The learned words listed in (3b) include words whose use has been generalized recently and which were nonexistent or hardly used before 1950, either because of the late introduction of the designated concept or entity to the dialect, or because the concept or entity was designated first in Spanish and, later, in Catalan (see Bibiloni 1998), and, also, relatively older words that have remained in the dialect as non-common lexica. Most of these words, on the other hand, do not show morphophonological alternations (3bi), at least alternations that can be considered productive, but some of them do (3bii) (see, in this respect, § 4). The same behavior is found in prefixed words, compounds or words with word-initial epenthesis (3biii).

(3) a. Presence of unstressed [e] in loanwords

<i>v[e]rm[ú]t</i>	‘vermouth’	(cf. orthography: <i>vermut</i>)
<i>v[e]rb[é]na</i>	‘night party’	(cf. orthography: <i>verbena</i>)
<i>v[e]d[é]t</i>	‘vedett’	(cf. orthography: <i>vedet</i>)
<i>qu[e]rat[í]na</i>	‘Keratin’	(cf. orthography: <i>Keratina</i>)
<i>el M[e]s[s]es</i>	‘the Messiah’	(cf. orthography: <i>el Messies</i>)
<i>el P[e]nt[á]gon</i>	‘the Pentagon’	(cf. orthography: <i>el Pentàgon</i>)
<i>Fr[e]nad[ó]l</i>	‘Frenadol’	(cf. orthography: <i>Frenadol</i>)

b. Presence of unstressed [e] in learned words

(i) *Non-alternating recent and old learned words*

<i>p[e]l·l[í]cula</i>	‘film’	(cf. orthography: <i>pel·lícula</i>)
<i>p[e]d[ó]fil</i>	‘pedophile’	(cf. orthography: <i>pedòfil</i>)
<i>b[e]n[í]gne</i>	‘benign’	(cf. orthography: <i>benigne</i>)
<i>f[e]titx[í]sme</i>	‘fetishism’	(cf. orthography: <i>fetitxisme</i>)
<i>f[e]l·laci[ó]</i>	‘fellatio’	(cf. orthography: <i>fel·lació</i>)
<i>f[e]deraci[ó]</i>	‘federation’	(cf. orthography: <i>federació</i>)
<i>f[e]min[í]sme</i>	‘feminism’	(cf. orthography: <i>feminisme</i>)
<i>m[e]can[í]sme</i>	‘mechanism’	(cf. orthography: <i>mecanisme</i>)
<i>b[e]ng[á]la</i>	‘flare’	(cf. orthography: <i>bengala</i>)
<i>f[e]l[í]ç</i>	‘happy’	(cf. orthography: <i>feliç</i>)
<i>f[e]licit[á]t</i>	‘happiness’	(cf. orthography: <i>felicitat</i>)
<i>M[e]diterr[á]ni</i>	‘Mediterranean’	(cf. orthography: <i>Mediterrani</i>)
<i>p[e]nsi[ó]</i>	‘pension’	(cf. orthography: <i>pensió</i>)
<i>p[e]riod[í]sta</i>	‘journalist’	(cf. orthography: <i>periodista</i>)
<i>p[e]nicil[í]na</i>	‘penicillin’	(cf. orthography: <i>penicilina</i>)
<i>m[e]lod[í]a</i>	‘melody’	(cf. orthography: <i>melodia</i>)

(ii) *Alternating recent and old learned words*

<i>[e]ur[ó]t</i>	‘euro <i>dim.</i> ’	(cf. [é]uro ‘euro’)
<i>v[e]nj[á]nça</i>	‘revenge’	(cf. v[é]nja ‘(s/he) revenges’)

(iii) *Words with initial epenthesis, compounds and prefixed words*

<i>esp[e]ci[á]l</i>	‘special’	(cf. orthography: <i>especial</i>)
<i>esp[e]cialit[á]t</i>	‘speciality’	(cf. orthography: <i>especialitat</i>)
<i>esp[e]cialitz[á]r</i>	‘specialize’	(cf. orthography: <i>especialitzar</i>)
<i>esp[e]c[í]fic</i>	‘specific’	(cf. orthography: <i>específic</i>)
<i>esp[e]cificat[í]u</i>	‘specificative’	(cf. orthography: <i>especificatiu</i>)
<i>llargm[e]tr[á]tge</i>	‘feature film’	(cf. orthography: <i>llargmetratge</i>)
<i>comm[e]mor[á]r</i>	‘commemorate’	(cf. orthography: <i>commemorar</i>)

c. Absence of unstressed [e] in inherited words

<i>v[ə]ll[ú]t</i>	‘velvet’	(cf. orthography: <i>vellut</i>)
<i>v[ə]rm[ó]i</i>	‘red’	(cf. orthography: <i>vermell</i>)
<i>p[ə]d[á]ç</i>	‘dishtowel’	(cf. orthography: <i>pedaç</i>)
<i>m[ə]norqu[í]</i>	‘Minorcan’	(cf. orthography: <i>menorquí</i>)
<i>m[ə]ll[ó]</i>	‘melon’	(cf. orthography: <i>meló</i>)
<i>f[ə]ix[ú]c</i>	‘heavy’	(cf. orthography: <i>feixuc</i>)

Interestingly enough, vowel reduction to [ə] underapplies as well in productive derived forms with an unstressed vowel, also located in the initial syllable of the stem, which alternates with a stressed mid front vowel ([é], [ê]) in the stem of the underived form (4a) and in first conjugation verbal forms with an unstressed vowel located, again, in the initial syllable of the stem which alternates with a stressed close mid front vowel ([é]) in another verbal form of the same inflectional paradigm (4b) (see Bibiloni 1998; Mascaró 2002, Mascaró 2005; Pons-Moll 2011a, b). And, likewise loanwords and learned words, in verbal forms there is a tendency to underapplication when the unstressed vowel alternating with [é] is preceded by a labial consonant (*m[é]ula* ‘(s/he) meows’ ~ *m[e]ular* ‘to bleat’; *b[é]la* ‘(s/he) bleats’ ~ *b[e]lar* ‘to bleat’). (Grimalt, p.c.)

(4) a. Underapplication of vowel reduction to [ə] in productive derivation

Stressed position		Unstressed position	
<i>f[é]sta</i>	‘party’	<i>f[e]st[á]ssa</i>	‘party <i>augm.</i> ’
<i>c[é]l</i>	‘sky’	<i>c[e]l[ó]t</i>	‘sky <i>dim.</i> ’
<i>Est[é]ve</i>	‘Stephen’	<i>Est[e]v[ó]t</i>	‘Stephen <i>dim.</i> ’

(cf. 2a: *caf[é] ~ caf[ə]t[ó]t*)

b. Underapplication of vowel reduction to [ə] in verbal inflection

Stressed position		Unstressed position	
<i>p[é]ga</i>	‘(s/he) hits’	<i>p[e]g[á]m</i>	‘(we) hit’
<i>esp[é]ra</i>	‘(s/he) waits’	<i>esp[e]r[á]u</i>	‘(you) wait’

(cf. 2a: *cont[é]st ~ cont[ə]st[á]m*)

1.2. Theoretical focus

The main focus of this paper is to provide a formal explanation for underapplication of vowel reduction to schwa in loanwords and learned words in Majorcan Catalan (§ 3). And, on the basis of the analysis of these data, and comparing it to that related to productive derivation and verbal inflection, to explore the existing —and not yet acknowledged— correlation between those processes that exhibit a particular behaviour in the loanword phonology with respect to the native phonology of the language, those processes that show lexical exceptions and those processes that underapply due to morphological reasons and (§ 1.2.1). Finally, we show how the analysis of loanwords and learned words in terms of contextual markedness constraints targeting a specific structural context and the analysis of productive derivation and verbal inflection in terms of positional faithfulness targeting the very same structural context brings about a possible diachronic relation between these two kinds of constraints which in principle are mutually exclusive (§ 1.2.2).

1.2.1. Differential importation and phonological productivity

An intriguing facet of loanword adaptation that still requires an explanation is that of *differential importation*. Differential importation refers to the fact that, among the structures not allowed in the native phonology of a specific language, only

a partial subset is imported to its loanword phonology (Kang 2010). It has been observed that certain constraints against specific structures active in the native phonology of a language are more prone to be relaxed or violated than others in the loanword phonology of the same language (Holden 1976, Itô & Mester 1995, Davidson & Noyer 1997, Broselow 2009, Kang 2010). And this circumstance has been often interpreted as a consequence of the degree of strength (or the degree of productivity) of native constraints: the greater the strength or productivity of the native constraint, the more likely it will be active or «visible» in loanword phonology, a hypothesis labeled *Magnetic Attraction* by Holden (1976). Or it is also regarded as a consequence of the «natural» (Chen 1973) or the «essential» character of certain constraints within a specific language, in the sense that they «define the basic syllable canons and other central aspects of the language» (Itô & Mester 1999: 65).

One of the purposes of this paper is to contribute to a better understanding of differential importation by showing how the *novel structures* that emerge in the loanword phonology of a language are precisely the ones that emerge in learned words—in the form of «lexical exceptions»—and, more significantly, the ones that can be generated due to morphological reasons, such as paradigmatic pressure or the need to realize a specific morpheme. In our specific case, the application of a general process of the language, *i.e.* vowel reduction, fails to apply in learned words and loanwords and, also, in productive derivation and in inflection, which is inherently productive. We therefore provide empirical evidence that novel or unattested structures in the etymologically older or «core» set of words of the language, tend to emerge consistently in the *productive phonology* of the language, precisely because of the weakness or *lack of productivity* of the markedness constraints that militate against them, with respect to other markedness constraints, which are strong or productive enough to avoid underapplication in any of the depicted situations.

Overall, this paper takes as its starting point the observation that there exists a noteworthy correlation between the processes that exhibit a peculiar behaviour within loanword phonology, the processes that underapply in a given language due to morphological reasons and the processes that have more «lexical exceptions». The same correlation also exists between the processes that exhibit a regular behaviour within the loanword phonology of a specific language, the processes that do not underapply due to morphological reasons and the processes that have no lexical exceptions. In Catalan it is possible to find many instances of these correlations, which are not always neat but consistent enough to be considered (see Pons-Moll (2009 / 2010)).¹

1. In Pons (2009 / 2010), it is argued that a gradation can be drawn between the processes in which all these three factors (*i.e.*, morphologically driven underapplication, underapplication in learned words and underapplication in loanwords) are present, the processes which meet just two of them, and the processes which do not meet any of them. In this paper it is also proven how this gradation has significant consequences in the acquisition of a second language, in the sense that those processes that tend to underapply in the situations mentioned are not transferred to the second language speech, whereas the processes that normally apply in the same situations are transferred to the second language speech. As shown in § 3, these findings are relevant for the analytical perspective adopted to account for the phonological behaviour of loanwords in Majorcan Catalan.

For instance, the processes of deletion of posttonic *-n* and *-r* in (absolute) word-final position (*canço[n]eta* ~ *cançó[n]s* ~ *cançó[Ø]* ‘song *dim.*’ ~ ‘song *pl.*’ ~ ‘song *sg.*’; *carrer[ó]* ~ *carre[Ø]* ~ *carre[Ø]s* ‘street *dim.*’ ~ ‘street *sg.*’ ~ ‘street *pl.*’), active in most varieties of Catalan, are processes which show a totally discrepant behaviour in loanwords (*canca[n]* ‘Can Can’, *toboga[n]* ‘toboggan’; *amat[er]* ‘amateur’, *au-p[er]* ‘au pair’), many instances of morphologically driven underapplication (*Cat. enté[n]* ‘(s/he) understands’, *cantara[n]* ‘(they) will sing’; *Insular Cat. ma[n]* ‘(I) order’, *conside[r]* ‘(I) consider’), and many lexical exceptions (*so[n]* ‘sleep’, *na[n]* ‘midget’; *ace[r]* ‘steel’, *ma[r]* ‘sea’). Likewise, the process of vowel reduction of [é], [ê] and [á] to [ə] in unstressed position, active in most Eastern Catalan varieties (*c[a]sa* ‘house’ ~ *c[ə]seta* ‘house *dim.*’, *m[é]s* ‘month’ ~ *m[ə]set* ‘month *dim.*’), exhibits a totally irregular behaviour in words of more recent introduction (*mòd[e]m*, *v[e]det* ‘music hall star (from French ‘vedette’); *Maj. Cat. v[e]rbena* ‘open-air dance’, *v[e]rmut* ‘vermouth’), underapplies due to paradigmatic pressure in the phonology of Majorcan Catalan (*v[é]nt* ‘wind’ ~ *v[e]ntet* ‘wind *dim.*’, *esp[é]ra* ‘(s/he) waits’ ~ *esp[e]ram* ‘(we) wait’), and has many lexical exceptions in all Eastern varieties (*class[e]* ‘class’, *Ter[e]* ‘truncated form for Teresa’, *Sòcrat[e]s*; *Maj. Cat. p[e]riodista* ‘journalist’, *p[e]l·lícula* ‘movie’). The process of cluster reduction of word-final clusters made up of a homorganic lateral or nasal followed by a stop, active in some varieties of Catalan (*sa[nt]a* ~ *sa[n]* ‘saint *fem.*’ ~ ‘street *masc.*’; *a[lt]a* ~ *a[l]* ‘tall *fem.*’ ~ ‘tall *masc.*’), has no lexical exceptions, but many instances of morphologically driven underapplication (*reso[lt]* ‘solved’ *mò[lt]* ‘milled’; *Eiv. Cat. ca[nt]* ‘(I) sing’, *sa[lt]* ‘(I) jump’), and considerable variation in loanwords (*PowerPoi[nt~nØ]*, *Pai[nt~nØ]*, *Ka[nt~nØ]*). Finally, epenthesis in word-final clusters to avoid a Sonority Sequencing Principle violation or a Sonority Gradiency violation, active in all varieties of Catalan (*centr[ə]* ‘center’, *retaul[ə]* ‘altarpiece’), does not generally show lexical exceptions but it does show morphologically driven underapplication in Balearic Catalan (*com[pr]* ‘(I) buy’, *en[tr]* ‘(I) enter’), and also a peculiar behaviour in loanwords (*ma[j]l* ‘email’, *Intera[j]l*).²

On the other hand, there are processes which are never challenged in any of the depicted circumstances, like word-final obstruent devoicing (*i.e.*, *llo[β]a* ‘wolf female’ ~ *llo[p]* ‘wolf male’; cf. *pu[p]* ‘pub’, *clu[p]* ‘club’) or epenthesis in word-initial *sC-* clusters (*i.e.*, [ə]steps, [ə]Sting, [ə]stand, [ə]sport, etc.). It is important to note here that, in her paper devoted to vowel reduction and vowel harmony in Eastern Catalan, Cabré (2009) shows how initial epenthesis is «one of the basic and unavoidable phonological processes of Catalan; “native” vowel reduction, on the other hand, is not such a central process». And in the present paper we show how native vowel reduction in Majorcan Catalan is indeed challenged in several circumstances, thus confirming that it is not a fundamental process of the language.

As will be shown in this paper, the key that justifies these asymmetries is *phonological productivity*, which is relevant in two respects: on the one hand, as a

2. The data and some of the observations referred to in this section can be found in Bibiloni (1983, 1998), Bonet & Lloret (1998), Cabré (2002, 2009, 2010), Lloret (2002), Mascaró (2002, 2005), and Pons-Moll (2002, 2007, 2011a, b).

context of the grammar, given that «underapplication» is systematically found in what we call the productive phonology of the dialect (including loanwords, learned words, productive derivation and verbal inflection); on the other hand, as a trigger or blocker of processes, in that the productivity or the lack of productivity of a specific process or constraint in the language is what explains whether it is challenged or not in any of the depicted situations.

1.2.2. *Positional faithfulness and contextual markedness*

Optimality Theory has commonly made use of two types of constraints: faithfulness and markedness (Prince & Smolensky 1993, McCarthy & Prince 1995). These constraints, moreover, admit relativization depending on the position or context to which they apply or are active. Thus, in addition to standard faithfulness constraints and context-free markedness constraints, *positional* faithfulness constraints (Beckman 1998; Casali 1996, 1997) and *contextual* markedness constraints (Prince & Smolensky 1993; Crosswhite 1999, 2004) are commonly invoked.

Positional faithfulness constraints and contextual markedness constraints, however, are alleged to be redundant and thus mutually exclusive, in that in most cases they do the same job and hence produce the same effects (McCarthy 2008). Positional faithfulness constraints typically interact with context-free markedness constraints: the effects of a general markedness constraint can be inhibited not only by its interaction with a general faithfulness constraint but also with a faithfulness constraint which protects a segment or feature in a specific structural position (*i.e.*, with a positional faithfulness constraint). Contextual markedness constraints, on the other hand, interact with standard faithfulness constraints: in this case, the effects of a specific markedness constraint can be constrained by relativizing it to a specific context. Overall, positional faithfulness constraints and contextual markedness constraints have a common ground, a common denominator: a *position* or a *context* in which a specific structure is preserved—in the case of positional faithfulness—or forbidden—in the case of contextual markedness.

Although both kinds of constraints may have in certain particular cases discrepant effects, in the literature framed within Optimality Theory the differences between them are in general thought to be merely technical. And, typically, either one type of constraint or the other is invoked. In the present paper, on the basis of the phonological behaviour of loanwords and learned words in the Catalan dialect spoken in Majorca, we show that instead of thinking of the relationship between the two types of constraints as a mere technicality of the theory it might be more fruitful to view it in terms of a natural diachronic relationship.

1.3. *General proposal and outline*

According to our proposal, underapplication of vowel reduction in Majorcan Catalan loanwords and learned words is, from a diachronic point of view, inherently connected to underapplication in productive derivative forms and inflective verbal forms. We argue, indeed, that a set of output-to-output faithfulness constraints relativized according to the position of the vowel within the stem, is responsible for

underapplication of vowel reduction to schwa in *productive derivation* and *verbal inflection* (Pons-Moll 2011a, b), that is, in the (historically) *productive phonology* of the dialect, and has provoked a drastic reduction in the occurrences of the schwa in stem-initial position, and finally has led, over time, to a reinterpretation of the grammar by Majorcan Catalan speakers. That is to say, the effects of the positional (output-to-output) faithfulness constraints enhancing the appearance of [e], instead of [ə], in the initial syllable of the stem of derivative and verbal forms would have been reinterpreted by the speakers as a consequence of the activity of a contextual markedness constraint of the type $*\text{ə}/\text{INITIALSYLLSTEM}$, which bans a schwa in the initial syllable of the stem; this constraint would be first active in the loanword phonology of Majorcan Catalan and, in fact, would end up being the only one active in the entire productive phonology of the dialect, after the demotion of the output-to-output positional faithfulness constraints, thus also involving productive derivation and verbal inflection items. Therefore, we assume for Majorcan Catalan synchronic phonology the existence of two coexisting grammars or phonologies, one active in what we label the *productive phonology* of the dialect (including learned words and loanwords, productive derivation and verbal inflection) and the other only active in what we label the *unproductive phonology* of the dialect (including non-alternating inherited words, *i.e.* $p[\text{ə}]daç$, and non-productive derivation, *i.e.* $p[\text{ə}]drera$).

The paper is organized as follows. In section 2 we analyze the cases of regular application of vowel reduction. In section 3 we deal with the cases of underapplication of vowel reduction in loanwords and learned words: in sections 3.1 and 3.2 we contextualize and expose the data; in section 3.3 we present the main generalizations of the data and we spell out a diachronic and a synchronic Optimality Theory account for them; this section also includes a discussion of alternative analyses for underapplication in loanwords and learned words (§ 3.3.5) and a presentation and an Optimality Theory analysis of the cases of underapplication of vowel reduction in other areas of the productive phonology of the dialect (§ 3.3.6). Section 4 copes with some residual issues concerning the data analyzed which deserve comment. Section 5, finally, is devoted to the concluding remarks and the main findings of the paper.

2. Normal application of vowel reduction to schwa in Majorcan Catalan

2.1. Data

As exposed in §1.1, Majorcan Catalan has a general process of vowel reduction, according to which the mid front vowels /é/ and /ê/ and the open central vowel [á] are reduced to [ə] in unstressed position (5), which explains, as said, both alternations such as $p[\acute{a}]ssa$ ‘step’ ~ $p[\text{ə}]ss[\acute{a}]t$ ‘step *dim.*’, $caf[\acute{e}]$ ‘coffee’ ~ $caf[\text{ə}]t[\acute{a}]t$ ‘coffee *dim.*’, $carr[\acute{e}]r$ ‘street’ ~ $carr[\text{ə}]r[\acute{o}]$ ‘street *dim.*’ and the lack of [e], [ɛ] and [a] in unstressed position ($p[\text{ə}]d[\acute{a}]ç$ ‘dishtowel’; $p[\text{ə}]ssi[\acute{o}]$ ‘passion’).

(5) Morphophonological alternations provoked by vowel reduction

Stressed position		Unstressed position	
<i>c[á]sa</i>	‘house’	<i>c[ə]s[ə]ta</i>	‘house <i>dim.</i> ’
<i>caf[é]</i>	‘coffee’	<i>caf[ə]t[ə]t</i>	‘coffee <i>dim.</i> ’
<i>carr[é]r</i>	‘street’	<i>carr[ə]r[ə]</i>	‘street <i>dim.</i> ’
<i>cont[é]st</i>	‘(I) answer’	<i>cont[ə]st[ə]m</i>	‘(we) answer’
<i>tol[é]r</i>	‘(I) tolerate’	<i>tol[ə]r[ə]m</i>	‘(we) tolerate’
<i>x[é]rr</i>	‘(I) chat’	<i>x[ə]rr[ə]m</i>	‘(we) chat’

2.2. Analysis

Within Optimality Theory, the reduction of a vowel system in unstressed position is generally interpreted, along the lines of Crosswhite (1999, 2004), as an effect of the harmony scale for vowels in unstressed position (6a). This harmony scale and the subsequent constraint hierarchy (6b) express the universal preference for segments of low sonority in unstressed syllables or, in other words, the universal dispreference for segments of high sonority in unstressed syllables (see the assumed sonority scale for vowels in 6c). (For an application of this constraint hierarchy to the unstressed vowel system of some Catalan varieties, see Wheeler 2005, Lloret & Jiménez 2008, Cabré 2009, and Pons-Moll 2011a, b.)

(6) *Universal harmonic scale and constraint hierarchy for unstressed syllables* (After Crosswhite 1999, 2004; Prince & Smolensky 1993)a. *Universal harmonic scale for unstressed syllables*

$$\text{UNSTR}\sigma/\partial \succ \text{UNSTR}\sigma/\text{i,u} \succ \text{UNSTR}\sigma/\text{e,o} \succ \text{UNSTR}\sigma/\text{e}, \text{ɔ} \succ \text{UNSTR}\sigma/\text{a}$$
b. *Universal constraint hierarchy for unstressed syllables*

$$*\text{UNSTR}\sigma/\text{a} \gg * \text{UNSTR}\sigma/\text{e}, \text{ɔ} \gg * \text{UNSTR}\sigma/\text{e,o} \gg * \text{UNSTR}\sigma/\text{i,u} \gg * \text{UNSTR}\sigma/\partial$$
c. *Sonority scale for vowels (from more to less sonority)*

$$\text{a} > \text{ɛ}, \text{ɔ} > \text{e}, \text{o} > \text{i}, \text{u} > \partial$$

The application of vowel reduction to the vowels of the front series and the low vowel in Majorcan Catalan is therefore due to the ranking of the contextual markedness constraints $*\text{UNSTR}\sigma/\text{a}$, $*\text{UNSTR}\sigma/\text{e}$ and $*\text{UNSTR}\sigma/\text{e}, \text{ɔ}$, which penalize elements of high sonority in unstressed syllables, above the faithfulness constraint which penalizes featural changes, and, of course, above $*\text{UNSTR}\sigma/\partial$. Thus, in the tableau in (7), candidates with [a], [ɛ] or [e] in unstressed position are discarded; candidates with [ə], by contrast, are selected as optimal.

(7) *Prominence-driven vowel reduction in Majorcan Catalan* (after Crosswhite 1999)³

a. /pas+ət/ [pəsət] 'step <i>dim.</i> '	*UNSTRσ/a	*UNSTRσ/ε	*UNSTRσ/e	*UNSTRσ/ə	IDENT(F)
☞ i. [pəsət]				*	*
ii. [pasət]	*W			L	L
b. /kəfət+ət/ [kəfətət] 'coffee <i>dim.</i> '	*UNSTR/a	*UNSTR/ε	*UNSTR/e	*UNSTR /ə	IDENT(F)
☞ i. [kəfətət]				**	*
ii. [kəfətət]		*W		L	L
c. /kær+er+on/ [kærəró] 'street <i>dim.</i> '	*UNSTR/a	*UNSTR/ε	*UNSTR/e	*UNSTR/ə	IDENT(F)
☞ i. [kærəró]				**	*
ii. [kæreró]			*W	L	L

3. Underapplication of vowel reduction to schwa in Majorcan Catalan loanwords and learned words

3.1. Empirical background

In most Eastern Catalan dialects, underapplication of vowel reduction in unstressed position involves vowels from both the front and the back series and it is found for several reasons. Lack of vowel reduction or partial vowel reduction is especially persistent in words of recent introduction to the language and it is inclined to affect those vowels placed at the edges of the word (see *b*). The main factors that induce lack of vowel reduction are the following:

- a) The phonetic context in which the vowels occur, such as a following schwa or a central low vowel (i.e., *t[e]atre* 'theater', *r[e]al* 'real', *t[e]atral* 'theatrical', *r[e]alisme* 'realism', *nàus[e]a* 'sickness', etc.; see Bonet & Lloret 1998; Mascareó 2002).
 - b) The type of word, in that it tends to involve learned words (*class[e]* 'class', *bas[e]* 'base', *fras[e]* 'sentence', *eg[o]*, *líbid[o]*, *cosm[o]s*, etc.), proper and commercial names (*Balm[e]s*, *Bòst[o]n*, *Osl[o]*, *Fr[e]nadol*, *R[e]nault*, *Clam[o]xyl*, *R[e]psol*, etc.), borrowings (*perceb[e]* 'goose barnacle', *karat[e]*, *làt[e]x*, *córn[e]r*, *allegr[o]*, *f[o]rfet* 'ski pass', *d[o]ssier*, *c[o]llage*, etc.), truncated forms (*cin[e]* 'truncated form for cinema', *tel[e]* 'truncated form for television', *afr[o]*,
3. To illustrate the analysis, we use comparative tableaux. The "W" stands for winner, and it appears below the constraint that favours the winner, and the "L" stands for loser, and it appears below the constraint which favours the loser. According to this analytical system, every L must be dominated by at least one W.

porn[o], etc.), hypocoristic forms (*Monts*[e], *Ter*[e], etc.), abbreviations and acronyms (*Renf*[e], *UNESC*[o], [o]*TAN*), and some learned prefixes (*dent*[o] *alveolar*, etc.) (see Bonet & Lloret 1998; Cabré 2002, 2006, 2009; Mascaró 2002).

- c) The morphological structure of the words, which, in some cases, favour the presence of a secondary stress which explains lack of vowel reduction. Examples of these cases are prefixed words and compounds (*r[è]ntaplats* ‘dish-washer’, *s[ò]breviure* ‘survive’, *b[ò]nament* ‘good well *adv.*’, etc.) (see Bonet & Lloret 1998).

As an Eastern Catalan dialect, Majorcan Catalan shares this behaviour, which in some respects is yet more intense (see, in this regard, Bibiloni 1998: 537-538, and § 3.3.4), and even more cases of lack of vowel reduction or partial vowel reduction. A reduced set of cases is made up of the numerals starting with the prefix *di-* (‘teen’), realized as *de-* in Majorcan Catalan: *d[e]sset* ‘seventeen’, *d[e]vuit* ‘eighteen’, *d[e]nou* ‘nineteen’ (Bibiloni 1998: 533). Another reduced set of cases is constituted by traditional and more recent words ending in *-ec*: *càv[e]c* ‘mattock’, *màn[e]c* ‘handle’, *espàr[e]c* ‘asparagus’, *diàl[e]g* ‘dialogue’, *pròl[e]g* ‘prologue’, *monòl[e]g* ‘monologue’ (Bibiloni 1998: 537). Verbal stems followed by a (stressed) pronominal clitic also tend to show lack of vowel reduction to schwa, due to the presence of a secondary stress on the verbal stem (*posar-nos* [pozàmmós] ‘to put it on us’; *comprar-vos* [kompràvvós] ‘to put it on you *plur.*’) (see § 3.3.6 for more details on these cases.)

Most of the cases, though, involve words of recent introduction into the language (including learned words and borrowings), productive derived forms and inflectional verbal forms, in which the vowel is located in the initial syllable of the stem. The former are the object of the following four sections; the latter are briefly analyzed in § 3.3.6.

3.2. Data

As noted in § 1.1, learned words and loanwords with an unstressed *e* are unexpectedly realized with [e], especially when the vowel is located in the initial syllable of the stem (Pons-Moll 2011a, b) and when it is preceded by a labial consonant, either a stop, a nasal or a fricative (8a) (Bibiloni 1998: 536-537). This unstressed [e] always corresponds to an orthographic *e*, and it is found either in nominal and verbal forms (*i.e.*, *m[e]ntal*, *m[e]ntalitat*, *m[e]ntalitzar*; *f[e]deració*, *f[e]derar*; *f[e]liç*, *f[e]licitat*, *f[e]licitar*). Note how the relevant position for underapplication of vowel reduction is the initial syllable of the stem (and not of the word), in that it is also found in stems preceded by a prefix or in the second term of a compound (8b), and in words with initial vowel epenthesis (8c); the epenthetic vowel and the vowels *a* or *e* in the unstressed prefix are realized, on the contrary, as [ə]. Underapplication of vowel reduction to schwa, on the other hand, is also possible, although less frequently, when the preceding consonant is a coronal (8d), and, even less frequently, when it is a velar (8e).

The list of loanwords and learned words in (8) includes words whose use has been generalized recently and which were nonexistent or hardly used before 1950, either because of the late introduction of the designated concept or entity into the dialect, either because the concept or entity was designated first in Spanish or with another term. The list also comprises relatively older words that have remained in the dialect as non-common lexica, as well as proper names, place names and some commercial names.

Most of these words, moreover, do not show morphophonological alternations, at least alternations that can be considered synchronically productive or transparent enough for the speakers (cf. *b[é] ~ b[e]nigne*; *f[ó]mina ~ f[e]minisme*;⁴ *f[é]u ~ f[e]udalisme*), but some of them do (*m[é]nt ~ m[e]ntal*; *[é]uro ~ [e]uret*; *esp[é]rma ~ esp[e]rmatozou*; *v[é]nja ~ v[e]njança*; *v[é]nia ~ v[e]nial*; *sup[é]ra ~ sup[e]rar*; *esf[é]ra ~ esf[e]reta*, etc.) (see, in this respect, § 3.3.6, devoted to underapplication of vowel reduction in productive derivation and verbal inflection).

(8) *Underapplication of vowel reduction in loanwords and learned words*⁵

<i>Underapplication in loanwords and learned words with e in the initial syllable of the stem</i>					
<i>a. Loanwords and learned words (non-prefixed words / words without initial epenthesis)</i>					
<i>After a labial stop</i>		<i>After a labial nasal</i>		<i>After a labial fricative</i>	
<i>el P[e]nt[á]gon</i>	'the Pentagon'	<i>el M[e]s[s]í[é]s</i>	'the Messiah'	<i>v[e]r[m]ú[t]</i>	'vermouth'
<i>P[e]qu[í]n</i>	'Pekin'	<i>m[e]ssi[á]nic</i>	'messianic'	<i>v[e]r[b]é[na]</i>	'night party'
<i>p[e]n[í]nsula</i>	'peninsula'	<i>m[e]r[ç]and[á]jsing</i>	'merchandising'	<i>v[e]d[é]t</i>	'vedett'
<i>p[e]r[é]</i>	'perlé'	<i>m[e]r[ó]t</i>	'Merlot'	<i>v[e]g[á]</i>	'veggan'
<i>p[e]r[on]é</i>	'fibula'	<i>m[e]nh[í]r</i>	'menhir'	<i>f[e]r[á]ri</i>	'Ferrari'
<i>p[e]t[á]nca</i>	'bowls game'	<i>m[e]n[ú]</i>	'menu'	<i>f[e]tucc[í]ni</i>	'fettuccini'
<i>P[e]tr[á]rca</i>	'Petarca'	<i>m[e]t[á]stasi</i>	'metastasis'	<i>f[e]rom[ó]nes</i>	'feromones'
<i>b[e]havor[í]sme</i>	'behaviorism'	<i>m[e]teor[í]t</i>	'meteorite'	<i>V[e]rs[á]lles</i>	'Versailles'
<i>p[e]ru[á]</i>	'Peruvian'	<i>M[e]c[á]no</i>	'Mecano, game'	<i>v[e]rsal[ó]tes</i>	'little caps'
<i>p[e]l[í]cula</i>	'film'	<i>m[e]can[í]sme</i>	'mechanism'	<i>v[e]sp[í]no</i>	'Vespino'
<i>p[e]d[ó]fil</i>	'pedophile'	<i>M[e]diterr[á]ni</i>	'Mediterranean'	<i>f[e]tix[í]sme</i>	'fetishism'
<i>p[e]nsi[ó]</i>	'pension'	<i>m[e]lod[í]a</i>	'melody'	<i>f[e]l[á]ci[ó]</i>	'fellatio'
<i>p[e]riod[í]sta</i>	'journalist'	<i>m[e]c[á]nic</i>	'mechanic'	<i>f[e]der[á]r</i>	'to federate'
<i>p[e]nicil[í]na</i>	'penicillin'	<i>m[e]ridi[á]</i>	'mechanism'	<i>f[e]deraci[ó]</i>	'federation'

4. In fact, this case is especially illuminating of the lack of productivity or transparency of these alternations, in that a stressed schwa, of course, never triggers underapplication of vowel reduction in productive derivation and verbal inflection (see § 3.3.6).
5. Most of the data in this table are from Bibiloni (1998) and have been checked and enlarged with personal inquiries. I am grateful, in this respect, to Gabriel Bibiloni, Pere Grimalt, F. Felipe Legaz, Joan-Ignasi Servera, Maria del Mar Vanrell, and also to the songs of Antònia Font.

<i>Underapplication in loanwords and learned words with e in the initial syllable of the stem</i>					
<i>a. Loanwords and learned words (non-prefixed words / words without initial epenthesis)</i>					
<i>After a labial stop</i>		<i>After a labial nasal</i>		<i>After a labial fricative</i>	
<i>p[e]culi[á]r</i>	‘peculiar’	<i>m[e]d[á]lla</i>	‘medal’	<i>f[e]mi[n]í[s]me</i>	‘feminism’
<i>p[e]d[á]l</i>	‘pedal’	<i>m[e]dicina</i>	‘medicine’	<i>f[e]l[í]ç</i>	‘happy’
<i>p[e]ssim[í]sta</i>	‘pessimist’	<i>m[e]decina</i>	‘medicine, drug’	<i>f[e]licit[á]t</i>	‘happiness’
<i>p[e]tici[ó]</i>	‘petition’	<i>m[e]dicament</i>	‘medicament’	<i>f[e]licit[á]r</i>	‘to congratulate’
<i>p[e]n[ú]ltim</i>	‘penultimate’	<i>m[e]dit[á]r</i>	‘to meditate’	<i>f[e]udal[í]sme</i>	‘feudalism’
<i>p[e]d[á]nt</i>	‘pedantic’	<i>m[e]diév[á]l</i>	‘medieval’	<i>v[e]n[á]nça</i>	‘revenge’
<i>b[e]nz[í]na</i>	‘petrol’	<i>m[e]di[ó]cre</i>	‘mediocre’	<i>v[e]h[í]cle</i>	‘vehicle’
<i>b[e]n[í]gne</i>	‘benign’	<i>m[e]nt[á]l</i>	‘mental’	<i>v[e]locit[á]t</i>	‘velocity’
<i>b[e]ng[á]la</i>	‘flare’	<i>m[e]ntalít[á]t</i>	‘mentality’	<i>v[e]getac[ió]</i>	‘vegetation’
<i>b[e]g[ó]nia</i>	‘begonia’	<i>m[e]ntalitz[á]r</i>	‘mentalize’	<i>v[e]rtebr[á]t</i>	‘vertebrate’
<i>b[e]r[í]na</i>	‘sedan’	<i>m[e]todolog[í]a</i>	‘methodology’	<i>v[e]ni[á]l</i>	‘venial’
<i>b. Loanwords and learned words (prefixed words)</i>					
<i>imp[e]c[á]ble</i>	‘impeccable’	<i>c[o]mm[e]mor[á]r</i>	‘commemorate’	<i>r[ə]f[er]der[á]r</i>	‘to refederate’
<i>imp[e]d[á]ncia</i>	‘impedance’	<i>ll[à]rgm[e]tr[á]tge</i>	‘feature film’	<i>[ə]f[e]min[á]t</i>	‘effeminate’
<i>sup[e]dit[á]r</i>	‘to abide’	<i>Tr[à]nsm[e]diterr[á]nea</i>	‘ship company’	<i>p[ò]stf[e]ud[á]l</i>	‘postfeudal’
<i>sup[e]r[á]r</i>	‘to overcome’	<i>quilò[m]e[tre]</i>	‘kilometer’	<i>inv[e]rtebr[á]t</i>	‘invertebrate’
<i>c. Loanwords and learned words (words with initial vowel epenthesis)</i>					
<i>[ə]sp[e]ci[á]l</i>	‘especial’	<i>[ə]sp[e]c[í]fic</i>	‘specific’	<i>[ə]sp[e]c[í]nt</i>	‘expectant’
<i>[ə]sp[e]cial[í]sta</i>	‘especialist’	<i>[ə]sp[e]cificad[ó]r</i>	‘specifier’	<i>[ə]sm[e]r[á]m</i>	‘brighten up’
<i>[ə]sp[e]cialit[á]t</i>	‘especiality’	<i>[ə]sp[e]cificat[í]u</i>	‘specifier’	<i>[ə]sf[e]r[á]ta</i>	‘sphere dim.’
<i>[ə]sp[e]cialitz[á]r</i>	‘especialize’	<i>[ə]sp[e]cificit[á]t</i>	‘specificity’	<i>[ə]sv[e]r[á]t</i>	‘reckless’
<i>[ə]sp[e]cialm[é]nt</i>	‘especially’	<i>[ə]sp[e]rmatozou</i>	‘spermatozoon’	<i>[ə]sv[e]l[é]sa</i>	‘slenderness’
<i>d. Loanwords and learned words (with e preceded by a coronal or a velar consonant)</i>					
<i>s[e]m[á]for</i>	‘traffic light’	<i>c[e]l[é]brity</i>	‘celebrity’	<i>qu[e]rat[í]na</i>	‘keratin’
<i>n[e]n[ú]lfar</i>	‘water lily’	<i>c[e]l·lul[ó]s·ide</i>	‘celluloid’	<i>k[e]tch[ú]p</i>	‘Ketchup’
<i>n[e]f[á]st</i>	‘nefast’	<i>[ə]st[e]reot[í]p</i>	‘stereotype’	<i>qu[e]b[á]b</i>	‘quebab’
<i>N[e]p[á]l</i>	‘Nepal’	<i>[ə]st[e]r[ó]s·ide</i>	‘asteroid’	<i>[ə]sk[e]tch[á]r</i>	‘to sketch’
<i>l[e]g[á]l</i>	‘legal’	<i>[ə]st[e]reotip[á]r</i>	‘to stereotype’	<i>[ə]squ[e]x[á]da</i>	‘Catalan meal’
<i>n[e]gat[í]u</i>	‘negative’	<i>[ə]ster[ó]ides</i>	‘steroids’	<i>Qu[e]b[é]c</i>	‘Quebec’
<i>r[e]v[ó]lver</i>	‘revolver’	<i>[ə]ster[e]r[í]sc</i>	‘star, sign’	<i>K[e]nt[á]ky</i>	‘Kentucky’

Inherited words with an unstressed *e* in the same structural and phonetic context, on the contrary, are realized, as expected, with [ə] (9); so are words (both native and recently introduced to the dialect) with the vowel placed in a context other than the initial syllable of the stem or with the vowel not preceded by a labial consonant (10a). As said before, the initial epenthetic vowel is also realized as schwa (10b) (see also the examples in 8b and 8c).

(9) *Normal application of vowel reduction in inherited words with e in the initial syllable of the stem*⁶

After a labial stop		After a labial nasal		After a labial fricative	
p[ə]d[á]ç	'cloth'	m[ə]nɛst[é]r	'need'	f[ə]ix[ú]c	'heavy'
p[ə]nɛd[í]r-sɛ	'to be sorry'	m[ə]nt[í]da	'lie'	f[ə]r[í]r	'to hurt'
p[ə]ssig[á]r	'to pinch'	m[ə]s[ú]ra	'measure'	f[ə]m[é]lla	'female'
b[ə]s[á]da	'kiss'	m[ə]tz[í]na	'poison'	v[ə]d[é]ll	'beef'
b[ə]ss[ó]	'twin'	m[ə]l[ó]	'melon'	v[ə]ll[ú]t	'velvet'
b[ə]t[ú]m	'shoe polish'	m[ə]nɔrqu[í]	'Minorcan'	v[ə][í]	'neighbor'

(10) *Normal application of vowel reduction in other structural / phonetic contexts*

<i>a. Inherited words with e not placed in the initial syllable of the stem or preceded by a non-labial consonant (loanwords, learned words and inherited words)</i>					
camp[ə]r[ó]l	'farmer'	am[ə]nɪtz[á]r	'to entertain'	[ə]traf[é]g[á]r	'to rush'
pr[ə]s[ə]rvat[í]u	'preservative'	pr[ə]t[ə]nsi[ó]s	'pretentious'	pr[ə]f[ə]r[é]nt	'preferent'
fl[ə]xi[ó]ns	'push-ups'	pr[ə]c[ó]ç	'early'	pr[ə]ci[ó]s	'precious'
<i>b. Words with initial e epenthesis (loanwords, learned words and inherited words)</i>					
[ə]sp[é]ci[á]l	'especial'	[ə]sp[ə]r[í]t	'spirit'	[ə]sp[ə]rs[ó]r	'sprinkler'
[ə]sp[é]cial[í]sta	'specialist'	[ə]sb[ə]rl[á]r	'to shatter'	[ə]s[é]l[é]ta	'sphere dim.'

Some relevant remarks should be made about the patterns of loanwords and learned words exposed in (8). *a*) First is that there are a few words which exhibit underapplication of vowel reduction of *e* when this vowel is not placed in the initial syllable of the stem (11a) (see § 4, for a plausible explanation of these kinds of exceptions, and also § 3.3.6).

6. The data in this table are from Bibiloni (1998)

- (11) *Underapplication to schwa in loanwords and learned words with e not placed in the initial syllable of the stem (exceptions to the patterns in (8))* (Bibiloni 1998: 537)

ab[e]rraci[ó] ‘aberration’
am[e]ric[á] ‘American’

- b) Second is that some of the words listed in (8) are not in fact adapted by any means and show a fully discrepant behavior with respect to the regular phonology of the dialect (with no vowel reduction in other contexts, with closed mid vowels, instead of schwa or instead of the open mid vowels) (12), in that they are fully pronounced following the phonetic system of Spanish.

- (12) *Words with a fully discrepant behavior with respect to the native phonology*

v[e]rb[é]n[a] (cf. other Eastern dialects: *v[ə]rb[é]n[ə]*)
v[e]d[é]t (cf. other Eastern dialects: *v[ə]d[é]t*)
r[e]v[ó]lv[e]r (cf. other Eastern dialects: *r[ə]v[ó]lv[ə]r*)
V[e]rs[á]ll[e]s
P[e]n[é]lop[e]
R[e]ps[ó]l

- c) Third is that a secondary stress in the *e* in prefixed words and compounds induces, of course, lack of vowel reduction, following the regular patterns of Eastern Catalan dialects (13).

- (13) *Underapplication to schwa in loanwords and learned words with e in a prefix or in the first member of a compound*

<i>p[è]ntasíl·lab</i>	‘pentasyllabe’	<i>m[e]lómano</i>	‘music lover’
<i>p[e]rmutació</i>	‘permutation’	<i>m[è]nopausa</i>	‘menopause’
<i>p[è]nja·robes</i>	‘hanger’	<i>m[e]tàfora</i>	‘metaphor’
<i>M[è]rcadona</i>	‘supermarket name’	<i>m[e]tàstasi</i>	‘metastasis’
<i>m[e]gàfon</i>	‘megaphone’	<i>m[è]tabolisme</i>	‘metabolism’
<i>m[è]lodrama</i>	‘melodrama’	<i>v[è]lomar</i>	‘pedalo’

- d) Fourth is that underapplication of vowel reduction of *e* is also possible, as exposed in § 3.1, in other contexts: in fact, realizations with [e] are especially intense in (absolute) word-final position in loanwords and learned words (14a), are also found in word-medial position, probably due to a long-distance harmony effect (14b) and, recently, their occurrences have been extended in word-initial position even when not preceded by a labial consonant, especially among young speakers (14c).

(14) *Underapplication to schwa in loanwords and learned words with e in other positions of the word*a. *Occurrences of e in (absolute) word-final position* (Bibiloni 1998: 537)

<i>bilingü[e]</i>	'bilingual'	<i>timbr[e]</i>	'bell'
<i>buc[l[e]</i>	'loop'	<i>rifl[e]</i>	'riffle'
<i>cabl[e]</i>	'cable'	<i>tigr[e]</i>	'tiger'
<i>cafr[e]</i>	'moron'	<i>síndrom[e]</i>	'syndrome'
<i>calibr[e]</i>	'caliber'	<i>índ[e]x</i>	'index'
<i>còmplic[e]</i>	'accessory'	<i>píx[e]l</i>	'pixel'
<i>deform[e]</i>	'deform'	<i>mamíf[e]r</i>	'mammal'
<i>enorm[e]</i>	'enormous'	<i>níqu[e]l</i>	'nickel'
<i>forens[e]</i>	'forensic'	<i>revòlv[e]r</i>	'revolver'
<i>mediocr[e]</i>	'mediocre'	<i>sem[e]n</i>	'semen'

b. *Occurrences of e in word-medial position (harmony effect)* (Bibiloni 1998: 537)

<i>f[e]d[e]ració</i>	'federation'	<i>m[e]di[e]val</i>	'medieval'
<i>p[e]n[e]trar</i>	'to penetrate'	<i>v[e]g[e]tal</i>	'vegetal'
<i>v[e]rt[e]brat</i>	'vertebrate'	<i>c[e]r[e]bral</i>	'brainy'

c. *Occurrences of e not preceded by a labial consonant in word-initial position*

<i>pl[e]tòric</i>	'plethoric'
<i>pl[e]beu</i>	'plebian'
<i>pr[e]matur</i>	'premature'
<i>pr[e]carietat</i>	'precariousness'
<i>pr[e]cipitar</i>	'precipitation'

- e) Fifth, and very importantly, is that there is a similar tendency to not reduce to schwa the unstressed *a* in loanwords and learned words. Although in this case underapplication is not as biased by the structural and the phonetic context as the cases with *e*, it is more frequent, again, when the vowel is placed in the initial syllable of the stem (15); contrarily to the realizations with unstressed *e*, realizations with unstressed *a* appear in words in general not adapted to the phonology of the language in other respects (i.e. *c[a]mi[ón]*, *t[a]p[é]t[e]*), and are weakened over time as the words progressively become adapted (i.e. *c[a]mi[ón]* > *c[ə]mi[óØ]*; *[a]vi[ón]* > *[ə]vi[óØ]*).

- (15) *Underapplication of vowel reduction in loanwords and learned words with unstressed a* (Bibiloni 19: 98-99; personal inquiries)

<i>Old loanwords</i>		<i>More recent loanwords</i>	
<i>x[a]let</i>	‘summer house’	<i>Coc[a]-Col[a]</i>	
<i>c[a]rnet</i>	‘card’	<i>M[a]rlboro</i>	
<i>c[a]c[a]uet</i>	‘peanut’	<i>k[a]tiuskas</i>	
<i>m[a]mà</i>	‘mom’	<i>X[a]ngai</i>	
<i>p[a]pà</i>	‘dad’	<i>b[a]guette</i>	‘bread’
<i>[a]vió</i>	‘plane’	<i>c[a]b[a]ret</i>	‘cabaret’
<i>[a]tleta</i>	‘athlete’	<i>C[a]puccino</i>	
<i>c[a]mió</i>	‘truck’	<i>D[a]ikiri</i>	
<i>t[a]pete</i>	‘rug’	<i>b[a]mbú</i>	
<i>b[a]nquete</i>	‘banquet’		

- f) Fifth is that the influence that the preceding consonant has on underapplication decreases in the following direction: bilabial consonants > labiodental consonants > coronal consonants > velar consonants (see, in this regard, § 3.3.1).

3.3. *Generalizations and Optimality Theory analysis*

Within the learned words and loanwords exposed in (8), there are four crucial conditions that favour underapplication of vowel reduction: *a*) the phonetic context in which the vowel occurs, in that is generally preceded by a labial consonant; *b*) the structural position of the affected vowel, which is always placed in the initial syllable of the stem; *c*) the quality of the vowel itself, which always corresponds to an orthographic *e*, and *d*) the novel character of the word itself.

3.3.1. *The phonetic context of the vowel*

Bibiloni (1998) argues that, although the phonetic context (*i.e.*, the labial character of the consonant that precedes the vowel) has some exceptions such as *l[e]gal*, *n[e]fast* or *n[e]gatiu*, it is a relevant factor for underapplication of vowel reduction in loanwords and learned words. The influence of the preceding vowel can be interpreted as a consequence of the activity of a (coarticulatory driven) contextual markedness constraints which demands that adjacent segments share the feature [–posterior] (see 16): labial consonants and [e], indeed, share the value [–posterior], whereas labials and [ə] do not (see 17). This account of the facts, on the other hand, allows us to include coronals, which are also [–posterior], as inducers of underapplication of vowel reduction, because, in fact, as claimed in § 3.2, lack of vowel reduction is especially frequent when the preceding consonant is a labial, but also when it is a coronal; the same patterns are found, actually, in productive derivation and, in part, in verbal inflection (see § 3.3.6).

(16) *Contextual markedness constraint*

SHARE(-posterior): Assign one violation mark for each sequence of consonant + vowel adjacent segments with a different specification for the feature [-posterior].

(17) *Assumed features (after Bonet & Lloret 1998)*

	p	m	f	e	ə	a	t	d	k	g
labial	+	+	+	-	-	-	-	-	-	-
posterior	-	-	-	-	+	+	-	-	+	+
anterior	+	+	+	+	-	-	+	+	-	-

The fact, though, that labials favor underapplication more systematically than coronals could be interpreted as a consequence of a gradient coarticulatory effect, namely, as a consequence of the *greater degree of anteriority* (or, what it is the same, the lesser degree of posteriority) of labials with respect to coronals. In fact, as said in § 3.3.2, the influence of the preceding consonant on underapplication decreases precisely according to its degree of anteriority; bilabial consonants, indeed, are more prone to trigger underapplication than labiodentals, which are more prone to trigger underapplication than velar consonants. Some speakers, indeed, just show underapplication when the preceding vowel is bilabial, some others both when it is bilabial and labiodental, some others when it is an anterior consonant and, yet, some others in all cases.

It is important to draw attention, here, to the fact that the phonetic context seems to be more decisive in old learned words than in recent learned words or loanwords, where underapplication of vowel reduction in stem-initial position is almost fully systematic no matter the phonetic context (see 8c: *n[e]núfar*, *qu[e]ratina*; 14c: *pr[e]carietat*, *pr[e]cipitar*). This seems to indicate that the phenomenon started in a very specific phonetic context (preceding labials), that it was progressively extended to other phonetic contexts (preceding coronals), until it reached all possible phonetic contexts (including preceding velars). In fact, another factor to be considered here is the frequency: words with stem-initial *e* preceded by a labial or a coronal are larger in number than words with stem-initial *e* preceded by a velar, and this could contribute to the tendency for underapplication in the former cases.

Overall, from a strictly synchronic point of view, the unquestionable context is the structural position of the vowel (*i.e.* stem-initial), rather than the quality of the preceding consonant, and this is what we are taking into account for the analysis. If the constraint in (16) is considered, though, it has to be subject to additional constraints, which are addressed in the following sections, and only operating, of course, in the productive grammar of the dialect (see, in this respect, § 3.3.3).

3.3.2. *The structural position of the vowel*

Underapplication of vowel reduction to schwa in learned words and loanwords is found in those cases in which the unstressed vowel is located in the initial syllable of the stem. Note, again, that the relevant structural position is the initial syllable of the stem, and not of the word, as shown by the fact that underapplication emerges in prefixed words and compounds, such as *comm[e]morar* and *llargm[e]tratge*, or in words with initial epenthesis, such as [ə]sp[e]cial or [ə]st[e]reotip (see 8b, 8c), where the vowel with lack of vowel reduction to schwa is located not in the initial syllable of the word but rather in the initial syllable of the stem. As already said, on the other hand, there are only two cases which escape from this generalization: *ab[e]rració* and *am[e]ricà* (11), in which, although the vowel it is not situated in the initial syllable of the stem, there is underapplication of vowel reduction to schwa. (For the theoretical consequences of the behaviour related to epenthesis and for a possible explanation of these two last exceptions, see § 4).

Unlike the cases of underapplication concerning productive derivation and verbal inflection (see 4a, 4b and § 3.3.6), in learned words and loanwords the unstressed vowel does not generally alternate with a stressed one, so that it cannot be alleged that paradigmatic pressure is a factor at play here. According to our view, though, the fact that underapplication of vowel reduction occurs, as in productive derivation and verbal inflection, when the vowel is located in the initial syllable of the stem is not a simple coincidence and leads to the already mentioned likely connection between positional faithfulness and contextual markedness constraints (see § 1.2.2).

A plausible diachronic origin for underapplication in loanwords and learned words is the activity of the output-to-output faithfulness constraints relativized according to the position of the vowel within the stem, which have been responsible for underapplication of vowel reduction to schwa in productive derivation and verbal inflection (18a; § 3.3.6), that is, in the (historically) *productive phonology* of the dialect. These output-output constraint have provoked a drastic reduction in the occurrences of the schwa in stem-initial position, and led, over time, to a reinterpretation of the grammar by Majorcan Catalan speakers. That is to say, the effects of the positional faithfulness constraints enhancing the appearance of [e], instead of [ə], in the initial syllable of the stem would have been reinterpreted by the speakers as a consequence of a contextual markedness constraint of the type *ə/INITIALSYLSTEM, which bans a schwa in the initial syllable of the stem and prevents from the occurrence of this segment in this structural position in learned words and loanwords (18b).

(18) From positional faithfulness to contextual markedness

PRODUCTIVE PHONOLOGY	
a. PROD. DERIVATION & VERBAL INFLECTION	b. LEARNED WORDS & LOANWORDS
O-O <i>positional</i> faithfulness ↓ absence of [ə] in the <i>initial syllable</i> of the stem	absence of [ə] in the <i>initial syllable</i> of the stem ↑ contextual markedness
<i>f</i> [é]sta → <i>f</i> [e]st[á]ssa <i>esp</i> [é]ra → <i>esp</i> [e]r[á]u	<i>v</i> [e]rm[ú]t <i>p</i> [e]l·l[í]cula

Like the output-to-output positional faithfulness constraints alleged to account for productive derivation and verbal inflection (see Pons-Moll 2011a, b; § 3.3.6), the contextual markedness constraint *ə/INITIALSYLLSTEM is both psychologically and phonetically grounded, in the sense that in a prominent position, such as the initial syllable of the stem, a vowel with higher sonority, and thus more prominent, than the schwa is preferred. Indeed, this is an instance of accumulation of prominent properties (such as an element of high sonority) in an evenly prominent position (such as the initial syllable of the stem). Several psycholinguistic experiments have concluded that there is a noticeable left / non-left asymmetry, in that the left part of the word is more relevant than the end part of the word and even more relevant than the middle part of the word in word recognition. This has been related to the importance of temporal processing of words or to the lexical access to words, from left to right (see, among others, Nooteboom 1981, Hawkins & Cutler 1988, Barnes 2002, Chitoran *et al.* 2002, Lloret & Jiménez 2008), and it explains, among other facts, why this position crosslinguistically favours finer faithfulness requirements (Beckman 1998; Casali 1996, 1997), the accumulation of prominent properties (Crosswhite 1999, 2004) or the preference for suffixing versus prefixing (Hawkins & Cutler 1988). In fact, the initial position of the *word* in the phonology of Catalan has been proposed to be relevant in previous work by Cabré & Prieto (2006) to explain the preservation of vocalic features and the blocking of glide formation in Catalan and Spanish, and in work by Lloret & Jiménez (2008) and Jiménez & Lloret (2010) to justify the occurrence of elements of high sonority in the phonology of Western Catalan dialects. On the other hand,

the relevance of the initial syllable of the *stem* has already been explored in work by Pons-Moll (2011a, b) to explain finer faithfulness requirements in Majorcan Catalan derivation and verbal inflection (see § 3.3.6) and in work by Torres-Tamarit & Pons-Moll & Cabrera-Callís (2012) to justify the metathesis patterns in Algerese Catalan.

The constraint $*\text{ə}/\text{INITIALSYLLSTEM}$, of course, is not an isolated one, but it is connected to the harmony scale for vowels placed in the initial syllable of the stem (19a) and belongs to the subsequent constraint hierarchy (19b), according to which at the left periphery of the stem elements of high sonority are preferred. As seen in (19b), the schwa, being the less sonorous vowel, is the least preferred in a prominent position such as the initial syllable of the stem. Note, on the other hand, how this contextual markedness constraint is fully justified when the facts related to the unstressed *a* in loanwords are considered: as seen in (15), this vowel is also not reduced to schwa in loanwords, especially when it is located in the initial syllable of the stem (cf. *b[a]mbú*).

(19) *Universal harmonic scale and constraint hierarchy for unstressed vowels in the initial syllable of the stem* (adapted from Crosswhite 1999, 2004) (see also § 6)

- a. *Universal harmonic scale for unstressed vowels in the initial syllable of the stem*
 $a/\text{INITIALSYLLSTEM} \succ \text{ɛ,ɔ}/\text{INITIALSYLLSTEM} \succ \text{e,o}/\text{INITIALSYLLSTEM} \succ \text{i,u}/\text{INITIALSYLLSTEM} \succ \text{ə}/\text{INITIALSYLLSTEM}$
- b. *Universal constraint hierarchy for unstressed vowels in the initial syllable of the stem*
 $*\text{ə}/\text{INITIALSYLLSTEM} \gg *i,u/\text{INITIALSYLLSTEM} \gg *e,o/\text{INITIALSYLLSTEM} \gg *ɛ,ɔ/\text{INITIALSYLLSTEM} \gg *a/\text{INITIALSYLLSTEM}$
- c. *Sonority scale for vowels (from more to less sonority)*
 $a > \text{ɛ,ɔ} > \text{e,o} > \text{i,u} > \text{ə}$

As shown in the tableau of (21), this constraint hierarchy interacts with the constraint hierarchy for vowels in unstressed syllables (see also 6), which we reproduce below for expository reasons:

(20) *Universal constraint hierarchy for unstressed syllables*

- $$* \text{UNSTR}\sigma/a \gg * \text{UNSTR}\sigma/\text{ɛ,ɔ} \gg * \text{UNSTR}\sigma/\text{e,o} \gg * \text{UNSTR}\sigma/\text{i,u} \gg * \text{UNSTR}\sigma/\text{ə}$$

Note how, by the richness of the base hypothesis (Prince & Smolensky 1993), it is necessary to list both /e/ and /ɛ/ in the underlying representation, since both vowels can be realized as [e] in unstressed position ($/\text{f}\text{é}/\text{sta}$ ‘party’ ~ $/\text{f}\text{e}/\text{st}[\acute{\text{a}}]\text{ssa}$ ‘party *augm.*’; $c[\acute{\text{e}}]l$ ‘sky’ ~ $c[\text{e}]/l[\acute{\text{a}}]t$ ‘sky *dim.*’; see also the examples in (4) and § 3.3.6). And it is crucial, therefore, that $*\text{UNSTR}\sigma/\text{ɛ}$ dominates $*\text{e}/\text{INITIALSYLLSTEM}$, because otherwise the universal ranking $*\text{e}/\text{INITIALSYLLSTEM} \gg *ɛ/\text{INITIALSYLLSTEM}$ would favour the candidate with [ɛ] in stem-initial position (21c). It is also crucial, of

course, that *ə/INITIALSYLLSTEM dominates *UNSTRσ/e, so that the candidate with [e], and not with [ə], in unstressed position is the one eligible to be optimal (21a vs. 21b).

(21) *Underapplication of vowel reduction in loanwords and learned words (words without morphophonological alternations / only structural position considered)*

<i>f</i> e,ε/ <i>t</i> i <i>x</i> i <i>s</i> m <i>e</i>	*ə/INITIAL SYLLSTEM	*UNSTRσ/ε	FAITH	*e/INITIAL SYLLSTEM	*ε/INITIAL SYLLSTEM	*UNSTRσ/e
☞ a. <i>f</i> [e] <i>t</i> i <i>x</i> i <i>s</i> m <i>e</i>			*	*		*
b. <i>f</i> [ə] <i>t</i> i <i>x</i> i <i>s</i> m <i>e</i>	*W		**W	L		L
c. <i>f</i> [ε] <i>t</i> i <i>x</i> i <i>s</i> m <i>e</i>		*W	*	L	*W	L

The results are the same, of course, if loanwords and learned words with morphophonological alternations (cf. *m*[é]*nt* ~ *m*[e]*ntal*; [é]*uro* ~ [e]*uret*, *esp*[é]*rma* ~ *esp*[e]*rmatozou*) are considered. The only difference is that either the winner candidate and the losing candidate show lesser faithfulness violations, since there is a single vowel in the underlying representation.

(22) *Underapplication of vowel reduction in loanwords and learned words (words with morphophonological alternations / only structural position considered)*

<i>m</i> /e/ <i>ntalitat</i> cf. <i>m</i> [é] <i>nt</i>	*ə/INITIAL SYLLSTEM	*UNSTRσ/ε	FAITH	*e/INITIAL SYLLSTEM	*ε/INITIAL SYLLSTEM	*UNSTRσ/e
☞ a. <i>m</i> [e] <i>ntalitat</i>			*	*		*
d. <i>m</i> [ə] <i>ntalitat</i>	*W		*W	L		L

In the last tableau, we have not taken into consideration the phonetic context: as exemplified in the following tableaux, the inclusion of SHARE(-posterior) in the constraint hierarchy would formally express that underapplication is more prone to apply when the stem-initial vowel is preceded by a labial and a coronal. Note how considering this asymmetry sheds light in a new ranking argument: SHARE(-post), *UNSTRσ/ε >> *ə/INITIALSYLLSTEM, FAITH.

(23) *Underapplication of vowel reduction in loanwords and learned words (structural position and phonetic context considered)*a. *Preceding labial or coronal*

<i>f</i> e,ɛ <i>t</i> i <i>x</i> i <i>s</i> m <i>e</i> n e,ɛ <i>n</i> ú <i>f</i> a <i>r</i>	SHARE (-post)	*UNSTRσ/ε	*ə/INITIAL SYLLSTEM	FAITH	*e/INITIAL SYLLSTEM	*ε/INITIAL SYLLSTEM	*UNSTRσ/e
☞ a. <i>f</i> e <i>t</i> i <i>x</i> i <i>s</i> m <i>e</i> n e <i>n</i> ú <i>f</i> a <i>r</i>				*	*		*
☞ b. <i>f</i> ə <i>t</i> i <i>x</i> i <i>s</i> m <i>e</i> n ə <i>n</i> ú <i>f</i> a <i>r</i>	*W		*W	**W	L		L
☞ c. <i>f</i> ε <i>t</i> i <i>x</i> i <i>s</i> m <i>e</i> n ε <i>n</i> ú <i>f</i> a <i>r</i>		*W		*	L	*W	L

b. *Preceding velar*

<i>q</i> u e,ɛ <i>r</i> o <i>s</i> è	SHARE (-post)	*UNSTRσ/ε	*ə/INITIAL SYLLSTEM	FAITH	*e/INITIAL SYLLSTEM	*ε/INITIAL SYLLSTEM	*UNSTRσ/e
a. <i>q</i> u e <i>r</i> o <i>s</i> è	*W		L	L	*W		*W
☞ b. <i>q</i> u ə <i>r</i> o <i>s</i> è			*	**			
c. <i>q</i> u ε <i>r</i> o <i>s</i> è	*W	*W	L	L		*W	

3.3.3. *The novel character of the word*

As will be seen in § 3.3.6 and as argued in Pons-Moll (2011a, b), underapplication of vowel reduction in derived and first conjugation verbal forms in Majorcan Catalan, which is subject to morphophonological alternations (see the examples in 4), can be understood as a direct consequence of the interaction between the prominence constraint hierarchy for vowels in unstressed position (Crosswhite 1999, 2004) and a set of output-to-output faithfulness constraints relativized according to two factors: the productivity of the derivational process and the position of the affected vowel within the stem. The proposal is framed within the Transderivational Correspondence Theory (Benua 1997 / 2000) and the Optimal Paradigms Model (McCarthy 2005), and in order to formalize the second factor, that is, the incidence of the position of the affected vowel within the stem for underapplication of vowel reduction, a set of output-to-output *positional* faithfulness constraints are invoked.

Given the presented facts related to words of recent introduction, in which we systematically find unstressed [e] in stem-initial position, it is reasonable to think that the output-to-output positional faithfulness constraints alleged to account for underapplication of vowel reduction to schwa in productive derivation and inflection would tend to become operatively obsolete, and only the contextual markedness constraint *ə/INITIALSYLLSTEM would be the one showing effects in the entire *productive* phonology of Majorcan Catalan, thus also affecting productive derivative forms, verbal inflectional forms and learned words and loanwords (24).

This promotion, over time, of the contextual markedness prohibiting the schwa in this specific position can be interpreted as an instance of the *retreat to the*

unmarked (McCarthy & Prince 1994, Kenstowicz 2005), in the sense that a vowel with low sonority would tend to reduce its occurrence in prominent positions, not only in the initial syllable of the stem, but also in word-final position (see also § 3.3.2 and § 3.3.5), or in stressed position (see § 3.3.6.2). In order to corroborate this approach, according to which *ə/INITIALSYLLSTEM would end up being responsible for underapplication of vowel reduction even in the cases where there are morphological alternations (*i.e.*, derivation and verbal inflection), it would be necessary to explore whether there were cases of underapplication in derivative forms which historically have lost the morphological relation with the corresponding underived primitive form; if this was the case, we would have further empirical evidence to sustain this approach. In fact, non-productive derived forms such as *pedrera* ‘quarry’ or *peixater* ‘fisherman’ can show in young speakers [ə] realizations, as expected, but also realizations with [e].

Overall, we assume for Majorcan Catalan the existence of two coexisting grammars or phonologies (see, among others, Anttila 1997), one active in what we call the *productive phonology* of the dialect (24) and including learned words and loanwords, productive derivation and verbal inflection, and the other only active in what we call the *unproductive phonology* of the dialect (25) and including non-alternating inherited words and unproductive derivation. As can be seen in tableaux (24) below, the ranking *ə/INITIALSYLLSTEM, *UNSTRσ/ε, FAITH >> *e/INITIALSYLLSTEM >> *ε/INITIALSYLLSTEM, *UNSTRσ/e would be the one responsible for underapplication of vowel reduction to schwa in the former cases. It is important to note that no distinction is necessary between the lexical classes «loanword» and «learned word», in that they behave exactly the same way, at least as far as words with unstressed *e* are considered (see, though, § 3.3.4, for empirical arguments which do support this distinction when the unstressed *a* is considered, and Cabré 2009 for empirical arguments which do support it in the phonology of other Eastern Catalan dialects).

(24) PRODUCTIVE PHONOLOGY

a. *Loanwords*

<i>v/e,ε/rmut</i>	*ə/INITIAL SYLLSTEM	*UNSTRσ/ε	FAITH	*e/INITIAL SYLLSTEM	*ε/INITIAL SYLLSTEM	*UNSTRσ/e
☞ <i>a. v[e]rmut</i>			*	*		*
<i>b. v[ə]rmut</i>	*W		**W	L		L
<i>c. v[ε]rmut</i>		*W	*	L	*W	L

b. *Learned words*

<i>f/e,ε/titxisme</i>	*ə/INITIAL SYLLSTEM	*UNSTRσ/ε	FAITH	*e/INITIAL SYLLSTEM	*ε/INITIAL SYLLSTEM	*UNSTRσ/e
☞ <i>a. f[e]titxisme</i>			*	*		*
<i>b. f[ə]titxisme</i>	*W		**W	L		L
<i>c. f[ε]titxisme</i>		*W	*	L	*W	L

c. *Productive derivative forms*

<i>p/e/dreta</i> cf. <i>p[é]dra</i>	*ə/INITIAL SYLLSTEM	FAITH	*e/INITIAL SYLLSTEM	*UNSTRσ/e
☞ <i>a. p[e]dreta</i>			*	*
<i>b. p[ə]dreta</i>	*W	*W	L	L

d. *First conjugation verbal forms*

<i>esp/e/rar</i> cf. <i>esp[é]ra</i>	*ə/INITIAL SYLLSTEM	FAITH	*e/INITIAL SYLLSTEM	*UNSTRσ/e
☞ <i>a. esp[e]rar</i>			*	*
<i>b. esp[ə]rar</i>	*W	*W	L	L

And, as can be seen in tableaux (25), the ranking *UNSTRσ/e >> FAITH, *ə/INITIALSYLLSTEM >> *e/INITIALSYLLSTEM would be active in the unproductive phonology of the dialect, including inherited words and non-productive derivative forms. Note that in non-alternating inherited forms realized with a schwa (*i.e.*, *bessó* ‘twin’) four underlying vowels (/a, ə, e, ε/) must be posited, since the grammar can give as a result the surface realization with [ə] departing from either of the four. This explains the tie between the winning and losing candidates with respect to the FAITH constraint in (25a). As seen in (25b), however, unproductive derivative forms, which do exhibit morphological alternations and in which there is empirical evidence for the unique underlying form (with /e/ in this particular case), provide evidence for the ranking argument *UNSTRσ/e >> FAITH.

(25) UNPRODUCTIVE PHONOLOGY

a. Inherited words

<i>b/a,ə,e,ε/ssó</i>	*UNSTRO/e	FAITH	*ə/INITIAL SYLLSTEM	*e/INITIAL SYLLSTEM
<i>a. b[e]ssó</i>	*W	**	L	*W
☞ <i>b. b[ə]ssó</i>		**	*	

b. Non-productive derivative forms

<i>pl/drera</i> cf. <i>p[é]dra</i>	*UNSTRO/e	FAITH	*ə/INITIAL SYLLSTEM	*e/INITIAL SYLLSTEM
<i>a. p[e]drera</i>	*W	L	L	*W
☞ <i>b. p[ə]drera</i>		*	*	

3.3.4. The quality of the vowel

The cases dealt with in this paper are those with an unstressed *e*. As seen in § 3.2., though, this behavior is not restricted to front vowels, but also affects the unstressed *a*, also when located in the initial syllable of the stem, although in the latter case the phenomenon affects loanwords (cf. *b[a]mbú*) but not learned words (cf. *m[ə]quievèlic*); and, in fact, it appears in loanwords not adapted to the language phonology in other respects. As said, on the other hand, old loanwords, originally pronounced with [a] (cf. *m[a]mà*, *c[a]rnet*), tend to progressively be pronounced with [ə] (cf. *m[ə]mà*, *c[ə]rnet*). This shows, on the one hand, that there is a progressive restructuring of the Majorcan Catalan unstressed vowel system, still going on, and, on the other hand, that underapplication of vowel reduction concerning the unstressed *a* is less consistent than that concerning *e* (cf. old loanwords: *p[e]l·lícula*). In any case, the instances of stem-initial unstressed schwa derived from *a* are not only limited due to underapplication in recent loanwords, but also due to a process of word-initial schwa deletion, quite systematic within the Majorcan dialect (cf. [Ø]turar ‘to stop’).

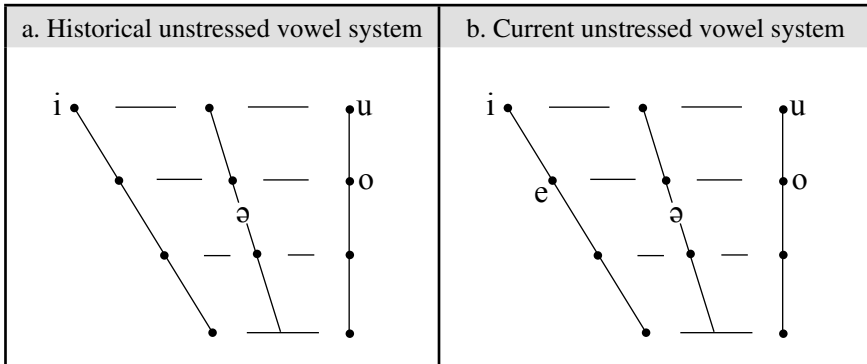
3.3.5. Alternative analyses and discussion

We discard an interpretation of the facts based on a stratified lexicon and constraints indexed to a specific set of words, along the lines of Itô & Mester (1999) and Pater (2000, 2005), because, as proven in this paper, the cases with underapplication of vowel reduction in Majorcan Catalan affect a group of words substantial, heterogeneous and general enough, including learned words and loanwords, and productive derivative forms and verbal forms (see in this respect § 3.3.6) to be considered not exceptions and thus lexically marked, but rather the present and, certainly, the future phonological regularity of the dialect. Under this new perspective, therefore, «lexical exceptions» (corresponding, in our case, to learned words) should no longer be considered exceptions and underapplication should no longer be considered «underapplication» but instead normal application.

There is an additional argument which supports this approach to the facts. As stated in Pons-Moll (2009 / 2010) and as noted above (see § 1.2.1), those processes that underapply because of morphological reasons and in learned words and loanwords are the ones that are not transferred to second language speech, and this could be taken as strong evidence that there is a specific grammar (*i.e.*, constraint hierarchy) for the whole productive phonology of the language, rather than a markedness constraint indexed to a set of words (for instance, $*\text{ə}/\text{INITIALSYLLSTEM}$ indexed to the group of words made up of loanwords, learned words, productive derivative and verbal inflectional forms). In other words, it is much more economical to assume that the constraint hierarchy active in the productive phonology of the dialect is the one activated when acquiring a second language, rather than to have to lexically mark all the words coming from the second language when they meet certain specific structural conditions (see, in this respect, footnote 1).

On the other hand, the fact that the productive phonology of Majorcan Catalan systematically favours [e] instead of [ə] suggests that the unstressed vowel system of Majorcan Catalan, which has been historically asymmetric (see § 1.1), is progressively becoming symmetric, with a significant expansion of the occurrences of [e] in diverse contexts (cf. 26a vs. 26b).

(26) *Rebalancing the Majorcan Catalan unstressed vowel system*



In fact, as seen in § 3.3.2, the increase of [e] in unstressed position is especially intense in Majorcan Catalan, in that, in addition to the stem-initial position, this vowel has more occurrences in (absolute) word-final position (cf. 14a: *bilingü[e]*, *índ[e]x*) than other Eastern dialects of Catalan with a similar behaviour (see § 3.1), and, even, in word-medial position (cf. 14b: *f[e]d[e]ració*, *m[e]di[e]val*).

It seems plausible, therefore, to hypothesize that the constraints that favour the presence of [e] in unstressed position in Majorcan Catalan are (externally) driven by the need to rebalance the unstressed vowel system. Trying to formalize this possibility lies outside the main goals of this paper. These facts could be explained, though, by resorting to any model that includes as candidates not just segments within isolated words but segments taken as part of the whole system, along the lines of Flemming (2004).

An alternative proposal to the one defended here, with roughly the same effects, would be to resort to a positional faithfulness constraint requiring the preservation of the featural specification of those segments located in the initial syllable of the stem, again, active only, in the productive phonology of Majorcan Catalan. In this case, though, we would have to assume for the novel forms realized with a surface [e] a unique underlying representation with /e/ and for the forms realized with [ə] a unique underlying representation with /e/. Otherwise, it would be unavoidable to resort to an *arbitrary* ranking in which the positional faithfulness constraint protecting the /ə/ should be ranked above the one protecting the /e/ within the productive phonology, and another *arbitrary* ranking in which the positional faithfulness constraint protecting the /ə/ should be ranked above the ones protecting the /e/ and the /e/. An approach based on the contrast between /e/ (for loanwords) and /ə/ (for inherited words) would have to face the problem of determining which is the source of the underlying representation: the written form for loanwords and learned words and the transmitted oral form for inherited words.

All in all, if it is true that there is an external factor inducing the occurrence of [e] in unstressed position, such as the need to rebalance the unstressed vowel system of Majorcan Catalan, it is more reasonable to explain it in terms of contextual markedness than in terms of positional faithfulness.

3.3.6. *Underapplication of vowel reduction to schwa in other areas of Majorcan Catalan productive phonology*⁷

In this section we briefly expose the facts related to underapplication within productive derivation and verbal inflection. The behavior of productive derivatives and verbal forms is relevant for the purposes of this paper, first because it is intriguingly similar to that of loanwords and learned words; second, because it is believed and argued to be the historical origin of the lack of vowel reduction in loanwords and loanwords, and, third, because the patterns related to verbal forms show how the schwa is not only becoming an unproductive segment in unstressed position, but also in stressed position.

As exposed in § 1.1, productive derived forms with an unstressed vowel located in the initial syllable of the stem which alternates with a stressed [é] or [ê] vowel at the base-stem of the primitive are realized not with [ə] but with [e] (*p[e]ix[ə]t* ‘fish *dim.*’, cf. *p[é]ix* ‘fish’; *Est[e]v[ə]t* ‘Stephen *dim.*’, cf. *Est[é]ve* ‘Stephen’; *ren[e]tet* ‘great-grandson *dim.*’, cf. *ren[é]t* ‘great-grandson’; *c[e]l[ə]t* ‘sky *dim.*’, cf. *c[é]l* ‘sky’). Non-productive derived forms with an unstressed vowel located in the initial syllable of the stem which alternates with a stressed [é] or [ê] vowel at the base-stem of the primitive undergo, on the contrary, regular vowel reduction to [ə] (*p[ə]ixat[é]r* ‘fisherman’; *c[ə]lesti[á]l* ‘celestial’). Productive and non-productive derived forms with an unstressed vowel *not* located in the initial syllable of the stem with an alternating stressed [é] or [ê] vowel at the base-stem of the primitive do also undergo regular vowel reduction to [ə] (*pap[ə]r[ə]t* ‘paper *dim.*’ ~ *pap[ə]r[é]ra* ‘paper bas-

7. The data in this section is from Bibiloni 1998 and Mascaró 2005, and their descriptive generalizations are from Pons-Moll 2011a, 2011b.

ket', cf. *pap[é]r* 'paper'; *caf[ə]t[ə]t* 'coffee dim.' ~ *caf[ə]ter[í]a* 'coffee shop', cf. *caf[é]* 'coffee').

The very same patterns under similar conditions hold for inflectional paradigms of first conjugation verbs. We find underapplication of vowel reduction when an unstressed vowel located in the initial syllable of the stem alternates with a stressed close mid front vowel [é] in another verbal form of the same inflectional paradigm (cf. *p[e]g[á]m*, *p[e]g[á]u*, *p[e]gar[é]*, *p[e]gar[í]* *es...*, cf. *p[é]ga*, *p[é]gues...* 'to hit' verbal forms; *esp[e]r[á]m*, *esp[e]r[á]u*, *esp[e]r[á]ssis...*, cf. *esp[é]r*, *esp[é]res* 'to wait' verbal forms). By contrast, we find again regular application of vowel reduction when the alternating unstressed vowel is not located in the initial syllable of the stem (cf. *cont[ə]st[á]m*, *cont[ə]st[á]u*, *cont[ə]star[í]a*, cf. *cont[é]st*, *cont[é]stes*, *cont[é]sta...* 'to answer' verbal forms). In inflection, on the other hand, underapplication of vowel reduction is not found when the alternating stressed vowel is the open mid front vowel [é] (*x[ə]rr[á]m*, *x[ə]rr[á]u*, *x[ə]rrar[í]es...*, cf. *x[é]rr*, *x[é]rra...* 'to chat' verbal forms), unless a labial consonant precedes the vowel (*m[é]ula* '(s/he) meows' ~ *m[e]ular* 'to bleat'; *b[é]la* '(s/he) bleats' ~ *b[e]lar* 'to bleat'; see § 1.1), which make the patterns even more similar to those related to loanwords and learned words. It is important to note here that, although inflection is productive *per se*, underapplication is only found in verbs of the first conjugation, which is the productive one in Catalan, so that productivity is again a factor at play here.⁸

Pons-Moll (2011a, 2011b) argues that underapplication of vowel reduction in productive derivation and verbal inflection is a direct consequence of the interaction of the prominence constraint hierarchy for vowels in unstressed position (see 6) and a set of output to output faithfulness constraints relativized according to two factors: the productivity of the derivational process and the position of the affected vowel within the stem. The asymmetry, with respect to vowel reduction, between productive and non-productive derived forms is accounted for resorting to an uneven structure for the generated paradigm candidates as well as to the invocation of specific O-O faithfulness constraints with an explicit reference to the subparadigm. The asymmetry between forms with the affected vowel in the initial syllable of the stem and forms with the vowel in other positions is formalized resorting to an even further relativized version of the very same constraints with an overt reference to this specific structural position, the initial syllable of the stem.⁹

As argued before, these relativized output-output faithfulness constraints have lead to a *productive phonology* with an unconditional absence of schwa in the *initial syllable of the stem*, and this circumstance would have ended being interpreted by Majorcan Catalan speakers as a markedness prohibition against schwas placed in the initial syllable of the stem.

8. Interestingly enough, verbs of the second conjugation, which do not show paradigmatically driven underapplication (cf. *f[ə]rem*, *f[ə]reu*, cf. *f[é]r*; *p[ə]rdem*, *p[ə]rdeu*, cf. *p[é]rd*) do show underapplication of vowel reduction when a (stressed) pronominal clitic follows, especially when the vowel is preceded by a labial consonant (cf. *fer-ho* [fɛr'ó], *perde-us* [pɛrdə'vós]).
9. For the formal details of the analysis as well as for the specific constraints involved in it, see Pons (2011a, 2011b).

It is important to insist here that the position that favours lack of vowel reduction or partial vowel reduction is the initial syllable of the stem, and not the initial syllable of the word; that is, only the vowels in the initial syllable of the stem are the ones affected by the (structurally relativized) paradigmatic pressure. Indeed, the phenomenon consistently involves the second vowel in derivatives and verbal forms like *Est[e]vet* (also *esqu[e]met* ‘scheme *dim.*’, *esqu[e]rreta* ‘left *dim.*’, etc.), *esp[e]rar*, or the vowel in the second member of prefixed and compound words like *re-n[e]tet* (also *mare-de-d[e]ueta* ‘godmother *dim.*’), *im-p[e]rar* ‘to imperate’, *des-esp[e]rar* ‘to desperate’, etc. (see § 4, for the theoretical consequences of this behavior).¹⁰ It is important to note, however, that there are some cases with fluctuations between realizations with [e] and realizations with [ə] (Bibiloni 1998: 535): *aix[e/ə]car* ‘to lift’, *empr[e/ə]nyar* ‘bother, get angry’, *engr[e/ə]ixar* ‘to gain weight’, *al[e/ə]grar* ‘to cheer up’ (see § 4, for a possible explanation of these variable forms).

Another aspect to be considered is the absence of overapplication of vowel reduction in stressed verbal stems, which would be naturally expected by the Optimal Paradigms Model (McCarthy 2005), in which the verbal forms analysis is couched: overapplication of vowel reduction in stressed position, indeed, would be expected given the ranking of the OP-IDENT constraints above the markedness constraint *UNSTR/e, but it is argued to be blocked by the high ranked markedness constraint *PEAK/ə, which penalizes a segment of low sonority, such as the schwa, as a syllable peak.¹¹ In the vowel system of Majorcan Catalan, we find [ə] in stressed position (29). And this may appear to be in contradiction with the invoked constraint *Peak/ə, but, in fact, it is not. In Majorcan Catalan, the schwa is no longer a productive phoneme. In fact, in this dialect, most loanwords with a graphic *e* in stressed position are now adapted with the close-mid vowel [é], (30), not with [ə́], as was the case in the past (cf. *estr[ə́]t* ‘narrow’, *gross[ə́]t* ‘big *augm.*’) (Bibiloni 1983, 1998). This is to say that [ə] is permitted when it is underlying but not when derived, which ratifies again the unproductive character of the schwa in this dialect, in this case in stressed position.

10. See (Pons-Moll 2011 a, b) for a complete formalization of these conditions in OT terms.

11. It is important to mention here two relevant predictions of the Optimal Paradigms model: on the one hand, the fact that the direction of the pressure cannot be motivated, *a priori*, by any particular member of the paradigm: rather, markedness is the factor that governs the direction of the pressure, in our particular case *PEAK/ə; on the other hand, the fact that only overapplication of a process is predicted by this submodel, unless a specific markedness constraint—in our particular case *PEAK/ə—blocks it.

(27) a. Occurrences of [ə] in stressed position in Majorcan Catalan

<i>cad[ə]na</i>	‘chain’	<i>pr[ə]n</i>	‘(s/he) has’
<i>c[ə]ba</i>	‘onion’	<i>[ə]mp[ə]</i>	‘(s/he) uses’
<i>p[ə]l</i>	‘hair’	<i>menj[ə]l</i>	‘eat it (masc. sing.)!’
<i>par[ə]t</i>	‘wall’	<i>menj[ə]-la</i>	‘eat it (fem. sing.)!’
<i>s[ə]c</i>	‘dry’	<i>comprar-m[ə]</i>	‘(to) buy it from / for me!’
<i>v[ə]n</i>	‘(s/he) sells’	<i>comprar-l[ə]</i>	‘(to) buy it (fem. sing.)’

(See Bibiloni 1983, Mascaró 2002)

b. Recent loanword adaptations with a stressed e in Majorcan Catalan

<i>Intern[é]t</i>	<i>etiqu[é]ta</i> (vb.)	<i>carn[é]t</i>	<i>t[é]tanos</i>
<i>bagu[é]tte</i>	<i>carn[é]t</i>	<i>compl[é]t</i>	<i>F[é]derer</i>
<i>cass[é]t</i>	<i>cacau/v[é]t</i>	<i>[é]xtasi(s)</i>	<i>J[é]nnifer</i>
<i>xicl[é]t</i>	<i>ved[é]t</i>	<i>[é]psilon</i>	<i>K[é]nnedy</i>
<i>bid[é]t</i>	<i>cabar[é]t</i>	<i>g[é]minis</i>	<i>Pen[é]lope</i>
<i>xall[é]t</i>	<i>xicl[é]t</i>	<i>tap[é]te</i>	<i>S[é]neca</i>
<i>espagu[é]tis</i>	<i>atl[é]ta</i>	<i>c[é]lebre</i>	<i>[é]go</i>
<i>conf[é]ti</i>	<i>plan[é]ta</i>	<i>for[é]nse</i>	<i>cin[é]ma</i>
<i>d[é]fícit</i>	<i>prof[é]ta</i>	<i>banqu[é]te</i>	<i>etc[é]tera</i>

(See Bibiloni 1983: 95; personal inquiries)

4. Residual issues: the nature of underlying representations and allied topics

We have seen that the initial vowel in word-initial *sC*-clusters was unaffected by the contextual markedness constraint against a schwa in the initial syllable of the stem in learned words and loanwords (28) and that behaves as «invisible» to the output-output positional faithfulness constraints alleged to account for underapplication of vowel reduction in derivation and inflection (29).¹²

(28) Loanwords and learned words with initial schwa + *sC*

<i>[ə]sp[e]cial</i>	‘especial’	<i>[ə]sp[e]cífic</i>	‘specific’
<i>[ə]sp[e]cialista</i>	‘specialist’	<i>[ə]sp[e]cificador</i>	‘specifier’
<i>[ə]sp[e]cialitat</i>	‘especiality’	<i>[ə]sp[e]cificitat</i>	‘specificity’
<i>[ə]sp[e]cialitzar</i>	‘especialize’	<i>[ə]sp[e]rmatozou</i>	‘spermatozoon’
<i>[ə]sp[e]cialment</i>	‘especially’	<i>[ə]st[e]roide</i>	‘asteroid’
<i>[ə]st[e]reotip</i>	‘stereotype’	<i>[ə]st[e]roides</i>	‘steroids’
<i>[ə]st[e]reotipar</i>	‘to stereotype’	<i>[ə]sv[e]rat</i>	‘reckless’
<i>[ə]sp[e]ctant</i>	‘expectant’	<i>[ə]sv[e]ltesa</i>	‘slenderness’
<i>[ə]sm[e]ram</i>	‘we brighten up’	<i>[ə]sk[e]tchar</i>	‘to sketch’
<i>[ə]s[e]reta</i>	‘sphere <i>dim.</i> ’	<i>[ə]squ[e]xada</i>	‘Catalan meal’

12. I am grateful to Donca Steriade for pointing me out the relevance of this subject.

(29) *Productive derivative forms and verbal forms with initial schwa + sC*

<i>Est[é]ve</i>	‘Stephen’	<i>Est[e]vet</i>	‘Stephen <i>dim.</i> ’
<i>esqu[é]ma</i>	‘Scheme’	<i>esqu[e]met</i>	‘scheme <i>dim.</i> ’
<i>esp[é]ra</i>	‘(s/he) waits’	<i>esp[e]r[á]u</i>	‘(you) wait’
<i>est[é]n</i>	‘(s/he) tends’	<i>est[e]nem</i>	‘(we) tend’

We have also seen that native Majorcan Catalan speakers unexpectedly alternate between realizations with [e] and [ə] when the vowel is the initial of the stem in a reduced set of cases (*i.e.*, *empr[ə/e]nyar*, *enr[ə/e]ixar* or *al[ə/e]grar*) or the fact that in learned words and loanwords it is possible to find unpredicted realizations with [e] when the vowel is not the initial of the stem (*ab[e]rració* and *am[e]ricà*). In this section we show that these cases, far from having to be considered exceptions or counterexamples to our arguments, lead to some interesting theoretical implications concerning the nature of the underlying representations and the opaque character of morphophonological alternations by prefixation.

Within Optimality Theory, there is some controversy regarding how to determine underlying representations. The structure present in underlying representations is not problematic when morphophonological alternations shed light on it: for instance, excluding from the underlying representation the initial schwa in words like [ə]*scriure* ‘to write’ is justified by alternating forms such as *in[Ø]scriure* ‘to register’ or *des[Ø]criure* ‘to describe’ (see, however, McCarthy 1981). Uncertainty appears in those cases in which such morphophonological alternations do not exist: this is the case of the segment [ə] in words like [ə]*stona* ‘time’ or [ə]*scala* ‘stairs’, whose underlying forms cannot be empirically discovered due to the fact that the initial schwa does not alternate with [Ø]. Within Optimality Theory, these facts have typically been addressed in the following ways.

According to the Richness of the Base Hypothesis (Prince & Smolensky 1993: 205, 225), in the absence of morphophonological alternations, the speaker projects all potential underlying representations for every phonetic form, which would be /ə_sC/ and /Ø_sC/ in the cases mentioned above (we do not take into account the underlying vocalic quality of the first segment); the grammar (*i.e.*, EVAL) is ultimately what is responsible for selecting the actual phonetic form in a given language, no matter which underlying representation is taken.

On the other hand, Prince and Smolensky (1993/2004: 225) assume that, in the process of language acquisition, the principle called Lexicon Optimization is at play. According to this principle and in the absence of morphophonological alternations, the learner projects the underlying form which is closer to the surface form; in this way, input-output mappings are economized, given that the pass from underlyingly to surface representations is accomplished more faithfully.

Finally, McCarthy (2005) considers how learners build their underlying representations from surface representations, both those that are subject to morphophonological alternations and those that are not. Language acquisition is precisely very interesting in this regard, given that, apart from having to face those cases in which there are no morphophonological alternations, learners have limited experience

and consequently in most cases ignore the morphophonological alternations that allow them to discover underlying representations. In fact, according to McCarthy (1981, 2005), it is doubtful that a learner of Catalan (in his original work, a learner of Spanish) would come up with the abovementioned alternation $[\ə]scriure \sim in[\emptyset]scriure \sim des[\emptyset]criure$, given that these alternations are not very productive, at least less productive than those found in inflection.

Actually, the fact that native Majorcan Catalan speakers themselves alternate between realizations with $[e]$ and $[\ə]$ in cases such as *empr* $[\ə/e]$ *nyar* ‘to bother’, *enr* $[\ə/e]$ *ixar* ‘to gain weight’ or *al* $[\ə/e]$ *grar* ‘to make happy’ (see § 3.3.6.2) or the fact that sporadically it is possible to find realizations with $[e]$ when the vowel is not the initial of the stem (*ab* $[e]$ *rració* and *am* $[e]$ *ricà*; see § 3.3) reveals the opaque character of morphophonological alternations by prefixation: these are precisely the cases in which the speaker / learner can be uncertain about the morphological structure of the word and erroneously interpret it as a prefixed word (*ab* $[e]$ *rració*, *am* $[e]$ *ricà*, (*aix* $[e/\ə]$ *car*), (*empr* $[e/\ə]$ *nyar*), (*enr* $[e/\ə]$ *ixar*), *al* $[e/\ə]$ *grar*)¹³ and also uncertain about the underlying character of the first vowel in the cases where a consonantal group follows ((*empr* $[e/\ə]$ *nyar*), (*enr* $[e/\ə]$ *ixar*)).

Overall, according to this author, the learner can resort to different strategies in order to establish the underlying representations in cases without morphophonological alternations: the learner can project a faithful underlying representation with respect to the surface representation (following lexicon optimization), or generalize an unfaithful underlying representation, deduced from those cases in which there is alternation (*escriure* ‘to write’), to all the cases in which there is no alternation (*escala* ‘stairs’), following a radical version of the Richness of the Base hypothesis.

That is to say, the learner of Catalan knows, or he/she is able to know, that the underlying form of *escriure* ‘to write’ is $/skriw/$, due to the alternation $[\ə]scriure \sim in[\emptyset]scriure \sim des[\emptyset]criure$; from this alternation, the learner can build the mapping $/\emptyset/ \rightarrow [\ə]$. However, the learner does not have the same information when determining the underlying form of words such as $[\ə]$ *stona* ‘time’ or $[\ə]$ *scala* ‘stairs’, which lack, as noted, morphophonological alternations. In the latter cases, the learner has three alternatives: *a*) to assume that the schwa is derived from an underlying schwa, and build the faithful mapping $/\ə/ \rightarrow [\ə]$; *b*) to assume that the schwa is derived from two potential underlying forms ($/\ə/$ and $/\emptyset/$); or *c*) to generalize the unfaithful mapping $/\emptyset/ \rightarrow [\ə]$, which is uncontroversially legitimate in those cases that show morphophonological alternations, to those cases without alternation. From an individual perspective, the first mapping ($/\ə/ \rightarrow [\ə]$) is more economical because it is more faithful; however, from a more general view, that is, taking into account all the cases of the language, deriving every schwa from $/\emptyset/$ is even more economical because it rules out, in the process of acquisition of Catalan, the additional mapping $/\ə/ \rightarrow [\ə]$. This strategy consisting of generalizing a certain mapping, supported by external morphophonological alternations, to those cases in which there are no such alternations is what McCarthy calls *free-ride*, an idea that was first presented in his 1981 work.

13. Between brackets we indicate that these are historically prefixed words.

The data considered in this paper should be taken as positive evidence for the last alternative: [ə]sp[e]cial, [ə]steroide, [ə]sk[e]tchar, [ə]st[e]vet, [ə]squ[e]met or [ə]sp[e]rau are cases without the alternation [ə] ~ [Ø], and this is why the question as to whether the initial vowel belongs to the stem or not arises, as does the question as to whether this vowel must be listed in the lexical representation or not. As proven in this paper, the second vowel of these words is affected by both positional faithfulness and contextual markedness constraints relativized according to the position that the vowel occupies within the stem, and this can be taken as positive evidence that the initial vowel, realized as a schwa, is actually an epenthetic vowel. If this were not the case, the second vowel would not be affected by these constraints, because it would occupy a position other than the initial within the stem, and instead it would be the first one that was affected.

5. Concluding remarks

One of the purposes of this paper was to contribute to a better understanding of differential importation by showing how the novel structures that emerge in the loanword phonology of a language are precisely those that emerge in learned words—in the form of «lexical exceptions»—and, more significantly, those that can be generated due to morphological reasons, such as paradigmatic pressure or the need to realize a specific morpheme. In this paper we have provided significant empirical evidence of this situation: a typically native process of Majorcan Catalan, vowel reduction to schwa, fails to apply not only in loanwords and learned words, but also in productive derivative forms and inflectional verbal forms of the first conjugation. We have shown that in the two latter cases vowel reduction underapplies or, better, has historically underapplied due to morphological reasons and, more specifically, because of the need to maintain a uniform stem throughout the derivational and inflectional paradigms. At the same time, we have illustrated how the structures that cannot be derived by paradigmatic pressure, such as a schwa in stressed position, which is in fact found in the native phonology of the dialect, are the ones banned in loanwords and learned words.

It has been argued that underapplication of vowel reduction in derivational and inflectional phonology can be understood, in fact, as the historical origin of the same phenomenon found in loanwords and learned words. Formally, it can be interpreted as a direct consequence of the interaction between the prominence constraint hierarchy for vowels in unstressed position and a set of output-to-output faithfulness constraints relativized according to two factors: the productivity of the derivational process and the position of the affected vowel within the stem. And the effects of these relativized output-output faithfulness constraints, indeed, have led to a *productive phonology* with the absence of schwa in the *initial syllable of the stem*.

The other purpose of the paper was to show that the relation between positional faithfulness and contextual markedness constraints is not a mere technicality of Optimality Theory, but might instead reflect a natural diachronic relationship between them. Taking into account that underapplication in loanwords and learned

words occurs when the vowel is located in the initial syllable of the stem and in the absence of morphological alternations which could justify paradigmatic pressure as a factor for underapplication in these cases, we have proposed a diachronic account based on a historical transformation of *positional faithfulness* constraints into *contextual markedness constraints*: given that both types of constraints refer to and target the same context or position, we have argued that it is plausible to think that they might have interacted over time.

Our argument is that the output-to-output positional faithfulness constraints, which have been responsible for underapplication in productive derivation and inflection, have produced a drastic reduction in the occurrences of the schwa in the initial syllable of the stem. And this drastic reduction of the schwa in this specific position has been interpreted by Majorcan Catalan speakers as a consequence of the activity of a contextual markedness constraints prohibiting a schwa in this specific position. It has been conjectured that this constraint would end up affecting not just loanwords and learned words, but also the rest of the productive phonology of Majorcan Catalan, including, therefore, productive derivation and verbal inflection. As argued, the promotion of this contextual markedness constraint can be understood as an instance of the retreat to the unmarked, which very likely has been (externally) driven by the need to stabilize the unstressed vowel system of Majorcan Catalan.

This is why, from a synchronic point of view, we have assumed for the Majorcan Catalan phonology two coexisting grammars or phonologies, one active in what we have called the *productive phonology* of the dialect (including learned words and loanwords, productive derivation and verbal inflection) and the other only active in what we have called the *unproductive phonology* of the dialect (including non-alternating inherited words and non-productive derivation). Under the adopted perspective, therefore, «lexical exceptions» (corresponding, in our case, to learned words) should no longer be considered exceptions and «underapplication» should no longer be considered underapplication but instead normal application. We have proven, on the other hand, that, as far as unstressed *e* is concerned, no distinction is necessary between loanwords and learned words, in that they behave exactly in the same way, and this indicates that «underapplication» of vowel reduction to schwa in words with unstressed *e* is, undeniably, a consistent and robust phenomenon of the dialect, probably reinforced by the already mentioned need to stabilize the unstressed vowel system of Majorcan Catalan. We have shown, on the other hand, that, although there are significant instances of underapplication of vowel reduction of the unstressed *a* in the loanword phonology of Majorcan Catalan, they are absent in learned words, and this indicates that underapplication in these cases is not as robust, and, as seen, more ephemeral, probably due to the fact that it is of no use as far as the stabilization of the system is concerned.

Overall, *phonological productivity* has proven to be crucial in three respects: on the one hand, as a context of the grammar, given that «underapplication» is systematically found in what we call the productive phonology of the dialect (including loanwords, learned words, productive derivation and verbal inflection); on the other hand, as a principle guide which can explain the transition from the historical to the

synchronic phonology of a linguistic variety, and, finally, as a trigger or blocker of processes, in that the productivity or the lack of productivity of a specific process or constraint in the language is what explains why it is challenged or not in any of the circumstances that opened this paper, that is, loanword phonology, learned words and specific situations of morphological conditioning.

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