

Palatalisation across the Italian lexicon

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Abstract

I present an analysis of the different applications of palatalisation in Italian. The major part of the study argues that patterns of under-, over-, and normal palatalisation in the three verb families of Italian are governed by a single stress-sensitive base-to-derivative constraint (Kager 2000). This constraint requires correspondence with stressed [\pm STRIDENT] segments of a verb's infinitive. Misapplication of palatalisation is found in verbs whose infinitives stress the theme vowel, and thus the stem-final velar, whose form is then carried over in inflection. Normal palatalisation only arises in the class of verbs whose infinitives assign stress to the verb stem, and not the infinitive suffix. The paper then addresses the question of how the base form is selected, identifying the infinitive as the most morpho-phonologically informative member of the inflectional paradigm (Albright 2002). Comparison is then made to palatalisation in Italian nouns and adjectives (Giavazzi 2012). While palatalisation in these two domains is similarly governed by stress-related constraints, verbs are argued to be subject to a separate and stronger rule of palatalisation. Exceptions to this rule are exclusively derived verbs, which resist palatalisation because of a more general output-to-output constraint which applies in derivation.

Author's note

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1 Introduction

Italian has a phonological rule that palatalises velar stops /k,g/ into affricates [tʃ,dʒ] respectively when followed by front vowels [i,e]. At the boundary between word stem and agreement suffix, this rule does not apply uniformly for either nouns and adjectives (1a) or verbs (1b):

- | | | | | | | | |
|-----|----|-----------------|-----------------|-------------------------------|-----------------|---------------|----------------------------|
| (1) | a. | <i>farmac-o</i> | farmako | ‘medication _{M.SG} ’ | <i>antic-o</i> | antiko | ‘ancient _{M.SG} ’ |
| | | <i>farmac-i</i> | farmatʃi | ‘medication _{M.PL} ’ | <i>antich-i</i> | antiki | ‘ancient _{M.PL} ’ |
| | b. | <i>vinc-o</i> | vinʃko | ‘I win’ | <i>pag-o</i> | pago | ‘I pay’ |
| | | <i>vinc-i</i> | vintʃi | ‘you _{SG} win’ | <i>pagh-i</i> | pagi | ‘you _{SG} pay’ |

The focus of this study is not the nature of palatalisation itself, but rather where the rule applies and misapplies in the Italian language. For the purposes of formalism, though, palatalisation is taken to be a phonological rule which changes the stridency of a velar consonant when followed by a front vowel. A linear phonological¹ rule is thus given in (2), while the reader seeking more detailed analysis of palatalisation itself may consult Giavazzi (2010a; 2012) in regard to Italian specifically, as well as Wilson (2006), and references therein, for more in-depth study of the phonetic properties and perceptual issues that the rule relates to.

- (2) Simple palatalisation rule

$$k,g \rightarrow [+strident] / _ V_{\text{FRONT}}$$

Palatalisation in contemporary Italian has evolved from being non-existent in classical Latin to exceptionless in Late Latin (Allen 1965; Calabrese 1993), and so it might appear that the language contains remnants of these stages in its history. To varying degrees, this view underpins approaches to Italian (or Romance) morpho-phonology which base accounts for this and other seemingly irregular phonology in lexical terms (eg. Burzio 2004; Krämer 2007; 2009). In this manner of approach, different lexical classes are subject to different morphological or phonological principles. Underpalatalisation in particular may be derived by indexing faithfulness constraints to corresponding lexical classes such as first conjugation verbs and sets of nouns and adjectives.

This study will provide a purely synchronic account of Italian palatalisation, for both the verbal and nominal domain, by identifying the cues that are available to speakers and learners of modern Italian, meaning no recourse need be made to the history of the language. The primary influences on the application of the palatalisation rule will in fact be shown to be stress (Giavazzi 2010a; 2012) and derivational correspondence. In due course, however, the ways in which these two factors influence palatalisation will be shown to differ between the nominal and verbal domains. To unify these analyses, it will be necessary to admit a limited but arguably more principled type of indexation, based in theories of category-specific phonology (Smith 2011).

In the major part of this study I develop a new account of palatalisation as applied to verbs. While Giavazzi (2010a; 2012) effectively argues that stress prevents palatalisation in the

¹ A note on Italian orthography: <c> and <g>, normally pronounced [k] and [g], are pronounced [tʃ] and [dʒ] when followed by the vowels <i> or <e>. An <h> written between the velar and vowel indicates pronunciation of a velar stop. Similarly, an unpronounced <i> between <c,g> and a vowel other than <i,e> indicates pronunciation as an affricate.

following syllable, this finding does not carry over to verbs, I argue the patterns of palatalisation associated with verbs are stress-conditioned also, albeit not in the same manner as with nouns and adjectives. In verbal paradigms, palatalisation takes place, regardless of stress, before front vowels [i,e] in the infinitive, as expected given the rule in (2). However, in inflection the rule can misapply, most notably as underpalatalisation in the first conjugation. In accounting for these patterns, I will indeed follow Burzio (2004) and Krämer (2009) in identifying output-to-output correspondence (Benua 2000) as a factor governing misapplication of palatalisation throughout a verb's inflectional paradigm. The effect of output-to-output correspondence, essentially, will give rise to systematic patterns of paradigm correspondence that correlate with whether velar segments in the paradigm's base - the infinitive - are stressed. In this way, stress fulfils the role previously given to indexation: rather than relying on (a series of) idiosyncratic output-to-output constraints, a single condition, contingent on stress assignment, is able to derive the fact that Italian's palatalisation rule may both under- and overapply, thus achieving greater empirical coverage than existing analyses, in a more uniform manner.

In extending the analysis to derived verbs, it is necessary to make a comparison to palatalisation in the nominal domain. Derived infinitives may in fact not apply palatalisation, both stem-internally and at the morpheme boundary. However, I find that the only environments where this happens is when the infinitive is built on a noun or adjective base which itself adheres to Giavazzi's analysis (to which a slight extension must be made to account for morpheme internal contexts). As such, I build a fuller picture of the complete range of environments where palatalisation occurs in Italian.

The paper now proceeds as follows: section two introduces the verbal paradigms of Italian and the patterns of palatalisation they are associated with. The main proposal of the account - that correspondence may be stress-dependent - is then presented before each particular palatalisation pattern is derived in turn. The section then discusses related phonological operations and the impact of the analysis on existing literature. Section three addresses the issue of base selection, following Albright (2002) in confirming the infinitive as the paradigm base, by virtue of it being the most morpho-phonologically informative member of the paradigm. Section four compares the distribution of palatalisation in verbs, including derived verbs, with nouns and adjectives. Section five concludes.

2 Palatalisation in Italian Verbs

This section first introduces the three Italian verb families and the different agreement suffixes that each takes. It will be shown that the application of palatalisation is not uniform, but that there is consistency within a class. The account for this is then provided in the main body of the section, which closes with discussion of the issues the account raises in comparison to existing phonological and morphological literature.

2.1 Verb families and palatalising suffixes

Italian verbs are traditionally divided into three families, which are defined by their infinitive suffix: *-are*, *-ere*, or *-ire*. The following selection of couples present the palatalisation patterns associated with each verb family. First conjugation verbs are noted to have stems which do not change between infinitive and inflected forms, regardless of the following vowel. This is analysed as underpalatalisation in the case of stems ending [k,g], and simply as reflective of the

underlying representation of stems ending [tʃ,dʒ]. In the second and third conjugation, infinitive stems only end in affricates. Second conjugation verbs stems are taken to have underlying /k,g/, on the grounds that both stops and affricates are attested in inflection, and that there is in fact no *-ere* verb whose inflectional paradigm contains a stop or an affricate exclusively. By contrast, third conjugation verbs are like first conjugation verbs: the same infinitive stem, containing an affricate, is maintained throughout the inflectional paradigm². This affricate is taken as underlying. It should be noted that the account to be developed will show palatalisation is systematically prevented from being blocked in infinitives, and that this in turn derives each pattern of palatalisation. Under principles of richness of the base, therefore, a learner positing an underlying stop in stems analysed here as containing an affricate will still derive the correct patterns of palatalisation.

(3)	1st conjugation , <i>-are</i> verbs:	<i>UR</i>	<i>Infinitive Stem</i>	<i>Inflected stem(s)</i>
	<i>giocare</i> ‘to play’	dʒɔk	dʒɔk	dʒɔk
	<i>pagare</i> ‘to pay’	pag	pag	pag
	<i>lanciare</i> ‘to throw’	lantʃ	lantʃ	lantʃ
	<i>mangiare</i> ‘to eat’	mandʒ	mandʒ	mandʒ
	2nd conjugation , <i>-ere</i> verbs:	<i>UR</i>	<i>Infinitive Stem</i>	<i>Inflected stem(s)</i>
	<i>piacere</i> ‘to please’	pjak	pjatʃ	pjak, pjatʃ
	<i>volgere</i> ‘to turn’	vɔlg	vɔldʒ	vɔlg, vɔldʒ
	3rd conjugation , <i>-ire</i> verbs:	<i>UR</i>	<i>Infinitive Stem</i>	<i>Inflected stem(s)</i>
	<i>cucire</i> ‘to sew’	kutʃ	kutʃ	kutʃ
	<i>agire</i> ‘to act’	adʒ	adʒ	adʒ

The suffixes that should trigger palatalisation - ie. those with an initial front vowel - vary by conjugation family. Additionally, the three verb families in fact form four classes of agreement suffixes, as the *-ere* family divides into two slightly different paradigms: the majority of *-ere* verbs, most readily identifiable by a lack of stress on the infinitive suffix (Burzio 2004), have a small number of forms with unpredictable stem variation³. For this reason, I henceforth term this major subgroup the irregular *-ěre* paradigm, in contrast to the minor subgroup, termed the regular *-ére* paradigm. The same suffix may be a trigger in one conjugation paradigm and not in others. For example, the 3P.SG present indicative suffix is non-triggering *-a* for *-are* verbs, but triggering *-e* for *-ere* and *-ire* verbs. Suffixes for the *-are* and regular *-ére* agreement paradigms are given below, with palatalisation triggers highlighted in bold type:

² The exception to this claim is in derived verbs formed by suffixation of *-ire* to an adjective or noun (*-ere* is not a productive suffix in derivation). Derivational morphology is accounted for in section four.

³ This variation is unpredictable in the sense that it is arguably an example of morphologically-conditioned allomorphy rather than phonologically-conditioned allomorphy (Embick 2010). Variance in the verb stem is what defines a verb as irregular in Italian and Romance grammars, as well as in Boyé’s (2000) comprehensive survey of Romance verbal morphology. I refer specifically here to verbs such as *vincere* - ‘to win’, which have velar-final stems for most forms, (/viŋk/), but sibilant-final stems in the remote past (/vins/). They also have a suppletive past participle form, here *vinto*, whose stem cannot be clearly isolated from its suffix. See section 2.3.6 for a reanalysis of these forms.

(4) Agreement suffixes for *-are* verbs

TENSE/MOOD	1P.SG	2P.SG	3P.SG	1P.PL	2P.PL	3P.PL
PRESENT	-o	-i	-a	-jamo	-ate	-ano
IMPERFECT	-avo	-avi	-ava	-avamo	-avate	-avano
REMOTE PAST	-ai	-asti	-o	-ammo	-aste	-arano
SIMPLE FUTURE	-ero	-erai	-era	-eremo	-erete	-eranno
PRES. SUBJ.	-i	-i	-i	-jamo	-jate	-ino
IMPERF. SUBJ.	-assi	-assi	-asse	-assimo	-aste	-assero
CONDITIONAL	-erei	-eresti	-erebbe	-eremmo	-ereste	-erebbero
IMPERATIVE	/	-a	-i	-jamo	-ate	-ino

INFINITIVE	-are	PRES. GERUND	-ando
PRES. PARTICIPLE	-ante	PAST PARTICIPLE	-ato

(5) Agreement suffixes for regular *-ére* verbs

TENSE/MOOD	1P.SG	2P.SG	3P.SG	1P.PL	2P.PL	3P.PL
PRESENT	-o	-i	-e	-jamo	-ete	-ono
IMPERFECT	-evo	-evi	-eva	-evamo	-evate	-evano
REMOTE PAST	-wi	-esti	-we	-emmo	-este	-wero
SIMPLE FUTURE	-ero	-erai	-era	-eremo	-erete	-eranno
PRES. SUBJ.	-a	-a	-a	-jamo	-jate	-ano
IMPERF. SUBJ.	-essi	-essi	-esse	-essimo	-este	-essero
CONDITIONAL	-erei	-eresti	-erebbe	-eremmo	-ereste	-erebbero
IMPERATIVE	/	-i	-a	-jamo	-ete	-ano

INFINITIVE	-ere	PRES. GERUND	-endo
PRES. PARTICIPLE	-ente	PAST PARTICIPLE	-uto

Trigger vs. non-trigger status is perhaps most evident when considering the large groups of forms, for example the imperfects, which have suffixes that retain the theme vowel of the infinitive (ie. *-a-*, *-e-*, or *-i-*). As such, of the 51 agreement suffixes that may be applied to an *-are* verb, 19 are triggers for palatalisation, whereas 45 of the suffixes for *-ére* verbs are triggers. For the sake of simplicity and consistency, derivations in this paper mainly present forms suffixed by the present indicative 1.SG and 2.SG suffixes *-o* and *-i*. It is important to stress, though, that the application of palatalisation before all triggering suffixes in a paradigm is identical to palatalisation before *-i* in that paradigm, and likewise all non-triggering suffixes in a paradigm follow the application of the rule before *-o* in that paradigm⁴.

Returning to the examples given in the opening of this paper, I now present in detail the different application patterns of the palatalisation rule. Consider first the entirely regular application of palatalisation in the irregular *-ěre* verb paradigm exemplified by *vincere* - ‘to win’. There are seven exceptional forms (in shaded cells) - three third person remote past forms and the past participle, which appear to take a different verb stem *vins-* or *vin-* (see section 2.3.6),

⁴ The exception to this claim is that in the irregular *-ěre* paradigm, palatalisation occurs before /j/-initial suffixes, but not before /o/. The front glide is in fact an additional trigger for palatalisation - see section 2.3.3.

and three others with an assimilated glide-initial suffix (see section 2.3.3). However, it is otherwise seen that when the form has a triggering suffix palatalisation takes place, as expected following the rule given in (2).

(6) Normal Palatalisation: *vincere* - ‘to win’

TENSE/MOOD	1P.SG	2P.SG	3P.SG	1P.PL	2P.PL	3P.PL
PRESENT	viŋko	vintfi	vintse	vintfamo	vintfete	viŋkono
IMPERFECT	vintsevo	vintsevi	vintseva	vintsevamo	vintsevate	vintsevano
REMOTE PAST	vinsi	vintfesti	vinse	vintfemmo	vintfeste	vinsero
SIMP. FUTURE	vintfero	vintferai	vintfera	vintferemo	vintferete	vintferanno
PRES. SUBJ.	viŋka	viŋka	viŋka	vintfamo	vintfate	viŋkano
IMPERF. SUBJ.	vintfessi	vintfessi	vintfesse	vintfessimo	vintfeste	vintfessero
CONDITIONAL	vintferai	vintferesti	vintferebbe	vintferemmo	vintfereste	vintferebbero
IMPERATIVE	/	vintfi	viŋka	vintfamo	vintfete	viŋkano

INFINITIVE	vintfere	PRES. GERUND	vintfendo
PRES. PART.	vintfente	PAST PARTICIPLE	vinto

Palatalisation does not take place in the example of *paghi* - ‘you_{SG} pay’, even though the 2P.SG suffix *-i* would otherwise trigger it. The failure of the rule to apply is common to all *-are* verbs⁵, and not only to this form, but to all forms in the paradigm with a triggering suffix:

(7) Underpalatalisation: *pagare* - ‘to pay’

TENSE/MOOD	1P.SG	2P.SG	3P.SG	1P.PL	2P.PL	3P.PL
PRESENT	pago	pagi	paga	pagjamo	pagate	pagano
IMPERFECT	pagavo	pagavi	pagava	pagavamo	pagavate	pagavano
REMOTE PAST	pagai	pagasti	pago	pagammo	pagaste	pagarono
SIMPLE FUTURE	pagero	pagerai	pagera	pageremo	pagerete	pageranno
PRES. SUBJ.	pagi	pagi	pagi	pagjamo	pagjate	pagino
IMPERF. SUBJ.	pagassi	pagassi	pagasse	pagassimo	pagaste	pagassero
CONDITIONAL	pagerei	pageresti	pagerebbe	pageremmo	pagereste	pagerebbero
IMPERATIVE	/	paga	pagi	pagjamo	pagate	pagino

INFINITIVE	pagare	PRES. GERUND	pagando
PRES. PARTICIPLE	pagante	PAST PARTICIPLE	pagato

Thus, palatalisation underapplies across the entire *-are* paradigm. Less obvious perhaps is that some verbs overapply the rule: they apply the process outside of an appropriate environment or,

⁵ The data and claims presented here and in subsequent sections of the study with regards to the extent of the application of palatalisation across the Italian lexicon are based on consultation of three resources. First, the Garzanti-Linguistica dictionary, whose online edition offers conjugation tables for all Italian verbs. Second, the Morph-It Corpus (Zanchetta and Baroni 2005) of over 500,000 inflected word forms, based on around 35,000 bases, and third, an additional corpus extracted from an electronic version of the Sabatini-Coletti dictionary.

put differently, when taking a non-triggering suffix. This is seen in all but three forms (see section 2.3.3) of the paradigm of *tacére* - ‘to be quiet’, a regular *-ére* verb:

(8) Overpalatalisation: *tacére* - ‘to be quiet’

TENSE/MOOD	1P.SG	2P.SG	3P.SG	1P.PL	2P.PL	3P.PL
PRESENT	tatfo	tatfĩ	tatfe	tatfamo	tatfete	tatfono
IMPERFECT	tatfevo	tatfevi	tatfeva	tatfevamo	tatfevate	tatfevano
REMOTE PAST	takwi	tatfesti	takwe	tatfemmo	tatfeste	takwero
SIMPLE FUTURE	tatfero	tatferai	tatfera	tatferemo	tatferete	tatferanno
PRES. SUBJ.	tatfa	tatfa	tatfa	tatfamo	tatfate	tatfano
IMPERF. SUBJ.	tatfessi	tatfessi	tatfesse	tatfessimo	tatfeste	tatfessero
CONDITIONAL	tatferrei	tatferesti	tatferebbe	tatferemmo	tatfereste	tatferebbero
IMPERATIVE	/	tatfĩ	tatfa	tatfamo	tatfete	tatfano

INFINITIVE	tatfere	PRES. GERUND	tatfendo
PRES. PARTICIPLE	tatfente	PAST PARTICIPLE	tatfuto

To summarise, there are three distributions of palatalisation across Italian verbs, which correlate with the conjugation family which a verb belongs to. Normal palatalisation only takes place with irregular *-ère* verbs. Underpalatalisation is observed for all *-are* verbs, while overpalatalisation is seen in the small group of regular *-ére* verbs. Including *-ire* verbs, for which a full account is developed in sections 2.3 and 4.2, (9) presents the discussed palatalisation patterns according to the traditional classification of Italian verb families.

(9) Conjugation classes and palatalisation application

1st conjugation: <i>-are</i> verbs	Underpalatalise
pagáre - ‘to pay’	→ págo, paági
2nd conjugation: <i>-ere</i> verbs	Overpalatalise or palatalise normally
tatfére - ‘to be quiet’	→ taátfo, tátfĩ
víntfere - ‘to win’	→ vinko, vintfĩ
3rd conjugation: <i>-ire</i> verbs	Affricate in UR, always present in inflection
cutfíre - ‘to sew’	→ cútfjo, cútfjĩ

The trigger vs. non-trigger distinction of a suffix has been shown to be indicative only of how palatalisation applies for the irregular subgroup of *-ère* verbs. Normal application of palatalisation is inhibited in other verb classes by additional factors. The following sections will show that properties of the infinitive, or more specifically the base form of the paradigm, govern how the rule applies across the language’s verb classes.

2.2 Analysis of palatalisation patterns

Before proceeding to analysis of what causes misapplication of palatalisation, it is necessary to first establish how normal palatalisation is derived. Above, in (2), a rule was given that represented how /kI/ sequences neutralise to [tʃi]. Palatalisation will henceforth be represented in simple optimality theoretic terms as the interaction of two constraints. One is a markedness constraint penalising the surfacing of a perceptually weak sequence [kI] (Giavazzi 2010a; 2012). This constraint outranks a second constraint that requires faithfulness to the input of the derivation.

(10) Palatalisation Constraints

*kI: Penalise velar stop - front vowel sequences

ID(STRIDENT) (IO): Penalise a candidate in which a segment in the *Output* does not match for stridency with its correspondent in the *Input*.

Consider again the normal palatalisation observed in the conjugation of *vincere* - 'to win'. Put simply, the present indicative 1P.SG suffix *-o* is not a trigger for palatalisation (11a), so there is no change from the input. By contrast, the 2P.SG suffix *-i* is, and so causes palatalisation as the faithful candidate is eliminated by the given markedness constraint (11b).

(11) a.	/vink+o/	*kI	ID(STR) (IO)	b.	/vink+i/	*kI	ID(STR) (IO)
☞ a.	viŋ.ko				a.	viŋ.ki	*!
b.	vin.tʃo		*!	☞ b.	vin.tʃi		*

As noted, this normal palatalisation only occurs in the irregular *-ĕre* verb paradigm. Underpalatalisation among the *-are* paradigm has previously (Burzio 2004; Krämer 2007; 2009) been attributed to output-to-output (OO) correspondence (Benua 2000), which requires identity, in this case, between the infinitive and inflected forms of a verb⁶. I identify both types of misapplication - both under- and overpalatalisation - as caused, more specifically, by inflectional base-to-derivative (BD) faithfulness effects. I will simplify and expand on the use of BD or OO faithfulness across Italian verbal paradigms, though save more detailed comparison of these theories for discussion at the end of this section. Critically, though, I also make reference to prominence-related faithfulness (Beckman 1999; Steriade 2009), in that faithfulness here is specific for stridency and importantly only invoked for the onset of the stressed syllable of the base, a model of stress-conditioned OO phonology comparable to Kager's (2000) analysis of Levantine Arabic. The stress shift in irregular *-ĕre* infinitives is therefore key: unlike in other paradigms, infinitive stress is in a position that does not make the relevant stem-final segments prominent for the purposes of BD-faithfulness.

Thus, I propose that onset segments in conjugated verbs in Italian remain faithful for stridency *when those same segments are stressed in the infinitive*. This captures the observed patterns of palatalisation as discussed above, save for a small number of forms for which additional explanation is given in following sections. The only paradigm that has normal alternation of palatalisation is the irregular subgroup of *-ĕre* verbs which, unlike other paradigms,

⁶ Krämer (2007; 2009) also attributes underpalatalisation in nouns and adjectives to OO-correspondence between singular and plural forms. See Giavazzi (2010b; 2012) for discussion of the alternative stress-conditioned account.

places infinitive stress in a position that makes the relevant stem-final segments, by contrast, non-prominent. As such, the relevant segments in these verbs' derivatives are unaffected by BD-faithfulness. The non-alternating patterns (ie. under- and overpalatalisation) are the product of the infinitive stressing the relevant [\pm STRIDENT] segment which is then carried over across the entire paradigm. One further point should be made explicit: I will also show that these verb paradigms, at least, require only one stem, thus implying that the phonology of the language may play a larger role than has previously been assumed in analysis of the seeming irregular nature of Italian verbal morphology (eg. Boyé 2000; Pirrelli and Battista 2000).

To know how a verb form palatalises, then, two things must be known. First, how the verb's infinitive palatalises and, second, where the verb's infinitive is stressed. Fairly simple generalisations can be given regarding these two pieces of information. Firstly, palatalisation in the infinitive depends entirely on the suffix: infinitives always palatalise if their suffix is a trigger (ie. is *-ere* or *-ire*). Secondly, stress assignment is relatively straightforward when considering Italian infinitives - it is penultimate, falling on the infinitive suffix containing the theme vowel, for all *-are* and *-ire* verbs, but varies among *-ere* verbs (Davis et al. 1987), where there is a tendency to fall on the antepenultimate syllable if heavy, else to otherwise fall on the penult, which corresponds to the infinitive suffix again⁷ (a system akin to Turkish stress, Sezer 1981). Stem-final consonants become the onsets of the penultimate syllable, so are stressed in *-are*, *-ire*, and regular *-ére* verbs, but unstressed when stress is antepenultimate in irregular *-ěre* verbs. Ultimately, of the *-ere* verbs relevant to discussion, only three are members of the regular *-ére* paradigm: *piacére* - 'to please', *tacére* - 'to be quiet', and *giacére* - 'to lay down'.

The three patterns of palatalisation can now be presented as a product of the interaction of infinitive stress and palatalisation:

(12) Palatalisation as a function of infinitive stress and conjugation

	Stress on infinitive suffix	Stress <i>not</i> on infinitive suffix
Infinitive suffix triggers palatalisation	<i>Overapplication</i> <i>-ére</i> verbs: tatʃére	<i>Normal application</i> <i>-ěre</i> verbs: víntʃere
Infinitive suffix <i>does not</i> trigger palatalisation	<i>Underapplication</i> <i>-are</i> verbs: pagáre	

The requirement to stand in correspondence to the stressed syllable of the infinitive is introduced with a new constraint which ranks higher than those responsible for deriving palatalisation above:

(13) Stress-dependent Base-to-Derivative faithfulness for stridency

ID(STRI) / ÓNSET (BD) : Penalise the occurrence of a *Derivative* onset with a stressed *Base* correspondent which mismatches for [\pm STRIDENT]

The sections immediately following show the interaction of this constraint with those seen earlier in deriving the attested palatalisation across the three verb families of Italian.

⁷ Of the Italian verbs relevant to discussion of palatalisation - those with stem-final velars - this tendency is exceptionless. This generalisation may be extended to the entire family of verbs with moderate success (eg. *pérdere* - 'to lose' vs. *temére* - 'to fear'), though there are some exceptions, eg. *crédere* - 'to believe'. Although stress assignment in *-ere* infinitives is crucial to the analysis here, it is not its focus, and for the remainder of this study can be treated as lexical.

2.2.1 Normal palatalisation: irregular *-ere* verbs (2nd conjugation)

As discussed, there are two palatalisation patterns observed for *-ere* verbs, corresponding to the two different classes the family divides into. The major group of *-ere* verbs - the irregular paradigm - is set apart from other Italian verbs in stressing the verb root and not the infinitive affix. For these verbs, BD-faithfulness is not invoked, and they palatalise normally, as in (11) above.

(14) *vincere* → *vínco, vínci* ‘to win → 1P.SG, 2P.SG’

i) Derivation of infinitive - palatalisation triggered by suffix

/vɪŋk+ere/	ID(STRI) / ÓNS (BD)	*KI	ID(STRI) (IO)
a. víŋ.ke.re		*!	
☞ b. vín.tʃe.re			*

ii) Derivation of 1.SG - BD constraint not applicable, palatalisation not triggered by suffix

/vɪŋk+o/	ID(STRI) / ÓNS (BD)	*KI	ID(STRI) (IO)
☞ a. víŋ.ko			
b. vín.tʃo			*!
<i>Base = Inf: vín.tʃe.re</i>			

iii) Derivation of 2.SG - BD constraint not applicable, palatalisation triggered by suffix

/vɪŋk+i/	ID(STRI) / ÓNS (BD)	*KI	ID(STRI) (IO)
a. víŋ.ki		*!	
☞ b. vín.tʃi			*
<i>Base = Inf: vín.tʃe.re</i>			

2.2.2 Underpalatalisation: *-are* verbs (1st conjugation)

All *-are* verb forms underpalatalise. With the crucial segment of the infinitive being stressed and [-STRIDENT], correspondents in derived forms must also be [-STRIDENT], at the cost of violating the constraint *KI:

(15) *pagáre* → *págo, pághi* ‘to pay → 1P.SG, 2P.SG’

i) Derivation of infinitive - palatalisation not triggered

/paɡ+áre/	ID(STRI) / ÓNS (BD)	*KI	ID(STRI) (IO)
☞ a. pa.gá.re			
b. pa.dzá.re			*!

ii) Derivation of 1.SG - no palatalisation, given both BD and faithfulness constraints

/pag+o/	ID(STRI) / ÓNS (BD)	*KI	ID(STRI) (IO)
☞ a. pá.go			
b. pá.dʒo	*!		*
<i>Base = Inf. pa.gá.re</i>			

iii) Derivation of 2.SG - underpalatalisation

/pag+i/	ID(STRI) / ÓNS (BD)	*KI	ID(STRI) (IO)
☞ a. pá.gi		*	
b. pá.dʒi	*!		*
<i>Base = Inf. pa.gá.re</i>			

2.2.3 Overpalatalisation: Regular *-ére* verbs (2nd conjugation)

Overpalatalisation is attested for the regular *-ére* verbs which stress the infinitive suffix, and is derived in a similar manner to the underpalatalisation example, only with derivatives now faithful to the [+STRIDENT] segment of the infinitive:

(16) *tacére* → *táccio, táci* ‘to be quiet → 1P.SG, 2P.SG’

i) Derivation of infinitive - palatalisation triggered, cf. [takwi], 3P.SG remote past

/tak+ére/	ID(STRI) / ÓNS (BD)	*KI	ID(STRI) (IO)
a. ta.ké.re		*!	
☞ b. ta.tʃé.re			*

ii) Derivation of 1.SG - overpalatalisation

/tak+o/	ID(STRI) / ÓNS (BD)	*KI	ID(STRI) (IO)
a. tá.ko	*!		
☞ b. tá.tʃo			*!
<i>Base = Inf. ta.tʃé.re</i>			

iii) Derivation of 2.SG - palatalisation, given both BD and markedness constraints

/tak+i/	ID(STRI) / ÓNS (BD)	*KI	ID(STRI) (IO)
a. tá.ki	*!	*	
☞ b. tá.tʃi			*
<i>Base = Inf. ta.tʃé.re</i>			

This effectively concludes the derivation of each of the patterns of palatalisation attested in the verb families of Italian. One single constraint has been shown to be responsible for each pattern. The remainder of this section will show how this constraint’s derivational power extends further.

2.3 Additional cases of palatalisation

A complete account of palatalisation in Italian verbs requires analysis of the third conjugation. I will show now that the account is able to derive palatalisation in this class successfully, then continue to extend the BD constraint's use to account for a number of more irregular verb types.

2.3.1 *-ire* verbs, 3rd conjugation

Affricates appear in every form of the non-derived⁸ *-ire* paradigm. More regular *-ire* verbs take an additional suffix *-isc* between the verb stem and agreement suffix⁹ in certain forms, including the singulars of the present indicative, but one relevant verb¹⁰, *cucire* - 'to sew', does not. Regardless, the [tʃ] observed in the infinitive is found in every member of verb's paradigm (including in the remote past), suggesting an analysis where the affricate is underlying, rather than the product of overpalatalisation. For the verbs which take *-isc*, while the suffix is a trigger for palatalisation, the infinitive also contains a stressed [tʃ], meaning the presence of the affricate in inflection is again required by two constraints.

(17) *farcire* → *farcisco, farcisci* 'to fill/top → 1P.SG, 2P.SG'

i) Derivation of infinitive - palatalisation triggered (infinitive does not use infix)

/fartʃ+ire/	ID(STRI) / ÓNS (BD)	*KI	ID(STRI) (IO)
a. far.kí.re		*!	*
☞ b. far.tʃí.re			

ii) Derivation of 1.SG - normal palatalisation before *-isc*

/farktʃ+isk+o/	ID(STRI) / ÓNS (BD)	*KI	ID(STRI) (IO)
a. far.kís.ko	*!	*	*
☞ b. far.tʃís.ko			
Base = Inf. far.tʃí.re			

⁸ See section 4.2, following discussion of palatalisation in nouns and adjectives, for analysis of derived *-ire* verbs.

⁹ I do not provide any account of when this additional suffix is used. It has been treated as a means of maintaining a tri-syllabic word length or as keeping stress off the verb stem. For a comprehensive overview see Meul (2010).

¹⁰ The verb *fuggire* - 'to flee', seems to be the single exception to the account developed here, in that it has a stressed affricate, but normal palatalisation in conjugation:

(i) *fudʒ:ire* → *fúg:o, fúdz:i* 'to flee → 1P.SG, 2P.SG'

The initial syllable of the verb seems relatively prominent due to the combination of the geminate and vowel [u], which may attract stress: consider *lúcere* - 'to illuminate' & *licére* - 'to be allowed'. (Dictionaries note both of these verbs are poetic, and claim they can only be conjugated for the third person, else *licére* could be treated as a regular *-ére* verb.) I suggest the prominence of the initial syllable reduces the effect of stress in the second, rendering BD-faithfulness inactive. Further consideration is given to irregular *-ére* verbs containing geminates in section 2.3.4.

iii) Derivation of 2.SG - normal palatalisation

/fartʃ+isk+i/	ID(STRI) / ÓNS (BD)	*KI	ID(STRI) (IO)
a. far.kís.ki	*!	**	*
b. far.tʃís.ki	*!	*	
☞ c. far.tʃí.ʃí			*
<i>Base = Inf: far.tʃí.re</i>			

2.3.2 Additional underlying affricates

Affricates are attested before the *-are* suffix of the first conjugation, as in *lanciáre* - ‘to throw’. As for *-ire* verbs, these forms simply reflect the UR of the verb stem containing /tʃ/. The affricate appears in the infinitive and all members of the inflectional paradigm, though faithfulness to a [+STRIDENT] segment in the base form enforces this vacuously.

(18) *lanciáre* → *lancio, lán-ci* ‘to throw → 1P.SG, 2P.SG’

i) Derivation of infinitive - affricate in UR

/lantʃ+áre/	ID(STRI) / ÓNS (BD)	*KI	ID(STRI) (IO)
a. lan.ká.re			*!
☞ b. lan.tʃá.re			

ii) Derivation of 1.SG

/lantʃ+o/	ID(STRI) / ÓNS (BD)	*KI	ID(STRI) (IO)
a. lán.ko	*!		*
☞ b. lán.tʃo			
<i>Base = Inf: lan.tʃá.re</i>			

iii) Derivation of 2.SG

/lantʃ+i/	ID(STRI) / ÓNS (BD)	*KI	ID(STRI) (IO)
a. lán.ki	*!	*	*
☞ b. lán.tʃi			
<i>Base = Inf: lan.tʃá.re</i>			

The above analysis correctly predicts verb forms for nearly the entirety of the three verb families of Italian. The next section derives the different application of palatalisation before glide-initial suffixes which correspond to the small number of verb forms not yet accounted for.

2.3.3 Palatalisation before glides

The suffixes /-jamo/ - 1P.PL present indicative & subjunctive, and /-jate/ - 2P.PL present subjunctive, are found in all four agreement paradigms. They are also triggers for palatalisation, with the same pattern of application as the vowel-initial suffixes discussed so far. However, the

front glide /j/ deletes when suffixed to relevant *-ere* and *-ire* verb roots (regardless of stress). It is only retained in the first conjugation:

- (19) *víncere* → *vinciámo* /vink+jamo/ → [vinɲfámo] ‘to win → 1p.pl’
tacére → *tacciámo* /tak+jamo/ → [tatfámo] ‘to be quiet → 1p.pl’
pagáre → *paghiámo* /pag+jamo/ → [pagjámo] ‘to pay → 1p.pl’

Velar-glide sequences are known to assimilate into affricates in order to satisfy MAX constraints that target a segment’s features rather than the segment as a whole (Flemming 2001). In this case, affrication preserves the [+CONTINUANT] feature of the glide and the [+CONSONANTAL] feature of the stop. The following represents the affrication process that results from concatenation of a velar and a glide. An illicit sequence is created in the input (20a), which is resolved by affrication to preserve both of the relevant features of the input segments (20b). Deletion of one of the segments entirely, as in (20c) would violate the requirement to not delete the segment’s features.

- (20) a. [+CONS][+CONT] b. [+CONS][+CONT] cf c. [+CONS][+CONT]
- | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|----|---|----|---|---|---|---|
| | | / | + | / | → | / | + | / | cf | | ≠ | | |
| k | j | / | | / | | [| tʃ |] | | [| k | _ |] |

This is now formalised with the constraints MAX(+CONS) and MAX(+CONT) whose effects are to penalise deletion of the velar or glide respectively, rather than incorporating them into an affricate. Two markedness constraints derive otherwise normal glide assimilation. One is similar to *KI¹¹, while the other, *TʃJ, penalises the surfacing of sequences [tʃj] or [dʒj] which are unattested in the language (they could not even be written):

(21) Additional Constraints

- MAX(+CONS): Penalise deletion of a [+CONSONANTAL] feature
- MAX(+CONT): Penalise deletion of a [+CONTINUANT] feature
- *KJ: Penalise velar stop - glide sequences
- *TʃJ: Penalise affricate - glide sequences

Glide assimilation interacts with BD-correspondence in a familiar manner. As above, consider first the derivation of normal glide assimilation in *víncere* in which BD-correspondence does not play a role. The MAX constraints prevent deletion of either of the segments in question, while the markedness constraints disqualify the input form as well as a form that palatalises without deleting the glide. The assimilating candidate simply outperforms all other candidates because it does not violate any constraint except IO-faithfulness.

¹¹ *KJ may be considered a redefined version of the *KI constraint. Allen (1965) notes that palatalisation before glides was attested in Latin much earlier than it was before vowels, suggesting that there were two separate rules, but there are contemporary similarities between the sequences the two constraints penalise. One similarity, discussed in section four, is that both [KI] and [KJ] sequences are restricted to the same morpheme-internal contexts.

(22)

/vink+jamo/	ID(STRI) / ÓNS (BD)	MAX (+CONS)	MAX (+CONT)	*KJ	*TfJ	ID(STRI) (IO)
a. viŋk.já.mo				*!		
b. viŋ.ká.mo			*!			
c. vin.já.mo		*!				
d. vintf.já.mo					*!	*
e. vin.tfjá.mo						*
<i>Base = Inf: vín.tfje.re</i>						

Underpalatalisation before a glide is again driven by BD-faithfulness. Once active in the *-are* paradigm, as the highest ranked constraint it disqualifies the candidates which palatalise, including the assimilating candidate, as they do not maintain the infinitive's [-STRIDENT] segment, entailing a violation of *KJ. However, the MAX constraints, ranked higher than the markedness constraints, otherwise prevent deletion, leaving the winning candidate as faithful to the input.

(23)

/pag+jamo/	ID(STRI) / ÓNS (BD)	MAX (+CONS)	MAX (+CONT)	*KJ	*TfJ	ID(STRI) (IO)
a. pag.já.mo				*		
b. pa.gá.mo			*!			
c. pa.já.mo		*!				
d. padʒ.já.mo	*!				*	*
e. pa.dzá.mo	*!					*
<i>Base = Inf: pa.gá.re</i>						

The influence of BD-faithfulness in the *-ire*¹² and regular *-ére* paradigms turns out to be trivial. Palatalisation is derived in a similar manner to the irregular *-ěre* paradigm above, though as a [+STRIDENT] segment is demanded by BD-faithfulness, the non-palatalising candidates are disqualified earlier. Once palatalisation is a given though, the glide may assimilate - rather than delete - in order to satisfy the markedness constraint *TfJ.

(24)

/tak+jamo/	ID(STRI) / ÓNS (BD)	MAX (+CONS)	MAX (+CONT)	*KJ	*TfJ	ID(STRI) (IO)
a. tak.já.mo	*!			*		
b. ta.ká.mo	*!		*			
c. ta.já.mo		*!				
d. tatf.já.mo					*!	*
e. ta.tfjá.mo						*
<i>Base = Inf: ta.tfje.re</i>						

¹² The tableau for the third conjugation, eg. *cuciámo* - 'we sew', would derive the desired output in exactly the same way as the tableau for *taciámo* - 'we are quiet', save trivial differences in which candidates violate the lowest ranked IDENT constraint, owing to the affricate being present in the UR. Similarly, *-are* verbs with a [+STRIDENT] in their infinitive also delete the glide, eg. *lanciámo* - 'we throw'.

In contrast to front glide-initial suffixes, the three remote past suffixes with initial back glides, /wi/, /we/, and /wero/, belong only to the regular *-ére* paradigm, and do not trigger palatalisation:

(25) *tatʃére* → *takwi*, *takwe*, *takwero* ‘to be quiet → 1P.SG, 3P.SG, 3P.PL remote past’

Given that these forms’ infinitives contain stressed affricates, which should, according to the principles outlined above, be carried over to conjugated forms, further explanation is required as to why these suffixes are blocking palatalisation. I account for these examples with a high ranked markedness constraint *Tʃw, distinct from *Tʃj, and ranked higher even than BD-faithfulness, whose grounding is found in the fact that the sequence is unattested in native Italian phonology¹³.

(26)

/tak+wi/	*Tʃw	ID(STRI) / ÓNS (BD)	*KI	ID(STRI) (IO)
☞ a. <i>ták.wi</i>		*		*
b. <i>tá.tʃwi</i>	*!			

Base = Inf: ta.tʃé.re

These final three forms complete the account of palatalisation as observed in the three verb families of Italian. Though the main body of the analysis is now complete, I reserve discussion of the relevance it may have to existing phonological theory for the closing of this section. The following few sections show how the analysis is relevant to the study of an additional number of more particular verb groups.

2.3.4 Geminated affricates in the irregular *-ére* paradigm

Verbs belonging to the irregular *-ére* paradigm may contain geminated affricates. As with other irregular *-ére* verbs, these verbs palatalise normally:

(27) *lédʒ:ere* → *lég:o*, *lédʒ:i* ‘to read → 1P.SG, 2P.SG’
kɔ.rédʒ:ere → *kɔ.rég:o*, *kɔ.rédʒ:i* ‘to correct → 1P.SG, 2P.SG’

In these cases, the first segment of the geminate will be the coda of the initial syllable, thereby receiving stress¹⁴. It can be noted now that a more general BD constraint, targeting the entire stressed syllable (ie. the coda as well as the onset) would wrongfully enforce faithfulness to the affricate of the infinitive, and thus fail to derive the normal lack of palatalisation before *-o*.

(28) Wrongful derivation of 1.SG of *leggere*

/legg+o/	ID(STRI) / Ó (BD)	*KI	ID(STRI) (IO)
a. <i>lég.go</i>	*!		
☞ b. <i>lédʒ.dʒo</i>			*

Base = Inf: lédʒ.dʒe.re

¹³ The sequence may found in the loanword [kétʃwa] - ‘Quechua’. Thank you to an anonymous reviewer for pointing this out.

¹⁴ Given how stress assignment in *-ere* infinitives seems to be sensitive to syllable weight (see fn. 7), there are no regular *-ére* verbs containing a geminate.

It is for this reason that the BD constraint has been proposed to target stressed onsets specifically. The correct derivation of normal palatalisation is shown below, relying on the BD constraint targeting onsets, as used so far. BD-correspondence in fact has no influence over the derivation: the affricate in question, despite being in a stressed syllable, is its coda, not its onset. Normal palatalisation then follows from the lower ranked constraints, exactly as in previous discussion.

(29) i) Derivation of 1.SG of *leggere*

/legg+o/	ID(STRI) / ÓNS (BD)	*KI	ID(STRI) (IO)
☞ a. léɡ.go			
b. lédz.dzɔ			*!
<i>Base = Inf: lédz.dzɛ.re</i>			

ii) Derivation of 2.SG of *leggere*

/legg+o/	ID(STRI) / ÓNS (BD)	*KI	ID(STRI) (IO)
a. léɡ.go		*!	
☞ b. lédz.dzɔ			*
<i>Base = Inf: lédz.dzɛ.re</i>			

2.3.5 The interaction of palatalisation and fricative assimilation

Another relevant phonological process in Italian is the assimilation of sibilant-velar sequences into fricatives if followed by a palatalisation trigger. Put simply, again, the phonological rule for this alternation would resemble the following:

(30) Assimilation into a fricative

$$/sk/ \rightarrow [ʃ] / _ V_{\text{FRONT}}$$

This rule interacts with the by now familiar pressures of BD-faithfulness for stridency. The result of the normal application of the rule, as found in a numerous group of relevant irregular *-ere* verbs such as *creſcere* - ‘to grow’, is that the 1P.SG form is faithful to the input and does not assimilate, while the 2P.SG assimilates in the presence of a palatalisation trigger:

(31) *kréferɛ* → *krésko*, *kréʃi* ‘to grow → 1P.SG, 2P.SG’

The rule underapplies, as would be expected, in the conjugation of *-are* verbs. In the 2P.SG form of *confiscare* - ‘to confiscate’, assimilation is blocked:

(32) *kɔnfiskáre* → *kɔnfisko*, *kɔnfiski* ‘to confiscate → 1P.SG, 2P.SG’

There is no evidence that the rule would overapply due to an independent fact about the Italian lexicon: there are no regular *-ére* (or *-ire*¹⁵) verbs with /sk/ stem-finally. Nonetheless, I provide a simple analysis of the normal and underapplication of this rule, making use of the MAX(CONS) constraint seen above in discussion of glides, and introducing a new markedness constraint *STʃ, grounded again in the fact that the sequence it would penalise is unattested in Italian.

(33) Normal application of fricative assimilation

i) Derivation of the infinitive *créscere*

/kresk+ere/	ID(STRI) / ÓNS (BD)	MAX(CONS)	*STʃ	*KI	ID(STRI) (IO)
a. krés.ke.re				*!	
b. krés.tʃe.re			*!		*
c. kré.se.re		*!			
☞ d. kré.ʃe.re					*

ii) Derivation of 1P.SG

/kresk+o/	ID(STRI) / ÓNS (BD)	MAX(CONS)	*STʃ	*KI	ID(STRI) (IO)
☞ a. krés.ko					
b. kré.so		*!			
c. kré.ʃo					*!
<i>Base = Inf. kré.ʃe.re</i>					

iii) Derivation of 2P.SG

/kresk+i/	ID(STRI) / ÓNS (BD)	MAX(CONS)	*STʃ	*KI	ID(STRI) (IO)
a. krés.ki				*!	
b. krés.tʃi			*!		*
c. kré.si		*!			
☞ d. kré.ʃi					*
<i>Base = Inf. kré.ʃe.re</i>					

Normal application is observed for the infinitive *créscere*, as BD-faithfulness is inactive. In derivation of the infinitive - as well as the 2P.SG - the assimilating candidate is selected as it satisfies all the markedness and MAX constraints. The 1P.SG creates no context for palatalisation and the candidate faithful to the input wins.

Comparing this case to underapplication in the *-are* paradigm, with now-relevant BD-correspondence, any candidate with a [+STRIDENT] segment is immediately ruled out. The choice falls between candidates that violate MAX or markedness constraints, and thus the entirely faithful candidate wins, though due to the high ranking of MAX(CONS).

¹⁵ Although the sequence /ski/ cannot result from concatenation of an *-ire* verb root and a suffix, the sequence is created when a verb takes the *-isc* suffix before an agreement suffix. Palatalisation in this case is always normal, and can be derived as in the tableau in (33ii-iii) as there is no effect of BD-correspondence.

(34) Underapplication of fricative assimilation

Derivation of 2p.sg of *confiscare*

/kɔnfisk+i/	ID(STRI) / ÓNS (BD)	MAX(CONS)	*STf	*KI	ID(STRI) (IO)
☞ a. kɔn.fis.ki				*	
b. kɔn.fis.tʃi	*!		*		*
c. kɔn.fí.si		*!			
d. kɔn.fí.ʃi	*!				*

Base = Inf. kon.fis.ká.re

2.3.6 Suppletive verbs

A number of conjugated verbs display stem final [k,tʃ] or [g,dʒ] despite their infinitive containing no such segment. The verbs in question are typically developed from Latin infinitives with overt velar segments, eg. *fare*, *dire*, & *pro-durre*, from *facere*, *dicere*, & *ducere* ('to do, to say, & to lead' respectively). At early stages in the evolution of Latin these infinitives would have been pronounced without palatalisation, but Italian infinitives always palatalise before the suffix *-ere*. These infinitives have become suppletive forms, and in doing so have avoided creating a marked sequence. This is also the case in other forms which would be suffixed by a triggering suffix. For example, the 2P.SG of *fare* is *fai*. Nonetheless, consider the example of *produrre*, which has a suppletive infinitive, but maintains velar segments in what I take to be the stem of inflected forms.

(35) *produrre* → *prodúko*, *prodútʃi* 'to produce, 1P.SG, 2P.SG'

Quite simply, these irregular verbs palatalise normally because the relevant segments have no correspondent in the infinitive. Put differently, the base of the paradigm does not contain a relevant correspondent for the BD constraint governing palatalisation in derivatives. As a result, BD-faithfulness cannot be invoked, and palatalisation is the product of the lower ranked constraints again. Indeed, following Benua (2000), misapplication of the palatalisation rule (ie. under- or overpalatalisation) can only ever occur because of an active BD or OO constraint, and as such irregular verbs always display normal application. The derivation of the 1.SG and 2.SG of *produrre* is shown below.

(36) i) Derivation of 1.SG of *produrre*

/produk+o/	ID(STRI) / ÓNS (BD)	*KI	ID(STRI) (IO)
☞ a. pro.dú.ko			
b. pro.dú.tʃo			*!

Base = Inf. pro.dúr.re

ii) Derivation of 2.SG of *produrre*

/produk+i/	ID(STRI) / ÓNS (BD)	*KI	ID(STRI) (IO)
a. pro.dú.ki		*!	
☞ b. pro.dú.tʃi			*
<i>Base = Inf: pro.dúr.re</i>			

The conjugation of *dire* follows the above derivation exactly. The conjugation of *fare*, however, differs. The 1P.SG form of *fare* might appear to be an instance of overapplication, while the 2P.SG, as noted earlier, is suppletive:

- (37) *fáre* → *fátfo*, *fái* ‘to do, 1P.SG, 2P.SG’

As overapplication can only be the result of the BD constraint, however, the output of the form here must be representative of an affricate /tʃ/ present in the UR of the conjugated stem, evidence for which may be found by consulting the entire paradigm of *fare*: the affricate is found in all verb forms which are not suppletive. Palatalisation here is normal too then, governed simply by the very lowest ranked IO constraint¹⁶:

(38) Derivation of 1.SG of *fare*

/fatʃ+o/	ID(STRI) / ÓNS (BD)	*KI	ID(STRI) (IO)
a. fá.ko			*!
☞ b. fá.tʃo			
<i>Base = Inf: fá.re</i>			

2.3.7 Further suppletion in the irregular *-ěre* paradigm

Though tangential to the discussion of palatalisation, the use of markedness constraints as above may provide a phonological explanation of the suppletive forms of the irregular *-ěre* paradigm, thus meaning that only one verb base is required throughout this paradigm too. The four suppletive forms of the paradigm are repeated below for reference:

- (39) *víncere* → *vínsi*, *vínse*, *vínsero* ‘to win → Remote past: 1P.SG, 3P.SG, 3P.PL
 → *vínto* → PAST PARTICIPLE’

Concerning the remote past forms, [s] appears frequently in what is taken to be the verb stem of irregular *-ere* verbs, including those without stem-final velars (40b). Though this is by no means an exceptionless generalisation, and though some forms show other alternations, the following are some common examples of the 1P.SG remote past forms and the infinitives they are derived from:

¹⁶ Concerning the 2P.SG *fai*, the recourse to suppletion now seems unfounded: if the UR contains an affricate, then a marked sequence would not be created by suffixation of *-i*. I leave this question open.

- (40) a. vóldzere → vólsi ‘to turn’
 pjándzere → pjánsi ‘to cry’
 protédz:ere → protéssi ‘to protect’
- b. pérdere → pérsi ‘to lose’
 kórrere → kórsi ‘to run’
 mwóvere → móssi ‘to move’

The remote past suffixes of the irregular *-ere* paradigm are proposed to be reanalysed as /-si/, /-se/, and /-sero/. Under this assumption, the stem final consonant of the irregular *-ere* verb is deleted due to a markedness constraint preventing the sequence [ks] from surfacing. This sequence is again otherwise unattested in the native vocabulary of Italian (though present in loanwords with an ⟨x⟩, as in *extra*). The stem-final consonant deletes due to the comparative perceptual prominence of the [s] in an onset position, as per Steriade’s (2001) P-map hypothesis.

(41)

/vink+si/	*KS	FAITH(ONSET)	*KI	FAITH (IO)
a. viŋk.si	*!			
☞ b. vin.si				*
c. viŋ.ki		*!	*	*
d. vin.tʃi		*!		*

A redefinition of the past participle as *-to* would not gain as much empirical coverage as the redefinition of the remote past suffixes. Irregular *-ere* verbs without stem-final velars have past participles containing an [s]:

- (42) pérdere → pérsi ‘to lose’
 kórrere → kórso ‘to run’
 mwóvere → móssso ‘to move’

As applied to velar-final verbs though, such an analysis would likewise make use of a *KT markedness constraint, penalising surfacing of another sequence unattested in the language:

(43)

/vink+to/	*KT	FAITH(ONSET)	*KI	FAITH (IO)
a. viŋk.to	*!			
☞ b. vin.to				*
c. viŋ.ko		*!		*

2.4 Discussion

With the analysis of Italian verbal morphology concluded, I now present some points that bear on the established phonological theory that the developed account has either built on or stands in contrast to. Specifically, the account builds on theories of paradigm correspondence (Benua 2000) by having correspondence constraints sensitive to phonological prominence, rather than idiosyncratic lexical indexing, as is the case in Krämer (2007; 2009). It may also provide an example of the interface between phonology and morphology that may constitute a middle ground between contrasting accounts of stress-conditioned phonology, namely positional

faithfulness (Beckman 1999) and phonetic phonology (Giavazzi 2010a). Lastly, the analysis bears on Pirrelli & Battista's (2000) account of Italian verbal morphology which details the series of stem distributions in the language's verbs.

2.4.1 Paradigm correspondence

The account developed above owes a great deal to theories of output-to-output correspondence (Benua 2000). Misapplication of a phonological rule functions exactly as it does for Benua - it is the result of a constraint requiring identity between two output forms. Normal application, however, does not quite proceed along the same lines. For Benua normal application is the result of an output-to-output constraint being outranked by a markedness constraint. Here it is the result of the BD constraint being made inactive due to its stress dependence. This difference is, however, by no means critical, and is largely the result of a difference in the scope of the analyses. Whereas Benua offers crosslinguistic evidence for each of the different patterns of application, here a single language is shown to display all three.

The adaption of paradigm correspondence here to be stress-dependent (Kager 2000) here stands in contrast to its adaption as a constraint governing indexed areas of the lexicon in Krämer's (2007; 2009) account of Italian palatalisation. Krämer identifies the underapplication pattern attested for *-are* verbs and derived *-ire* infinitive forms, as well as for feminine plural and selected masculine plural nouns and adjectives. He takes each of these, however, to be caused by a different correspondence constraint that affects only morphemes that are marked according to their lexical or morphological features, proposing constraints such as BO-IDENT₁ which demands verbs of the first conjugation are faithful to a base, assumed to be the infinitive again. Giavazzi (2010b) presents arguments that stress better serves as a phonological cue regarding the application of palatalisation in nouns and adjectives, and likewise I suggest the stress-dependent account of verbs is more expansive, reduces recourse to exceptionality, and yet makes use of a single BD constraint and a single constraint ranking. Krämer cites Pater's (2006) exceptional morpheme-indexing in proposing these constraints, though the extent of lexical indexing that would follow from Krämer's account would be vast: the major (and most productive) class of Italian verbs, that is, *-are* verbs, would all be marked, as would most nouns and adjectives - all feminine forms and a large number of masculine forms. If, rather than lexical items, it is constraints which are indexed, though, the phonological cues presented here aid the learner without the need to devise specific constraints which may not come from universal grammar - a constraint governing first conjugation verbs, after all, would have no relevance outside of Italian or Romance. This is not to fully refute an analysis where different phonology applies to different divisions of the Italian lexicon, but the task of the learner is demonstrably simpler if alternation is conditioned by stress, to which I now turn.

2.4.2 Stress-conditioned faithfulness

Within the framework of output-to-output phonology, perhaps the closest comparison to be made to the proposed analysis is Kager's (2000) account of verbal morphology in Levantine Arabic. Both derivations make use of OO constraints which govern segments whose correspondents are stressed in a base form. The only point of difference between the two derivations is Kager's use of an OO MAX constraint rather than a DEP constraint. In more classical OT, still, the fact that prominence of stress induces exceptional faithfulness is not new. In particular, the account warrants comparison to theories of positional faithfulness (Beckman 1999), which also make use

of faithfulness within stressed syllables. The crucial difference between positional faithfulness and the account developed here, though, is that while the former evaluates unstressed input forms with regard to stressed output candidates, the latter evaluates output forms exclusively.

As such, the issue of stress assignment and stress-conditioned alternation taking place concurrently, as raised by Giavazzi (2010a), is avoided. It is also important to note, too, how positional faithfulness would not function as an explanation of Italian verbal morphology. Stress can shift between infinitive and conjugated verb forms, but it is stress in the infinitive base that is important. For Giavazzi, underpalatalisation in Italian nouns and adjectives is a purely phonetic side effect on segments in a post-tonic syllable. I suggest that the account developed here governing Italian verbal morphology should be considered an example of the interface between the phonology and morphology of Italian. The account of Italian verbal morphology does not contradict Giavazzi's phonetic analysis (which is in any case restricted to nominal morphology) but shows that there are additional interface-related consequences associated with stress. That is, stress-induced faithfulness here is not a result of stress in the syllable in question in the output or even input form - as is the case for positional faithfulness - but may be required, depending on phonetic prominence, because of the stressed syllable in a related form.

2.4.3 Suppletion and Verb Stem Distribution

Pirrelli & Battista (2000) provide an account of Italian verbal morphology centred on the form of the stem and its distribution across classes of verbs. Ultimately, they cover a wide range of morpho-phonological variation, some of which is the result of well-understood phonological rules - palatalisation being one example - and some of which is more unpredictable. Essentially, for Pirrelli & Battista, any stem variation that cannot be accounted for by exceptionless normal application of a phonological rule signifies a change of verb stem akin to suppletion. Burzio (2004), in discussion of this approach, introduces OO-faithfulness as a means of explaining exceptional application of a phonological rule. Developed to the extent in this paper, OO-faithfulness reduces the recourse to suppletion required for a full account of Italian verbal morphology. There remain, of course, many more phonological alternations than palatalisation, but the influence of the rule on stem variation warrants further investigation. A full investigation would merit a study in its own right - one that cannot be pursued at depth here - but consider the example of verbs like *tenere* - 'to hold' or *venire* - 'to come':

- (44) *te.né.re* → *téŋ.go, tjé.ni* 'to hold → Present indicative: 1P.SG, 2P.SG'
 ve.ní.re → *véŋ.go, vjé.ni* 'to come → present indicative: 1P.SG, 2P.SG'

This may be a less obvious example of the influence of the palatalisation requirement, as the velar segment is not present in the infinitive. The presence of an underlying velar in the verb stem could be argued for, on the basis of the 1P.SG forms, with the infinitive being derived by deletion¹⁷ of /g/ to satisfy *KI. Under this assumption, the appearance of a glide in the 2P.SG cannot otherwise be accounted for, but nonetheless, stem variation frequently takes place when the suffix is a trigger for palatalisation. For Pirrelli & Battista, consistent stem variation in paradigm slots is representative of a systematic principle, but the disregarded form of the suffix may be what makes the variation systematic in the first place.

¹⁷ I make no claim about what causes a verb to delete /k/, rather than palatalise before a front vowel, other than that made in discussion of irregular verbs and other phonological processes related to palatalisation earlier in this section.

3 Base selection

Though the selection of the infinitive as the base of the paradigm may seem somewhat intuitive¹⁸, further investigation is required to determine why the form is selected in particular from among the entire paradigm. This section follows Albright (2002) in identifying the base as the most morpho-phonologically informative member of the paradigm.

3.1 Infinitives and conjugation

The information that the base form provides in Italian is the agreement paradigm of the verb, or, put differently, the particular set of suffixes that the verb takes in agreement. The best base, ie. the most informative base, will be a verb form which, if given to a speaker in isolation, allows confident prediction of the agreement paradigm the verb belongs to. Under this theory, the infinitive is indeed a suitable base, as the infinitive forms of each of the four Italian agreement paradigms have suffixes which are phonologically distinct (note that the distinction between *-ére* and *-ère* verbs is made possible by stress in the infinitive). That is, if a speaker is given an infinitive verb form, they will be able to tell which of the four agreement paradigms the verb belongs to. Below, this metric is schematised with the verb *pagare* - ‘to pay’. If a speaker is given the form [pagare], the *-are* suffix clearly identifies the verb as belonging to the first conjugation as the suffix does not appear in any other conjugation.

(45)	<i>Base form</i>	<i>Base Stem + Identification of paradigm</i>
	[pagare]	/pag/ + {-are, -ére, -ère, -ire}

Given this, the speaker may then correctly conclude that in conjugation, the stem /pag/ must take the suffixes of the first conjugation.

By contrast, an unsuitable base would be the 1P.PL simple future, as homophony neutralises the contrast between three of the agreement paradigms:

(46)	<i>Base form</i>	<i>Base Stem + Identification of paradigm</i>
	[pajerò]	/pag/ + {-erò, -erò, -erò, -irò }

The 1P.PL simple future suffix is identical in the *-are*, *-ére*, and *-ère* paradigms, and so a speaker given this form will not be able to confidently predict which paradigm of agreement suffixes to apply to the verb stem in inflection. Put coarsely, they would have to guess which of these three paradigms the verb belongs to.

¹⁸ Selection of the infinitive as the paradigm base may be considered in some way to adhere to theories of base containment (Kager 2000), in that the infinitive is a ‘neutral’ form; it does not show any tense/agreement morphology that would contrast with the morphology of inflected forms. Were this true, the intent of this section is to show that a more methodological means of base-selection is adhered to in Italian. (See also Bermúdez-Otero 2011 and Steriade 2012 on issues with containment.)

At a first pass then, the infinitive seems an ideal base. It allows prediction of a verb's agreement paradigm with a high degree of confidence, as each agreement paradigm's infinitive suffix has a distinct form. There is, in fact, some degree of identity between suffixes, as with the 1P.SG simple future above, in the majority of conjugations, meaning a large proportion of verb forms can be discounted as potential bases. However, including the infinitive, there are five verb forms which maintain contrast between the four agreement paradigms. Alternatives to the infinitive are the 1P.SG, 3P.SG, and 3P.PL of the remote past, as well as the past participle. The following table shows the forms of agreement suffixes, following the phonological derivations detailed in section two, and the neutralisations of agreement paradigms between them (in greyed cells). The five forms which maintain contrast are in bold type, and framed with a double outline.

(47) Identity between agreement suffixes across paradigms (in post-velar contexts)

TENSE/MOOD	1P.SG		2P.SG		3P.SG		1P.PL		2P.PL		3P.PL	
PRESENT	-o	-o	-i	-i	-a	-e	-jamo	-amo	-ate	-ete	-ano	-ono
	-o	-o	-i	-i	-e	-e	-amo	-amo	-ite	-ete	-ono	-ono
IMPERFECT	-avo	-evo	-avi	-evi	-ava	-eva	-avamo	-evamo	-avate	-evate	-avano	-evano
	-ivo	-evo	-ivi	-evi	-iva	-eva	-ivamo	-evamo	-ivate	-evate	-ivano	-evano
REMOTE PAST	-ai	-(w)i	-asti	-esti	-ò	-(w)e	-ammo	-emmo	-aste	-este	-aronno	-(w)ero
	-ii	-si	-isti	-esti	-i	-se	-immo	-emmo	-iste	-este	-ironno	-sero
SIMPLE FUTURE	-erò	-erò	-erai	-erai	-erà	-erà	-eremo	-eremo	-erete	-erete	-eranno	-eranno
	-irò	-erò	-irai	-erai	-irà	-erà	-iremo	-eremo	-irete	-erete	-iranno	-eranno
PRESENT SUBJUNCTIVE	-i	-a	-i	-a	-i	-a	-jamo	-amo	-jate	-ate	-ino	-ano
	-a	-a	-a	-a	-a	-a	-amo	-amo	-ate	-ate	-ano	-ano
IMPERFECT SUBJUNCTIVE	-assi	-essi	-assi	-essi	-asse	-esse	-assimo	-essimo	-aste	-este	-asserò	-essero
	-issi	-essi	-issi	-essi	-issi	-esse	-issimo	-essimo	-iste	-este	-isserò	-essero
CONDITIONAL	-erei	-erei	-eresti	-eresti	-erebbe	-erebbe	-eremmo	-eremmo	-ereste	-ereste	-erebbero	-erebbero
	-irei	-erei	-iresti	-eresti	-irebbe	-erebbe	-iremmo	-eremmo	-ireste	-ereste	-irebbero	-erebbero
IMPERATIVE	/	/	-a	-i	-i	-a	-jamo	-amo	-ate	-ete	-ino	-ano
	/	/	-i	-i	-a	-a	-amo	-amo	-ite	-ete	-ano	-ano

INFINITIVE	-are	-ére	PRESENT	-ando	-endo
	-ire	-ëre	GERUND	-endo	-endo
PRESENT PARTICIPLE	-ante	-ente	PAST PARTICIPLE	-ato	-uto
	-ente	-ente		-ito	-(t)o

KEY	-are	-ére
	-ire	-ëre

Paradigm neutralisation is in fact entirely a result of morphological identity between suffixes rather than phonology - indeed *-are* verbs are dissociated from the other agreement paradigms in forms with glide-initial suffixes. The majority of forms in the verbal paradigm should immediately be disqualified as bases as they neutralise two or more agreement paradigms:

(48) *Neutralisation* *Forms*

Complete	Present indicative: 1P.SG, 2P.SG
- <i>ére</i> , - <i>ěre</i> , - <i>ire</i>	Present indicative: 1P.PL, 3P.SG, 3P.PL ; Present subjunctive: 1P.SG, 2P.SG, 3P.SG, 1P.PL, 2P.PL, 3P.PL ; Imperative: 2P.SG, 3P.SG, 2P.PL, 3P.PL ; PRESENT PARTICIPLE ; PRESENT GERUND
- <i>éere</i> , - <i>ěere</i> , - <i>are</i>	Simple future: 1P.SG, 2P.SG, 3P.SG, 1P.PL, 2P.PL, 3P.PL ; Conditional: 1P.SG, 2P.SG, 3P.SG, 1P.PL, 2P.PL, 3P.PL
- <i>ére</i> , - <i>ěre</i>	Imperfect indicative: 1P.SG, 2P.SG, 3P.SG, 1P.PL, 2P.PL, 3P.PL ; Imperfect subjunctive: 1P.SG, 2P.SG, 3P.SG, 1P.PL, 2P.PL, 3P.PL ; Present indicative: 2P.PL ; Remote past: 2P.SG, 1P.PL, 2P.PL ; Imperative: 2P.PL

As noted, five forms maintain contrast across the four agreement paradigms and so have the potential to act as the base:

- (49) No neutralisation: Remote past: 1P.SG, 3P.SG, 3P.PL ;
 INFINITIVE ; PAST PARTICIPLE

Considering these five forms, the suppletive versus non-suppletive distinction that defines the regular and irregular *-ere* paradigms becomes relevant. Returning to the metric for evaluating potential bases, once the base form's suffix is removed the other suffixes of the paradigm must be applied to the remaining stem. This being the case, four of the five potential bases become unsuitable due to suppletion, or rather deletion (see section 2.3.7), in the irregular *-ěre* paradigm. Whereas a speaker may be able to reconstruct an underlying stem-final velar from an affricate, deletion is impossible, or at least less simple to undo, as there is more than one deletion rule in the language. Thus, a speaker selecting the past participle or one of the three remote past forms as the paradigm base may be able to predict the agreement paradigm the verb belongs to, but this comes at the cost of positing an incorrect stem.

(50) <i>Potential base</i>	<i>Base Input</i>	<i>Output</i>	<i>Posited Stem</i>	<i>Example derivation (1P.SG)</i>
INFINITIVE	/vink+ere/	[vintʃere]	/vink-/	✓[viŋko]
PAST PART	/vink+to/	[vinto]	/vin-/	*[vino]
REMOTE PAST	/vink+si/	[vinsi]	/vin-/	*[vino]

To reiterate, only the infinitive allows prediction of a verb's agreement paradigm at the same time as providing a suitable stem for suffixation in the rest of the paradigm. This is what leads to selection as a base under the principles of Albright (2002), and so the adoption of the infinitive as the paradigm base seems to be well founded.

3.2 Stem-internal variation

It should be the case that all Italian verbs have a base-member of the paradigm whose selection follows the metric discussed above. For verbs without a stem-final velar, the identification of the base via a table of identity as in (47) would be identical, except the distinction between glide initial suffixes would be entirely neutralised. The distinction between the regular and irregular *-ere* paradigms remains in all the forms that it does for verbs with stem-final velars. In particular the remote past suffixes of the irregular *-ēre* paradigm are distinct from those of the regular *-ere* paradigm, in that *-ēre* verbs have remote past suffixes beginning with /s/, and a more irregular past participle (see section 2.3.7). The best indicator of a verb's agreement paradigm for verbs without stem-final velars therefore remains the infinitive.

However, the question of the form of the stem becomes more problematic when consideration is given to irregular verbs, for which agreement correlates with more irregular stem-internal alternation. Preceding sections have shown, for verbs whose phonology has previously assumed to be suppletive, that alternation taking place at the edge of the verb stem can be predicted from established phonological processes of Italian. Nonetheless, alternations remain which defy straightforward phonological explanation. Consider again the case of *tenere* - 'to hold', whose present indicative paradigm, showing three verb stems, is given below:

(51)		SINGULAR	PLURAL	<i>Stems</i>
	1P	ténngo	tenjémo	/teng/, /tjen/, /ten/
	2P	tjéni	tenéte	
	3P	tjéne	ténngono	<i>Infinitive: tenere</i>

While there is systematicity in where each of the three stems appears in the paradigm, in that there is a correlation with stress and the initial vowel of the suffix (see also Pirrelli and Battista 2000), the difficulty with stem-internal alternation in this case is that none of the three possible stems can be taken as underlying and used to derive the stems surfacing in patterns in the rest of the paradigm. I leave more in-depth study of base-selection among these verbs for future study, but will briefly note that selecting the infinitive as the paradigm base would provide the stem /ten/. This would certainly derive the largest number of correct forms from the three observed stems, as the stem surfaces in the majority of the paradigm, in 28 of the verb's 51 forms. In this way, Albright's (2002) proposal that the base must be maximally informative may still hold true. Though the base of an irregular verb cannot be predicted with full confidence, as was the case for velar-final and other regular verbs, the infinitive nonetheless remains the form which allows the greatest degree of confidence in deriving the rest of the paradigm.

This concludes the part of this paper dedicated to the analysis of palatalisation in Italian verbal inflection. To briefly summarise the main argument in the analysis of verbs again, misapplication of a palatalisation rule across the Italian verbal domain has its roots in paradigm correspondence. Conjugated verbs are faithful for stridency to the onset of the stressed syllable of the infinitive.

4 The distribution of palatalisation across nominal and verbal morphology

This section begins by presenting Giavazzi's (2012) model of stress-conditioned palatalisation in Italian nouns and adjectives in comparison to the analysis of verbs developed in section two. I will argue for a number of extensions to Giavazzi's analysis, which will allow an account of stem-internal contexts to be developed. The resulting analysis will then prove instrumental in accounting for palatalisation in derived verbs.

It has been noted that misapplication of palatalisation in both verbs and nouns is dependent on stress, but in different ways. To present the facts alongside one another, verbs only underapply palatalisation before the front vowels [i,e] when their infinitive stresses a [-STRIDENT] segment - in other words due to paradigm effects:

(52) Palatalisation in verbs

a. Palatalisation

In <i>-ére</i> and <i>-ére</i> infinitives:	vín. tfe .re, ta. tjé .re	'to win, to be quiet'
In inflected <i>-ére</i> verbs:	vín. tji , vín. tje	'to win, 2P.SG, 3P.SG'

b. Underpalatalisation

In inflected <i>-are</i> verbs:	pa.gá.re → pá. gi	'to pay → 2P.SG'
---------------------------------	--------------------------	------------------

Following Giavazzi, palatalisation before the plural suffixes of nouns and adjectives only takes place in an environment far from stress, effectively in the second syllable of a lapse¹⁹. The rule furthermore only applies before the frontmost vowel of the masculine plural suffix *-i*, and not the feminine plural *-e*. Essentially, Giavazzi's analysis shows palatalisation to be blocked in the syllable immediately following stress:

(53) Palatalisation in nouns and adjectives

a. Palatalisation

Far from stress:	lí.ri.ko, lí.ri. tji	'lyrical, M.SG, M.PL'
------------------	-----------------------------	-----------------------

b. Underpalatalisation

In the post stress syllable:	an.tí.ko, an.tí. ki	'antique, M.SG, M.PL'
Before the /-e/ of the F.PL:	lí.ri.ka, lí.ri. ke	'lyrical, F.SG, F.PL'

Linear rules for palatalisation in nouns and adjectives based on Giavazzi's analysis then resemble the following. Note that the context refers specifically to [i], rather than all front vowels.

¹⁹ There are a small number of exceptions to Giavazzi's proposed analysis, which I cannot offer any further insight on. These include some common forms such as the masculine plural of *amico* - 'friend', which palatalises in a post-stress syllable: [amit**tji**].

(54) Palatalisation rules for nouns and adjectives:

- a. /k,g/ → [tʃ,dʒ] / ɔ̃.σ.__i
- b. */k,g/ → [tʃ,dʒ] / ɔ̃.__i

It is important to note that the system of palatalisation applying to verbs is not a more complicated version of the system applying to nouns and adjectives, or vice-versa. That is, the basic system of palatalisation for verbs is not identical to that for nouns and adjectives, only with additional restrictions based on output-to-output correspondence. Furthermore, the difference between the verbal and nominal domains does not follow from the size of the verbal paradigm, or some other factor, which might create additional pressures on verbs which are not relevant to nouns or adjectives (Cable 2004; Bobaljik 2008). The rule driving the occurrence of palatalisation in verbs is notably stronger than that for nouns and adjectives, in that it targets both front vowels, it cannot be influenced by stress, and it can only be blocked by BD-correspondence.

4.1 Weak nominal palatalisation and strong verbal palatalisation

To integrate the two systems of palatalisation, this study will adopt the approach of category-specific phonology, in specifying separate constraints which are sensitive to the nominal and verbal domains. One is a stronger constraint indexed to verbs, the other a weaker constraint indexed to nouns and adjectives. It is argued that this approach forms more natural lexical classes than those proposed by Krämer (2007; 2009), and that this division, with parallels in other languages (Smith 2011), is of more universal relevance. To advance this proposal, the study will be extended to morpheme-internal environments, though one independent issue must be addressed now to avoid conflation with the in-earnest analysis of these contexts.

4.1.1 Initial syllable faithfulness

One area of commonality exists between the nominal and verbal domains. The following sections will be concerned with the environments where neutralisation of [KI,TʃI] does and does not take place, and so it should be noted before analysis of this begins that initial syllables independently permit this contrast. In both the nominal and verbal domains, /KI/ (and /KJ/) are preserved, in contrast with affricates, in the initial syllable, even when unstressed:

- | | | | | | | |
|------|-----|-----------------|--------------------------|----|-----------------|------------|
| (55) | a. | kinó ttó | ‘myrtle-flavoured drink’ | b. | kiná re | ‘to bend’ |
| | | kirú rɡo | ‘surgeon’ | | ɡi ɲáre | ‘to sneer’ |
| | | kj áro | ‘clear, M.SG’ | | kj amáre | ‘to call’ |
| | cf. | tʃi bo | ‘food’ | | tʃi táre | ‘to cite’ |

Initial syllables, as psycho-linguistically prominent positions, are independently capable of inducing otherwise exceptional faithfulness (Beckman 1999; Becker et al. 2012). In this literature, this is understood as exceptional faithfulness to the input, and given that this effect is found in nouns, adjectives, and verbs in Italian, a simple and uniform account of this need only propose an undominated faithfulness constraint targeting initial syllables:

(56) a. Preservation of /kI/ in the initial syllable of a noun

/kirúg+o/	ID(STRI) / #_	*kI	ID(STRI) (IO)
☞ a. ki.rúr.go		*	
b. tʃi.rúr.go	*		*

b. Preservation of /kI/ in the initial syllable of a verb

/giŋ+áre/	ID(STRI) / #_	*kI	ID(STRI) (IO)
☞ a. gi.ŋá.re		*	
b. dʒi.ŋá.re	*		*

With an understanding of initial syllable faithfulness, analysis now proceeds to compare neutralisation at the morpheme boundary with neutralisation inside (but not initial to) the morpheme. This account of initial syllables will be furthermore relevant to analysis of derived verbs in section 4.2.

4.1.2 Palatalisation in nouns and adjectives

Giavazzi argues that palatalisation is a neutralisation process which is blocked in post-stress syllables as a consequence of the preceding vowel receiving stress. Palatalisation may therefore only take place far from stress. Giavazzi's analysis is recast here in simple OT terms via a meta-ranking of palatalisation constraints. A new constraint, *kĩ (N/A) is indexed to nouns and adjectives as it will otherwise fail to derive the occurrence of palatalisation seen so far in infinitives.

(57) Palatalisation in nouns and adjectives

*kĩ (N/A) : In nouns and adjectives, penalise [ki,gi] in a *non-prominent* position
 - where a *prominent* position is the post-stress syllable

The constraint *kĩ (N/A) takes a role similar to the *kI constraint used in section two, being higher ranked than a faithfulness constraint. The fact that this particular constraint does not govern palatalisation before -e is understood to follow from the fact that [e] does not cause perceptual difficulties to the same degree that [i] does (see discussion in Wilson 2006). *kI serves here as a general palatalisation constraint, which applies to all [ki, gi, ki, ge] sequences regardless of stress, though its effect is restricted as it is outranked by the identity constraint. Thus, in (58a), palatalisation takes place because the environment is sufficiently far from the stressed syllable, leading to a violation of *kĩ (N/A). In (58b) the sequence [ki] is found in a post-stress syllable, meaning there is no violation of *kĩ (N/A), so the palatalising candidate is disqualified under the identity constraint. Regarding the feminine plural -e (58c), the high ranked *kĩ (N/A) constraint again only targets the frontmost vowel, so the non-palatalising candidate wins because of the faithfulness constraint, though it does incur a violation of the more general palatalisation constraint.

(58) Palatalisation before plural suffixes -i and -e²⁰

a. Palatalisation occurs in syllables far from stress

/lírik+i/	*kĩ (N/A)	ID(STRI) (IO)	*KI
a. lí.ri.ki	*!		*
☞ b. lí.ri.tʃĩ		*	

b. /ki/ in a post-stress syllable is preserved

/ántík+i/	*kĩ (N/A)	ID(STRI) (IO)	*KI
☞ a. an.tí.ki			*
b. an.tí.tʃĩ		*!	

c. [ke] does not palatalise

/lírik+e/	*kĩ (N/A)	ID(STRI) (IO)	*KI
☞ a. lí.rí.ke			*
b. lí.rí.tʃe		*!	

As Giavazzi's study considers only the M.PL suffix -i, which never receives stress, the analysis only provides evidence that palatalisation is blocked in the post-stress syllable. Though examples which show this are not numerous, other stem-internal environments in the language also block palatalisation. Following Giavazzi, the onset of the stressed syllable should itself be as prominent as the onset of the post-stress syllable. This should lead to preservation of sequences which would otherwise palatalise. Neutralisation of /KI/ to [Tʃi] (or /KJ/ to [Tʃj]) is indeed blocked in these environments:

(59) Preservation of /KI/ in nouns and adjectives in prominent positions

a. *Onset of the post-stress syllable*

b. *Onset of the stressed syllable*

mákkina

'car'

zukíno

'courgette'

márkjo

'mark'

arkívjo

'archive'

All that is required to derive stem-internal palatalisation is to redefine the constraint indexed to nouns and verbs, still in the spirit of Giavazzi's analysis, to not apply in a set of prominent positions: *within* and *immediately following* a stressed syllable.

(60) Palatalisation in nouns and adjectives (revised)

*kĩ (N/A) : In nouns and adjectives, penalise [ki,gi] in *non-prominent* positions
 - where *prominent* positions are stressed *and* post-stress syllables

The effect of this constraint is shown below in the derivation of preservation of /ki/ in a stressed syllable:

²⁰ Stress is shown in the input cell of each tableau merely to highlight where it will fall in the derived candidates. See Giavazzi (2010a) for more detailed discussion of whether this is appropriate.

(61) Stress-internal preservation of /ki/

/arkívjo/	*kĩ (N/A)	ID(STRI) (IO)	*KI
☞ a. ar.kí.vjo			*
b. ar.tʃí.vjo		*!	

The approach developed here will again be instrumental in analysis of derived verbs, which the following sections will show to constitute the sole exceptions to the strong palatalisation rule argued to apply to verbs.

4.1.3 Revising palatalisation in verbs

In the verbal domain, misapplication of palatalisation, including underpalatalisation, only arises in inflected forms. As noted, the system of palatalisation developed for nouns and adjectives cannot derive the palatalisation attested in verbs: a more general constraint *kĩ would systematically fail to derive palatalisation before each of the infinitive suffixes *-ěre*, *-ére*, and *-ire*. Stems given these suffixes would not have reason to palatalise; in the first two cases because the suffix is *-e*, not *-i*, and in all three cases because they would place a stem-final velar in a prominent (stressed or post-stress) position. For illustrative purposes, incorrect derivation of one of these examples follows:

(62) Wrongful derivation of **tachére*

/tak+ére/	*kĩ	ID(STRI) (IO)	*KI
☞ a. ta.ké.re			*
b. ta.tʃé.re		*!	

While the constraint responsible for deriving palatalisation in nouns will not apply to verbs, in the immediately preceding section it was proposed as part of a meta-ranking. This meta-ranking required the general palatalisation constraint *KI to be ranked low, below input-to-output faithfulness. For these reasons, it is necessary to reintroduce the high-ranked strong palatalisation constraint used in section two, though now as a constraint indexed to verbs:

(63) Palatalisation in verbs (revised)

*KI (V): In verbs, penalise all [ki, gi, ke, ge] sequences (everywhere)

The constraint *KI (V) may be safely substituted for the more general constraint *KI used in the analysis of verbal phonology in section two. There are now, however, a number of different palatalisation constraints at play, so the following correct derivation of palatalisation in an infinitive is intended to represent the interaction of the constraints relevant so far. Effectively, the specific constraints governing palatalisation in nouns, adjectives, and verbs outrank input-to-output faithfulness, which in turn outranks the most general palatalisation constraint. The top ranked palatalisation constraints cannot be ranked relative to one another as they apply in mutually exclusive contexts.

(64) Correct palatalisation before the suffix *-ére*

/tak+ére/	*KI (V)	*kĩ (N/A)	ID(STRI) (IO)	*KI
a. ta.ké.re	*!			*
☞ b. ta.tʃé.re			*	

Together with the fact that infinitives are derived as the paradigm base, thus without the influence of BD-correspondence that inflected verbs are subject to, there is a further consequence of verbs being subject to a strong palatalisation rule. An apparent lexical gap is found in the language's infinitives: there is no *-ere* or morphologically simplex *-ire* infinitive which has an overt velar before the infinitive suffix:

(65) Attested logically conceivable occurrences of palatalisation in infinitives

	Infinitive suffix <i>does not</i> trigger palatalisation (<i>-are</i>)	Infinitive suffix triggers palatalisation (<i>-ere, -ire</i>)
Stem-final consonant [tʃ,dʒ]	✓ - lantʃáre	✓ - tatʃére, vintʃere
Stem-final consonant [k,g]	✓ - pagáre	* - 'takére'

The neutralisation implied by this gap extends to stem-internal environments. However, at this point it must be noted that only *-are* verbs offer further significant evidence for the distribution of palatalisation inside the verb stem. All morphologically simplex *-ere* and *-ire* infinitives are three syllables long, save one set of relevant exceptions (66b). There are, therefore, no additional contexts to consider in these verbs: initial syllables have been shown to independently preserve contrast, the second syllable contains the morpheme boundary that analysis has concentrated on so far, and the third syllable, always being [re], is unimportant.

Nonetheless, (66) shows the same environments as in (59), where the weak palatalisation rule allows contrast. This includes the post-secondary stress syllable, in the case of *-are* verbs, and the stressed, peninitial syllable of irregular *-ére* verbs formed by non-decomposable prefixation of a bound verb stem. Only affricates appear in these environments, including when the following vowel is [e].

(66) Neutralisation of /KI,Tʃi/ in verbs

a. *Onset of the post-stress syllable*

àdʒitáre 'to agitate'
emàntʃipáre 'to emancipate'
kàntʃelláre 'to cancel'

b. *Onset of the stressed syllable*

detʃídere 'to decide'
utʃíðere 'to kill'
etʃéllere 'to excell'

The only exceptions to the strong palatalisation rule for verbs are indeed derived verbs, to which analysis now turns.

4.2 Derived verbs

Derived verbs constitute the last remaining area of the Italian lexicon to be accounted for here. There are two sets of examples to be considered. The first is stem-internal distribution of palatalisation in *-are* verbs, while the second is palatalisation before two relevant derivational

suffixes, *-ire*, as well as *-izzare*. In accounting for these examples, an additional question will be addressed as to whether palatalisation inside the stem of a derived verb (ie. not at the morpheme boundary) should be weak, if the inner morpheme is a noun or an adjective, or whether it should be strong, given that the product of the derivation is a verb. The resulting analysis will introduce a final new, more general principle of derivational correspondence than that applied in verbal inflection, which will apply regardless of stress. Broadly put, derived verbs will be shown to maintain the palatalisation of the nouns they are derived from.

4.2.1 Derived *-are* verbs

The Morph-It corpus (Zanchetta and Baroni 2005) provides the following numbers of *-are* verbs in which palatalisation does not take place inside the verb stem. Excepting six verbs²¹, every form in which [ki] is observed is either derived from a nominal or adjectival base which adheres to the weak palatalisation rule, or else is a prefixed form built on a velar-initial verb²².

(67) Preservation of velars in derived *-are* verbs

<i>Total</i>	<i>CV sequence</i>	<i>Example</i>	<i>Gloss</i>	<i>Base (M.SG)</i>	<i>Gloss</i>
41	[ki]	brùskináre	‘to groom a horse’	bruskíno	brush
37	[ke]	ètikettáre	‘to label’	etikétta	label
5	[gi]	sòggináre	‘to subtly sneer’	gignáre	to sneer
7	[ge]	tràgettáre	‘to target’	tragétto	target

Underpalatalisation here is an effect of a simpler and more general principle of derivational correspondence, of the type proposed in analysis both before and after the introduction of OT (Chomsky and Halle 1968; Kiparsky 1985; McCarthy and Prince 1995; Benua 2000). The derived verbs above are simply maintaining the form of the noun, adjective, or verb that they are built on, which all preserve /kI/ sequences in the contexts considered in section 4.1. The output-to-output constraint required to account for this is therefore not as specific as the one proposed for verbal inflection, it simply requires identity (for stridency), regardless of stress, between the derived verb and a nominal, adjectival, or indeed verbal base.

(68) Base-to-Derivative faithfulness for stridency (applies to derived verbs)

ID(STRIDENT) (BD_v): A segment in a *Derived verb* must match its correspondent in the *Base* for stridency.

²¹ Four exceptions exist among the 41 verbs containing [ki]. There are two forms that dictionaries note as archaic, or loaned from Greek: [aŋkilosáre] - ‘to fuse (of bones)’, and [annihiláre] - ‘to annihilate’. The remaining two verbs are noted as onomatopoeic, which should not exempt them from analysis, but on which I can offer no further comment: [kjàkjeráre] - ‘to chatter’ and [skrikjóláre] - ‘to creak’. Two archaic exceptions are found in the 37 verbs containing [ke], [bùskeráre] - ‘to deceive’ and [tikettáre] - ‘to tick over’. There are no further exceptions among the verbs containing [gi] and [ge].

²² Among the velar-initial verbs, most *also* have a nominal base; of the eight [ki] or [kj]-initial verbs, five are derived, for example [kjódo] - ‘nail’ → [kjódáre] - ‘to nail (something to something else)’. There is only one [ke-] verb, [ketáre], which arguably has the base [kéto], an archaic form meaning ‘quiet’, while all verbs containing [gi] and [ge] have identifiable bases.

The first stage of a complete derivation of a relevant derived *-are* verb is to derive the form of the noun or adjective, or verb, exactly as shown in section 4.1 above. The high ranking of the new BD constraint then correctly derives the preservation of velars before front vowels in the relevant contexts in derivation of a verb. Note that in (69a) one of the categorial constraints will incur a violation, though it is unclear which - the context is either nominal, given the category of the stem, or verbal, given the result of the derivation. In (69b) this issue is not raised because the derivation is verbal throughout, with underpalatalisation in the base a result of initial-syllable faithfulness.

(69) Palatalisation in derived *-are* verbs

a. Noun → *-are* verb derivation: *archívio* ‘archive’ → *archviáre* ‘to archive/file’

/arkivj+áre	ID(STRI) (BD _v)	*KI (V)	kĩ (N/A)	ID(STRI) (IO)	*KI
☞ a. ar.ki.vjá.re		(*)	(*)		*
b. ar.tʃi.vjá.re	*!			*	
Base = ar.ki.vjo					

b. Verb → *-are* verb derivation (*ghignáre* - ‘to sneer’ → *sogghignáre* - ‘to subtly sneer’)

/so+giŋ+áre/	ID(STRI) (BD _v)	*KI (V)	kĩ (N/A)	ID(STRI) (IO)	*KI
☞ a. sog.gi.ŋá.re		*			*
b. sod.dzi.ŋá.re	*!			*	
Base = gi.ŋá.re					

With this, the stem-internal distribution of palatalisation is now fully accounted for. The final case to consider is alternation at the morpheme boundary found in verbs derived with front-vowel initial suffixes.

4.2.2 Derived *-ire* and *-izzare* verbs

Underpalatalisation in derived *-ire* verbs, which has been mentioned several times above, can now be presented. One additional suffix²³, *-izzare*, is also relevant, and will be analysed alongside *-ire*. Verbs that are created by these suffixes tend to have a similar meaning, along the lines of ‘to make like *x*’ where *x* is the nominal or adjectival root²⁴.

²³ The similar suffix, *-ificare*, would be relevant, but its use is restricted in comparison to the other suffixes. Only two relevant forms are found in corpus searches: [patʃifikáre] - ‘to pacify’ and [kaltʃifikáre] - ‘to calcify’, from [pátʃe] - ‘peace’, and [káltʃe] - ‘lime’, both of which are built on bases with underlying affricates. Save the reason why this particular suffix attaches exclusively to nouns or adjectives that do not raise the issue of palatalisation, these forms do not provide any additional insight on palatalisation, and I make no further reference to them.

²⁴ Suffixes *-izzare* and *-ificare* correspond to the English suffixes ‘-ise/-ize’ and ‘-ify’. Verbs derived by *-ire* can be quite figurative, as seen in, for example, [zgraŋkíre] from [gráŋkjo] - ‘crab’. The verb means to stretch in a particular way, with the elbows pointed and arms bent back, supposedly giving the stretcher the appearance of a crab. Their use can also be quite particular - the first dictionary entry for *bianchire* lists it as a technical term meaning specifically ‘to bleach’. Nonetheless, the meanings of these derived verbs are adequately transparent, I suggest, for speakers to be aware of their derived status.

Derivational *-ire* simply never causes palatalisation. Corpus searches produce 45 relevant forms, all of which have a nominal or adjectival base, and none of which palatalise. A selection are given below, alongside the M.SG form of the adjective or noun taken to be their base.

(70)	<i>Infinitive</i>	<i>Gloss</i>	<i>Base (M.SG)</i>	<i>Gloss</i>
	bjaŋkíre	‘to pale’	bjáŋko	‘white’
	rimboskíre	‘to reforest’	bósko	‘forest’
	impràtikíre	‘to train’	prátiko	‘practice’
	inselvàtikíre	‘to release into the wild’	selvátiko	‘wild’

However, *-izzare* shows alternation. The suffix is slightly more productive, with corpus searches returning 63 forms. Palatalisation in this case correlates with the plural form of the nominal or adjectival base, though in subsequent discussion this will not be taken as a base:

(71)	<i>Infinitive</i>	<i>Gloss</i>	<i>Base (M.PL)</i>	<i>Gloss</i>
	típitfizzáre	‘to make typical’	típitfi	‘typical’
	liritfizzáre	‘to lyricise’	liritfi	‘lyrical’
	antikizzáre	‘to make antique’	antíki	‘antique’
	tedèskizzáre	‘to make German’	tedéski	‘German’

An analysis of palatalisation in *-izzare* verbs in the spirit of derived *-are* verbs is conceivable, but this will raise a question about base selection which can only be given a stipulative answer: *-ire* verbs would be faithful to a singular base form, while *-izzare* verbs would be faithful to a plural base form. A simpler alternative is to apply the weak palatalisation rule before this suffix (ie. in the same environment as the plural accounted for by Giavazzi), on the grounds that morpheme boundary in question is between the stem and the additional suffix *-izz*, rather than the verbal infinitive suffix *-are*. As such, the effect of the newly introduced general BD constraint is mooted: correspondence to a (masculine singular) base does not apply here because the context in question is not internal to a verbal stem: [típitfizz-] should be considered nominal until the morpheme boundary before the infinitive suffix *-are*²⁵. Unlike *-ire*, *izzare* does not shift stress, but causes the main stress of its base to receive secondary stress (main stress will always fall on the theme-vowel syllable). This accounts for the alternation of palatalisation, in line with that in the nominal domains. Palatalisation before *-izzare* verbs is then effectively derived under Giavazzi’s analysis.

(72) Preservation of contrast before *-izzare*:

a. Context is internal to nominal morphology, palatalisation occurs far from stress

/lírik+izz+áre/	*KI (V)	*kĩ (N/A)	ID(STRI) (IO)	*KI
a. lì.ri.kiz.zá.re		*!		*
b. lì.ri.tfíz.zá.re			*	

²⁵ This determines the palatalisation constraint in effect in (69a) to in fact be *kĩ (N/A).

b. Context is internal to nominal morphology, /ki/ is preserved in a post-stress syllable

/antik+izz+are/	*KI (V)	kĩ (N/A)	ID(STRI) (IO)	*KI
☞ a. an.ti.kiz.zá.re				*
b. an.ti.tʃiz.zá.re			*!	

Derivation of the final set of *-ire* verbs would be possible under either the strong or weak palatalisation rules. The weak palatalisation rule, claimed to derive palatalisation in nouns, adjectives, and also *-izzare* verbs, would block palatalisation as the suffix's theme vowel will always be stressed, thus providing a context where a stem-final velar can be preserved. Equally, the strong palatalisation rule claimed to apply to verbs could apply, but be blocked by correspondence with a base, as with derived *-are* verbs. Given that, unlike *-izzare*, the environment in question here is the boundary directly between the stem and infinitive suffix, I analyse the lack of palatalisation before the derivational *-ire* suffix as correspondence with a base, as with derived *-are* verbs, which here blocks the application of the strong palatalisation rule:

(73) Blocking of palatalisation before derivational *-ire*

a. Adj → *-ire* verb (*biánco* - 'white' → *bianchíre* - 'to pale/bleach' | cf. M.PL [bjánkɪ])

/bjank+íre/	ID(STRI) (BD _v)	*Kĩ (V)	ID(STRI) (IO)	*KI
☞ a. bjan.kí.re		*		*
b. bjan.tʃí.re	*!		*	
Base = M.SG: bián.ko				

b. Adj → *-ire* verb (*selvático* - 'wild' → *selvatichíre* - 'to set free' | cf. M.PL [selvátitʃi])

/selvatik+íre/	ID(STRI) (BD _v)	*Kĩ (V)	ID(STRI) (IO)	*KI
☞ a. sel.va.ti.kí.re		*		*
b. sel.va.ti.tʃí.re	*!		*	
Base = M.SG: sel.vá.ti.ko				

To summarise this section, I have argued that two similar but distinct constraints are responsible for deriving the different applications of palatalisation across the Italian lexicon. These constraints apply systematically to nouns and adjectives in one case, and to verbs in the other. The first constraint, applying to the nominal domain, was adapted from Giavazzi (2012) and termed weak palatalisation. The constraint only had effect far from stress, and before the frontmost vowel [i]. This allowed preservation of /ki/ sequences within and immediately after stressed (and secondarily stressed) syllables. In the second case, the verbal domain was subject to a more powerful rule which could cause palatalisation before any front vowel, and regardless of stress, but this rule could be blocked by correspondence to a base form.

5 Conclusion

To review the arguments made in this paper, the first part of the study presented a novel account of the application of palatalisation in Italian verbal morphology. Stress-dependent paradigm correspondence was introduced as a means of conditioning varying patterns of palatalisation in the language's verb families. Normal application only takes place in the irregular class of *-ĕre* verbs which, in not stressing their suffix, do not engage correspondence. Underpalatalisation occurs in *-are* verbs as the infinitive suffix causes a stem-final [-STRIDENT] segment to receive stress, which must then be maintained in the rest of the paradigm. Similarly, overpalatalisation occurs in regular *-ĕre* verbs as their infinitives stress a [+STRIDENT] segment. Cases where palatalisation did not straightforwardly follow this account, such as before glides and in irregular verbs, were accounted for by the adoption of a small number of additional but principled conditions, based on established phonological theory. The study then began to develop a fuller view of the distribution of palatalisation across the Italian lexicon. Neutralisation was shown to be prevented in a number of cases: within and following stressed syllables in the nominal domain, and via correspondence with a base in the verbal domain, as well as in initial syllables. There ultimately remain only a few contexts for neutralisation: in the nominal domain, palatalisation takes place in the second syllable of a lapse Giavazzi (2012), and in the verbal domain only in underived infinitive forms, though these in turn can give rise to misapplication in inflection.

Although this study is restricted to the Italian language, the different systems of stress-dependent palatalisation considered constitute a broad empirical domain. With an understanding of most all areas of the Italian lexicon, accounted for with a modest number of well-grounded constraints, indexed by category rather than idiosyncratic lexical class, it should be evident that there are ample synchronic phonological and morphological cues available to the contemporary speaker attempting to derive the seemingly irregular application of palatalisation in the Italian language.

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